North East Wales Area Based Transport Study – WelTAG Stage 1 Assessment



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Foreword

The National Transport Plan (NTP) published in March 2010 contained a commitment to "*Consider the potential contribution of all modes to identify the most appropriate package of potential proposals to the transport issues in the area between Wrexham, Chester and Deeside* (NTP Ref 95)*".* The Prioritised NTP announced in December 2011 includes this as an ongoing commitment.

This commitment has been taken forward through the Welsh Transport Planning and Appraisal Guidance (WelTAG) process. WelTAG is an assessment tool that clearly identifies the benefits, costs and impacts of strategies and schemes and their contribution to the core transport objectives. WelTAG is required for all schemes that require funding or approval from the Welsh Government. A WelTAG Stage 1 appraisal is required for transport strategies

A WelTAG Stage 1 study - the North East Wales Area Based Transport Study (NEWABTS) - was commissioned jointly by Welsh Government and Taith the North Wales Regional Transport Consortium to address the NTP commitment. The study develops a strategy to deal with transport issues in the area between Deeside, Wrexham and Chester, considering all modes. This includes a delivery plan with measures that could be delivered in the short, medium and longer term. The packages of measures have been developed to deliver best value for money through focusing on lower cost interventions first by managing demand for travel and making best use of existing facilities and services before considering capacity enhancements. Measures in the delivery plan will require further development including design and the consideration of affordability and deliverability.

Introduction

1 Introduction

1.1 Study Overview

The Welsh Government (WG) and the regional transport consortium for North Wales, TAITH, have commissioned AECOM to undertake a transport study in the North East Wales area, focusing on the connectivity between the key settlements of Wrexham, Chester and Deeside. This study will follow the principles of the Welsh Transport Planning and Appraisal Guidance (WelTAG) to identify a strategy for improving transport provision in the area considering all modes of transport.

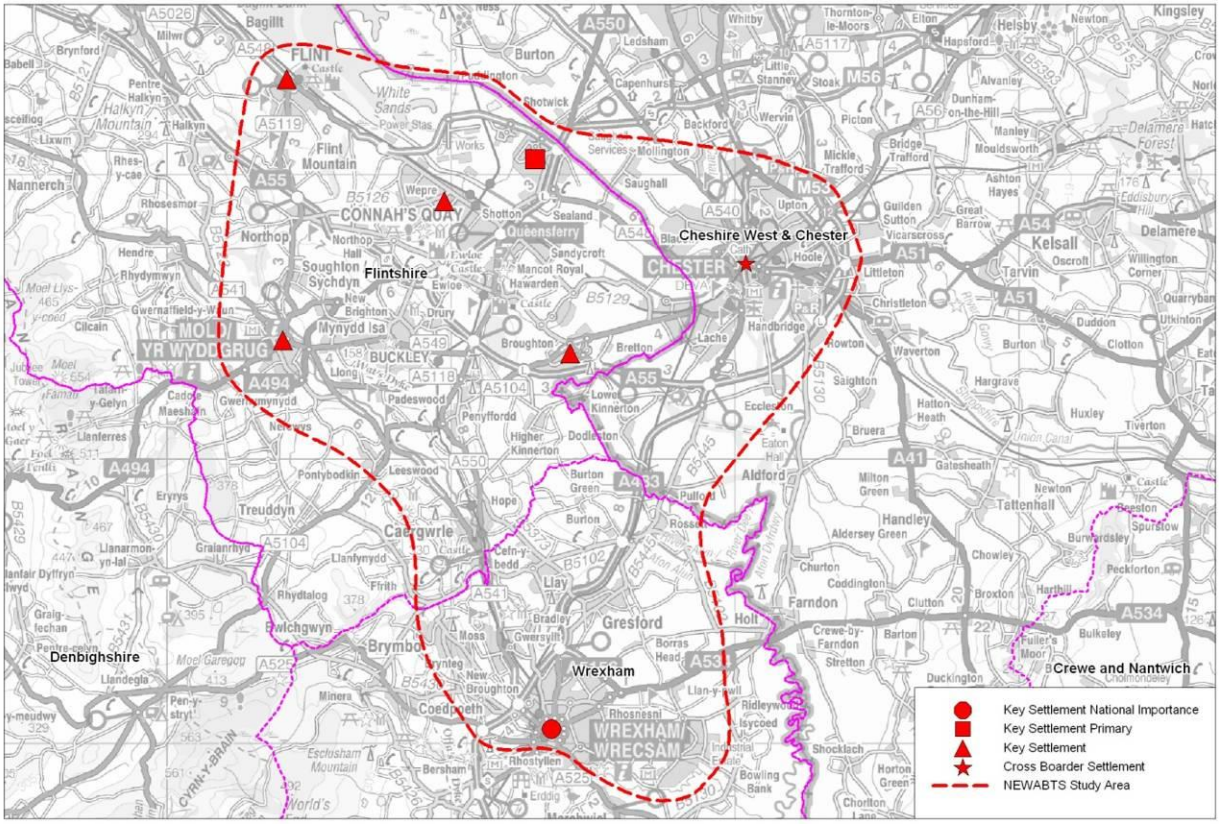
The Welsh Government and Taith commissioned the study following the announcement in the National Transport Plan outlining the following aim and commitment specifically related to transport issues in North East Wales:

Aim: "To continue to develop the most appropriate, and sustainable, solutions to transport issues in north-east Wales"

We will: "Consider the potential contribution of all modes to identify the most appropriate package of potential proposals to the transport issues in the area between Wrexham, Chester and Deeside"

The area of interest for this study is shown on Figure 1.1, which also indicates the key settlements in the area as identified in the Wales Spatial Plan. Although the study will concentrate on resolving problems within the area defined, it is acknowledged that potential solutions could extend outside of the immediate study area. The study area boundary has been drawn to recognise that transport issues and potential solutions do not stop at the border with England. The focus for this study is connectivity in relation to trips to / from and within Wales. It needs to be appreciated however that core sections of the strategic road and rail network between Wrexham and North East Wales are located within England, where different agencies are responsible for maintaining and enhancing the network and who may have different strategic priorities.

Figure 1.1: The NEWABTS Study Area



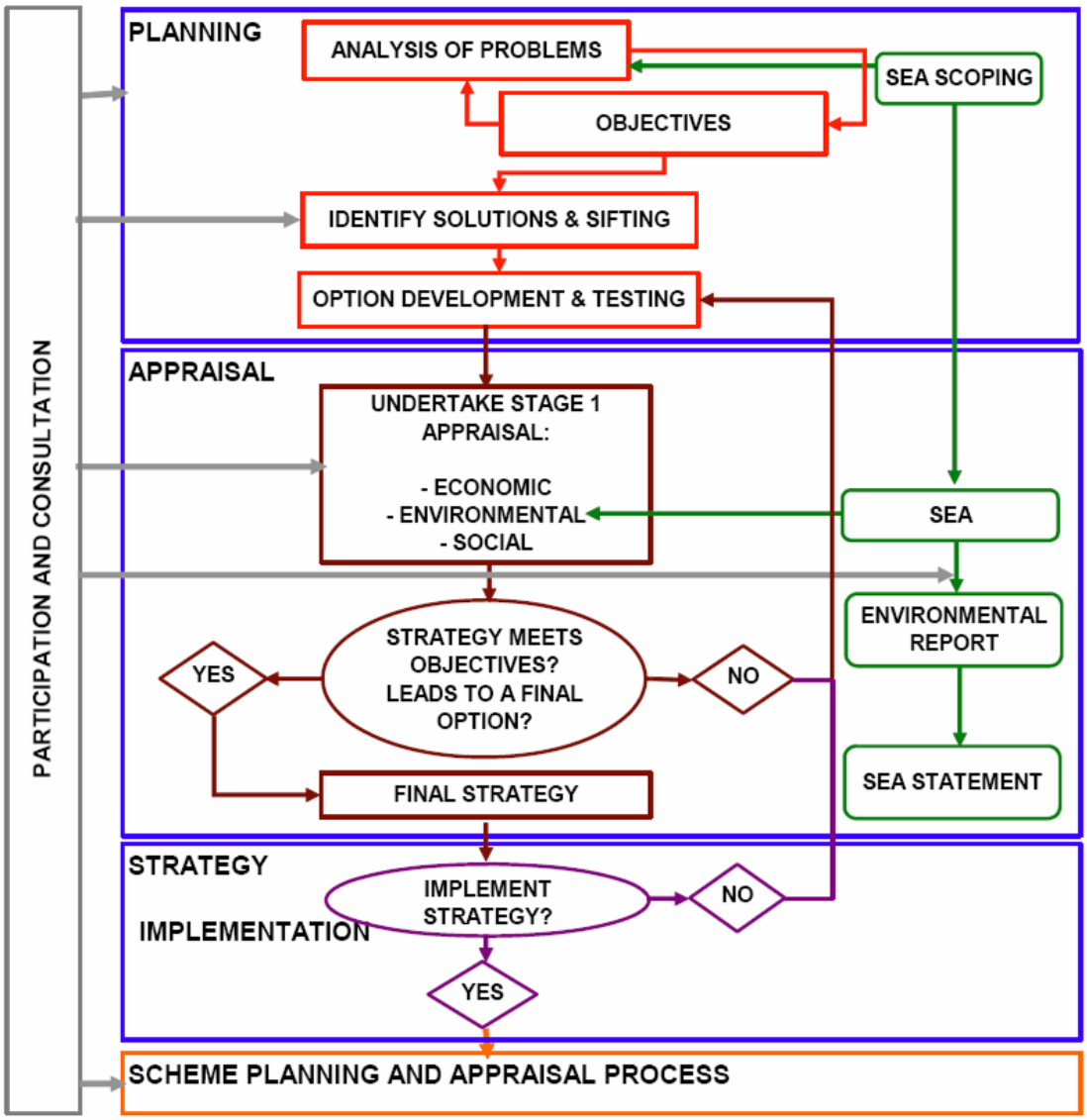
1.2 Objective of this report

"WelTAG is the Welsh Transport Planning Appraisal Guidance. It has been developed by the Welsh Government with the intention that it is applied to all transport strategies, plans and schemes being promoted or requiring funding from the Welsh Government." (source: Welsh Transport Planning and Appraisal Guidance, 2008)

Figure 1.2 below outlines the WelTAG process at the strategic level. This report contains the secondary element of the WelTAG assessment process for the North East Wales Area Based Transport Study; the Stage 1 Appraisal report. This takes the options identified by the planning stage as meriting further investigation and assesses them against the Welsh Impact Areas of economic, environmental and social concerns. The options are also assessed against the Transport Planning Objectives (TPOs) for the study which have been identified through the planning stage process.

The primary output from this report is a recommended delivery plan for how to take forward the identified overall strategy.

Figure 1.2: The Structure of WelTAG at the Strategic level (source: Welsh Transport Planning and Appraisal Guidance, 2008)



1.3 Report Structure

The report is structured as follows:

- Section 2 outlines the outcomes from the Planning Stage of this study.
- Section 3 discusses the WelTAG Stage 1 process and the methodology used to establish packages for assessment as part of this stage of work.
- Section 4 describes and outlines the elements contained within each of the packages.
- Section 5 discusses the stakeholder consultation exercise that forms an integral part of this stage of work.
- Section 6 provides the appraisal of each individual package of options.
- Section 7 establishes a strategy delivery plan.
- Section 8 concludes the study.

In addition to this main report, which summarises all of the elements of the appraisal there are the following appendices, which provide more detail behind the various aspects of the assessment:

- Appendix A: Stakeholder Consultation Report
- Appendix B: Economic Activity and Location Impacts (EALI) Report
- Appendix C: Environment Report
- Appendix D: Habitat Regulations Assessment (HRA)
- Appendix E: Strategic Environmental Assessment (SEA) – Non-technical Summary
- Appendix F: Strategic Environmental Assessment (SEA) – Report
- Appendix G: Health Impact Assessment (HIA)
- Appendix H: Equalities Impact Assessment

Outcomes from the Planning Stage

2 Outcomes from the Planning Stage

The Planning Stage of this project sought to identify the key problems and opportunities in the study area, identify a series of objectives for the study and a long list of possible options which could help to achieve these objectives. This process was undertaken through review of existing data sources, previous studies and reports as well as consultation with key stakeholders. Through this process the below Transport Planning Objectives were identified for the study going forward.

These objectives are an important part of the study because they identify the local priorities for the study and will be used alongside the Welsh Impact Areas of Economy, Environment and Society to ensure that the identified strategy meets the needs of Wales and the local area.

Table 2.1: Proposed Transport Planning Objectives

Business Transport Connections	*TPO*	*To improve transport connections for businesses within the study area to key economic centres and employment sites.*
	Justification	• Significant number of employment sites and freight generators within the study area who need to utilise the transport network to access markets. • Economic connectivity analysis highlights the importance of transport links to Northern England for businesses within the study area. • North West Wales exhibits strong economic connectivity with Northern England and requires access through the study area to reach these markets. • Congestion, real or perceived is seen as a problem and is exacerbated by network pinch points, lack of alternative routes and seasonal traffic flows.
Travel to Work	*TPO*	*To improve access between employment sites and workforce catchment areas.*
	Justification	• Travel to work analysis indicates a significant proportion of the employees within the study area live outside of the study area. • Significant volume of employment opportunities within the study area but often located outside of densely populated areas. • 23% of households do not have access to a car.
National & Regional Trips	*TPO*	*To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.*
	Justification	• A55, A494 & A483 form key parts of the strategic road network facilitating access to North West Wales, Ireland and England. • Strategic road and rail network provides access to North West Wales • Congestion is affecting strategic function of the trunk road • Key objectives in the Wales Transport Strategy and North Wales Regional Transport Plan. • To facilitate trips relating to Tourism and Leisure within the study area.
Safety and Security	*TPO*	*To improve the actual and perceived safety and personal security of all transport users in the study area.*
	Justification	• Safety of road users and maintenance workers was raised during the stakeholder consultation event. • Key objectives in the Wales Transport Strategy and North Wales Regional Transport Plan. • Significant numbers of foreign HGV hauliers operating within the study area. • Sections of the road network and key junctions exhibit higher accident rates. • Perceived safety problems at some complex road layouts where the merge and diverge is sub-standard.
Social Deprivation	*TPO*	*To reduce social deprivation through improved access to jobs and other key services.*

	Justification	• Analysis of Index of Multiple Deprivation has shown isolated areas of deprivation across the study area. • 23% of households do not have access to a car and are therefore reliant on PT, walking and cycling. • Key employment sites outside of key residential areas. • Lack of high frequency public transport to certain key employment sites.
Efficient Use	*TPO*	*To maintain and make more efficient use of the existing transport infrastructure in the study area.*
	Justification	• This was raised a key issue during the stakeholder consultation event. • The study area has three existing rail corridors, which could be used more efficiently. • Making best use of existing infrastructure may provide lower cost alternatives with lower environmental impact.
Carbon Emissions	*TPO*	*To reduce carbon emissions from transport in the study area.*
	Justification	• Flintshire is the 5th highest CO2 emitter from transport sources of Welsh counties. • Key objectives in the Wales Transport Strategy and North Wales Regional Transport Plan.
Natural Environment	*TPO*	*To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.*
	Justification	• There are a large number of International and European designated sites within and adjacent to the study area • Key objectives in the Wales Transport Strategy and North Wales Regional Transport Plan.
Human Environment	*TPO*	*To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.*
	Justification	• Key objectives in the Wales Transport Strategy and North Wales Regional Transport Plan.

As well as identifying suitable Transport Planning Objectives for the study a long list of possible solutions was identified, some suggested by consultees, others coming from previous studies and some identified by AECOM. Over 100 possible options were identified covering various modes of travel and forms of demand management. These options were assessed qualitatively against the Transport Planning Objectives to identify measures which did not succeed at meeting the study objectives; these options were then discounted. Some 18 options were discounted at the planning stage. The remaining options will be assessed in more detail as part of the WelTAG Stage 1 process, with the options being assessed as part of packages. The process used to package up the options and the contents of the various packages will be discussed in the next two sections of the report.

The WelTAG Stage 1 Assessment Process

3 The Stage 1 Assessment Process

This WelTAG Stage 1 report assesses the identified packages of options against a set of largely qualitative assessment criteria (prescribed in the Welsh Government WelTAG guidance) which will then be used to establish a strategy delivery plan.

The assessment criteria used to assess each option are based upon the agreed Transport Planning Objectives (TPOs) of the study, the Welsh Impact Areas (Economy, Environment and Society) and a number of other deliverability and feasibility criteria. Please refer to the Welsh Transport Planning and Appraisal Guidance for additional information on this process.

Table 3.1 below outlines the various headings under which the assessment is undertaken:

Table 3.1: The Economic, Environmental and Social Criteria used in the WelTAG Stage 1 appraisal process.

Economy
- Transport Economic Efficiency (TEE)
- Economic Activity and Location Impacts (EALI)
Environment
- Noise
- Local air quality
- Greenhouse gas emissions
- Landscape and townscape
- Bio-diversity
- Heritage
- Water environment
- Soils
Social
- Transport safety
- Personal security
- Permeability (non-motorised access)
- Physical fitness
- Social inclusion
- Equality, diversity & human rights
Public acceptability
Acceptability to other stakeholders
Technical and operational feasibility
Financial affordability and deliverability
Risks

3.1 Packaging Methodology

Rather than assessing each of the individual options, of which there are over 100, an approach has been identified to allow the options to form mutually supportive packages. The packages have been produced by initially dividing the successful options identified at the WelTAG Planning Stage into three distinct levels described below:

1. Managing Demand: options which aim to reduce the demand for travel.

2. Making Best Use: options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

3. Capacity Enhancements: options involving the provision of new infrastructure.

To ensure that suitable solutions are identified for each of the key movements in and through the study area, packages have been derived for each of the main corridors within the study area as shown on Figure 3.1.

The identified corridors are:

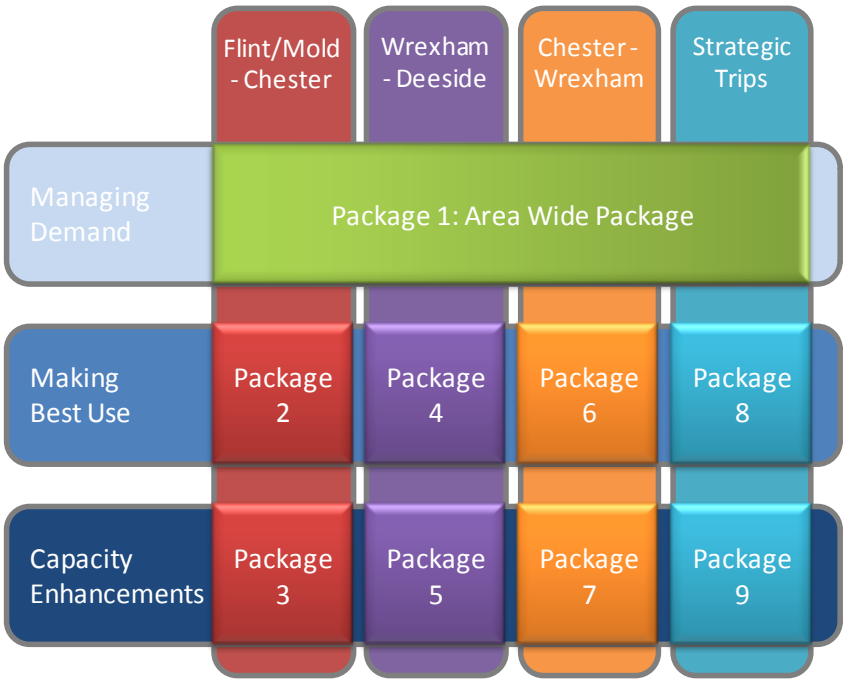
- Strategic Trips (trips through the study area from North West Wales, the North of England and the Midlands).
- Flint / Mold – Chester (via Deeside / Broughton).
- Wrexham – Deeside (via Mold / Buckley).
- Chester – Wrexham.

Figure 3.1: Study Corridors



Figure 3.2 therefore shows the various packages that have been identified for assessment at WelTAG Stage 1.

Figure 3.2: Packages identified for assessment



The next section of the report will indicate the options which form part of each of these packages, with the packages then assessed in section six of the report.

The Packages

4 The Packages

The following packages have been identified for assessment as part of the WelTAG Stage 1 assessment process. These packages have been derived from the options identified by stakeholders, previous studies and AECOM during the WelTAG planning stage. The options have been combined into packages using the packaging methodology discussed in the last section, with efforts made to ensure effective synergies between the package elements and to avoid duplication.

4.1 Package 1: Managing Demand (Area Wide Package)

The package contains options which aim to reduce the demand for travel.

Overview
This package contains a set of "soft" options applied throughout the study area aimed at reducing the use of unsustainable transport modes by changing peoples' travel behaviour. This involves funding and support to aid businesses in encouraging sustainable travel, publicity and awareness raising, and strengthening of policies.

Table 4.1 shows the elements which comprise this package.

Table 4.1: Package 1 (Managing Demand) - Area wide package – Applies to all corridors

Theme	Option Name	Option Description	Reference
Walking and Cycling	Funds for businesses to invest in walking and cycling facilities	Provide grant funding which businesses in the study area can bid for to use on walking and cycling facilities.	29
	Encourage employers to increase cycling within its work force	Provide support to employers to help encourage walking and cycling to work.	30
	Develop a local publicity campaign to promote walking and cycling	Coordinated local publicity campaign to increase awareness of the benefits of walking and cycling and current facilities and support that is available.	31
Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	The traditional way of moving a large proportion of goods is by lorry. Many companies are not even aware of a possible alternative to this and there is an opportunity for TAITH to work with industry in an awareness campaign.	75
	Freight Exchange	There are a number of internet based freight exchanges but the membership of these by hauliers is still relatively low. This could be enhanced through an independent awareness campaign.	78
Other	Ensure that future developments mitigate any adverse impacts on the transport network	This would be a policy stance whereby the agencies in the study area who consider development control ensure that future developments mitigate the adverse impacts on the transport network that they are anticipated to cause.	88
	Improve linkages between economic development plans and transportation plans.	Ensuring that economic development plans and transport plans are written in a coordinated manner so that they do not cause unintended consequences for each other.	90
Demand Management	Promoting car clubs and car sharing	Providing financial and other forms of support to help groups with the development of car clubs and car sharing schemes in the study area.	93
	Workplace Travel Planning	Work with employers at key employment centres in the study area to reduce car travel to work and promote alternative modes.	96
	Parking management strategy	Devise a study area wide parking management strategy to reduce demand for car travel during peak periods and incentivise travel by alternative means.	97

Corridor: Flint / Mold - Chester (via Deeside / Broughton)

This is the transport corridor between Flint / Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

4.2 Package 2: Making Best Use (Flint/Mold – Chester)

This package contains options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

Overview

This package contains a set of options which seek to make more efficient use of existing transport facilities and infrastructure along the corridor between Flint, Mold and Chester (via Deeside or Broughton).

The walking and cycling elements of the package aim to improve safety, security and integration of walking and cycling as well as improved signage.

Bus improvements focus on giving buses priority over general traffic at key junctions and links, such as along the B5129 (Ref 44). Also improving integration with rail and using integrated area ticketing and real time passenger information to improve the experience for bus users.

The rail elements of this package focus on improving access to stations and integration with bus services, particularly in Shotton (Ref 106).

Finally the highway elements focus on bottlenecks along the existing corridor roads, including the A5104 between Mold and Chester (Ref 103), the B4129 through Connah's Quay (Ref 9) and the Alltami signals (Ref 8).

Table 4.2 shows the elements which comprise this package; these are also shown in map form in Figure 4.1.

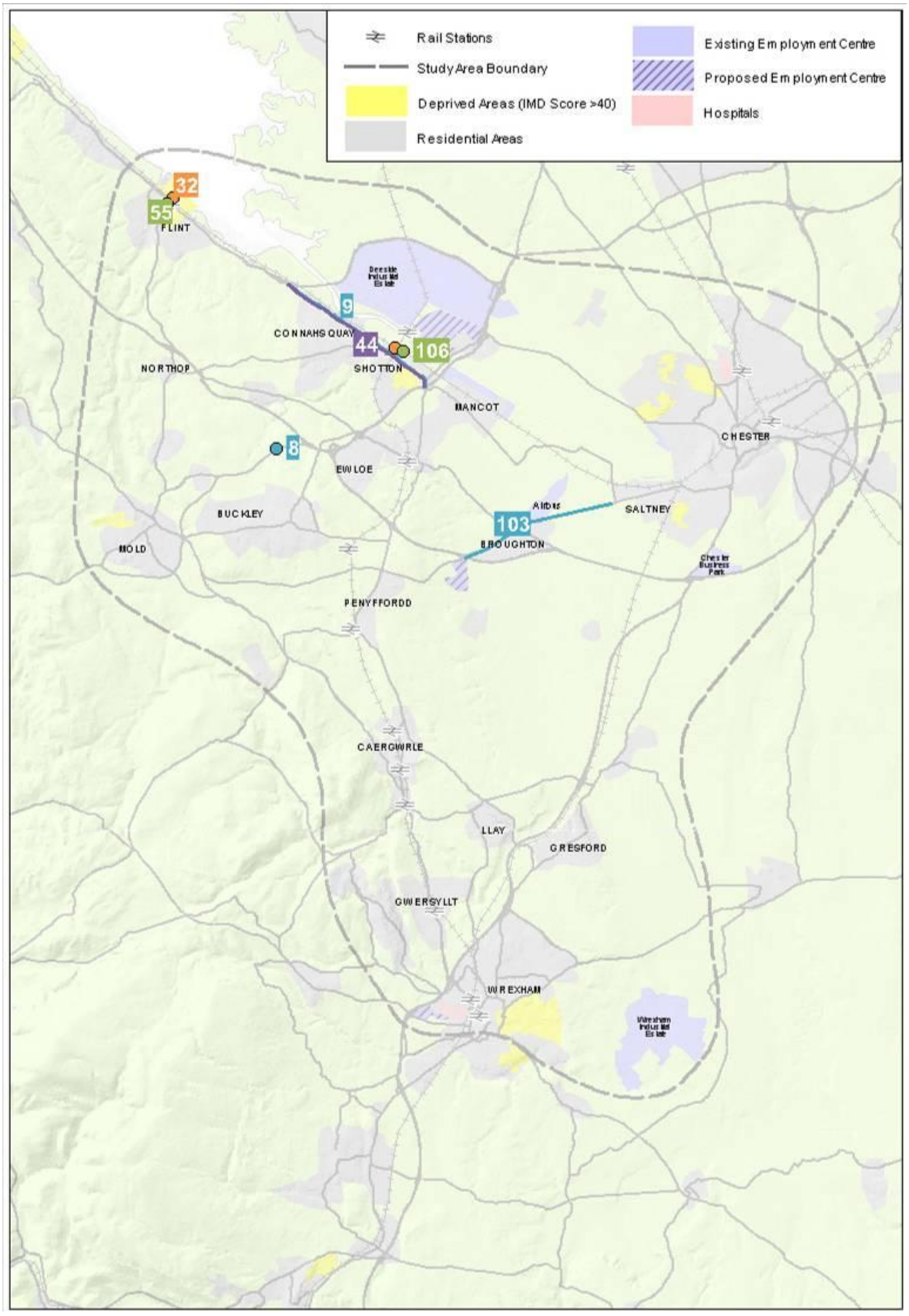
Table 4.2: Package 2 (Making Best Use) – Flint / Mold-Chester

Theme	Option Name	Option Description	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of options to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority options along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry.	Provide bus priority options along the B5129 to allow buses to avoid traffic congestion when travelling through the Connah's Quay/Shotton area and improve service reliability.	44
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101

Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	55
	Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments.	106
Highway	Improvements to Alltami Signals	Improve the traffic signal arrangements at Alltami to reduce delays at this location.	8
	Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay	Identify a series of minor on-line highway improvements which can reduce the congestion problems currently experienced along the B5129 between Connah's Quay and Queensferry.	9
	Minor on-line improvements between Broughton and Saltney	Identify a series of highway options which improve safety and relieve pinch points on the A5104	103

Options that have been shaded in grey in the above Table are not location specific, and have not therefore been mapped.

Figure 4.1: Package 2 (Making Best Use) – Flint / Mold-Chester



4.3 Package 3: Capacity Enhancements (Flint/Mold – Chester)

This package contains options involving the provision of new infrastructure and significant service enhancements.

Overview

This package includes a number of major capacity enhancements across all transport modes which seek to improve connections between Flint, Mold and Chester (via Deeside or Broughton).

For walkers and cyclists this package offers new links between Mold and Saltney and along the Flintshire coast as well as connections to key employment sites and public transport interchanges.

Improvements to bus include a new cross Dee link between Holywell, Flint and Chester as well as bus routes between rail stations and employers along the corridor.

Rail users along this corridor will gain from new and improved services as well as new stations at Queensferry and Deeside Park. Major rail infrastructure will be required to deliver the proposed service improvements.

A Park and car share or Park and Ride element is also included, helping to reduce levels of single occupancy car use.

The two key employment sites along this corridor at Deeside Industrial Park and Broughton will gain from improved road connections to reduce the traffic issues experienced at these locations.

Table 4.3 shows the elements which comprise this package; these are also shown in map form in Figure 4.2.

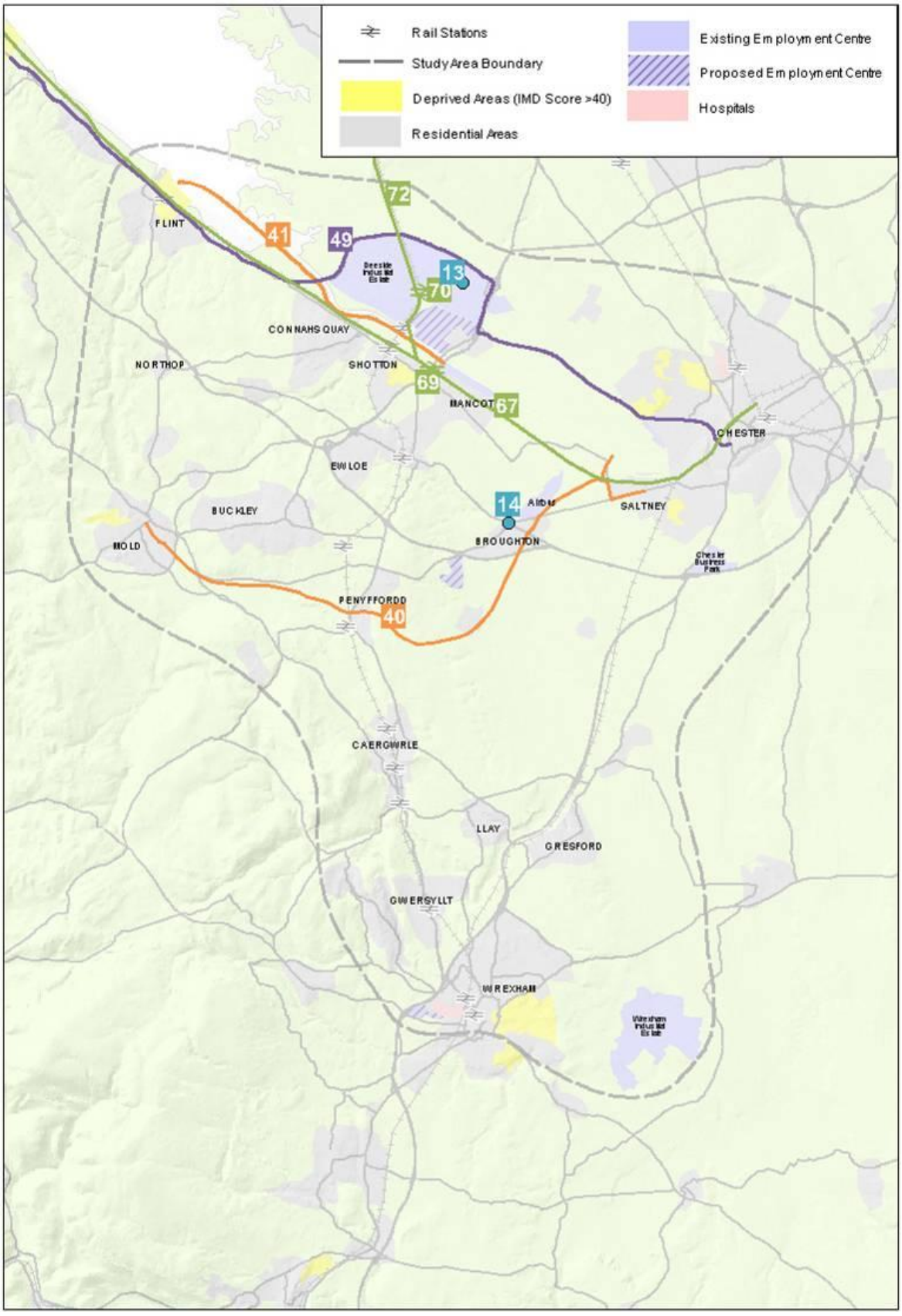
Table 4.3: Package 3 (Capacity Enhancements) – Flint / Mold-Chester

Theme	Option Name	Option Description	Reference
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing National Cycle Route 5 to provide a link from Chester to Denbigh and Wrexham.	39
	Mold to Saltney cycle way	A new walking and cycling link between Mold and Saltney with associated connections to key destinations along the route utilising a former railway alignment.	40
	Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities, and major employers.	41
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
Bus	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	49
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
Rail	Rhyl-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester-Crewe shuttle). Requires new turnback facility at Rhyl.	67
	New station at Queensferry on the North Wales Main Line	New stations have been assessed as part of the NWRS study for Taith.	69
	New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.	70
	New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton	72

Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	Improve road connections to Deeside Industrial Park	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Park.	13
	Improve road connections to the Broughton area	Identify a series of highway improvements which can improve the ease of accessing key traffic generators in the Broughton area.	14

Options that have been shaded in grey in the above Table are not location specific, and have not therefore been mapped.

Figure 4.2: Package 3 (Capacity Enhancements) – Flint / Mold-Chester



Corridor: Wrexham – Deeside (via Mold / Buckley)

This is the transport corridor between Wrexham and Deeside, via Mold and Buckley.

4.4 Package 4: Making Best Use (Wrexham – Deeside)

This package contains options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

Overview
This package contains a set of options which seek to make more efficient use of existing transport facilities and infrastructure along the corridor between Wrexham and Deeside (via Mold or Buckley).

The walking and cycling elements of the package seek to improve the safety, security and integration of existing infrastructure along this corridor, with additional signage of the opportunities available.

The bus elements of the package focus on giving buses priority over general traffic at key junctions and links to improve reliability. Also improving integration with rail and using integrated area ticketing and real time passenger information to improve the experience of travelling by bus along this corridor.

The rail elements of the package focus on the accessibility of the stations along the corridor for non motorised modes and improved integration with rail at Shotton Station (Ref 106).

The highway elements of the package look to rationalise the route choices between the A55 and Wrexham whilst overcoming key pinch-points along this corridor, such as the Hope/Caergwrle area (Ref 7.)

Table 4.4 shows the elements which comprise this package; these are also shown in map form in Figure 4.3.

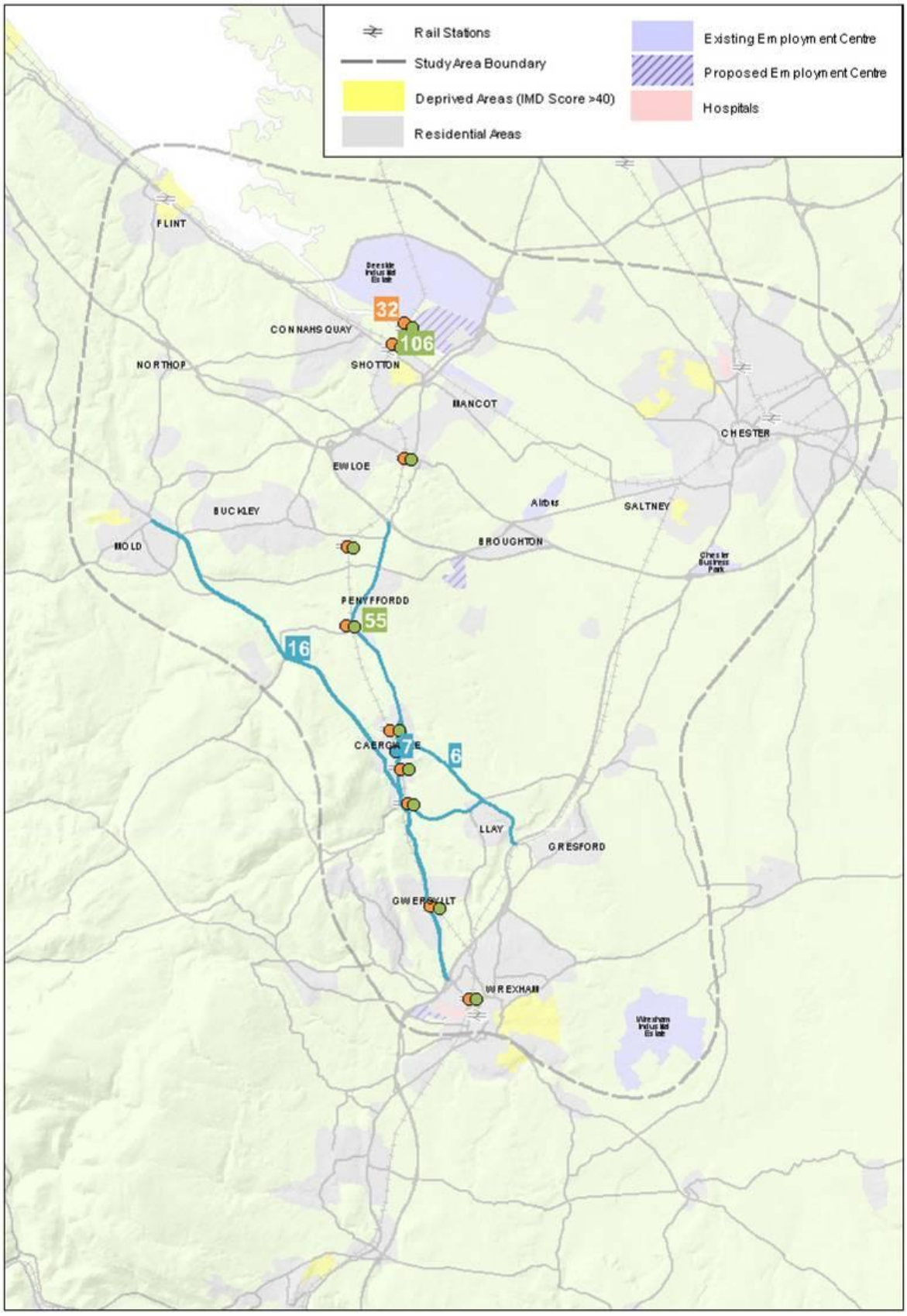
Table 4.4: Package 4 (Making Best Use) – Wrexham-Deeside

Theme	Option Name	Option Description	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of options to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority options along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus ‘travelcard’ to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	55

	Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments.	106
Highway	Consider a signage strategy for traffic travelling between the A55 and Wrexham	Look into options for improving the signage of traffic travelling between the A55 and Wrexham.	4
	Make better use of A541 / A550 route between the A55 and Wrexham	A series of minor improvements to the A541/A550 route addressing pinch-points along this route to improve the overall capacity of this route.	6
	Overcome pinch points in the Hope/Caergwrle area	A series of minor improvements to address the pinch-point that occurs in the Hope/Caergwrle area.	7
	Improvements on the A541 between Mold and Wrexham	Identify a series of highway options which can improve the safety and route consistency of the A541 between Mold and Wrexham.	16

Options that have been shaded in grey in the above Table are not location specific and have not therefore been mapped.

Figure 4.3: Package 4 (Making Best Use) – Wrexham-Deeside



4.5 Package 5: Capacity Enhancements (Wrexham – Deeside)

This package contains options involving the provision of new infrastructure and significant service enhancements.

Overview

This package includes a number of major capacity enhancements across all transport modes which seek to improve connections between Wrexham and Deeside (via Mold or Buckley).

The walking and cycling elements of the package seek to connect the communities along this corridor into key transport interchanges and employers, whilst also providing an off road link between Mold and the Deeside area.

The bus elements of the package include a multi-modal hub for Wrexham, improved cross Dee bus route between Mold and Ellesmere Port and improved bus links from stations to employment sites.

The rail elements of the package include service frequency enhancements along the Borderlands line, with a new station at Deeside Park, improved station parking and a new service connecting the Borderlands line into Chester. The service improvements described will require significant new rail infrastructure.

As with previous corridors a Park and car share or Park and Ride element is also including helping to reduce levels of single occupancy car use.

From a highway perspective the package aims to improve road connections into Deeside Park, with a new local road bridge connecting Connah's Quay to Deeside Park.

Table 4.5 shows the elements which comprise this package; these are also shown in map form in Figure 4.4.

Table 4.5: Package 5 (Capacity Enhancements) – Wrexham-Deeside

Theme	Option Name	Option Description	Reference
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
	Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside	104
Bus	Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxibuses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.	47
	Improved cross Dee bus route between Mold and Ellesmere Port	Connecting key employment locations. Improve the existing 111 service so that it operates twice per hour and is supported with highway infrastructure and traffic management improvements to improve punctuality.	50
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	Doubling of service frequency between Wrexham and Bidston (with potential extension into Birkenhead North)	56
	Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool	To extend Borderlands service into Liverpool requires either electrification (whole route or partial to Shotton) or dual-mode vehicle technology. Associated benefits combined with stopping more NWML services at Shotton low level.	58
	Increase parking provision at stations along the Wrexham - Bidston line (e.g. Penyffordd) to promote park and ride.	Additional parking provision at key stations along the Wrexham – Bidston line to encourage park and ride.	59
	New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.	70
	New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton	72

Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	Improve road connections to Deeside Industrial Park	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Park.	13
	New road bridge between Connah's Quay and Deeside Park	A new local road bridge connecting the B5129 at Connah's Quay with Deeside Park to reduce pressure on the existing crossing points.	23
Freight	Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.	84

Options that have been shaded in grey in the above table are not location specific, and have not therefore been mapped. Options shown in red are long term variants of other options; discussed below.

Longer-term Rail Options

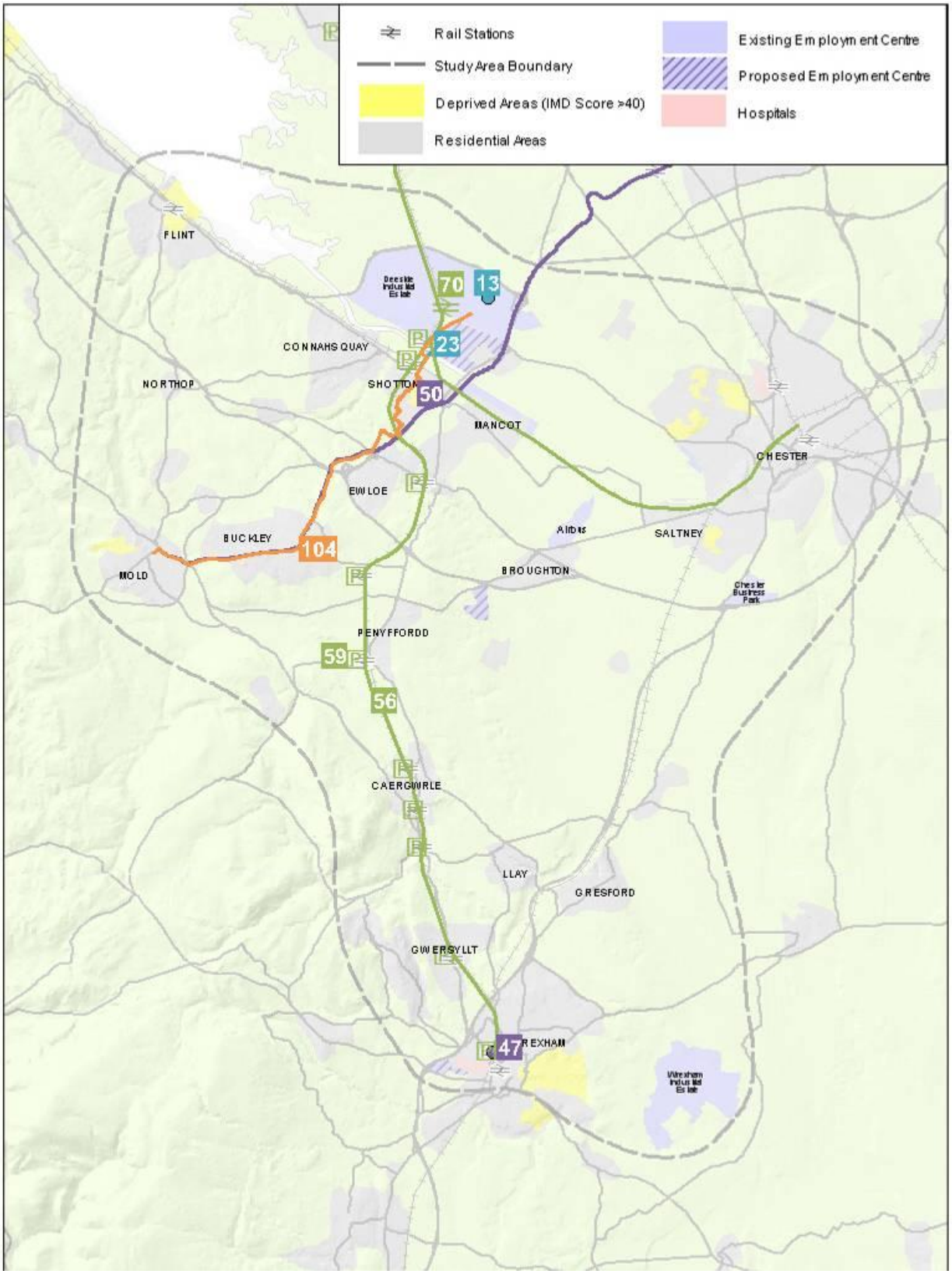
One of the rail options identified in this package was recommended in the North Wales Rail Study (NWRS) with short-term and longer-term alternatives.

The longer term rail options are:

Reference 58: Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool. This is a longer-term version of 'Reference 56' Service frequency increase on Borderlands Line (hourly to half-hourly). The longer-term option requires electrification of the line to enable trains to run through the Mersey tunnel into Liverpool.

The short-term scheme rather than the longer-term alternative has been chosen for the purpose of the Stage 1 Appraisal of this package.

Figure 4.4: Package 5 (Capacity Enhancements) – Wrexham-Deeside



Corridor: Chester – Wrexham

This is the transport corridor between Chester and Wrexham.

4.6 Package 6: Making Best Use (Chester – Wrexham)

This package contains options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

Overview
This package contains a set of options which seek to make more efficient use of existing transport facilities and infrastructure along the corridor between Wrexham and Chester.

As with previous making best use packages the walking and cycling elements of the package seek to improve the safety, security and integration of existing infrastructure along this corridor, with additional signage of the opportunities available.

The bus elements of the package focus on giving buses priority over general traffic at key junctions and links, such as the A483/B5455 junction (Ref.43). Also improving integration with rail and using integrated area ticketing and real time passenger information to improve the experience of travelling by bus along this corridor.

From a rail perspective this package focuses on improving the accessibility of stations for non car access.

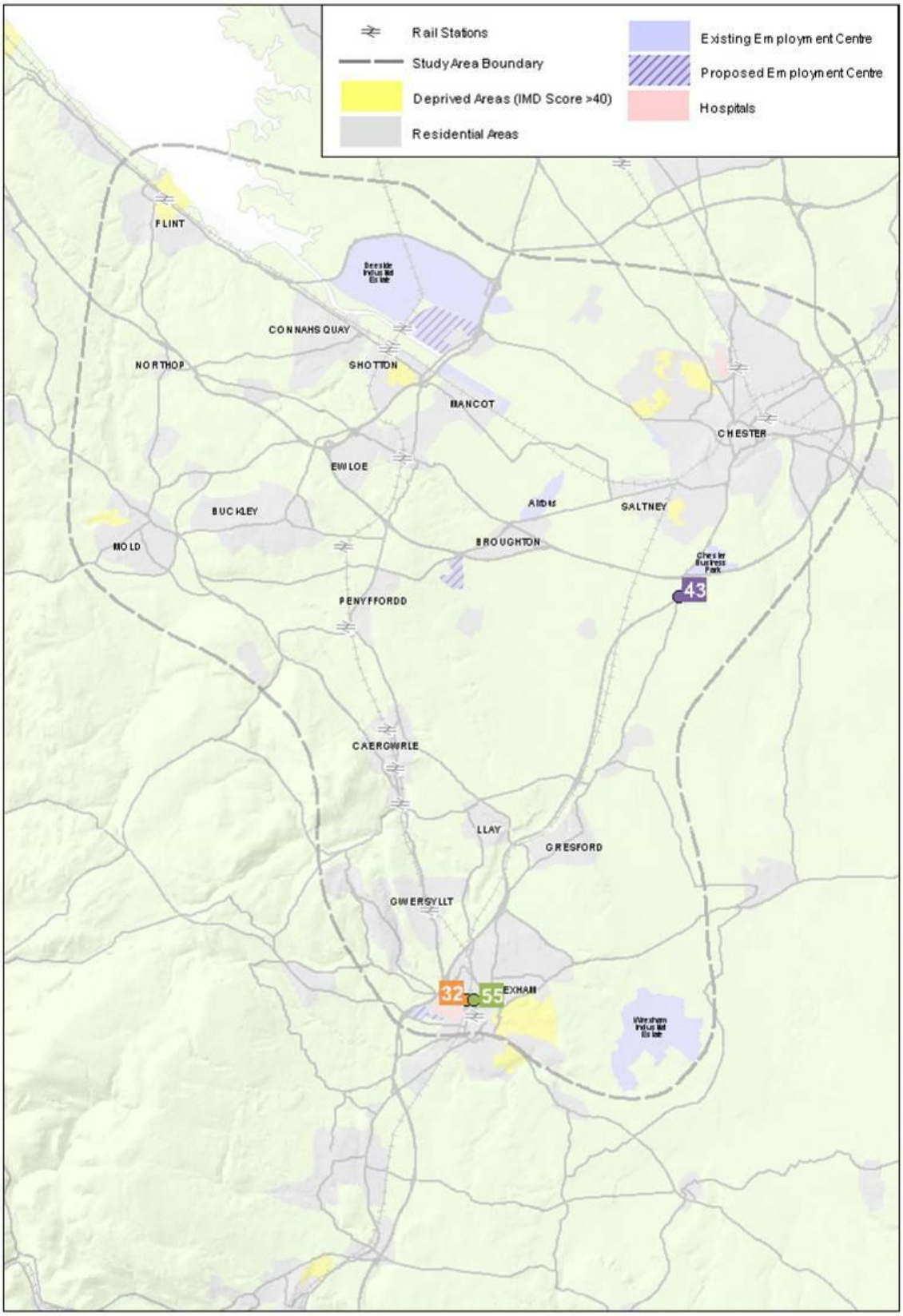
Table 4.6 shows the elements which comprise this package; these are also shown in map form in Figure 4.5.

Table 4.6: Package 6 (Making Best Use) – Chester-Wrexham

Theme	Option Name	Option Description	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of options to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority options along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Bus priority at the A483/B5445 junction to avoid traffic congestion	Provide bus priority options at the junction of the A483. Capacity Enhancements/B5445 to allow buses to avoid traffic congestion at this location and improve service reliability.	43
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus ‘travelcard’ to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	55

Options that have been shaded in grey in the above Table are not location specific and have not therefore been mapped.

Figure 4.5: Package 6 (Making Best Use) – Chester-Wrexham



4.7 Package 7: Capacity Enhancements (Chester –Wrexham)

This package contains options involving the provision of new infrastructure and significant service enhancements.

Overview

Package 7 includes a number of major capacity enhancements across all transport modes which seek to improve connections between Wrexham and Chester.

A new walking and cycling link is proposed between Chester and Wrexham and connecting into the national cycle network (Ref. 39). Additional new walking and cycling links to public transport interchanges and key employment sites are proposed.

A multimodal hub is proposed for Wrexham connecting bus and rail services, with additional bus routes going from the station to key employment sites.

The rail elements of this package include a new station at Rossett (Ref.71), shuttle services between Chester and Wrexham and a fast service between Llandudno and Manchester which connect into Wrexham. Many of these service enhancements will require significant additional rail infrastructure.

As with previous corridors a Park and car share or Park and Ride element is also including helping to reduce levels of single occupancy car use.

From a highway perspective this package looks to resolve the capacity issues along the A483 and at the junction of the A483 and A55 (Ref.18); an option currently being considered by the Highways Agency in England.

Table 4.7 shows the elements which comprise this package; these are also shown in map form in Figure 4.6.

Table 4.7: Package 7 (Capacity Enhancements) – Chester-Wrexham

Theme	Option Name	Option Description	Reference
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing National Cycle Route 5 to provide a link from Chester to Denbigh and Wrexham.	39
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
Bus	Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxibuses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.	47
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
Rail	Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion	Removal of intermediate stops between Chester & Manchester (except Warrington). Requires doubling of track between Wrexham and Chester (Saltney Jct), plus turnback facilities at Wrexham. New hourly stopping service between Manchester & Chester.	62
	Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury)	Hourly shuttle service to be operated alongside existing services to give a basic half-hourly service pattern between Wrexham and Chester.	64
	New station at Rossett on the Wrexham to Chester line	New stations have been assessed as part of the NWRS study for Taith.	71
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94

	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.	17
	Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.	18

Options that have been shaded in grey in the above table are not location specific, and have not therefore been mapped. Options shown in red are long term variants of other options; discussed below.

Longer-term Rail Options

One of the rail options identified in this package was recommended in the North Wales Rail Study (NWRS) with medium-term and longer-term alternatives.

The longer term rail options are:

Reference 62: Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion. This is a longer-term version of 'Reference 64' Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury). The longer-term option requires doubling of track between Wrexham and Chester (Saltney Jct), plus turnback facilities at Wrexham.

The medium-term scheme rather than the longer-term alternative has been chosen for the purpose of the Stage 1 Appraisal of this package.

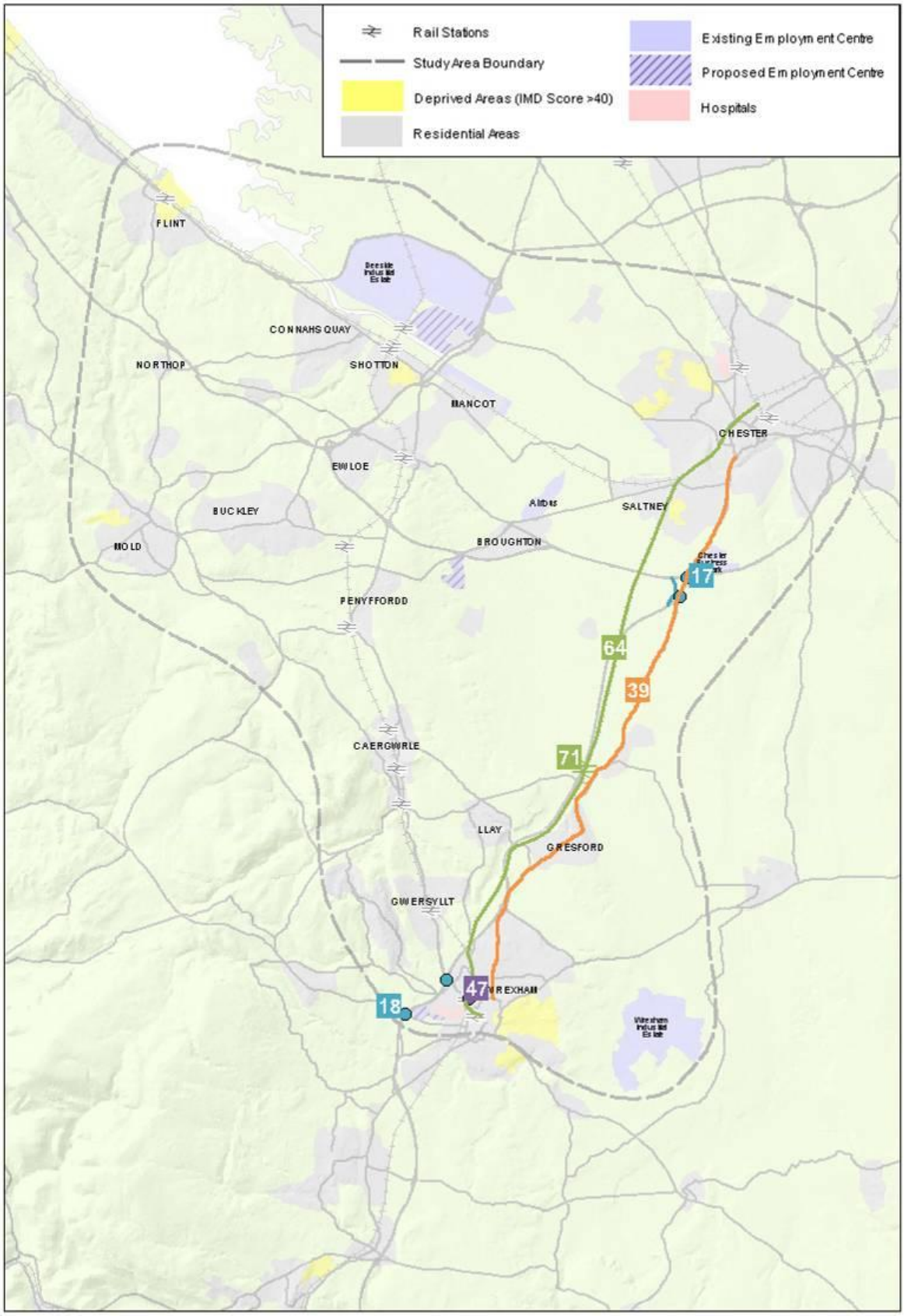
Highways Agency Scheme – A55 / A483 (Chester Southern Bypass)

A £500,000 scheme to improve the east bound exit slip at junction 36 on the A55 and associated works on the adjacent roundabout were completed in March 2011.

Work was carried out to create a third lane on the exit slip from the eastbound A55 to the A483, work was also carried out on the south side of the roundabout to create a third lane between the westbound exit and access slip roads.

In addition a highway scheme at A483 Pulford roundabout is in the Highways Agency four year forward programme and they plan to seek funding for construction in the financial year 2014 / 2015.

Figure 4.6: Package 7 (Capacity Enhancements) – Chester-Wrexham



Corridor: Strategic Trips

This is a transport corridor for strategic trips, this includes the trunk road network through the study area and the principal rail network.

4.8 Package 8: Making Best Use (Strategic Trips)

This package contains options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

Overview
This package contains a set of options which seek to make more efficient use of existing transport facilities and infrastructure which provide connections through the study area for strategic trips by all modes.

The walking and cycling elements of this package focus on improving the safety, security and integration of existing infrastructure, with additional signage of the opportunities available.

As with the previous corridor based “making best use” packages the bus elements of the package focus on giving buses priority over general traffic at key junctions and links to improve reliability. Also improving integration with rail and using integrated area ticketing and real time passenger information to improve the experience of travelling by bus along this corridor.

The rail elements of the package include extending the Llandudno to Manchester service as far as Manchester Airport, as well as improving non-car access at stations.

From a freight perspective the package includes publicity of rail freight opportunities and the management of road maintenance to minimise delays for the haulage industry.

In terms of highway the package looks at the signage of strategic traffic travelling through the study area to the Midlands and North of England. Additionally the package considers variable messaging signs and reducing local distributor access onto the strategic highway as means of maximising the strategic potential of the existing trunk road network.

Table 4.8 shows the elements which comprise this package; whilst the options that can be mapped are shown on Figure 4.7.

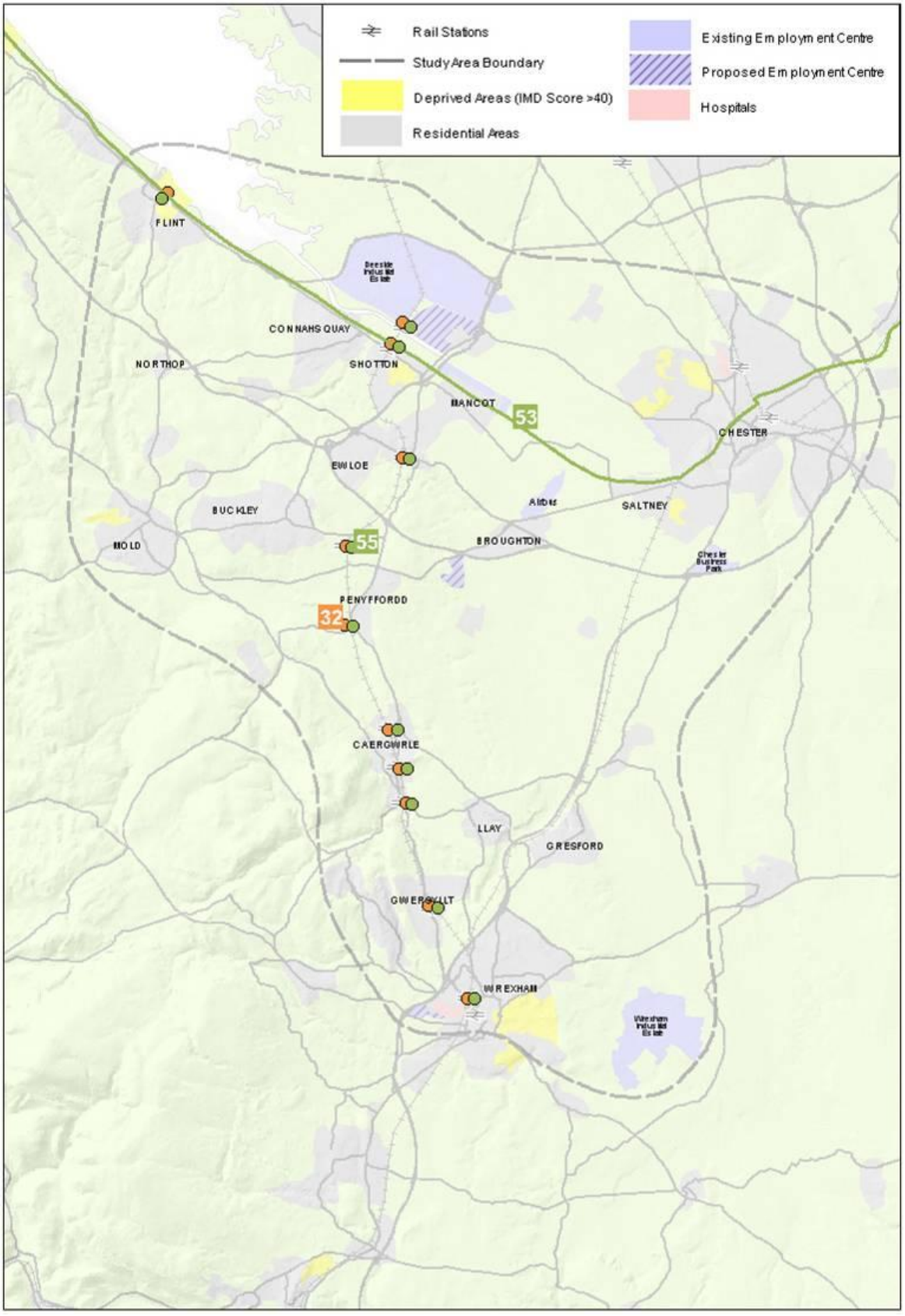
Table 4.8: Package 8 (Making Best Use) – Strategic Trips

Theme	Option Name	Option Description	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of options to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority options along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus ‘travelcard’ to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46

	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Extension of Llandudno-Manchester service to Manchester Airport.	Existing hourly service extended to Manchester Airport. These services have a long layover time at Piccadilly.	53
	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	55
Freight	Publicise the whereabouts and services from possible Port Rail & Inland Rail Terminals	The infrastructure in place for intermodal distribution from local ports is not being utilised to its full potential.	77
	Suspension of non essential maintenance at peak periods	Maintenance programs can cause pinch points on the network, even during quieter periods as seen around the tunnels at Penmaenmawr.	82
Highway	Reduce the number of slip roads on the strategic highway network. Reduce local distributer road access.	Reduce local access roads onto the strategic road network to improve the safety of these roads and reduce their use by local traffic.	1
	Consider a signage strategy for traffic travelling to/from the Midlands	Look into options for improving the signage of traffic travelling from the study area towards the midlands.	2
	Consider a signage strategy for traffic travelling to/from North England	Look into options for improving the signage of traffic travelling from the study area towards North England.	3
	Variable Messaging Signs	Variable messaging signs on the A55/A494/A483 strategic routes to allow reduced speed limits and re-routing of traffic as a result of incidents.	102

Options that have been shaded grey in the above Table are not location specific, and have not therefore been mapped.

Figure 4.7: Package 8 (Making Best Use) – Strategic Trips



4.9 Package 9: Capacity Enhancements (Strategic Trips)

This package contains options involving the provision of new infrastructure and significant service enhancements.

Overview

Package 9 includes a number of major capacity enhancements across all transport modes which seek to improve connections through the study area for strategic trips.

The walking and cycling elements of this package include a number of new off road routes connecting the key settlements in the area as well as linking to key employment sites.

Bus improvements include an express coach service linking North Wales to key destinations in England, new or improved cross Dee bus routes and bus links between key employment sites and rail stations.

The rail elements of the package include service frequency enhancements along the Borderlands and North Wales coastal lines. Many of these service enhancements will require significant additional rail infrastructure which may be outside of the study area.

In terms of freight this package aims to improve rail freight and promote the transfer of freight from road to rail, whilst also overcoming the key issues caused to general traffic by lorries in the study area.

A Park and car share or Park and Ride element is also included to help reduce levels of single occupancy car use.

In terms of highway options a number of improvements are included for the key highways in the study area including the A55, A494, A483 and A548. However it is not assumed that all of these elements will be required. The A55/A494 study will help to shape the preferred set of highway improvements to be taken forward.

Table 4.9 shows the elements which comprise this package; these are also shown in map form in Figure 4.8.

Table 4.9: Package 9 (Capacity Enhancements) – Strategic Trips

Theme	Option Name	Option Description	Reference
Walking and Cycling	Provide walking and cycling crossing facilities on trunk roads and associated junctions	Identify demands for walking and cycling crossing facilities along the key roads in the study area and provide suitable crossing facilities.	33
	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing National Cycle Route 5 to provide a link from Chester to Denbigh and Wrexham.	39
	Mold to Saltney cycle way	A new walking and cycling link between Mold and Saltney with connections to key destinations along the route utilising a former railway alignment.	40
	Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities and major employers.	41
	Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside	104
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
	Provide a cycle link between Deeside and Neston	Utilise existing informal route to form a continuous walking and cycling link between Neston and Deeside Park	107
Bus	Taith Express coach services	Express coach services operating between Holyhead and Manchester Airport with stops in the study area.	51
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	49

	Improved cross Dee bus route between Mold and Ellesmere Port	Connecting key employment locations. Improve the existing 111 service so that it operates twice per hour and is supported with highway infrastructure and traffic management improvements to improve punctuality.	50
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	Doubling of service frequency (to 2 tph) between Wrexham and Bidston (with potential extension into Birkenhead North).	56
	Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool	To extend Borderlands service into Liverpool requires either electrification (whole route or partial to Shotton) or dual-mode vehicle technology. Associated benefits combined with stopping more NWML services at Shotton low level.	58
	Fast Llandudno-Manchester Airport service	Removal of intermediate stops between Chester & Manchester (except Warrington). New hourly stopping service between Manchester & Chester.	61
	Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion	Removal of intermediate stops between Chester & Manchester (except Warrington). Requires doubling of track between Wrexham and Chester (Saltney Jct), plus turnback facilities at Wrexham. New hourly stopping service between Manchester & Chester.	62
	Extension of London-Chester services to Bangor/Holyhead	This creates an hourly service between N Wales and London.	66
	Rhyl-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester-Crewe shuttle). Requires new turnback facility at Rhyl.	67
Freight	Freight Consolidation Centres including one at Deeside	There may be an economic case for establishing whether opening “open user” distribution centres for example at strategic points in England e.g. near Wakefield on the M62 and near Manchester on the M60 might reduce the number of vehicles that have to make a journey to Deeside.	74
	Truckstops	Lack of truck parking facilities across North Wales, sites at both ends of the A55 would be ideal in reducing the number of illegally parked vehicles overnight in lay-bys and levels of vehicle crime.	83
	Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.	84
	Rail electrification	Electric freight trains can accelerate quicker and depending on the locomotive have the potential to pull a heavier train than a diesel.	87
	Open Access Rail Terminal	Lack of rail freight on the NWCL resulting from poor handling infrastructure despite apparent interest from industry particularly for continental services to and from Ireland	105
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95

Highway	Apply managed motorway concepts to key trunk roads	Whilst not having full hard shoulders, ITS technology could be deployed on key routes such as the A55/A494 to vary speed limits according to traffic levels determined through traffic loops and CCTV.	5
	Provide hard shoulders on dual carriageway trunk roads	Hard shoulders would improve the resilience of these routes to incidents and maintenance events and improve safety.	99
	Enhance the A548 route between Flint and the A550	A series of highway improvements on the links and junctions on the A548 between Flint and the A550 to the east of Deeside Industrial Park to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.	10
	A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.	17
	Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.	18
	New road connecting the A55 and A548	A new road connecting the A55 at Northop and the A548 at Kelsterton to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.	21
	A55 Ewloe to Northop Improvements	Widening of the highway between Ewloe and Northop – the scale of such improvements is yet to be determined.	24
	Ewloe Interchange Improvements	Identify a higher capacity design for the A55/A494 Ewloe Interchange which reduces the congestion problems and improved the safety issues currently experienced at this location.	25
	A494 Ewloe to Drome Corner Improvements	Widening of the highway between Ewloe and Drome Corner – the scale of such improvements is yet to be determined.	26
	Improve the capacity of the A494 River Dee crossing	Widening of the existing A494 crossing of the River Dee to improve the capacity and safety of this link.	27

Options that have been shaded in grey in the above table are not location specific, and have not therefore been mapped. Options shown in red are long term variants of other options; discussed below.

Longer-term Rail Options

Two of the rail options identified in this package were recommended in the North Wales Rail Study (NWRS) with short-term and longer-term alternatives.

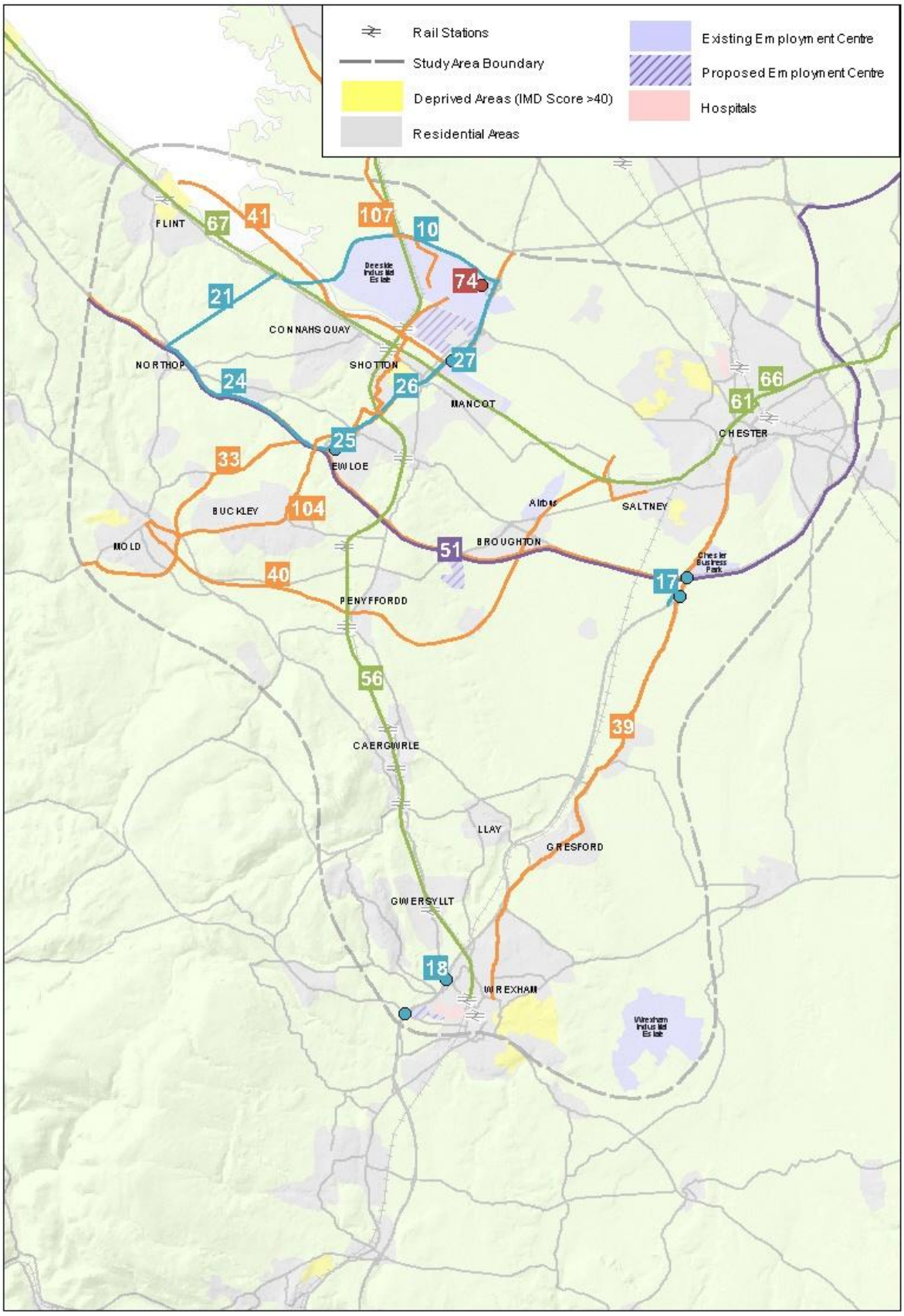
The longer term rail options are:

Reference 58: Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool. This is a longer-term version of 'Reference 56' Service frequency increase on Borderlands Line (hourly to half-hourly). The longer-term option requires electrification of the line to enable trains to run through the Mersey tunnel into Liverpool.

Reference 62: Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion. This is a longer-term version of 'Reference 61' Fast Llandudno-Manchester Airport service. The longer-term option requires the doubling of the track between Wrexham and Chester (Saltney Jct), plus turnback facilities at Wrexham.

The short-term schemes rather than the longer-term alternatives have been chosen for the purpose of the Stage 1 Appraisal of this package.

Figure 4.8: Package 9 (Capacity Enhancements) – Strategic Trips



Stakeholder Consultation

5 Stakeholder Consultation

The aim of this stage in the study is to prioritise the packages, review these against the Transport Planning Objectives for the study and obtain stakeholder acceptability. In order to do so AECOM has developed a consultation process, involving technical stakeholders who have local knowledge of the area.

This section of the report summarises the findings from the Stage 1 consultation process, full details can be found in Appendix A: Stakeholder Consultation Report.

5.1 Methodology

A workshop event was arranged for the afternoon of Monday 29th November 2010 at St David's Park Hotel, Ewloe. The clients, Taith and WG, with the assistance of AECOM compiled a stakeholder list of 65 representatives. These representatives included County Council officers, emergency services, environmental groups and transport groups. AECOM was responsible for drafting and distributing the invitation letters to the 65 stakeholders inviting them to the workshop event. The letter provided a brief outline of the event indicating that delegates were to take part in group discussions. After the closing date for responses, AECOM re-contacted all non-respondents to encourage their attendance.

Prior to the event, AECOM arranged the 16 stakeholders that were confirmed as attending the event into three mixed groups so that representatives from a variety of organisations were in each group, the aim being to stimulate discussion from a variety of viewpoints. Each group was facilitated by AECOM's trained moderators. The intention of these groups was to prioritise the packages, review these against the Transport Planning Objectives for the study and gain stakeholder acceptability.

The workshop event started with a presentation providing a background to the study. A copy of the presentation slides is shown in *Annex B* of the Stakeholder Consultation Report.

Following the presentation, groups were formed comprising five – six delegates. Each group was facilitated by a trained moderator working from a discussion guide; all groups worked from the same discussion guide. Following a short discussion about each package delegates reviewed and scored each package against a range of Transport Planning Objectives. Once each package had been discussed and reviewed, delegates were asked to rank the nine packages in order of preference of being taken forward.

A question and answer session was also undertaken. It should be highlighted at this point that the views given at the stakeholder workshop were not necessarily based on facts but attendees' perceptions of the transport system and the issues associated with it.

A list of the delegates (by organisation) who attended the event is shown in Table 5.1 below, whilst a full list of delegates who were invited to the event can be found in *Annex A* of the Stakeholder Consultation Report. Due to their knowledge of the public transport in the area, the representatives from Arriva Trains Wales were able to provide useful information relating to the bus operators. Delegates from local businesses and health organisations did not attend this event.

5.2 Summary of Event

Full details of the comments for each package and the scoring system can be found in the Stakeholder Consultation Report (Appendix A). The event was a useful exercise as it has provided valuable local knowledge on the issues and impacts of the individual package elements. This information is outlined in detail in the Stakeholder Consultation Report and is also used in the appraisal of stakeholder and public acceptability.

In addition to this stakeholders were asked to score the identified packages against the Transport Planning Objectives of the study. In general, the packages scored positively against the TPOs. Four packages received positive scores for all elements of the TPOs; all being seen as slightly or moderately contributing towards the TPOs. These packages were:

- Package 2: Flint/Mold – Chester: Making Best Use
- Package 3: Flint/Mold – Chester: Capacity Enhancements
- Package 5: Wrexham – Deeside: Capacity Enhancements

- Package 7: Chester – Wrexham: Capacity Enhancements

Table 5.1 List of delegates (by organisation)

Organisation Name	Number of Delegates
Arriva Trains Wales	2
Cheshire West and Chester Council	2
Environment Agency Wales	1
Flintshire County Council	2
North Wales Police Force	1
North Wales Trunk Road Agency	1
Regional Ambulance Officer	1
Taith	1
Welsh Government	3
Wrexham County Borough Council	2

Considering all nine packages, these performed against the TPOs as follows:

Package 1: Managing Demand: Area Wide slightly contributes to all bar four of the TPOs with the package being seen to neither contribute nor detract from business transport connections, national and regional trips, safety and security and social deprivation.

Package 2: Flint/Mold – Chester: Making Best Use slightly contributes to all of the TPOs

Package 3: Flint/Mold – Chester: Capacity Enhancements slightly contributes to all of the TPOs

Package 4: Wrexham – Deeside: Making Best Use slightly contributes to all bar one of the TPOs with the package being seen to neither contribute nor detract from national and regional trips.

Package 5: Wrexham – Deeside: Capacity Enhancements slightly contributes to all of the TPOs

Package 6: Chester – Wrexham: Making Best Use slightly contributes to all bar three of the TPOs with the package being seen to neither contribute nor detract from national and regional trips, safety and security and social deprivation.

Package 7: Chester – Wrexham: Capacity Enhancements slightly contributes to all bar four of the TPOs with the package being seen to moderately contribute towards the four economy TPOs.

Package 8: Strategic Trips: Making Best Use slightly contributes to the four economy TPOs with the package being seen to neither contribute nor detract from the social and environmental TPOs.

Package 9: Strategic Trips: Capacity Enhancements moderately contributes towards the economy TPOs, slightly contributes towards the social TPOs and neither contributes nor detracts from the environment TPOs.

The scores from the package prioritisation exercise indicate that Package 5 has the lowest priority of being taken forward. Packages 7, 3 and 6 are seen as being important to take forward. These options were not seen to be able to solve the issues of the study area in their own right with a hybrid of elements being required.

Stakeholders recognised the importance of the dealing with issues affecting strategic trips and the potential impact of strategic trip packages. This is reflected in the scores against the TPOs. The lower priority scores for the strategic trips packages, shown in Figure 10, is an indication of the financial affordability and deliverability of these packages.

Assessment of Packages

6 Assessment of Packages

6.1 NEWABTS Appraisal Summary Tables

The following tables summarise the assessment of each of the identified packages against the various different criteria within the Welsh Impact Areas of Economy, Environment and Society. More detailed explanation behind the information that is summarised in these tables can be found in section 6.2.

Table 6.1: AST - Area Wide: Package 1. Managing Demand

Option Description: Area Wide: Package 1. Managing Demand			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £1m (2010 prices) The capital cost is comparably small, as there is no transport infrastructure in the package. The mode shift achieved would reduce highway congestion and traffic delays leading directly to a reduction in vehicle idle time and reduction in fuel costs for all motorised road users. A number of the options will help to reduce delays and journey times for all motorised road users.	Across the study area.	Slight Beneficial
EALI	Potential minor increase in local economic activity due to improved productivity through associated employee health benefits and increased local community interaction.	Potential minor economic benefits will be restricted to specific initiative locations. This package is unlikely to attract additional investment.	Slight Beneficial
Environment			
Noise	Qualitative. Although may provide slight beneficial impacts due model shift away from use of cars and improvements in freight logistics, generally the overall assessment is neutral	Unknown at this stage but likely to be widespread	Neutral
Local Air Quality	Qualitative. Slight beneficial although unlikely to be significant in terms of pollutant concentrations.	Unknown at this stage. Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Neutral/Slight Beneficial
Greenhouse Gas Emissions	Qualitative. Slight beneficial although unlikely to be significant in terms of national or regional emissions.	Global	Neutral/Slight Beneficial
Landscape and Townscape	Options have no direct physical effect on landscape/townscape resource or designated areas or features.	Throughout Study Area	Neutral
Bio-diversity	Options within this package will help to reduce traffic within the study area, thereby potentially having some positive effects on the designated sites, habitats and species in the study area through reduction in emissions, cleaner surface water run-off from the roads and reduction in	Across the study area.	Neutral NB – Some unmapped options cannot be fully

		potential wildlife/vehicle collisions, although these are not considered to be significant. Although work to improve walking and cycling facilities could potentially have impacts, there will depend upon the extent and location of the route.		considered at this stage.
Heritage		The area contains several key cultural heritage sites. The package is concerned with management issues only. It is conceivable that it may result in a net gain to the historic environment through less car use within areas containing built heritage.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Neutral-Slight Beneficial
Water Environment	**Surface Water**	This package would not involve any construction activities. Therefore, no construction impacts are expected. During the operation phase impacts are all assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted	Neutral
	Groundwater	As per surface water impacts		Neutral
	Flood Risk	This package would not involve any major construction activities. Therefore, no construction impacts are expected. During the operation phase impacts are all assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.		Neutral
Soils		As there are no intrusive works, construction impacts will be neutral. Operational impacts will result in a slight decrease in traffic, which will present a slight decrease in potential for pollution due to the use of the highway system (e.g. fewer pollution incidents, less run off containing de-icers).This is considered to have a slight beneficial impact.	Entire Study Area.	Neutral
Social				
Transport Safety		Reduced private car use and a switch to rail freight should improve safety. May lead to potential for accidents involving walking and cycling, due to higher use of these modes.	Entire study area	Slight Benefit
Personal Security		Higher levels of informal surveillance for sustainable travel users. Secure cycle parking should reduce bicycle theft. Parking management may shift so0me trips to modes perceived as less secure.	Benefits across the study area, potential disbenefits in areas of increased parking management.	Neutral
Permeability		No changes to infrastructure, publicity and improvements to future developments should reduce severance.	Entire study area	Slight Benefit
Physical Fitness		Improvements at major employment areas will encourage increase in walking and cycling amongst commuters improving physical fitness	Throughout study area, focussing on major employment areas	Slight Benefit

Social Inclusion	Improved facilities for walking and cycling at businesses and improved links between economic and transport plans should help to increase access to employment, promoting social inclusion.	Benefits for areas with low car ownership and high unemployment.	Slight Benefit
Equality, Diversity & Human Rights	No positive or negative discriminatory impact on any individual equality impact group		Neutral
Public Acceptability: Potential opposition to parking management elements.			
Acceptability to other Stakeholders: Consultees agreed with principles of managing demand.			
Technical and Operational Feasibility: Feasible, but may require additional staff resources.			
Financial Affordability and Deliverability: The options contained in this package are deliverable and affordable.			
Risks: Low financial risk, ongoing staff resource requirement			

Table 6.2: AST - Flint / Mold – Chester (via Deeside / Broughton): Package 2. Making Best Use

Option Description: Flint / Mold – Chester (via Deeside / Broughton): Package 2. Making Best Use			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £10.4m (2010 prices) The majority of the capital cost is associated with highway infrastructure options. Options to encourage mode shift and reduce congestion will reduce fuel vehicle operating costs. A number of the options will help to reduce delays and journey times for all motorised road users.	Majority of the benefits will be between Flint / Mold and Chester particularly along the A5104 and B5129.	Slight Beneficial
EALI	Potential localised increase in economic activity within Flintshire, due to improved multi modal accessibility, primarily between local labour market locations along the B5129 corridor and employment centres, generating an increase in productivity.	Potential localised economic benefits will be experienced within option specific locations within the Flint/Mold-Chester corridor, such as Broughton and B5129 corridor. Displacement responses are likely to be restricted.	Slight Beneficial
Environment			
Noise	Qualitative. Reduced congestion along B5129 may have a slight adverse impact on noise due to associated increase in speeds at certain times of the day. Possible slight overall beneficial impacts at those sites where traffic is attracted away to routes where through-put has improved.	B5129 and A5104	Neutral
Local Air Quality	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic volumes increase because of highway improvements.	Unknown at this stage. Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations (e.g. should traffic flows be increased along certain roads).	Global	Slight Beneficial
Landscape and Townscape	The majority of options proposed would not have an effect on the landscape/townscape resource of designated areas or features as proposals are purely operational improvements or are unquantifiable in landscape/townscape terms. Proposals for minor road improvements within urban areas and between Broughton and Saltney could potentially adversely affect the settings of Listed Buildings in close proximity to existing roads in these areas. It is considered that these effects could be successfully mitigated in the short to medium term.	Localised to road corridors between Connah's Quay to Queensferry, and Broughton to Saltney.	Slight Adverse[1]- Neutral [2]
Bio-diversity	Options will help to reduce traffic, thereby potentially having some positive effects on the designated sites, habitats and species in the	Flintshire area of study.	Slight Adverse [1]- Neutral [2]

		study area through reduction in emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions, although these are not considered to be significant. Options pose some ecological risk through the installation of signage, and create/improve walking and cycling facilities, and minor highway improvements which may infer the loss of woodland edge, mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species. A slight adverse effect will apply if signage etc is positioned outside of the highway (tarmac and pavement), this would include grass verges, hedgerows etc. The impact could be effectively mitigated if appropriate mitigation options are put in place.		NB – Some unmapped options cannot be fully considered at this stage.
	Heritage	The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming that the scale of works during construction is very small, it is predicted that the potential to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected. Therefore, impacts are assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted on the surface water environment.	Neutral
	Groundwater	Although the construction activities are not very extensive, the areas onsite associated with a Principal Aquifer or areas of total-catchment source protection zone have a high importance. With appropriate mitigation, this impact will reduce to a neutral impact.	Impacts could occur across study area	Slight Adverse[1]– Neutral[2]
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further		Large Adverse[1]– Neutral[2]

		assessment will be carried out and / or mitigation options implemented where required.		
Soils		Without mitigation, this package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. Soils and moderate agricultural value may also be adversely affected, depending on the final route(s) selected from this package. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Entire Study Area	Moderate Adverse[1]-Neutral[2]
Social				
Transport Safety		Improved safety of existing walking and cycling routes. Mode shift towards safer transport modes. Minor highway safety benefits	Benefits along corridor including highway benefits for trips between Broughton and Saltney	Moderate Benefit
Personal Security		Should overcome perceived personal security issues for walkers and cyclists. Higher levels of informal surveillance for sustainable modes.	Benefits along corridor	Moderate Benefit
Permeability		Improvements to existing routes and stations should improve permeability for those with limited mobility and through increased awareness of existing opportunities.	Benefits along corridor	Slight Benefit
Physical Fitness		Options will encourage a modal shift towards walking and cycling, as adequate infrastructure already exists.	Benefits for users commuting between Flint/Mold to Chester	Slight Benefit
Social Inclusion		Improved walking and cycling environment, better interchange opportunities and facilities helping to improve accessibility and promote social inclusion.	Benefits particularly for areas with low car ownership.	Slight Benefit
Equality, Diversity & Human Rights		Benefits particularly for disability groups.		Neutral
Public Acceptability: Possible opposition to bus priority options.				
Acceptability to other Stakeholders: Consultation indicates general support, but some options considered infeasible or already suitably implemented.				
Technical and Operational Feasibility: Most options feasible. Integrated ticketing could be complicated. Feasibility of bus priority and highway improvements on B5129 is limited by constrained nature of the corridor.				
Financial Affordability and Deliverability: The relatively low cost of this package mean that it is considered to be financially affordable. The options contained in this package are deliverable.				
Risks: Impacts of bus priority on general traffic. Requires support from network rail and bus operators.				

[1]Without Mitigation; [2]With Mitigation

Table 6.3: AST - Flint / Mold – Chester (via Deeside / Broughton): Package 3. Capacity Enhancements

Option Description: Flint / Mold – Chester (via Deeside / Broughton): Package 3. Capacity Enhancements			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £91.5m (2010 prices) A significant proportion of the capital cost is associated with rail and highway improvement schemes. Lower congestion levels should reduce fuel vehicle operating costs. Rail operators fuel and non-fuel operating costs will increase as a result of additional services and stopping at new stations. Travel time benefits will be experienced by the majority of transport users.	Majority of the benefits will be between Flint / Mold and Chester	Moderate Beneficial
EALI	Potential substantial increase in economic activity, through the provision of multi modal infrastructure, which addresses employment accessibility and productivity issues within the economically active corridor.	Potential substantial increase in the level of economic activity within the Flint/Mold-Chester corridor. Displacement responses are likely to be restricted, as this corridor represents the primary economic link within the NEWABTS study area.	Moderate Beneficial
Environment			
Noise	Qualitative. Possible slight adverse and beneficial impacts due to changes in traffic as a result of improved road connections.	Roads leading to Deeside Industrial Park and in the Broughton Area	Neutral
Local Air Quality	Qualitative. In general, the options are likely to have a slight beneficial impact, although significant adverse impacts could occur at some location (e.g. should traffic volumes increase because of highway improvements or on roads leading to/from park and ride schemes	Unknown at this stage Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic flows be increased along certain roads.	Global	Slight Beneficial
Landscape and Townscape	The majority of proposals will not have significant effect on landscape/townscape as they either comprise purely operational improvements; are unquantifiable in landscape/townscape terms; and/or, have not been developed sufficiently at this stage to be meaningfully assessed. Proposals to improve pedestrian and cycle links could have a potentially beneficial effect on the amenity value of the landscape/townscape resource. The requirement for a new rail curve at Shotton could have a detrimental, but localised effect on the character of the riverside (Dee) and local	Localised to the Deeside at Shotton.	Slight Adverse[1]-Neutral[2]

		recreational amenity, though this could be successfully mitigated in the medium to long term.		
Bio-diversity		Works within or close to a number of internationally and nationally protected sites, such as the River Dee. Options pose ecological risk through the loss of woodland (including Ancient Woodland), mature trees, standing water, scrub and hedgerows. Likely to disturb wildlife corridors/habitats such as disused railways, which are likely to be important for a number of protected species. Moderate adverse effects will occur if appropriate mitigation is not implemented, in particular for the Mold to Saltney cycleway. With suitable mitigation where appropriate, proposals could be successfully accommodated and impacts substantially reduced to slight adverse/neutral.	Flintshire/Cheshire area of study.	Large Adverse[1]-Slight Adverse/Neutral[2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage		The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming that the scale of works is very small, it is predicted that the potential for this package to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected. Therefore, impacts are assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted	Neutral
	Groundwater	Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone (other areas of the site are of high importance due to Principal Aquifers in the north-east and generally being classified as total-catchment source protection	Groundwater impacts are moderate adverse around the areas of inner source protection zone onsite; slight adverse elsewhere.	Moderate Adverse[1]-Neutral [2]

		zone). With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.		
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.	Impacts could occur across the study area.	Large Adverse [1]- Neutral [2]
Soils		Without mitigation, this package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. In particular, several large projects (the new walking and cycling route along the Dee Coast and the new rail curve at Shotton) have the potential to present challenges with respect to contaminated land and/or stability. Soils and mineral resources of moderate value may also be adversely affected, depending on the final route(s) selected. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral	Entire Study Area.	Moderate Adverse[1]- Neutral[2]
Social				
Transport Safety		Off road provision improving transport safety for walkers and cyclists. More direct PT opportunities transferring car trips to safer transport modes. Localised safety improvements at Deeside and Broughton	Benefits at the locations where improvements are proposed.	Large Benefit
Personal Security		Walking/cycling links constructed to best practice standards. Increased Informal surveillance. More direct PT opportunities.	Benefits at the locations where improvements are proposed.	Moderate Benefit
Permeability		Improved connections through the corridor and to key destinations for walkers/cyclists.	Benefits across corridor.	Large Benefit
Physical Fitness		New direct walking and cycling links to major employment areas likely to encourage modal shift to walking and cycling improving physical fitness	Corridor between Flint/Mold and Chester, specifically around employment areas `	Slight Benefit
Social Inclusion		Improved access to employment at Chester and Deeside from Flint and Mold for those without access to a car, promoting social inclusion.	Benefits for areas with low car ownership and unemployment.	Moderate Benefit
Equality, Diversity & Human Rights		Benefits particularly to those without access to a car – the women, the young and old.	Benefits for areas with low car ownership.	Slight Benefit
Public Acceptability: Anticipated broadly acceptable, possible opposition to bus priority on the B5129 if this led to delays for general traffic.				

Acceptability to other Stakeholders: Consultees were generally supportive, but felt that a making best use/demand management approach might be more appropriate for this corridor.
Technical and Operational Feasibility: Bus routes dependent upon business case. Land ownership issues for walking/cycling proposals. Rail improvements require various infrastructure. Constrained high traffic corridor makes highway options more difficult to implement operationally.
Financial Affordability and Deliverability: The majority of this package is considered financially affordable and deliverable. However the high financial cost of individual walking and cycling, rail and highway schemes make the package as a whole difficult to deliver.
Risks: Financial viability of the new cross Dee bus route and capital cost of Mold to Saltney cycle route.

[1]Without Mitigation; [2]With Mitigation

Table 6.4: AST - Wrexham – Deeside (via Mold / Buckley): Package 4. Making Best Use

Option Description: Wrexham – Deeside (via Mold / Buckley): Package 4. Making Best Use			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £20.4m (2010 prices) The majority of the capital costs will be associated with highway improvement schemes on the A541. Options to reduce congestion will lower fuel vehicle operating costs. Bus passengers will benefit from reduced bus travel times. Highway travel time savings will be experience along the A541 and A550.	Majority of the benefits will be between Wrexham and Deeside, particularly along the A541.	Slight Beneficial
EALI	Potential localised increase in economic activity and productivity within the Wrexham to Deeside corridor, due to improved highway resilience and public transport facilities/accessibility. However these responses maybe restricted by the existing Wrexham Industrial Estate.	Potential localised economic benefits will be experienced throughout the Wrexham-Deeside corridor. This package is likely to increase the competitive status of the corridor leading to a minor displacement effect.	Slight Beneficial
Environment			
Noise	Qualitative. Generally, slight adverse and beneficial impacts depending on changes in traffic flows as traffic is attracted to less congested routes / improved routes.	Unknown at this stage	Neutral
Local Air Quality	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic volumes increase because of highway improvements.	Unknown at this stage Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations (e.g. should traffic flows be increased along certain roads).	Global	Slight Beneficial
Landscape and Townscape	The majority of options would not have an effect on the landscape/townscape resource of designated areas or features, as proposals are purely operational improvements or are unquantifiable in landscape/townscape terms. A number of highway improvement options are proposed which could affect designated features including Listed Buildings, Conservation Areas, SAMs and a Local Landscape Area. Although unlikely to have a significant effect in isolation, there is potential for a significant, adverse cumulative effect, particularly where multiple proposals are located within a limited/localised area of primarily rural landscape. The significance of effect could be reduced following mitigation to	Throughout Wrexham to Deeside Corridor	Moderate Adverse [1] - Slight Adverse [2]

		slight adverse.		
Bio-diversity		Options will help to reduce traffic within the study area, thereby potentially having some positive effects on the designated sites, habitats and species in the study area through reduction in emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions, although these are not considered to be significant. Options pose some ecological risk through the installation of signage, and create/improve walking and cycling facilities, and minor highway improvements which may infer the loss of woodland edge, mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species. A slight adverse effect will apply if signage etc is positioned outside of the highway (tarmac and pavement), this would include grass verges, hedgerows etc. The impact could be effectively mitigated if appropriate mitigation options are put in place.	Flintshire and Wrexham area of study.	Slight Adverse [1]- Neutral [2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage		The majority of heritage assets impacted by the proposals are listed buildings of post-medieval date. There are also several other assets of earlier date noted in the area which could be affected. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming that the scale of works is very small, it is predicted that the potential for this package to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected. Therefore, impacts are assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted	Neutral
	Groundwater	As per surface water impacts, there will be a lack of construction impacts due to the limited construction activities plans. Furthermore, groundwaters are considered to be only of a medium importance as a resource. Operation		Neutral

		impacts will be slight beneficial due to a decrease in vehicular movements.		
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.	Impacts could occur across the study area	Large Adverse[1]- Neutral[2]
Soils		Without mitigation, this package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. Soils of moderate agricultural value may also be adversely affected, depending on the final route(s) selected. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Entire Study Area	Slight Adverse[1]- Neutral[2]
Social				
Transport Safety		Improved safety to existing walking/cycling routes. Safer transfer between transport modes. Mode shift from car to safer modes. Improved safety of the A541 between Mold and Wrexham.	Improved safety at locations which will be improved including the A541 between Mold and Wrexham.	Moderate Benefit
Personal Security		Personal security improvements to existing walking/cycling routes. Improved personal security when interchanging between PT. higher levels of informal surveillance	Benefits at locations where improvements are undertaken.	Moderate Benefit
Permeability		Permeability benefits for those with limited mobility and due to increased awareness of opportunities.	Benefits across study corridor.	Slight Benefit
Physical Fitness		Options such as increased cycle parking at public transport interchanges likely to improve integration of walking and cycling with other modes, improving modal splits and increasing levels of physical fitness	Improved physical fitness throughout the corridor area	Slight Benefit
Social Inclusion		Improved accessibility to key destinations using walking, cycling, bus and rail. Better opportunities to interchange. Bus priority improvements and improved integration with rail, should improve access to key destinations for those without access to a car.	Benefits particularly for areas with low car ownership and deprivation issues.	Slight Benefit
Equality, Diversity & Human Rights		Benefits particularly to those without access to a car – the women, the young and old.	Benefits for areas with low car ownership.	Slight Benefit
Public Acceptability: Anticipated to be publically acceptable.				
Acceptability to other Stakeholders: Consultation indicates broad acceptance. Improvements to the A483/A55 may resolve issues on the A550. Bus priority may not be suitable to level of demand.				
Technical and Operational Feasibility: Walking and cycling improvements feasible. Cycle integration with PT would require operator support (not forthcoming). Simple integrated ticketing feasible, but complex 'Oyster' system more difficult to implement. Lack of space at key junctions limits the operational effectiveness of bus priority options. Some land purchase required for highway elements.				
Financial Affordability and Deliverability: The majority of this package is considered financially affordable and deliverable with the exception of the financial cost of Improvements on the A541 between Mold and Wrexham. All options are deliverable although lack of support from the local highway authority would make bus priority difficult.				
Risks: Financial affordability of overall package and deliverability of bus priority options.				

[1]Without Mitigation; [2]With Mitigation

Table 6.5: AST - Wrexham – Deeside (via Mold / Buckley): Package 5. Capacity Enhancements

Option Description: Wrexham – Deeside (via Mold / Buckley): Package 5. Capacity Enhancements			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £92.5m (2010 prices) The majority of the capital costs are associated with rail and highway improvement schemes. A reduction in highway congestion and traffic delays will reduce vehicle idle time and hence fuel costs for other road users. Rail fuel and non-fuel operating costs will increase as a result of additional services, but should be offset by an increase in ticket revenues. Travel time benefits will be expected on strategic routes such as A55/A494, A550 and throughout the study area.	Majority of the benefits will be between Wrexham and Deeside.	Moderate Beneficial
EALI	Potential substantial increase in economic activity within the Wrexham to Deeside corridor, due to the provision of multi modal infrastructure, which addresses employee accessibility issues within the corridor, principally through rail service enhancements.	Potential substantial economic benefits will be experienced throughout the Wrexham-Deeside corridor. However based on the package options the economic responses are likely to be centralised within the Deeside area, generating a minor displacement response.	Moderate Beneficial
Environment			
Noise	Qualitative. Slight adverse noise impact alongside crawler lane due to increase in overall traffic speed. Possible slight adverse and beneficial impacts due to changes in traffic as a result of improved road connections including new bridge.	Alongside crawler lanes and along improved roads and new bridge	Neutral
Local Air Quality	Qualitative. In general, options are likely to have a slight beneficial impact, although significant adverse impacts could occur at some locations, for example should traffic volumes increase because of highway improvements or on roads leading to/from park and ride schemes.	Unknown at this stage Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic flows be increased along certain roads.	Global	Slight Beneficial
Landscape and Townscape	The majority of proposals will not have significant effect on landscape/townscape as they either comprise purely operational improvements; are unquantifiable in landscape/townscape terms; and/or, have not been developed sufficiently at this stage to be meaningfully assessed. Potential for significant effects has been identified where proposals could adversely affect the setting of the Listed Building and Wat's Dyke	Localised within Wrexham. Areas in proximity to trunk roads/A-roads.	Large Adverse[1]–Slight Adverse[2]

		SAM at Wrexham Station; and adversely affect designated features and visual amenity in rural areas where crawler lanes to key trunk and A-roads are proposed. With suitable mitigation where appropriate, proposals could be successfully accommodated and impacts substantially reduced to slight adverse.		
Bio-diversity		Works within or close to a number of internationally and nationally protected sites, such as the River Dee. Options within this package pose ecological risk through the loss of woodland (including Ancient Woodland), mature trees, standing water, scrub and hedgerows. Likely to disturb wildlife corridors/habitats such as Rivers, disused railways, which are likely to be important for a number of protected species. Large adverse effects will occur if appropriate mitigation is not implemented, in particular for the Dee crossing. The impact could be reduced following mitigation to slight adverse/neutral.	Flintshire and Wrexham area of study.	Large Adverse [1]– Slight Adverse/Neutral [2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage		The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming good practice is implemented during construction, construction impacts can be effectively mitigated. During the operation phase it is unlikely that any changes could occur on the pollutant loading of the road runoff and spillage risk. Further assessment will be required during the design of stream crossings. If open span structures are proposed that maintain the riparian corridor, impacts may be completely mitigated. If works in riparian banks or new piers are required in the channel, significant impacts of slight adverse magnitude may occur. It is likely that some adverse effects might occur as result of the operation of the new road bridge over the River Dee.	Impacts could occur across the study area	Slight Adverse[1]-Neutral[2]
	Groundwater	Both construction and operational effects are anticipated to be slight adverse, due to the sensitivity of the groundwater as a designated aquifer (and, in the north-east, as a total-catchment source protection zone) and the potential for creating both pathways to pre-		Slight Adverse[1]-Neutral[2]

		existing contamination as well as new pollution. With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.		
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.		Large Adverse[1]- Neutral[2]
Soils		Without mitigation, this package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. In particular, several large projects (the new cycle route between Mold and Deeside and the new the new road bridge between Connah's Quay and Deeside Industrial Park) have the potential to present challenges with respect to contaminated land and/or stability. Soils and mineral resources of moderate value may also be adversely affected, depending on the final route(s) selected. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	At the new cycle route between Mold and Deeside and the new the new road bridge between Connah's Quay and Deeside Industrial Park.	Moderate Adverse[1]- Neutral[2]
Social				
Transport Safety		Provision of safe walking and cycling links reducing conflicts with motorists. Transfer of trips from car to safer bus and rail. Reduced road traffic levels, with associated safety benefits.	Benefits across the corridor due to traffic reduction and particular benefits at improved locations	Large Benefit
Personal Security		New walking and cycling links, P&R and rail stations constructed to maximise personal security. Bus improvements provide more direct routes and improved interchange opportunities, reducing perceived personal security risks from walking and interchanging.	Benefits at locations improved.	Moderate Benefit
Permeability		New walking and cycling links reduce severance barriers of travelling along the corridor and accessing PT interchanges and employment sites.	Benefits along the corridor.	Large Benefit
Physical Fitness		Identifying new cycling links to exiting employment areas should encourage more walking and cycling and improve physical fitness levels	Benefits throughout the corridor, but specifically links between Mold and Deeside	Moderate Benefit
Social Inclusion		Improved access to Deeside Park and Wrexham from communities within the study area through the provision of walking and cycling links, bus routes and car sharing. New stations and rail services also increase accessibility to opportunities, promoting social inclusion. Improved road accessibility between Connah's	Benefits particularly for areas with high unemployment and low car ownership.	Moderate Benefit

	Quay and Deeside Park		
Equality, Diversity & Human Rights	Improved accessibility for disability groups	Benefits for areas with low car ownership.	Neutral
Public Acceptability: No strong opposition anticipated.			
Acceptability to other Stakeholders: Consultation indicates support. Stakeholders did not support local bridge element and felt the A55/A483 and A494 improvements would also be needed to improve this corridor.			
Technical and Operational Feasibility: Land purchase, space constraints, add to the complexity of this package. Rail curve requirement would be difficult to deliver. Road bridge technically complex for likely benefits.			
Financial Affordability and Deliverability: The majority of this package is considered financially affordable with the exception of the significant financial cost associated with certain rail options and highway options. The high financial cost of these options make the package as a whole difficult to deliver.			
Risks: Financial affordability of the rail and highway options associated with this package.			

[1]Without Mitigation; [2]With Mitigation

Table 6.6: AST - Chester – Wrexham: Package 6. Making Best Use

Option Description: Chester – Wrexham: Package 6. Making Best Use			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £2.5m (2010 prices) Mode shift from private car to walking/cycling and public transport reducing VOCs and journey times. Improved bus reliability and increase in bus and rail operator revenues. Reduction in indirect fuel taxes. Bus passengers will benefit from travel time savings.	Across the corridor between Chester and Wrexham, particularly on the A483/B5445.	Slight Beneficial
EALI	Potential minor economic response in GVA within the Wrexham and Chester corridor, due to improved public transport facilities and reliability.	Potential minor localised economic benefits will be experienced throughout the Chester-Wrexham corridor, principally within Chester City and Wrexham Town. Displacement responses are likely to be limited.	Slight Beneficial
Environment			
Noise	Qualitative	Unknown at this stage	Neutral
Local Air Quality	Qualitative. In general, the options within this package are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should bus priority options lead to increased congestion for other vehicles or in other locations. A more detailed assessment is therefore required.	Unknown at this stage. Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic flows be increased along certain roads.	Global	Slight Beneficial
Landscape and townscape	The majority of options proposed would not have an effect on the landscape/townscape resource of designated areas or features as proposals are purely operational improvements or are unquantifiable in landscape/townscape terms. Where there is potential for there to be a physical impact, proposals are of insufficient scale to cause any significant effects.	Throughout Chester - Wrexham Corridor	Neutral
Bio-diversity	Options will help to reduce traffic within the study area, thereby potentially having some positive effects on the designated sites, habitats and species in the study area through reduction in emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions, although these are not considered to be significant.	Cheshire and Wrexham area of study.	Slight Adverse [1]- Neutral [2] NB – Some unmapped options cannot be

		Options pose some ecological risk through the installation of signage, and improving walking and cycling facilities, and minor station improvements which may infer the loss of mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species. A slight adverse effect will apply if signage etc is positioned outside of the highway (tarmac and pavement), this would include grass verges, hedgerows etc. The impact could be effectively mitigated if appropriate mitigation options are put in place.		fully considered at this stage.
	Heritage	The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming that the scale of works is very small, it is predicted that the potential to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected. Therefore, impacts are assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted	Neutral
	Groundwater	Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone (other areas of the site are of high importance due to Principal Aquifers in the north-east and generally being classified as total-catchment source protection zone). With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.	Groundwater impacts are moderate adverse around the inner source protection zone onsite; slight adverse elsewhere.	Moderate Adverse [1]-Neutral [2]
	Flood Risk	Some minor construction work may be required to improve station accessibility. Assuming good practice is followed during construction, the	Impacts could occur at Wrexham Station.	Slight Adverse [1]-Neutral [2]

		construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.		
Soils		Without mitigation, this package has the potential to create pathways to pre-existing contamination. With mitigation, the risk for contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Entire Study Area.	Moderate Adverse[1]-Neutral[2]
Social				
Transport Safety		Improved safety of walking and cycling routes, improved safety of transferring between modes and improved safety due to shift from car to safer public transport modes. Increases in walking and cycling may increase severity of some accidents.	Safety benefits across the corridor between Chester and Wrexham	Moderate Beneficial
Personal Security		Should overcome perceived personal security issues with current walking and cycling routes. Greater levels of public transport, walking and cycling will increase informal surveillance.	Personal security benefits across the corridor between Chester and Wrexham	Moderate Beneficial
Permeability		Signage and maintenance of existing walking and cycling routes as well as station accessibility improvements may open up new opportunities to certain groups.	Permeability benefits across the corridor between Chester and Wrexham	Slight Beneficial
Physical Fitness		Improvements to existing infrastructure and improved signage will make walking and cycling more attractive, improving physical fitness.	Improved physical fitness across the corridor	Slight Beneficial
Social Inclusion		Improved accessibility to key destinations using walking, cycling, bus and rail.	Improved accessibility for journeys between Chester and Wrexham.	Slight Beneficial
Equality, Diversity & Human Rights		Due to the types of people who typically use the transport modes improved the package will particularly benefit women, disability groups and deprived groups without access to a car.	Benefits for disability groups, women, the old and young and deprived parts of the study area.	Slight Beneficial
Public Acceptability: Broad public support anticipated.				
Acceptability to other Stakeholders: Consultation indicates broad support, but felt capacity enhancements would also be required, such as the A55/A483 junction and park and ride facilities.				
Technical and Operational Feasibility: Walking and cycling improvements feasible. Cycle integration with PT would require operator support (not forthcoming). Simple integrated ticketing feasible, but complex 'Oyster' system more difficult to implement. Bus priority options may cause operation issues for general traffic.				
Financial Affordability and Deliverability: This package is considered financially affordable. In general the options are deliverable.				
Risks: Deliverability of bus priority options and integrating cycling with passenger transport services.				

[1]Without Mitigation; [2]With Mitigation

Table 6.7: AST - Chester – Wrexham: Package 7. Capacity Enhancements

Option Description: Chester – Wrexham: Package 7. Capacity Enhancements			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £93m (2010 prices) Highway improvements and mode shift from private car to walking/cycling and public transport reducing VOCs and journey times. Increase in rail operator revenues. Reduction in indirect fuel taxes.	All transport users will benefit from travel time savings across the corridor between Chester and Wrexham, particularly on the A483/B5445.	Moderate Beneficial
EALI	Potential substantial increase in economic activity within Wrexham to Chester corridor, due to improved multi modal accessibility for local and strategic trips. Key responses are delivered through targeted highway infrastructure and rail service enhancements.	Potential substantial economic benefits will be experienced throughout the Chester-Wrexham corridor, principally within Chester City and Wrexham Town. This package is likely to increase the competitive status of the corridor leading to a minor displacement effect.	Moderate Beneficial
Environment			
Noise	Qualitative. Increasing capacity on A483 and improving congestion is likely to have a slight adverse impact with regard to noise. Although traffic on other roads may decrease and provide slight beneficial impacts.	Alongside A483/A55	Neutral
Local Air Quality	Qualitative. In general, options are likely to have a slight beneficial impact, although significant adverse impacts could occur at some locations for example should traffic volumes increase because of highway improvements or on roads leading to/from park and ride schemes.	Unknown at this stage Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic flows be increased along certain roads.	Global	Slight Beneficial
Landscape and Townscape	The majority of proposals will not have significant effect on landscape/townscape as they either comprise purely operational improvements; are unquantifiable in landscape/townscape terms; and/or, have not been developed sufficiently at this stage to be meaningfully assessed. Potential for significant effects has been identified where proposals could adversely affect the setting of the Listed Building and Wat's Dyke SAM at Wrexham Station; and where junction improvements are proposed in proximity to Local Landscape Areas and designated features, west of Wrexham and South of Chester. With suitable design and mitigation, proposals could	Localised within Wrexham. Areas focussed around road junctions west of Wrexham and South of Chester.	Large Adverse[1] – Slight Adverse[2]

		be successfully accommodated and impacts substantially reduced to slight adverse.		
Bio-diversity		Works within or close to a number of Internationally and nationally protected sites. Options pose ecological risk through the loss of woodland (including Ancient Woodland), mature trees, standing water, scrub and hedgerows, in particular for doubling of track. Likely to disturb wildlife corridors/habitats such as rivers, and railways, which are likely to be important for a number of protected species. A moderate adverse effect could occur if appropriate mitigation is not implemented, depending on the exact location and extent of some of the options. With suitable mitigation where appropriate, impacts could be substantially reduced to slight adverse/neutral.	Cheshire and Wrexham area of study.	Moderate Adverse [1]- Slight Adverse/Neutral [2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage		The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	It is predicted that the potential for this package to affect surface water bodies during construction is neutral. During the operation phase, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected. Therefore, impacts are assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted	Neutral
	Groundwater	Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone (other areas of the site are of high importance due to Principal Aquifers in the north-east and generally being classified as total-catchment source protection zone). With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial (due to the assumed	Groundwater impacts are moderate adverse around the areas of inner source protection zone onsite; slight adverse elsewhere.	Moderate Adverse[1]- Neutral [2]

		remediation of any potential contamination) as a construction effect and as neutral due to operation.		
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase of the proposed schemes impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.	Impacts could occur across the study area	Large Adverse [1] - Neutral [2]
Soils		Without mitigation, this package has the potential to create pathways to pre-existing contamination. Additionally, the potential exists for the loss of Agricultural soils of moderate value. With mitigation, the risk for contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Entire Study Area.	Moderate Adverse[1]- Neutral[2]
Social				
Transport Safety		Improved safety due to new walking and cycling links and the switch from car use to more sustainable transport modes. Improvements at key junctions will also improve road safety.	Safety benefits at key junctions, for walking and cycling trips along the corridor and generally across the corridor.	Moderate Beneficial
Personal Security		New walking and cycling links will be built to modern standards. Reduced need to walk to access employment sites due to bus improvements. Park and ride and park and car share facilities may be perceived as a personal security risk.	Personal security benefits particularly for journeys on the corridor between Wrexham and Chester and for journeys to employers	Moderate Beneficial
Permeability		Permeability benefits due to new links to public transport interchanges, employment sites and between Wrexham and Chester.	Benefits across the corridor, but particularly at public transport interchanges and employment centres	Slight Beneficial
Physical Fitness		New cycling and walking links will provide more direct routes along the corridor, encouraging a modal shift to walking and cycling – improving physical fitness.	Benefits across the corridor, but particularly for walking and cycling trips to employment areas	Moderate Beneficial
Social Inclusion		Improved access to employment opportunities on foot, by bike and by bus, with increased opportunities for car sharing. This will benefit deprived groups without access to a car, promoting social inclusion.	Benefits particularly for deprived communities without access to a car.	Moderate Beneficial
Equality, Diversity & Human Rights		Improved accessibility to off road routes and opportunities to interchange between transport modes for disability groups. Benefits to those without access to a car, such as deprived groups, women and the young and old.	Benefits for disability groups, women, the old and young and deprived parts of the study area.	Slight Beneficial
Public Acceptability: Broad public support is anticipated.				
Acceptability to other Stakeholders: Consultation indicates particular support for A483/A55 junction and rail service improvements.				
Technical and Operational Feasibility: Walking and cycling links feasible, but requiring land purchase. Space constrains what is operationally feasible at Wrexham General Station. Feasibility of bus routes dependent upon business case. Track doubling required for rail service improvements. A483/A55 junction improvements would require approval from English Highways Authority.				

Financial Affordability and Deliverability: The majority of this package is considered financially affordable and deliverable. However the high financial cost of certain walking and cycling, rail and highway schemes make the package as a whole difficult to deliver.
Risks: Financial affordability of the rail and highway improvement options.

[1]Without Mitigation; [2]With Mitigation

Table 6.8: AST - Strategic Trips: Package 8. Making Best Use

Option Description: Strategic Trips: Package 8. Making Best Use			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £9m (2010 prices) The majority of the capital cost is associated with bus priority and other bus improvement options. Improving bus and rail integration making medium to long distance multi-modal journeys easier will lead to a small reduction in vehicle operating costs across the study area. Options which reduce congestion will lower fuel vehicle operating costs. Minor travel time benefits will be expected on strategic routes throughout the study area.	Majority of the benefits will be experienced by transport users on the strategic networks.	Slight Beneficial
EALI	Potential localised economic response in GVA, due to improved public transport accessibility and facilities within the Wrexham to Deeside corridor for local users. Additional potential increase in tourism within Llandudno.	Potential minor economic benefits will be restricted to the Wrexham to Deeside corridor and to the level of achievable public transport service provision and passenger increase. Displacement responses are likely to be limited.	Slight Beneficial
Environment			
Noise	Qualitative. Both slight adverse and beneficial impacts due to re-routing of traffic from reducing number of slip roads. Some slight to moderate beneficial impacts along the A55/A494/A483 due to variable speed limits allowing reduced speed limits – significance of impact is dependent on speed reduction.	At some locations alongside the strategic road network.	Slight Beneficial
Local Air Quality	Qualitative. Options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic be diverted because of slip road closures.	Unknown at this stage. Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight beneficial
Greenhouse Gas Emissions	Qualitative. Options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations (e.g. should traffic flows be increased along certain roads).	Global	Slight Beneficial
Landscape and Townscape	The majority of options proposed would not have an effect on the landscape/townscape resource of designated areas or features as proposals are purely operational improvements or are unquantifiable in landscape/townscape terms. Installation of VMS has potential for adverse effects if/where located within immediate setting of Listed Buildings, Scheduled Monuments located in close proximity to existing road corridors and, in the case of A483, within/adjacent to a Local Landscape Area between Rosset and	Throughout Study Area	Slight Adverse [1] – Neutral [2]

		Wrexham. With suitable mitigation where appropriate, proposed installations could be successfully accommodated and impacts completely mitigated.		
Bio-diversity		Options will help to reduce traffic within the study area, thereby potentially having some positive effects on the designated sites, habitats and species through reduction in emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions, although these are not considered to be significant. Options pose some ecological risk through the installation of signage, and create/improve walking and cycling facilities, which may infer very minor loss of woodland edge, mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species. A slight adverse effect will apply if signage etc is positioned outside of the highway (tarmac and pavement), this would include grass verges, hedgerows etc. The significance of effect could be reduced following mitigation to neutral.	Across the study area.	Slight Adverse[1]– Neutral[2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage		The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming that the scale of works is very small during construction, it is predicted that the potential to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected. Therefore, impacts are assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.	No impacts are predicted on the surface water environment.	Neutral
	Groundwater	Although the construction activities are not very extensive, the areas onsite associated with a Principal Aquifer or areas of total-catchment source protection zone have a high importance. With appropriate mitigation, this impact will	Impacts could occur across study area	Slight Adverse[1]– Neutral [2]

		reduce to a neutral impact.		
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required		Large Adverse[1]– Neutral [2]
Soils		Without mitigation, this package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. Soils of moderate agricultural value may also be lost. The operation has the potential to create new pollution, both through incidents and through the day-to-day running of the new/extended roadways. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Entire Study Area.	Slight Adverse[1]- Neutral[2]
Social				
Transport Safety		Improved safety of existing walking/cycling routes. Shift from car to safer transport modes. VMS/signage/slip road reductions should improve the safety of the strategic highway, may increase trips and accidents on urban.	Benefits at locations where improvements are made. Potential disbenefits on urban roads suffering traffic diversion.	Slight Benefit
Personal Security		Improvements to walking and cycling routes and secure cycle parking at public transport interchanges should improve personal security.	Benefits at locations where improvements are made.	Slight Benefit
Permeability		Improved access for those with limited mobility as well as increased awareness of existing opportunities.	Benefits throughout the study corridor.	Slight Benefit
Physical Fitness		Improved integration of walking and cycling with other modes could increase this modal shift for more long distance trips.	Throughout the study area, but benefits will be felt locally.	Slight benefit
Social Inclusion		Improved accessibility to key destinations by walking, cycling, bus and rail. Improved interchange opportunities, quicker bus journeys and access to Manchester airport, promoting social inclusion. Slip road closures may reduce accessibility for some trips.	Benefits throughout the study corridor. Potential disbenefits for locations near to slip road closures.	Slight Benefit
Equality, Diversity & Human Rights		Improved accessibility for disability groups and those without access to a car.	Benefits particularly for those without access to a car.	Slight Benefit
Public Acceptability: Potential opposition to local slip road closures.				
Acceptability to other Stakeholders: Consultation indicated that stakeholders did not feel that this package went far enough to resolve the issues with strategic travel. There may be lack of support for some bus priority options.				
Technical and Operational Feasibility: Walking and cycling improvements feasible. Integration of cycling with public transport requires support from PT operators (not forthcoming). Simple integrated ticketing feasible, but complex 'Oyster' system more difficult to implement. Rail improvements relatively straightforward to implement. Slip road closures may require local road improvements to mitigate the impacts.				
Financial Affordability and Deliverability: The relatively low cost of this package mean that it is considered to be financially affordable. In general options are considered to be deliverable.				
Risks: Deliverability issues associated with the bus priority and providing the additional facilities required to integrate cycling with passenger transport services.				

[1]Without Mitigation; [2]With Mitigation

Table 6.9: AST - Strategic Trips: Package 9. Capacity Enhancements

Option Description: Strategic Trips: Package 9. Capacity Enhancements			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £417m (2010 prices) The high capital costs are associated with significant highway and rail improvement schemes. The introduction of new bus routes will increase the vehicle operating costs of bus operators but should be offset by increased patronage and ticket revenues. Rail operating costs will increase due to increased frequency of services. Options that reduce congestion will result in lower fuel vehicle operating costs. Travel time benefits should be experienced by bus and rail passengers across the study area.	Majority of the benefits will be experienced by transport users on the strategic networks.	Moderate Beneficial
EALI	Potential substantial increase in economic activity and productivity within the NEWABTS study area and broader economy through the mitigation of specific highway transportation constraints and provision of multi modal accessibility	Potential substantial increase in the level of economic activity within the NEWABTS study area, leading to a minor displacement of GVA and jobs from broader competing locations, through the diversion of investment and employment.	Large Beneficial
Environment			
Noise	Qualitative. Traffic management along trunk roads are likely to have slight beneficial benefits. However, moderate adverse impacts would be expected from new road connecting A55 to A548.	Unknown at this stage	Slight Adverse
Local Air Quality	Qualitative. In general, the options are likely to have a slight beneficial impact, although significant adverse impacts could occur at some locations, for example should traffic volumes increase because of highway improvements or be brought closer to sensitive receptors as a result of road widening or realignment.	Unknown at this stage Transport options in one location, may have effects elsewhere so the location of these impacts is not possible to assess at this stage.	Slight Beneficial
Greenhouse Gas Emissions	Qualitative. In general, the options are likely to have a slight beneficial impact, although adverse impacts could occur at some locations, for example should traffic flows be increased along certain roads.	Global	Slight Beneficial
Landscape and Townscape	The majority of proposals will not have significant effect on landscape/townscape as they either comprise purely operational improvements; are unquantifiable in landscape/townscape terms; and/or, have not been developed sufficiently at this stage to be meaningfully assessed. Proposals to improve pedestrian and cycle links could have a potentially beneficial effect on the amenity value of the landscape/townscape resource.	Throughout Study Area, but primarily focussed on proposals to road corridors in proximity to settlements at Queensferry, Shotton, Ewloe, Northrop and Connah's Quay.	Large Adverse[1]– Moderate Adverse [2]

		Some options will have significant adverse effects due to the potential impacts associated with the new dual carriageway between A55 and A548, and due to both the individual and cumulative effect of a number of large scale road improvements to trunk roads and A roads. Potential impacts include the loss of Ancient Woodland, detrimental effects on the setting of Listed Buildings, urbanisation of the Greenbelt, temporary loss of existing roadside screen planting/mounding, the loss of locally characteristic landscape features and increases in visual intrusion within urban areas. With substantial landscape mitigation, it could be possible to successfully accommodate options of the scale proposed in most cases, and reduce potential effects in the longer term to moderate adverse.		
Bio-diversity		Works within or close to a number of internationally and nationally protected sites, such as the River Dee. Options pose ecological risk through the loss of woodland (including Ancient Woodland), mature trees, standing water, scrub and hedgerows. Likely to disturb wildlife corridors/habitats, which are likely to be important for a number of protected species. Large adverse effects will occur if appropriate mitigation is not implemented, in particular for the Dee crossing and new road. The significance of effect could be reduced following mitigation to slight adverse/neutral.	Across the study area.	Large Adverse [1]–Slight Adverse/Neutral [2] NB – Some unmapped options cannot be fully considered at this stage
Heritage		The majority of the affected heritage assets are post-medieval listed buildings. These could be impacted physically as well as visually depending on final designs. Dependant on possible design mitigation, the significance of this may vary. There is also the potential for impacting on previously unrecorded archaeological sites.	Heritage is seen as something having collective value to society. The distributional effects of impacts on heritage therefore do not need to be considered.	Moderate Adverse-Neutral
Water Environment	**Surface Water**	Assuming good practice is implemented during construction, impacts can be effectively mitigated. Assuming new treatment and containment facilities are installed as part of the new drainage system of the road network, it is predicted that this package is likely to result in neutral or even beneficial impacts to surface water environment (i.e. assuming that no appropriate treatment currently exists). Further assessment will be required during the design of stream crossings. If	Impacts could occur across the study area	Moderate Adverse[1]-Neutral[2]

		open span structures are proposed that maintain the riparian corridor, impacts may be completely mitigated. If works in riparian banks or new piers are required in the channel, significant impacts of moderate adverse magnitude may occur.		
	Groundwater	Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone (other areas of the site are of high importance due to Principal Aquifers in the north-east and generally being classified as total-catchment source protection zone). With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.	Groundwater Impacts are moderate adverse around the areas of inner source protection zone onsite; slight adverse elsewhere.	Moderate Adverse[1]-Neutral[2]
	Flood Risk	Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.	Impacts could occur across the study area	Large Adverse[1]-Neutral[2]
Soils		Without mitigation, this package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. In particular, several large projects (the new road connecting the A55 at Northop to the A548 at Kelsterton, the new cycle route between Mold and Deeside, and the new walking and cycling route along the Dee Coast) have the potential to present challenges with respect to contaminated land and/or Stability. Soils and Mineral resources of moderate value may also be adversely affected, depending on the final route(s) selected. The operation of the scheme has the potential to create new pollution, both through Incidents and through the day-to-day running of the new/extended roadways. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Entire Study Area. At the new road connecting the A55 at Northop to the A548 at Kelsterton, the new cycle route between Mold and Deeside, and the new walking and cycling route along the Dee Coast	Moderate Adverse[1]-Neutral[2]
Social				
Transport Safety		Off street provision improving transport safety for walkers and cyclists. Additional crossing opportunities reducing unsafe pedestrian crossing. General mode shift from car to safer sustainable travel modes. Reduction in accidents	Benefits across the study area focussing on locations where improvements are proposed.	Large Benefit

	involving HGVs. Improved safety of the strategic road network due to improvements to key links and junctions.		
Personal Security	Walking and cycling routes and pedestrian crossings will be constructed to current best practice to ensure perceived personal security. Bus and rail improvements will offer more direct routes, reducing perceived personal security risk associated with interchanging and walking to destinations. Truck stops will reduce night time risk of crime for HGV drivers.	Benefits across the study area focussing on locations where improvements are proposed.	Moderate Benefit
Permeability	New crossing opportunities of the strategic road network and walking and cycling links. New A55 to A548 link may present a severance barrier to a few residents.	Benefits particularly for those living near to the strategic road network. Potential disbenefits for the few living near to the A55 to A548 link.	Moderate Benefit
Physical Fitness	New cycle routes should encourage more cycling trips for work, and increases in physical fitness levels	Benefits across the whole study area	Slight Benefit
Social Inclusion	Improved accessibility to employment opportunities by walking, cycling, bus and rail. Taith Express and rail improvements open up accessibility to opportunities elsewhere in North Wales and England.	Benefits across the whole study area and beyond particularly for deprived areas with low car ownership.	Large Benefit
Equality, Diversity & Human Rights	Benefits particularly for disability groups and those without access to a car.	Benefits particularly for those without access to a car.	Slight Benefit
Public Acceptability: Public consultation has not yet been undertaken.			
Acceptability to other Stakeholders: Stakeholder consultation indicates moderate support. Stakeholders questioned the value of cycle improvements on commuter car trips, the likely patronage of Taith Express services and cross Dee bus routes.			
Technical and Operational Feasibility: Land purchase requirements. Bus routes will depend upon business case and likely patronage. Rail services will require rolling stock, turnback facilities and impact upon wider rail network. Truck stops difficult to gain planning approval and investment. Physical constraints limit possibility of hard shoulders in some locations. Online highway improvements will have a significant impact on traffic during construction.			
Financial Affordability and Deliverability: There is a significant financial cost associated with this package and is hence the package as a whole is considered not financially affordable and deliverable.			
Risks: Significant financial affordability risk due to the high cost of the overall package.			

6.2 Stage 1 Detailed Appraisal Elements

This section of the report will outline the detailed appraisal of each of the packages against the Welsh Impact Areas; economy, environment and society. The packages' acceptability to stakeholders and the public are discussed, together with their technical and operational feasibility and financial affordability, deliverability and risk. The subsequent section of the report will compare the performance of the assessed packages to allow a preferred strategy to be identified. Additional background information on the appraisal process relating to economy, environment and health can be found in the following appendices.

Appendix B: Economic Activity and Location Impacts (EALI) Report
Appendix C: Environment Report
Appendix D: Habitat Regulations Assessment (HRA)
Appendix G: Health Impact Assessment (HIA)
Appendix I: Equalities Impact Assessment

Package 1: Managing Demand (Area Wide Package)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of the Area wide, Managing Demand - Package 1 is estimated at £1 million (2010 prices).

The capital cost is likely to be comparably small, as there is no transport infrastructure included as part of the package.

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from road to other modes. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and reduction in fuel costs for all motorised road users.

The following options will encourage a mode shift away from road and reduce vehicle operating costs:

- Promotion of walking and cycling options will lead to a small reduction in VOCs across the whole of the study area. The reduction in trips is likely to come from commuter and leisure trips, but is unlikely to affect the number or length of business trips.
- Promotion of rail freight as a possible alternative to road will lead to a mode shift from HGV to rail leading to a reduction in delays and journey times on strategic routes leading to a small reduction in VOCs for all road users.
- Promotion of car clubs, car sharing and work place travel planning will reduce the number of solo-private car trips particularly in peak times leading to a small reduction in VOCs for all road users across the study area.

Greater awareness of freight exchanges by freight operators will reduce empty running and the number of vehicles required. This will lead to a reduction in congestion and traffic delays on local and strategic routes contributing to a reduction in vehicle idle time and fuel costs for all motorised road users.

Future increases to VOCs, due to increased traffic volumes and congestion will be constrained by options to mitigate the adverse effect of future developments and improving the linkages between development plans and transportation plans.

Travel Time Savings
Walking and cycling options aimed at reducing private car use for short to medium length journeys would help to reduce delays and journey times for all motorised road users.

A modal shift of freight trips to rail and more efficient use of existing HGV freight journeys will lead to a small reduction in highway delays and journey times for all road users throughout the study area.

Small to moderate travel time savings are likely for road users due to the modal shift away from single occupancy private car use to car sharing and car clubs for medium to long distance trips.

Options to mitigate the adverse effect of future developments and improving the linkages between development plans and transportation plans will help to reduce travel times.

Revenues and User Charging
Promotion of walking and cycling may reduce public transport operator revenues due to a greater number choosing to walk or cycle instead of using public transport.

Promotion of car clubs, car sharing and work place travel planning will reduce the number of private car trips decreasing indirect fuel tax revenue.

Freight operators' revenue would increase if transferring road freight to rail is a more cost effective option. A reduction in the number of HGV freight trips would decrease indirect fuel tax revenue.

Reliability
The reliability of highway trips in the transport corridor should improve due to options aimed at encouraging a mode shift away from road or more efficient use of existing road trips, reducing congestion.

Grant, Subsidy and any Developer Contributions
Assisting the TAITH partnership in Promoting the Use of Rail Freight has potential to be part funded by Network Rail. Developers within the study area could be asked to contribute to these options as part of section 106 agreements.

Economic Activity and Location Impacts (EALI)
In principle sustainable modes provide more opportunity for interaction with local communities and amenities, combined with associated employee health benefits, which potentially results in a minor increase in productivity and economic activity. However, based on the options within this package, the economic impact generated by this response is likely to be minimal.

Overall it is anticipated that this package will have a **slight beneficial impact** on the level and location of economic activity within the study area.

Environment

Noise
The options to reduce car usage and improve freight logistics will tend to reduce traffic volume and therefore reduce noise. The most likely outcome is that these benefits will not be widespread and therefore an overall assessment of the impact is **neutral.**

Local Air Quality
A reduction in travel demand and hence a reduction in traffic volumes on roads within the study area will have a **slight beneficial** impact on local air quality. Although overall beneficial, this impact is unlikely to be of significance at the majority of sensitive receptors.

Greenhouse Gas Emissions
The package should result in a reduction in travel demand and hence a reduction in traffic volumes on roads within the study area, this is likely to have a **slight beneficial** impact on greenhouse gas emissions.

Landscape and Townscape
This package does not include any options which propose a physical change to the landscape/townscape resource and as such no direct impacts to landscape/townscape are anticipated within the study area; the scale of impact would be **neutral**.

Biodiversity
The options will help to reduce traffic within the study area, thereby potentially having positive effects on the designated sites, habitats and species in the study area through reduction in emissions. Cleaner surface water run-off from roads and a reduction in potential wildlife/vehicle collisions. Hence, **no significant negative residual impacts** have been identified.

Heritage
This package will **not have any adverse impacts** on known or previously unrecorded cultural and built heritage. If the stated objective of reducing road traffic is achieved, this may result in a slight beneficial effect on elements of built heritage. This is due to members of the public being able to appreciate the character of the built heritage by enhancing the setting.

Soils
As this package has no intrusive options proposed, it is considered to have a **neutral impact**.

Water Environment
This package would not involve any construction activities, therefore no construction impacts on the water environment are expected. During the operation phase impacts are all assessed to be **negligible**.

Social

Transport safety
This package is likely to slightly increase levels of walking and cycling in the study area, which may increase the number of accidents. However, if vehicle drivers become more aware of and used to seeing walkers and cyclists they may also drive in a more considerate manner. The options in this package should also help to reduce the number of single occupancy cars using the study area roads, which will help to improve transport safety. The freight elements of the package should also slightly reduce the number of HGV trips in the study area, moving some of these trips to rail freight, a much safer mode of transport. This should reduce the number of accidents relating to HGVs.

Overall it is anticipated that this package will have a **slight beneficial** impact on transport safety in the study area.

Personal security
Personal security for walkers and cyclists should improve due to reduced risk and fear of crime due to an increase in the numbers of people using existing walking and cycling routes. Improved facilities for cyclists at employers, such as secure cycle parking, should reduce the risk of bicycle theft.

The parking management elements of this package are likely to result in a shift towards public transport, walking and cycling. Some people may perceive these modes of transport as offering lower levels of personal security than the private car.

Overall it is anticipated that this package will have a **neutral impact** on personal security.

Permeability
This package does not involve any changes to infrastructure and is therefore not anticipated to have an impact on physical levels of permeability. The publicity elements of the package may increase awareness of existing walking and cycling and cycling links which people were unaware of, which may increase permeability for these individuals. Ensuring that future developments mitigate any adverse impacts on the transport network may also lead to severance issues which may otherwise have occurred being overcome.

Overall it is anticipated that this package will have a **slight beneficial** impact on permeability in the study area.

Physical fitness
This option seeks to reduce the demand for travel across the whole study regions, and include options to encourage walking and cycling within the work force. As a general rule, the further and the longer you can encourage users to walk and cycle for, the better for their health. Encouraging a modal shift within the work force, increasing the levels of walking and cycling will help improve physical fitness.

It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

There are four main employment areas identified within the study area, Chester Business Park, Broughton (Airbus), Wrexham Industrial Estate and Deeside Industrial Park. All these areas have considerable residential populations within a 5Km radius, and all but Wrexham Industrial estate have large populations within a 2Km radius. For example, Broughton (Airbus) has around 3,900 people within 2Km, and 31,000 within a 5Km radius. This includes the western side of Chester, and Queensferry. Encouraging the workforce local to Broughton to cycle or walk to work would help to improve physical fitness within the work force.

Furthermore, this package includes local publicity campaigns, to promote the benefits of walking and cycling, and the current facilities available to accommodate this. These options will also help to encourage a modal shift towards walking and cycling again improving the health of the public, by encouraging exercise and physical fitness. This package will have **slight benefit** on physical fitness.

Social inclusion
This package should promote social inclusion through reducing some of the barriers preventing accessibility. For instance, improving facilities for walking and cycling at businesses may facilitate people who do not have access to a car being able to access employment at these locations. Improved linkages between economic development and transportation plans may result in a pattern of development which offers improved access to key services for deprived groups without access to a car. The parking management elements of this package may result in workers being unable to park near to their place of work. Where alternative forms of transport are not available this may lead to social exclusion impacts.

Overall it is anticipated that this package will have a **slight beneficial** impact on social inclusion within the study area.

Equality, Diversity & Human Rights
This package does not involve any physical changes to the existing transport network, so the equality, diversity and human rights impacts are likely to be limited.

Some of the improvements proposed, such as funds for businesses to invest in walking and cycling facilities will benefit those without access to a car, which is likely to lead to a positive benefit for socially deprived groups.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **neutral impact** upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not yet been undertaken. Stakeholders felt that there could be public opposition to the parking strategy elements of this package.

Acceptability to other stakeholders
Stakeholder consultation indicated overall support for this package. Consultees agreed with the principles of managing demand and promoting alternatives to car travel, but felt that options needed to be carefully targeted to ensure results. Consultees agreed that there was a need to ensure policies were integrated and that future developments were planned so as to limit impacts on the transport network.

Technical & Operational Feasibility
This package of options does not involve any construction or changes to the physical infrastructure in the study area. This should make it feasible, however it does require an ongoing staff resource to implement the various options.

Financial Affordability, Deliverability

Table 6.10 – Cost and Delivery Agents - Package 1: Managing Demand (Area Wide Package)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Funds for businesses to invest in walking and cycling facilities	0.05	Local Highway Authorities	29
	Encourage employers to increase cycling within its work force	0.1	Local Highway Authorities	30
	Develop a local publicity campaign to promote walking and cycling	0.25	Local Highway Authorities	31
Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	0.05	Taith / Network Rail	75
	Freight Exchange	0.01	WG / Taith	78
Other	Ensure that future developments mitigate any adverse impacts on the transport network	0	Highway & Planning Authorities	88
	Improve linkages between economic development plans and transportation plans.	0	-	90

Demand Management	Promoting car clubs and car sharing	0.50	Local Highway Authorities	93
	Workplace Travel Planning	0.04	Local Highway Authorities	96
	Parking management strategy	0	Local Highway Authorities	97

The total cost of this package is approximately £1m. There are potentially 4-5 delivery agents identified for this package

Suitable funding sources have yet to be identified, but smarter choices options such as these have been shown to represent good value for money in comparison to infrastructure improvements.

The options contained within this package have all been undertaken elsewhere in the UK, indicating that they are deliverable with known risks.

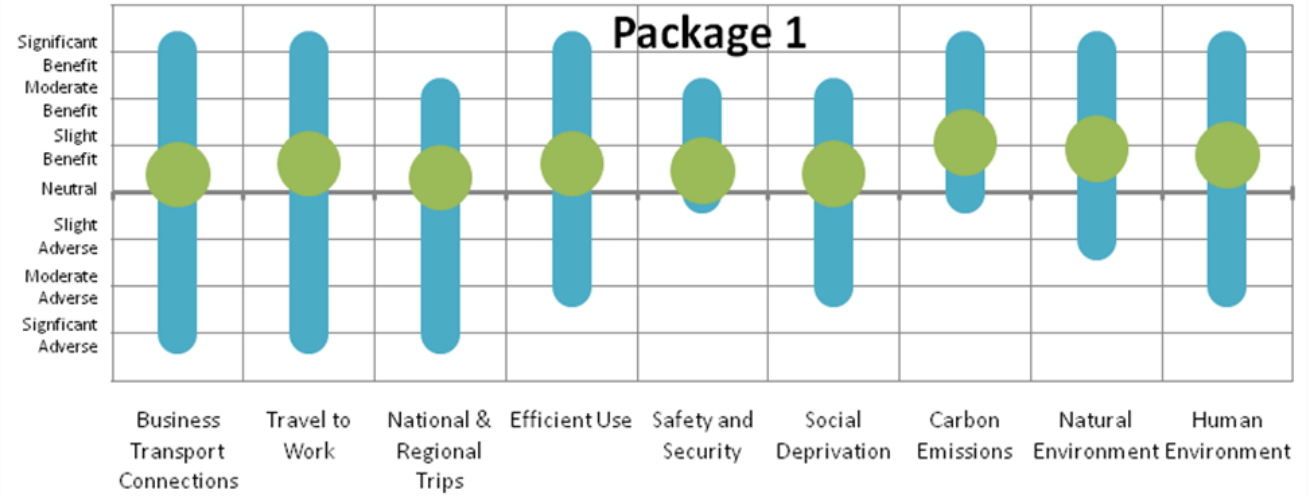
The parking management element of this package may not be popular with the public, which may lead to political pressure to remove this element from the package.

Risk
The low cost of this package means that the financial risk is low.

Demand management option need to have a suitable staff resource available to help implement the included options. Many of the options also require employers or other groups to engage with the delivery agent to implement the package element. This requirement for third party involvement represents a risk to the deliverability of the package.

Assessment Against TPOs
The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.1. This shows that stakeholders considered the package to contribute positively to all of the Transport Planning Objectives. However the range of responses from stakeholders to the impacts of this package was quite varied, with some feeling that the package contributed significantly to the objectives, and others feeling that it would have a significant negative impact.

Figure 6.1: Managing Demand (Area Wide): Stakeholder Assessment



To improve transport connections for businesses within the study area to key economic centres and employment sites.
This package will help to reduce levels of single occupancy car use in the study area. This should lead to a slight reduction in traffic levels on key routes through the corridor. This will help to improve transport connections for businesses. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.
This package seeks to overcome some of the barriers preventing use of public transport, walking and cycling to access workplaces through options such as workplace travel planning and walking and cycling publicity. This will increase awareness amongst workforce catchments of existing transport opportunities, improving accessibility. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.
This package will help to reduce levels of single occupancy car use in the study area. This should lead to a slight reduction in traffic levels on key routes through the corridor. This will help to facilitate national and regional trip movements through the study area.

A freight exchange and the promotion of rail freight should both help to facilitate the more efficient transport of freight through the study area.

Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To improve the actual and perceived safety and personal security of all transport users in the study area.
This package is likely to slightly increase levels of walking and cycling in the study area, which may increase the number of accidents. However, if vehicle drivers become more aware of and used to seeing walkers and cyclists they may also drive in a more considerate manner. Personal security for walkers and cyclists should improve due to reduced risk and fear of crime due to an increase in the numbers of people using existing walking and cycling routes. Improved facilities for cyclists at employers, such as secure cycle parking, should reduce the risk of bicycle theft.

The options in this package should also help to reduce the number of single occupancy cars using the study area roads, which will help to improve transport safety.

The freight elements of the package should also slightly reduce the number of HGV trips in the study area, moving some of these trips to rail freight, a much safer mode of transport. This should reduce the number of accidents relating to HGVs.

The parking management elements of this package are likely to result in a shift towards public transport, walking and cycling. Some people may perceive these modes of transport as offering lower levels of personal security than the private car.

Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package should help to reduce social deprivation through reducing some of the barriers preventing accessibility. For instance, improving facilities for walking and cycling at businesses may facilitate people who do not have access to a car being able to access employment at these locations. Improved linkages between economic development and transportation plans may result in a pattern of development which offers improved access to key services for deprived groups without access to a car. The parking management elements of this package may result in workers being unable to park near to their place of work. Where alternative forms of transport are not available this may lead to social exclusion impacts.

Overall it is anticipated that this package will have a **slight beneficial** impact on this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package involves options to try to change people's behaviour and make better use of existing public transport, walking and cycling infrastructure. No new infrastructure or maintenance is proposed as part of this package. It can therefore be considered to **moderately contribute** to this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package should slightly reduce the use of the private car, with trips switching to public transport, walking and cycling. This will be **slightly beneficial** in reducing carbon emissions from transport the study area.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
Reductions in private car use as part of this package will be slightly beneficial in terms of local air quality, but are unlikely to have an influence on water, soil pollution or biodiversity. Overall the impacts of the package on the natural environment are likely to be **neutral**.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.
This package does not involve any changes to infrastructure in the service area and the impacts of the behavioural change options on traffic levels are likely to be slight. The impacts on the human environment in terms of air, noise, light pollution and landscape and townscape are therefore likely to be **neutral**.

Corridor: Flint / Mold - Chester (via Deeside / Broughton)

Package 2: Making Best Use (Flint/Mold – Chester)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs

The capital cost of the Flint/Mold - Chester – Level 2 package is estimated at £10.4 million (2010 prices).
£6 million is associated with highway infrastructure options and £3 million associated with bus options.

Vehicle Operating Costs (VOCs)

There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- Integrating walking and cycling with public transport will lead to a small reduction in VOCs across the corridor/study area.
- Safety and signing of walking and cycling routes will lead to a small reduction VOCs across the corridor/study area.
- Improving bus and rail integration making multi-modal journeys easier will lead to a small reduction in VOCs across the corridor/study area.
- The introduction of area wide ticketing and real time information at bus stops will lead to a small reduction in VOCs across the corridor/study area
- Improving the connection between rail and bus services at Shotton combined with improved station accessibility will lead to a small reduction in VOCs across the corridor/study area

Bus priority at key junctions and the B5129 and area wide ticketing has the potential to decrease bus operating costs through a reduction in fuel and non fuel costs. Junction design favouring buses has the potential to Increase delays for other (non-bus) road users leading to a small increase in VOCs across the study area.

Minor on-line highway improvements along the B5129 between Connah's Quay and Queensferry will negate the impacts of bus priority on other motorised modes.

Improvements to the Alltami signals would reduce congestion on the A494; junction delays will decrease for all vehicles and reduce vehicle operator operating costs of bus, freight operators and general traffic.

Minor on-line improvements along the A5104 between Broughton and Saltney to remove pinch points will decrease delays for all vehicles and reduce vehicle operator operating costs of all road users.

Travel Time savings

The options identified as encouraging a mode shift away from private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes throughout the study area.

Travel time savings resulting from walking and cycling options are likely for road users. Short and medium length car trips will reduce as a direct result of a mode shift from private car. Improved walking and cycling integration with public transport interchanges and improved railway accessibility will encourage longer distance trips to shift from private car use, further decreasing congestion and travel times.

Bus priority at key junctions and the B5129 between Connah's Quay and Queensferry will improve bus travel times.

Reductions in bus journey times due to priority at key junctions and area wide ticketing has the potential to be offset by increased passenger numbers and bus dwell times from options aimed at increasing bus patronage. Similarly the time saving to other (non-bus) modes resulting from a modal shift to buses may be offset by bus priority at key junctions increasing journey times.

Rail journey times will remain unchanged.

Improvements to the Alltami signals on the A494 will decrease delays for all vehicles and reduce travel times. Minor on-line improvements along the A5104 between Broughton and Saltney and on the B5129 between Connah's Quay and Queensferry will decrease delays and journey times for all vehicles.

Revenues and user charging
A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues.

Bus operator revenues will increase due to increased passenger numbers from the following options:

- Improvements to cycling facilities at transport interchanges;
- Bus priority at key junctions and the B5129;
- Area wide ticketing.

Rail operator revenues will increase due to increased patronage as a result of improved station accessibility and improved connections with bus services.

Reliability
The reliability of highway trips in the in the study area should increase due to the combination of walking and cycling, bus and rail options aimed at encouraging a mode shift away from private car use, reducing congestion.

The reliability of bus services should be expected to increase due to bus priority at key junctions and along the B5129. Integrated area ticketing would reduce bus dwell times and improve service reliability, even with increased patronage.

Bus priority at key junctions would decrease the journey reliability of other motorised modes except along the B5129 where additional on-line highway improvements would improve reliability.

Improvements to the Alltami signals on the A494 and minor on-line improvements along the A5104 between Broughton and Saltney will decrease delays increasing reliability for all motorised modes.

Grant, subsidy and any developer contributions
There is potential for bus operator contributions towards area wide ticketing, provision of real time information and integrating cycling with passenger transport services.

All rail options included in this package could be subject to contributions from Network Rail.

Economic Activity and Location Impacts (EALI)
Based on economic structure of this corridor, the options within this package are likely to generate a positive economic response in both GVA and jobs throughout the corridor. Key economic benefits are produced through the improved resilience of the highway network, specifically options which tackle congestion within the B5129 Connah's Quay area, A5104 Broughton to Saltney corridor and the Alltami signals along the A483 Mold to Deeside corridor. These options are likely to increase the level of productivity and employment within the corridor through improved accessibility and reliability. This is likely to lead to the expansion of existing businesses, related to specific locational options, such as the retail centre within Broughton and Deeside Industrial Park. However the majority of options within this package support the existing economy rather than encouraging it to expand.

Essentially this package improves the linkages between key labour market locations and employment centres within the corridor through "Making Best Use" methods. However the net economic response is likely to be restricted by remaining strategic transit problems within the broader transport network and to the level of accessibility benefit provided by the options. The improvements within this corridor are likely to generate a minor displacement of GVA and employment towards the corridor from competing local locations.

Overall it is anticipated that this package will have a **moderate beneficial** impact on the level and location of economic activity within the corridor and study area.

Environment
Noise
Most of the non-highway options will have little impact on noise. Reduced congestion along the B5129 may have a slight adverse impact on noise due to associated increase in speeds at certain times of the day. Overall assessment is **neutral**.

Local Air Quality
Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality, however, the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations. Options aimed at

encouraging bus patronage have the potential to have a slight beneficial impact on local air quality. It is important that theses buses are of the highest emissions standard possible in order to maximise any air quality benefits.

The effect of bus priority options such as signal priority could lead to increased congestion for other vehicles and hence adverse air quality impacts. Improved station accessibility is unlikely to have a significant impact on local air quality unless it significantly reduces congestion outside the station.
Those options aimed at improving highway traffic flows have the potential to have a **slight beneficial** impact on local air quality should they lead to a reduction in congestion and therefore reduced emissions.

Greenhouse Gas Emissions
Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions, however the magnitude of such impacts are likely to be relatively small.
Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions. It is important that theses buses are low carbon emitters in order to maximise any emissions benefits. Improved station accessibility is unlikely to have a significant impact on greenhouse gas emissions. Those options aimed at improving highway traffic flows have the potential to have a **slight beneficial** impact on greenhouse gas emissions should they lead to a reduction in congestion.

Landscape and Townscape
The majority of options proposed are unquantifiable in landscape/townscape terms due to the type or scale of the proposal.

It is recognised that a number of options would be beneficial in terms of improved accessibility and permeability for non-motorised users in urban areas, the changes proposed would not have a significant direct, physical effect upon landscape or townscape as a resource, due to the small scale of the change.
There is potential for slight adverse effects upon the landscape/townscape in relation to the minor online highway improvements to the B5129 within Connah's Quay and Queensferry and A5104 between Broughton and Saltney.

Overall the package could have a potentially **Slight Adverse** effect.

Biodiversity
The walking, cycling, bus and rail options which aim to reduce traffic flow within the study area, could have positive effects on the designated sites, habitats and species within the study area through reduced emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions.

The highway improvement schemes could have a **slight/moderate adverse** impact on designated sites including Natura and Ramsar if works will not be fully contained within the existing highway boundary when close to these sites.

Heritage
The cultural heritage sites which could be impacted with the proposed changes in the area are listed buildings within the centres of the towns and villages, in particular Flint, Mold and Chester. There are listed buildings at the majority of the railway stations where alterations are proposed to take place at these locations. There are also listed buildings along the high streets of Connah's Quay and Broughton. There could be impacts on Conservation Areas in the study area, especially where options pass through the towns.

Soils
Construction impacts of this package are the potential creation of new pollutant linkages to pre-existing contamination and potential loss and destruction of agricultural soils. The operational impacts of this package are the potential creation of migration pathways for potential contaminants.

This package is predicted to have a moderate adverse impact. However, providing appropriate mitigation is implemented, the impacts can be effectively reduced to **neutral.**

Water Environment
Assuming that the scale of works during construction is very small, it is predicted that the potential to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected.

Although the construction activities are not very extensive, the areas on site associated with a Principal Aquifer or areas of total-catchment source protection zone have a high importance. With appropriate mitigation, the impact on ground water will reduce to a neutral impact.

Assuming good practice is followed during construction, the construction impacts on flood risk can be effectively mitigated. During the operation phase impacts on flood risk are all assessed to be **neutral.**

Social

Transport safety

This package should improve transport safety for walkers and cyclists through improvements to the safety of existing walking and cycling routes along the corridor between Flint, Mold and Chester. Improved integration between transport modes, including bus, rail and walking and cycling should improve the safety of transferring between these modes. The package should also encourage higher levels of bus and rail use, through mode shift from car use. This will improve transport safety as these modes are typically safer than private car use.

Improvements to walking and cycling facilities should encourage higher levels of walking and cycling, which may lead to higher numbers of vulnerable road users, but should also help to create a culture of walking and cycling where drivers are aware of the likelihood of seeing walkers and cyclists and drive appropriately.

Minor online highway improvements between Broughton and Saltney should also help to improve safety for all road users along this section of road.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon transport safety along this corridor.

Personal security

This package should overcome some of the perceived personal security issues with the existing key walking and cycling routes between Flint, Mold and Chester. Improved interchange facilities will also reduce the likelihood and fear of crime when switching between modes. Real time passenger information will provide better information about likely wait times, reducing uncertainty. The options in general should help to encourage higher levels of public transport use, walking and cycling improving perceived and actual personal security through greater levels of surveillance by fellow transport users.

Overall it is anticipated that this package will have a **moderate beneficial** impact on personal security.

Permeability

This package does not provide any new transport opportunities, instead it improves existing ones. The improvements to walking and cycling links may make certain routes suitable to people with limited mobility, who would otherwise be unable to use some current routes. Signage of walking and cycling links will make people aware of routes they may previously not have known about, offering increased permeability. Improved station accessibility may also make rail stations more accessible to pedestrians.

Overall it is anticipated that this package will have a **slight beneficial** impact on permeability within the study area.

Physical fitness

This option seeks to make more efficient use of existing transport facilities, and focuses on the transport corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park, or Buckley and Broughton. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Therefore encouraging a modal shift away from unsustainable modes towards walking and cycling will help improve physical fitness within this corridor.

It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options within this package include the provision of additional secure cycling at public transport interchanges, additional signage of existing walking and cycling routes and improvements to safety and security on existing routes used by walkers and cyclists. The aim of this package is to encourage a modal shift to walking and cycling, without providing substantial infrastructure improvements.

Linking Flint with Chester is National Cycle Route 5, which between Chester and Connah's Quay provides 8 miles of dedicated off road cycling. From Connah's Quay, route 5 continues for 4 miles into Flint by road. This creates a cycling time of around 1 hour from Flint to Chester, which whilst challenging would be achievable for keen cyclists, with the majority of the route being traffic free. Furthermore, this route would take users past Shotton Station, allowing for joined up travel between cycling and public transport. Improved signage, or improvements to the perceived safety of these existing routes could help encourage a modal shift of trips through this corridor area to walking and cycling, improving physical fitness.

This option package also includes improvements to the local highway, specifically looking at improvements to the B5129 through Connah's Quay. There is a possibility that improvements to the local road network to reduce congestion will encourage people who currently walk or cycle to work to take more unsustainable modes. This has the potential to reduce the physical fitness in the corridor. However, it is not considered that improvements to the local network will encourage a substantial shift to private vehicles, therefore this package will have a **slight benefit** on physical fitness levels.

Social inclusion
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services. Whilst no new routes or services are proposed as part of this package the improvements to existing facilities and improved integration should help those without access to a car to access important destinations, promoting social inclusion.

Overall it is anticipated that this package will have a **slight beneficial** impact on social inclusion.

Equality, Diversity & Human Rights
The improved safety and security of existing walking and cycling routes should improve accessibility for disability groups as should improved non car accessibility at stations. Improvements to bus services, such as real time passenger information and integrated ticketing should benefit women, the young and old; who typically make the greatest use of bus services.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit to deprived groups.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not been undertaken, however it is considered that this package would be generally supported. Car drivers may however oppose bus priority if it was to delay general traffic.

Acceptability to other stakeholders
Stakeholder consultation has indicated that this package would be supported, however some options, such as cycle carriers on buses were considered to be unfeasible and other options, such as integrated area ticketing and real time passenger information were considered to have been suitably implemented already. Consultees did not believe that there was sufficient carriageway width to allow bus priority along the B5129 without causing unacceptable delays for general traffic.

Technical & Operational Feasibility
The majority of the walking & cycling options could be achieved using interventions that are proven to work effectively, such as secure cycle parking, lighting and signage of cycle routes. However, integrating cycling with other passenger transport services may prove less feasible on operational grounds. This is due to lack of space for cycle storage in train carriages and opposition to cycle carriers on buses from bus operators.

Simple integrated area ticketing such as 'plus bus' schemes are already operational at some rail stations in the area, more complex systems that use an 'Oyster Card' style system would be more difficult to implement. Bus priority along the B5129 could be achieved through the use of bus lanes and bus priority at signals. However a lack of space at key junctions would restrict the operational effectiveness of the proposal and increase delays for other vehicles.

Highway improvements to the Alltami signals and Broughton/Saltney area should be technically feasible, but the extent to which significant improvements can be made in the constrained Connah's Quay/Queensferry area may be limited, with significant construction impacts.

Financial Affordability, Deliverability

Table 6.11 – Cost and Delivery Agents - Package 2: Making Best Use (Flint/Mold – Chester)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	0.05	Local Highway Authorities	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	0.1	Local Highway Authorities / Public Transport Operators	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.15	Local Highway Authorities	35
	Provide additional signage for walkers and cyclists	0.05	Local Highway Authorities	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	1	Local Highway Authorities	42
	Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry.	1	Flintshire CC	
	Improve rail and bus integration	0.15	Local Highway Authorities / Public Transport Operators	45
	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	46
	Real time passenger information at bus stops	0.2	Local Highway Authorities / Public Transport Operators	101
Rail	Improved station accessibility (non-car station access)	0.1 – 0.3	Network Rail / Local Highway Authorities	55
	Improved connection between rail and bus services at Shotton stations	1	Network Rail / Flintshire CC	106
Highway	Improvements to Alltami Signals	0.4	Flintshire CC	8
	Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay	5	Flintshire CC	9
	Minor on-line improvements between Broughton and Saltney	0.6	Flintshire CC	103

The total cost of this package is approximately £10.4m. There are 4 delivery agents identified for this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, integrating cycling with other passenger transport services will be more difficult to deliver due to the required negotiations with public transport operators.

Despite the benefits to bus passengers, bus priority at key junctions and along the B5129 is likely to be difficult to deliver due to the cost of the scheme and lack of support from the local highway authority.

Risk

The low cost of this package means that the financial risk is low.

A risk associated with this package is the deliverability issues associated with the bus priority along the B5129 and providing the additional facilities required to integrate cycling with passenger transport services.

Highway and bus priority options are at risk of causing additional delays to traffic during the construction period.

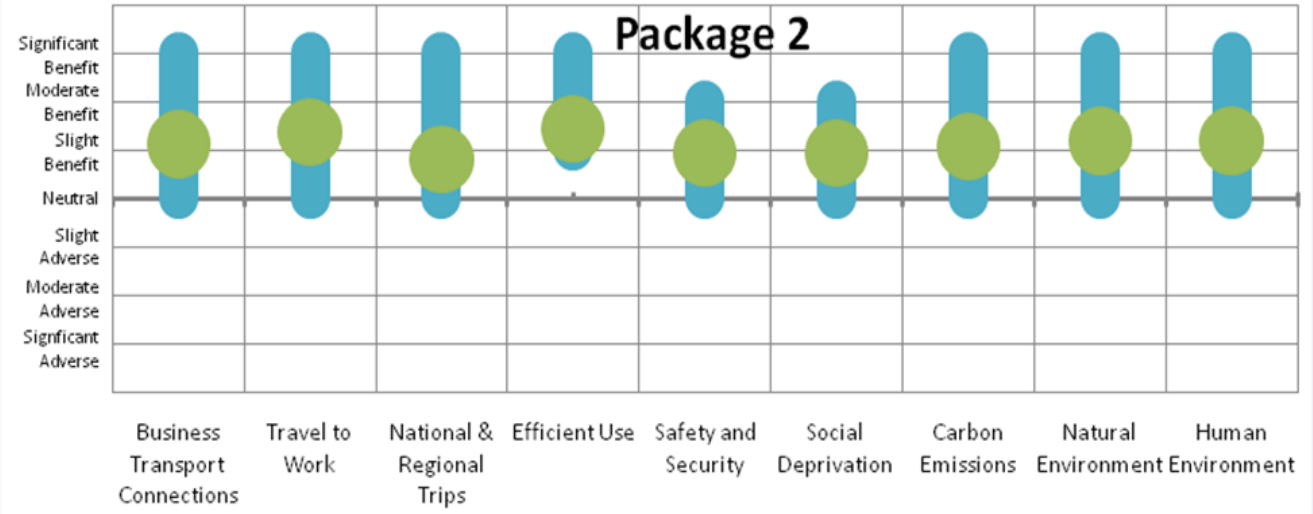
There is a risk that bus priority at key junctions has the potential to cause additional delays to other motorised vehicles.

Rail and Bus options require full support from Network Rail and transport operators.

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.2. Stakeholders have indicated positive approval of this package across all Transport Planning Objectives, but particularly travel to work and efficient use. The range of stakeholder views is quite narrow, with no stakeholders considering the package would have a negative impact on any of the Transport Planning Objectives.

Figure 6.2 Making Best Use (Flint/Mold – Chester): Stakeholder Assessment



<u>To improve transport connections for businesses within the study area to key economic centres and employment sites.</u>

This package will help to improve transport connections along the corridor from Mold to Chester through improvements which encourage a shift away from private car use as well as improvements to the road network to reduce congestion and delays. Businesses will therefore benefit from this reduction in delays for required trips along this corridor. This corridor contains a number of key employment sites requiring connections for business, such as between Flint and Connah's Quay and Deeside and Chester. This package is unlikely to influence the transport connections that businesses require to important destinations further afield. Overall it is anticipated that this package will **slightly contribute** towards this Transport Planning Objective.

<u>To improve access between employment sites and workforce catchment areas.</u>

This package includes improvements to existing walking and cycling routes, improved opportunities to interchange onto public transport and better bus and rail integration. These options will help to improve the public transport and walking and cycling connections between the major employment sites along the study corridor and workforce catchments.

Bus priority and options to reduce congestion along the B5129 will help improve accessibility by public transport and car between the workforce catchment areas of Connah's Quay, Shotton and Queensferry and employment sites including Deeside Park, Sandycroft Broughton and Chester.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.

This package contains a number of improvements to local walking, cycling, public transport and highway routes. These improvements mainly relate to local trips, rather than national or regional trip movements limiting the impact on strategic trips. However, improvements to local routes may encourage people to use these local routes rather than the current high levels of local use of the strategic highway. This will help to ensure that the strategic routes through the study area can facilitate necessary national and regional trip movements.

Overall it is considered that this package will provide a **slight positive impact** upon this transport planning objective.

To improve the actual and perceived safety and personal security of all transport users in the study area.
This package should improve transport safety and personal security for walkers and cyclists through improvements to the safety and security of existing walking and cycling routes along the corridor between Flint, Mold and Chester. Improved integration between transport modes, including bus, rail and walking and cycling should improve the safety and reduce the fear of crime when transferring between these modes. The package should also encourage higher levels of bus and rail use, through mode shift from car use. This will improve transport safety as these modes are typically safer than private car use and increased use of these modes should improve personal security due to greater levels of informal surveillance.

Improvements to walking and cycling facilities should encourage higher levels of walking and cycling, which may lead to higher numbers of vulnerable road users, but should also help to create a culture of walking and cycling where drivers are aware of the likelihood of seeing walkers and cyclists and drive appropriately.

Minor online highway improvements between Broughton and Saltney should also help to improve safety for all road users along this section of road.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package should improve the accessibility of the local population in deprived areas such as Flint and Connah's Quay to employment opportunities in Deeside Park and Chester and other key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services. Whilst no new routes or services are proposed as part of this package the improvements to existing facilities and improved integration should help those without access to a car to access important destinations helping to reduce social deprivation.

Overall it is anticipated that this package will have a slight beneficial impact on this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package seeks to make more efficient use of existing walking, cycling, public transport and highway infrastructure along the corridor from Flint to Chester. This package identifies a series of improvements to existing infrastructure which will help to make these transport modes more efficient, overcoming pinch-points and maintenance issues which currently affect the efficiency of these routes.

Overall it is considered that this package has a **large benefit** towards this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package should help to reduce carbon emissions due to improvements to sustainable travel options, encouraging mode shift away from car use. The package also overcomes some of the pinch points on the existing highway network, helping to reduce carbon emissions from traffic stuck in congestion. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.

With the necessary mitigation it is anticipated that this package will have a neutral impact on the natural environment in terms of water, soil pollution and biodiversity. The impact of the package in terms of reducing car trips and congestion delays should also help to provide a slight beneficial impact on local air quality.

Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

This package is anticipated to have a slightly beneficial impact on noise levels and the local air quality of the human landscape along the corridor, alongside a neutral impact upon light pollution and landscape and townscape assuming necessary mitigation options are undertaken. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

Package 3: Capacity Enhancements (Flint/Mold – Chester)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs

The capital cost of the Flint/Mold - Chester – Level 3 package is estimated at £91.5 million (2010 prices).

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- The provision of safe walking and cycling routes from communities to public transport interchanges.
- The provision of new walking and cycling links leading to a small decrease in VOCs on the A548/B5129 and A5118/A51104.
- New walking and cycling routes to key employment sites.
- New bus routes and improvements to existing bus services linking key employment sites with railway stations and other employment sites leading to a small decrease in VOCs on the A55/A494 and A548.
- A local Rhyl-Chester rail shuttle leading to a decrease in VOCs on the on the A548 and A55.
- A new railway station at Queensferry between Shotton & Chester leading to a small decrease in VOCs on the on B5129, A548 and local movements.
- A new railway station to serve industrial development in Deeside replacing the existing poorly used station at Hawarden Bridge leading to a small decrease in VOCs on the on B5129, A548 and local movements.
- A new rail service between the Borderlands line and Chester leading to a small decrease in VOCs on north-south movements using the A494 particularly movements serving Deeside Industrial Park

The introduction of new bus routes will increase the vehicle operating costs of bus operators but should be offset by increased patronage and ticket revenues.

Rail operators fuel and non-fuel operating costs will increase as a result of additional services and stopping at new stations. Increases in costs should be offset by an increase in ticket revenues.

The introduction of a rail service between the Borderlands line and Chester will facilitate rail freight links into Deeside Industrial Park from (key) Warrington/Crewe direction. This will reduce traffic flow on A494/A55 including local movements reducing congestion and decreasing VOCs of freight operators and other road users.

Promotion of car clubs, car sharing and work place travel planning will reduce the number of private car trips particularly in peak times leading to a small reduction in VOCs across the study area.

Highway improvements such as providing direct access to Deeside Industrial Park from the A55/A548 and improved interconnections between sections of the industrial estate will reduce local congestion particularly during peak times. This will lead directly to a reduction in vehicle idle time and hence fuel costs for all motorised modes.

The implementation of series of highway improvements on the A55 at junction 34A will improve the ease of accessing key traffic generators in the Broughton area and ease congestion at the A5104/B5125 junction particularly during peak times leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

Travel Time savings

The options identified as encouraging a mode shift away from private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes such as A55/A494, A548, B5129 and the A5118/A51104 throughout the study area.

Travel times of existing bus services would potentially increase due to higher bus patronage and longer stop dwell times.

Rail travel times will increase as a result of stopping at new stations.

The introduction of a rail service between the Borderlands line and Chester will facilitate rail freight links into Deeside Industrial Park from (key) Warrington/Crewe direction. This will decrease travel times on the A494/A55 for road users.

Providing direct access to Deeside Industrial Park from the A55/A548 and improved interconnections between sections of the industrial estate will reduce local congestion improving travel times.

Highway improvements on the A55 at junction 34A will improve the ease of accessing key traffic generators in the Broughton area and ease congestion at the A5104/B5125 junction particularly during peak times.

Revenues and user charging

A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues; however this will be partially offset by an increase in the number and frequency of bus and rail services increasing fuel tax revenues.

Bus and rail operator revenues will increase as a direct result of increased patronage.

More efficient use of existing road freight and a mode shift to rail will decrease fuel tax revenues.

Reliability
A mode shift away from private car use to public transport or walking/cycling will reduce congestion increasing journey reliability. Reliability improvements will be expected on roads such as A55/A494, A548, B5129 and the A5118/A51104 throughout the study area.

Increased bus patronage on existing bus services has the potential to decrease bus reliability.

Grant, subsidy and any developer contributions
There is potential for bus operator contributions towards a new cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester and rail link bus routes from train stations to key employment sites.

All rail options included in this package could be subject to contributions from Network Rail/Rail operators.

Economic Activity and Location Impacts (EALI)
Based on economic structure of this corridor, the options within this package are likely to generate a positive economic response in both GVA and jobs throughout the corridor. Key economic benefits are produced through the provision of commuter based rail services such as the new rail stations at Deeside and Queensferry and specific highway infrastructure connecting with the Deeside Industrial Park and Broughton, providing multi modal accessibility whilst providing localised highway access. However the components of these highway options are currently undefined.

This package facilitates the expansion of existing businesses, stimulates additional investment and contributes towards the delivery of proposed developments within the corridor, such as the Broughton retail extension and Deeside Industrial Park/Development Zone, which alone potentially generates 5,550 new jobs.

Options within this package improve the multi modal linkages between key labour market locations and employment centres throughout the corridor, leading to a positive economic response. The corridor improvements are likely to generate a minor displacement of GVA and employment towards the corridor from competing local locations.

Overall it is anticipated that this package will have a **significant beneficial** impact on the level and location of economic activity within the corridor and study area.

Environment

Noise
Generally, non-highway options will have little influence on noise. There may be some adverse impacts from local traffic relating to new rail stations at Queensferry and Deeside Park but these are generally situated in industrial areas. Possible slight adverse and beneficial impacts due to changes in road traffic as a result of improved road connections in the Broughton area. Overall assessment is neutral

Local Air Quality
Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a **slight beneficial** effect on local air quality.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality if they lead to a reduction the volume of traffic entering urban areas. However, there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.

The highway options have the potential to have an **adverse impact** on local air quality should they lead to a major increase in traffic volumes or changes in road alignment.

Greenhouse Gas Emissions

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions.

The highway options have the potential to have an **adverse impact** on greenhouse gas emissions should they lead to a significant increase in traffic volumes.

Landscape and Townscape

A number of proposals will have a Neutral impact on landscape/townscape as they comprise purely operational improvements to bus and rail services or are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal.

The potential effects of providing new walking and cycling routes to landscape and townscape would be slight or moderate beneficial due to the enhancement in terms of recreation, connectivity and permeability.

Although no designated features would be affected by any of the rail proposals, there is potential for the new curve at Shotton and New Station at Queensferry to have a Slight Adverse impact.

It is likely that the highway options would a have a neutral impact on the landscape and townscape of the area.

Overall the package could have a potentially **Slight Adverse** effect.

Biodiversity

Works such as new cycle routes, rail stations and highway could have an adverse impact on designated sites.

Through the fragmentation of habitats and habitat corridors, smaller areas of land may be more vulnerable to loss, damage or change, and may be unable to continue to support their original number and diversity of species.

The foraging routes of animals could be disturbed by developments or transport infrastructure which could divide habitats or wildlife corridors.

An increase in external lighting, especially in areas not previously lit, will fragment existing dark wildlife corridor and foraging areas for nocturnal animals, if appropriate mitigation options are not implemented.

Increase in the area of hard standing will reduce infiltration and increase the volume of run-off which can overload the capacity of water courses. Run-off from roads can contain oil, de-icing salt, particulates and accidental spillages. These pollutants and changes in flow could impact on the local water quality and the species associated with the watercourses, if appropriate treatment/containment facilities were not installed as part of the road drainage.

Heritage

The cultural heritage assets which could be impacted are listed buildings within the town centres of Chester, Mold and Flint as part of options to provide new cycle and bus routes. There are also likely to be impacts upon heritage assets within the towns and villages of Broughton, Shotton, Saltney, Broughton, Connah's Quay and Penyfford as part of rail and highway improvements. These assets are likely to be impacted visually rather than physically. There could be **adverse impacts** on Conservation Areas in the study area, especially where options pass through the towns.

Soils

Construction impacts of this package are potential instigation of stability hazards and potential creation of new pollutant linkages to pre-existing contamination. The operational impacts of this package are potential creation of migration pathways for potential contaminants.

This package is predicted to have a moderate adverse impact. However, providing appropriate mitigation is implemented, the impacts can be effectively reduced to **neutral.**

Water Environment

It is predicted that the potential for this package to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected, therefore, impacts are assessed to be negligible.

Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone. With the application of appropriate mitigation options, construction impacts on groundwater are assessed as slight beneficial and as **neutral** during the operational phase.

Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be **neutral**, assuming mitigation options are implemented where required.

Social

Transport safety

This package should improve safety for walkers and cyclists through providing safe links from communities to public interchanges, providing safe off road provision between Flint, Mold and Chester and from communities to major employment sites. This should reduce conflicts with motorists.

The bus elements of the package will provide more direct public transport opportunities between Holywell, Flint, Deeside Industrial Park and Chester and from rail stations to employment centres, reducing the need to walk between stops and employment sites, with associated potential safety benefits.

The rail elements of the package will make rail a more viable mode of travel for journeys along the corridor between Flint and Chester, reducing the number of car trips made and transferring them to rail; a much safer mode of travel. Park and ride and park and car share options will also help to reduce traffic levels along the corridor, with associated safety benefits.

The improvements to road connections at Deeside Park and Broughton should also help to improve transport safety at these locations.

Overall it is anticipated that this package will have a **significant beneficial** impact upon safety along this corridor.

Personal security

The new walking and cycling links proposed should improve the perceived security of travelling through the Flint/Mold - Chester corridor on foot or by bike as any new links will be constructed to current best practice standards in relation to personal security. Increased levels of walking and cycle use as a result of the improvements should also promote greater levels of surveillance, improving perceived security.

The new and improved bus routes proposed will help to promote increased personal security through providing a safe route between residential areas and key employment sites, reducing the perceived personal security issues associated with interchanging. The new rail link bus routes will also help to reduce the requirement to walk from rail stations to employment sites, helping to improve the perceived security of this journey.

The proposed new rail stations at Queensferry and Deeside Park will be constructed to modern standards (with CCTV etc) to promote increased personal security.

Some may perceive the park and ride and park and car share as a personal security issue, as cars will be left unattended at locations along the corridor, however this impact will be negated through security options integrated into the schemes.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon personal security.

Permeability

This package includes a number of new walking and cycling links creating connections through the corridor and to key employment sites and public transport interchanges. This will help to significantly increase the permeability of the corridor for non-motorised modes, overcoming existing barriers to pedestrian accessibility.

Overall it is anticipated that this package will have a **significant beneficial** impact upon the permeability of this corridor.

Physical fitness
This option seeks to provide additional capacity through the provision of new infrastructure, and focuses on the transport corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park, or Buckley and Broughton. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Therefore encouraging a modal shift away from unsustainable modes towards walking and cycling will help improve physical fitness within this corridor.

It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options on this corridor likely to impact physical fitness includes the provision of new cycle routes from Denbigh to Chester linking in with the existing National Cycle Route 5 and the Mold to Saltney cycle route. As the crow flies, Denbigh is around 11 miles from Mold, with Chester being a further 10 miles away. This would give an approximate cycling time of 55 minutes between Denbigh and Mold, and 50 minutes between Mold and Saltney. This is likely to discourage all but the keenest of cyclists, but does provide the option of a direct cycle route to Chester. Using this route to commute 3 times a week would fulfil the minimum recommended levels of physical exertion to improve physical fitness.

Part of this package of options also includes new highway links to both Deeside Industrial Park and within the Broughton area, with the view of improving accessibility of these sites by car. This has the potential to encourage the use of private and reduce physical fitness levels. However, it is not thought that these options will encourage a significant shift away from walking and cycling, and combined with the new infrastructure catering specifically for healthier modes, this option's package is deemed to have **slight benefit** on physical fitness.

Social inclusion
This package will significantly improve access to employment centres, such as Chester and Deeside Park from areas such as Flint and Mold, through provision of new walking, cycling, bus links, rail services and stations as well as increased opportunities for car sharing. These opportunities will particularly benefit those without access to a car, promoting social inclusion.

Improvements to road connections at Deeside Industrial Park and Broughton will help to improve access to these destinations by road, promoting social inclusion.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon social inclusion.

Equality, Diversity & Human Rights
The new walking and cycling routes built to modern accessibility standards should improve accessibility for disability groups.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit particularly to deprived groups, woman and the young and old, who are all less likely to have access to a car.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not yet been undertaken, however it is felt that this package would be considered broadly acceptable. Some users of the B5129 may not approve of bus priority options on this route if they would lead to additional delays for general traffic.

Acceptability to other stakeholders
Public consultation has indicated general support for this package. Some consultees felt that a making best use strategy with demand management would be a more appropriate approach for this corridor. Others questioned the demand for cycle route improvements along this corridor, with others considering land ownership an issue for the Mold to Saltney cycleway.

Technical & Operational Feasibility
Land ownership issues make the Mold to Saltney cycle way more complex to implement, similar issues may also be a problem for the other walking and cycling route proposals.

The proposed bus route improvements are all technically feasible, with some potential to extend or expand existing services increasing operational feasibility. The business case for these routes has not yet been established, so the likely level of patronage and therefore the degree of public subsidy is not known.

Rail improvements require new rolling stock, a turn-back facility at Rhyl and a new rail curve connecting the Borderlands and North Wales coastal lines. This last option is likely to be technically difficult to deliver due to tight land constraints. New stations at Queensferry and Deeside Park are technically and operationally feasible, with Deeside Park station currently going through the Network Rail GRIP process.

Improved road connections to the Deeside Industrial Park and Broughton area are considered technically and operationally feasible, but may not be straightforward due to the constrained nature and large traffic volumes travelling through the areas.

Financial Affordability, Deliverability

Table 6.12 – Cost and Delivery Agents - Package 3: Capacity Enhancements (Flint/Mold – Chester)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	0.15	Local Highway Authorities	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	14	Local Highway Authorities	39
	Mold to Saltney cycle way	9.85	Local Highway Authorities	40
	Provision of a Dee Coastal Path in Flintshire	0.25	Flintshire CC	41
	New walking and cycling links to key employment sites	0.15	Local Highway Authorities	100
Bus	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	WG / Local Highway Authorities / Bus Operators	
	Rail link bus routes from train stations to key employment sites	0.1	Local Highway Authorities / Public Transport Operators	52
Rail	Rhyl-Chester (with possible extension to Crewe) local shuttle	2	Network Rail / Train Operators	67
	New station at Queensferry on the North Wales Main Line	3 - 5	Network Rail / Flintshire CC	69
	New station at Deeside Park on the Borderlands line	7.5	Network Rail / Flintshire CC	70
	New rail service between Borderlands Line and Chester	20	Network Rail / Train Operators	72
Demand Management	Park and Car Share scheme	1	WG / Local Highway Authorities	94
	Park and Ride scheme	0.25	WG / Local Highway Authorities	95

Highway	Improve road connections to Deeside Industrial Park	7	WG / Flintshire CC	13
	Improve road connections to the Broughton area	25.00	WG / Flintshire CC	14

The total cost of this package is approximately £91.5m. There are 5 delivery agents identified for this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, the high cost associated with linking National route 5 from Chester to Denbigh, and the Wrexham Mold to Saltney cycle way would be require significant funding. .

A new rail service between Borderlands Line and Chester would require the construction of the Shotton curve. The high cost and potential land take would make this difficult to deliver.

The majority of this package is considered financially affordable and deliverable. However the high financial cost of individual walking and cycling, rail and highway schemes make the package as a whole difficult to deliver as funding will need to be sought from the delivery agencies that have been identified.

Risk

The financial risk associated with this package excluding the new rail service between Borderlands Line and Chester is moderate. The financial risk including the new rail service between Borderlands Line and Chester is high.

There is a risk that there is insufficient benefit from walking and cycling options to justify the capital cost.

Highway options are at risk of causing additional delays to traffic during the construction period.

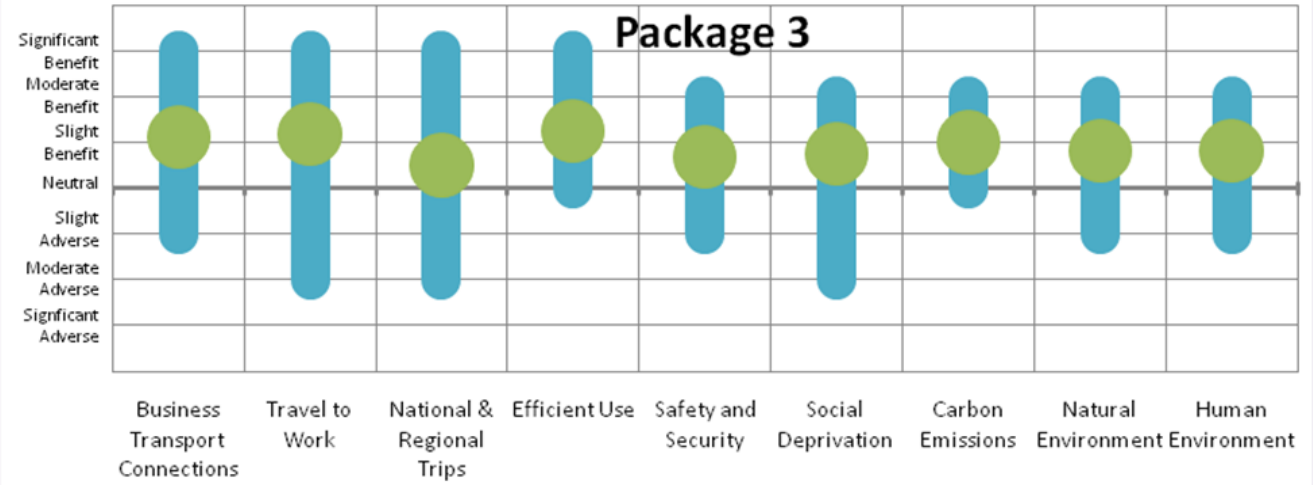
Rail and Bus options require full support from Network Rail and transport operators

Demand management option need to have a suitable staff resource available to help implement the included options. Many of the options also require employers or other groups to engage with the delivery agent to implement the package element. This requirement for third party involvement represents a risk to the deliverability of the package.

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.3. This shows that on average the stakeholders consulted felt that the package would contribute positively to all of the Transport Planning Objectives. The most positive impact was considered to be on making most efficient use of the transport network. Some consultees felt that the package might contribute negatively to travel to work, national and regional trips and social deprivation.

Figure 6.3 Capacity Enhancements (Flint/Mold – Chester): Stakeholder Assessment



To improve transport connections for businesses within the study area to key economic centres and employment sites.
Improved road connections to Deeside Park and the Broughton area would help businesses at these locations to access the strategic road network and connect with economic and employment centres in North Wales and England.

New rail stations at Deeside Park and Queensferry would facilitate improved access for businesses at these locations to economic centres on the rail network, with a new rail service between the borderlands line and Chester offering businesses with new opportunities for business rail travel and rail freight.

Local walking and cycling and public transport improvements will help to encourage mode shift away from car use for local and commuter trips. This will help to reduce traffic levels on the main highway routes through the study area, reducing the potential of delays for business trips.

Overall it is considered that this package will **moderately contribute** towards this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.
The walking and cycling elements of this package include providing new links between residential areas and key employment sites and to public transport interchanges. This will improve the ability to access work opportunities.

The bus elements of the package will also improve access to work opportunities providing more direct links between residential areas such as Holywell and Flint and employment sites such as Deeside Park and Chester.

New rail stations at Deeside Park and Queensferry will help improve accessibility to these employment areas from workforce catchments along the Borderlands and North Wales coastal lines.

Improved road connections to the Deeside Industrial Park and the Broughton area should help to improve accessibility between these major employment sites and nearby workforce catchments.

Overall it is considered that this package will contribute a **large benefit** towards this Transport Planning Objective.

To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.
This corridor is of key strategic importance for national and regional trips between North Wales and England. In terms of improvements for strategic trips this package is of limited benefit.

A rail station at Deeside Park and new rail service between the borderlands line and Chester offer the potential for greater levels of rail use for strategic movements utilising these rail lines and the potential for greater regional rail freight.

The new cross Dee Bus route will also offer improved cross border trip movements between Holywell /Flint and Chester.

The other capacity enhancements to the walking and cycling and public transport networks will help to increase sustainable travel use for local journeys. This will help to reduce traffic levels on the strategic road network. This will free up spare capacity for necessary national and regional trip movements.

The proposed improvements to the cycle network will help to create a more complete national cycle network, offering the potential for national and regional cycle trips; all though in practice few long distance trips will be undertaken.

Overall it is considered that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To improve the actual and perceived safety and personal security of all transport users in the study area.

This package should improve safety and security for walkers and cyclists through providing safe land secure inks from communities to public interchanges, providing safe off road provision between Flint, Mold and Chester and from communities to major employment sites built to current best practice design standards to ensure perceived security. Off road provision should reduce conflicts with motorists. Increased levels of walking and cycle use as a result of the improvements should also promote greater levels of surveillance, improving perceived security.

The bus elements of the package will provide more direct public transport opportunities between Holywell, Flint, Deeside Industrial Park and Chester and from rail stations to employment centres, reducing the need to walk between stops and employment sites, with associated potential safety and security benefits.

The rail elements of the package will make rail a more viable mode of travel for journeys along the corridor between Flint and Chester, reducing the number of car trips made and transferring them to rail; a much safer mode of travel. The proposed new rail stations at Queensferry and Deeside Park will be constructed to modern standards (with CCTV etc) to promote increased personal security.

Park and ride and park and car share options will also help to reduce traffic levels along the corridor, with associated safety benefits. Some may perceive these options as a personal security issue, as cars will be left unattended at locations along the corridor, however this impact will be negated through security options integrated into the schemes.

The improvements to road connections at Deeside Park and Broughton should also help to improve transport safety at these locations.

Overall it is anticipated that this package will have a **large beneficial** impact upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package will significantly improve access to employment centres, such as Chester and Deeside Park from deprived areas such as Flint and Mold, through provision of new walking, cycling, bus links, new rail services and stations as well as increased opportunities for car sharing. These opportunities will particularly benefit those without access to a car, helping to reduce social deprivation.

Improvements to road connections at Deeside Industrial Park and Broughton will help to improve access to these destinations by road, promoting social inclusion.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package will involve the construction of a number of new elements of transport infrastructure, such as new walking and cycling links, stations and park and ride facilities. These elements could not be considered to make more efficient use of existing transport infrastructure. However, they do link in with existing links, such as the existing off street cycle network to help make existing transport provision more efficient and effective. The new cross Dee bus route will seek to make use and build upon existing service provision where appropriate.

Overall it is anticipated that this package will **slightly contribute** towards this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
Overall it is anticipated that this package will result in a slight reduction in private car use alongside a reduction in delays due to congestion. This should contribute to a reduction in carbon emissions from transport in the study area. It is anticipated that this package will be **slightly beneficial** in contributing to this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
It is anticipated that this package will slightly reduce private car use and traffic delays, helping to slightly improve local air quality. The impacts of the package on water, soil pollution and biodiversity are anticipated to be neutral during the operation of the package assuming that suitable mitigating options are implemented. Overall it is anticipated that this package will have a **neutral impact** on this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

It is anticipated that this package will slightly reduce private car use and traffic delays, helping to slightly improve local air quality in the human environment. The impact of this package on noise, light pollution and landscape and townscape is considered to be neutral subject to suitable mitigation. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

Corridor: Wrexham – Deeside (via Mold / Buckley)

Package 4: Making Best Use (Wrexham – Deeside)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs

The capital cost of the Wrexham - Deeside – Level 2 package is estimated at £20.4 million (2010 prices). £15 million of this cost is attributed to highway improvements on the A541 between Mold and Wrexham.

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- Integrating walking and cycling with public transport will lead to a small reduction in VOCs across the corridor/study area.
- Safety and signing of walking and cycling routes will lead to a small reduction in VOCs across the corridor/study area.
- Improving bus and rail integration making multi-modal journeys easier will lead to a small reduction in VOCs across the corridor/study area.
- The introduction of area wide ticketing and real time information at bus stops will lead to a small reduction in VOCs across the corridor/study area.
- Improving the connection between rail and bus services at Shotton combined with improved station accessibility throughout the corridor/study area.

Providing bus priority will improve bus service reliability, decrease delays for buses and reduce vehicle operating costs of bus operators. Junction design favouring buses has the potential to Increase delays for other (non-bus) road users leading to a small increase in VOCs across the study area.

Consistent signage to ensure traffic travelling between Wrexham and the A55 uses the most appropriate route will reduce the use of minor routes for traffic travelling between the A55 and Wrexham and reduce congestion reducing vehicle operating costs for all highway modes.

Minor local improvements to the A550 and A541 (A55 J35 to A483 J5) combined with improvements to pinch points that occur at Hope, Cefn-y-Bedd and Gwersyllt could improve traffic flows relieving congestion, and decreasing vehicle operating costs. Height restrictions would limit use of this route and hence any vehicle operator savings by HGVs.

Travel Time Savings
The options identified as encouraging a mode shift away from private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes throughout the study area.

Travel time savings resulting from walking and cycling options are likely for road users. Short and medium car trips will reduce as a direct result of a mode shift from private car. Improved walking and cycling integration with public transport interchanges and improved railway accessibility will encourage longer distance trips to shift from private car use, further decreasing congestion and travel times.

Bus priority at key junctions will improve bus travel times.

Reductions in bus journey times due to priority at key junctions and area wide ticketing has the potential to be offset by increased passenger numbers and bus dwell times from options aimed at increasing bus patronage. Similarly the time saving to other modes resulting from a modal shift to buses may be offset by bus priority at key junctions increasing the journey times.

Rail journey times will remain unchanged.

Travel times for local traffic on minor routes between Wrexham and the A55 should improve as a result of a signage strategy for travelling between the A55 and Wrexham.

Minor local improvements to the A550 and A541 (A55 J35 to A483 J5) combined with improvements to pinch points that occur at Hope, Cefn-y-Bedd and Gwersyllt could improve traffic flows, relieving congestion and decreasing travel times.

Revenues and User Charging
A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues.

Bus operator revenues will increase due to increased passenger numbers from the following options:

- Improvements to cycling facilities at transport interchanges;
- Bus priority at key junctions;
- Area wide ticketing.

Rail operator revenues will increase due to improved station accessibility and improved connections with bus services.

Reliability
The reliability of highway trips in the study area should increase due to the combination of walking and cycling, bus and rail options aimed at encouraging a mode shift away from private car use, reducing congestion.

The reliability of bus services should be expected to increase due to bus priority at key junctions. Integrated area ticketing would reduce bus dwell times and improve service reliability, even with increased patronage.

Bus priority at key junctions would decrease the journey reliability of other motorised modes.

Minor local improvements to the A550 and A541 (A55 J35 to A483 J5) combined with improvements to pinch points that occur at Hope, Cefn-y-Bedd and Gwersyllt would improve journey reliability of all modes.

Grant, subsidy and any developer contributions
Potential for bus operator contributions towards area wide ticketing, provision of real time information and Integrating cycling with passenger transport services

All rail options included in this package could be subject to contributions from Network Rail.

Economic Activity and Location Impacts (EALI)

Based on the economic structure of this corridor this package is likely to generate a positive economic impact on the level of GVA and jobs. Principal economic responses are delivered through the improved resilience and reliability of the A541/A550 highway network, increasing the productivity of businesses within Wrexham, Ewloe and Mold. This package is likely to lead to an increase in the level of economic activity throughout the corridor, specifically between local labour market locations and employment centres of Wrexham, commuter villages of Gwersyllt and Caergwrle and the Deeside Industrial Park.

This package is likely to lead to job creation within the Wrexham-Deeside corridor, due to the expansion of existing businesses and potential attraction of additional investment, within Wrexham Town and Deeside Industrial Park. The options within this package contribute towards the delivery of programmed development allocations within Wrexham and surrounding commuter villages. However the majority of options within this package support the existing economy rather than encouraging it to expand.

The options within this package provide transport accessibility benefits within the Wrexham to Deeside corridor, through options that maximise the capability of the existing transport network through “Making Best Use” methods, by addressing key constraining factors such as highway pinch points. However the scale of any positive response is likely to be restricted by the remaining transit problems within the broader highway network i.e. A55/A494 trunk road.

Overall it is anticipated that this package will have a **moderate beneficial** impact on the level and location of economic activity within the corridor and study area. However, this package is unlikely to increase the overall level of economic interaction between Wrexham and Deeside.

Environment

Noise
The non-highway options will have little impact on noise. Generally the highway options may provide slight adverse and beneficial impacts depending on changes in traffic flows as traffic is attracted to less congested or improved routes, whilst reduced congestion may increase noise as speeds increase. However the overall assessment is **neutral.**

Local Air Quality
Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality, however the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations. Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality. It is important that these buses are of the highest emissions standard possible in order to maximise any air quality benefits. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.

Improved station accessibility and a service frequency increase on the Borderlands Line, are unlikely to have a significant impact on local air quality unless it significantly reduces congestion outside the station.

Those options aimed at improving highway traffic flows have the potential to have a **slight beneficial** impact on local air quality.

Greenhouse Gas Emissions
Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions, however the magnitude of such impacts are likely to be relatively small.
Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions. It is important that these buses are low carbon emitters in order to maximise any emissions reduction. Improved station accessibility is unlikely to have a significant impact on greenhouse gas emissions.
Those options aimed at improving highway traffic flows have the potential to have a **slight beneficial** impact on greenhouse gas emissions.

Landscape and Townscape
The majority of options proposed are not relevant to the landscape/townscape assessment as they either comprise purely operational improvements to existing bus and rail services or are unquantifiable in landscape/townscape terms due to the type or scale of the proposal.
All operational or unquantifiable options would have a neutral impact on landscape/townscape accordingly.

The minor highway improvements have potential for adverse impacts upon the landscape/townscape.
There are a number of constraints within the areas affected by these proposals including numerous Listed Buildings, a Conservation Area and two Scheduled Monuments at Caergwrle. There is also potential for the proposals to have a detrimental effect on the local landscape, particularly where proposals would be located within the designated area.

Overall the package could have a potentially **moderate adverse** effect due to the combined effect of minor highway improvements within a limited area of primarily rural landscape.

Biodiversity
The walking, cycling, bus and rail options which aim to reduce traffic flow within the study area, could have positive effects on the designated sites, habitats and species within the study area through reduced emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions.

The highway schemes, such as improvements on the A541 and A550 could have a **slight/moderate adverse** impact on designated sites including Natura and Ramsar if works will not be fully contained within the existing highway boundary when close to these sites.

Heritage
The cultural heritage sites which could be impacted with the proposed changes are listed buildings within the centres of the towns and villages. There are listed buildings at the majority of the railway stations where alterations are proposed to take place. Listed buildings within villages where highway improvement options are proposed along the A541 and A550 corridors may have their setting affected. There could be **adverse impacts** on Conservation Areas in the study area, especially where options pass through the towns.

Soils
Construction impacts of this package are potential creation of new pollutant linkages to pre-existing contamination. The operational impacts of this package are potential creation of migration pathways for potential contaminants.

This package is predicted to have a slight adverse impact. However, providing appropriate mitigation is implemented, impacts can be effectively reduced to **neutral**.

Water Environment
Assuming that the scale of works is small, it is predicted that the potential for this package to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes.

There will be minimal construction impacts on ground water due to the limited construction activities planned. Furthermore, groundwaters are considered to be only of a medium importance as a resource. Operational impacts will be slight beneficial due to a decrease in vehicular movements.
Assuming good practice is followed during construction, the construction impacts on flood risk can be effectively mitigated. During the operation phase impacts on flood risk are all assessed to be **neutral**.

Social

Transport safety
This package should improve the safety of existing walking and cycling routes along the corridor between Wrexham and Deeside. Improved integration between transport modes, including bus, rail and walking and cycling should improve the safety of transferring between these modes. The package should also encourage higher levels of bus and rail use, through mode shift from car use. This will improve transport safety as these modes are typically safer than private car use. Improvements to walking and cycling facilities will also encourage higher levels of walking and cycling, which may lead to higher numbers of vulnerable road users, but should also help to create a culture of walking and cycling where drivers are aware of the likelihood of seeing walkers and cyclists and drive appropriately.

Improvements to the A541 between Mold and Wrexham should help to improve the safety of this route for all users of the road.

Overall it is anticipated that this package will have a **moderate beneficial** impact on transport safety.

Personal security
This package should overcome some of the perceived personal security issues with the existing walking and cycling routes along the corridor between Wrexham and Deeside through identifying current areas of poor security and identifying improvements to overcome these issues.

Improved integration between transport modes will reduce the likelihood and fear of crime when switching between modes. Real time passenger information will provide better information about likely wait times, reducing uncertainty. The options in general should help to encourage higher levels of public transport use, walking and cycling improving perceived and actual personal security through greater levels of surveillance by fellow transport users.

Overall it is anticipated that this package will have a **moderate beneficial** impact on personal security.

Permeability
This package does not provide any new walking and cycling opportunities, instead it provides improvements to existing ones. The improvements to walking and cycling links may make certain routes suitable to people with limited mobility, who would otherwise be unable to use some current routes. Signage of walking and cycling links will make people aware of routes they may previously not have known about, offering increased permeability. Improved station accessibility may also make rail stations more easily accessible to pedestrians.

Overall it is anticipated that this package will have a **slight beneficial** impact on permeability within the study area.

Physical fitness
This option seeks to make more efficient use of existing transport facilities, and focuses on the transport corridor between Wrexham and Deeside, via Mold and Buckley. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Therefore encouraging a modal shift away from unsustainable modes towards walking and cycling will help improve physical fitness within this corridor. It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking

an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options included within this package are for the integration of cycling with other passenger services, improving the safety and security of existing cycle and walkways, and the provision of additional signage. As the crow flies, Wrexham to Deeside is approximately 12 miles, which is likely to dissuade all but the keenest of cyclists from using this mode to commute to work. However, providing secure parking at public transport interchanges, for example at stations on the Wrexham to Bidston line could encourage people to cycle to these locations, and utilise rail for part of their journey. Encouraging those that usually drive to stations to either walk or cycle would go some way to satisfying the minimum level of physical fitness.

It is therefore considered that this option package will have **slight benefit** on physical fitness.

Social inclusion
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services. Whilst no new routes or services are proposed as part of this package the improvements to existing facilities and improved integration should help those without access to a car to access important destinations, promoting social inclusion.

Overcoming pinchpoints in the Hope/Caergwrle area and improvements to the A541 should help to improve accessibility along the corridor for all road based modes, helping to improve access to key destinations.

Overall it is anticipated that this package will have a **slight beneficial** impact on social inclusion.

Equality, Diversity & Human Rights
Improvements to the safety and security of existing walking and cycling routes should improve accessibility for disability groups as should improved non car accessibility at stations. Improvements to bus services, such as real time passenger information and integrated ticketing should benefit women, the young and old; who typically make the greatest use of bus services.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit to deprived groups.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not yet been undertaken; however this package is anticipated to be publically acceptable.

Acceptability to other stakeholders
Stakeholder consultation has indicated that this package would be broadly acceptable to stakeholders. Stakeholders indicated that the problems on the A550 may result from capacity problems at the A483/A55 junction and investment at this location may resolve issues on the A550. Some consultees felt that demand for bus services along this corridor was not high and therefore bus priority improvements may have limited impact. Other consultees thought that the package should include rail connections to Birkenhead North and additional parking at stations.

Technical & Operational Feasibility
The majority of the walking & cycling options could be achieved using interventions that are proven to work effectively, such as secure cycle parking, lighting and signage of cycle routes. However, integrating cycling with other passenger transport services may prove less feasible on operational grounds. This is due to lack of space for cycle storage in train carriages and opposition to cycle carriers on buses from bus operators.

Simple integrated area ticketing such as ‘plus bus’ schemes are already operational at some rail stations in the area, more complex systems that use an ‘Oyster Card’ style system would be more difficult to implement.

Bus priority could be achieved through the use of bus lanes and bus priority at signals. However a lack of space at key junctions would restrict the operational effectiveness of the proposal and increase delays for other vehicles.

Changes to timetables to improve connections between rail and bus services at Shotton station could have wider operational impacts. Improved station accessibility options have been budgeted for by Taith; land surrounding the stations is owned by Arriva Trains Wales.

Depending upon the scale of improvements required the highway elements of this package could require some land purchase and may require some low bridges to be heightened.

Financial Affordability, Deliverability

Table 6.13 – Cost and Delivery Agents - Package 4: Making Best Use (Wrexham – Deeside)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	0.05	Local Highway Authorities	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	0.1	Local Highway Authorities / Public Transport Operators	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.15	Local Highway Authorities	35
	Provide additional signage for walkers and cyclists	0.05	Local Highway Authorities	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	1	Local Highway Authorities	42
	Improve rail and bus integration	0.15	Local Highway Authorities / Public Transport Operators	45
	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	46
	Real time passenger information at bus stops	0.2	Local Highway Authorities / Public Transport Operators	101
Rail	Improved station accessibility (non-car station access)	0.1 – 0.3	Network Rail / Local Highway Authorities	55
	Improved connection between rail and bus services at Shotton stations	1	Network Rail / Flintshire CC	106
Highway	Consider a signage strategy for traffic travelling between the A55 and Wrexham	0.1	WG / Local Highway Authorities	4
	Make better use of A541 / A550 route between the A55 and Wrexham	1.5	Flintshire CC / Wrexham CBC	6
	Overcome pinch points in the Hope/Caergwrle area	0.4	Flintshire CC	7
	Improvements on the A541 between Mold and Wrexham	15	Flintshire CC / Wrexham CBC	16

The total cost of this package is approximately £20.4m. £15m of this cost is attributed to Improvements on the A541 between Mold and Wrexham. There are potentially 6 delivery agents identified in this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, integrating cycling with other passenger transport services will be more difficult to deliver due to the required negotiations with public transport operators

Despite the benefits to bus passengers, bus priority at key junctions is likely to be difficult to deliver due to lack of support from the local highway authority.

The majority of this package is considered financially affordable and deliverable with the exception of the financial cost of Improvements on the A541 between Mold and Wrexham. All options are deliverable although lack of support from the local highway authority would make bus priority difficult.

Risk

The financial risk associated with this package excluding improvements on the A541 between Mold and Wrexham is low. Including improvements to the A541 between Mold and Wrexham the financial risk is considered moderate.

A risk associated with this package is the deliverability issues associated with the bus priority at key junctions and providing the additional facilities required to integrate cycling with passenger transport services.

Highway and bus priority options are at risk of causing additional delays to traffic during the construction period.

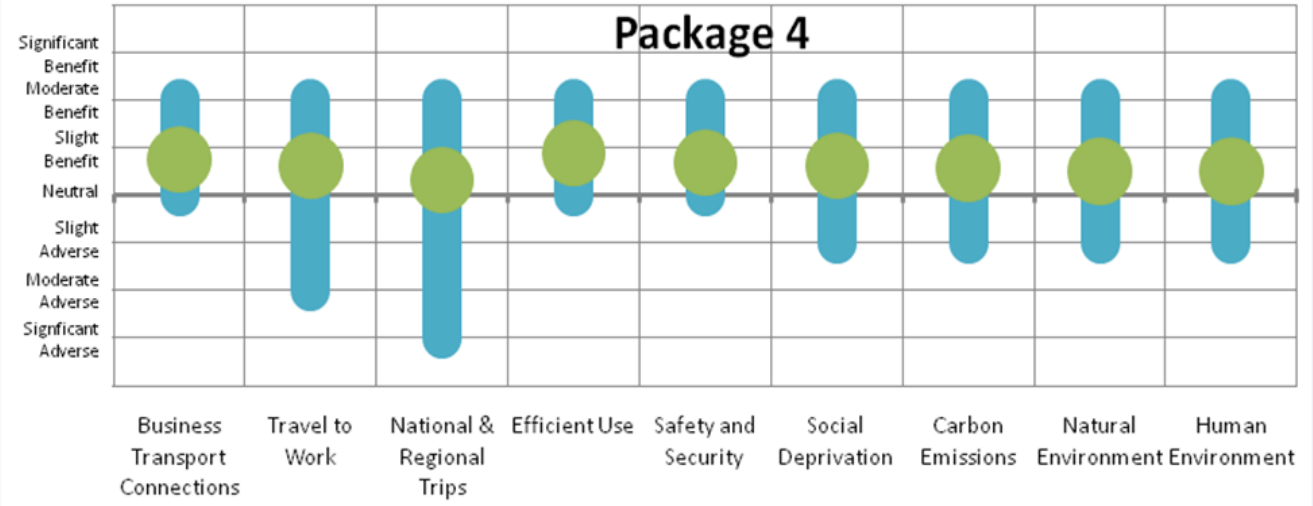
Rail and bus options require full support from Network Rail and transport operators.

There is a risk that bus priority at key junctions has the potential to cause additional delays to other motorised vehicles.

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.4. This indicates that on average stakeholders felt that the package would contribute slightly positively to all of the Transport Planning Objectives. Stakeholders felt that the package would contribute least to facilitating national and regional trips and most to making efficient use of the existing transport network.

Figure 6.4 Making Best Use (Wrexham – Deeside): Stakeholder Assessment



<u>To improve transport connections for businesses within the study area to key economic centres and employment sites.</u>

The improvements proposed as part of this package are not anticipated to have a direct impact on business transport connections as they relate to commuter and local transport movements only.

The package includes a number of improvements to walking, cycling, bus and rail transport. These improvements should encourage mode shift away from private car use for local and commuter trips. This should help to reduce traffic levels along

this corridor. This will free up additional highway capacity to facilitate improved transport connections for businesses to access economic centres such as Wrexham and Merseyside.

Improvements to the A541 and A550 alongside a signage strategy for traffic travelling between the A55 and Wrexham should help to encourage local traffic to use the local road network. This will help to free us the A483 route for use by business trips, helping to facilitate improved business connections along this corridor.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.
This package should help to slightly improve accessibility between Wrexham and Deeside by bus due to the provision of bus priority. This will help people living along the corridor to access employment sites, such as the Deeside Park and Wrexham Industrial Estate by bus. Improved integration between bus and rail will help to improve the ease with which people living in settlements along the corridor can access rail services and therefore access work opportunities further afield, such as in Merseyside.

Improvements to walking and cycling links and local road link improvements will help to improve local connections along the corridor, helping to facilitate improved accessibility between local residential and employment areas.

Overall it is anticipated that this package will have a **slight beneficial** impact on this Transport Planning Objective.

To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.
The elements contained within this package are unlikely to have an significant influence on national and regional trip movements. The walking and cycling improvements proposed will overcome some of the issues with the current local walking and cycling network. The bus priority improvements will make bus travel more efficient for journeys along this corridor. The rail improvements will overcome some of the minor issues with rail travel along this corridor. The highway elements of the package resolve some of the localised problems with the routes between Wrexham and Deeside. None of these improvements will directly affect strategic trips, however they may help to promote mode shift and reduce traffic levels on the strategic highway. This will help to facilitate more efficient journeys between Wrexham, Mold and strategic destinations such as Merseyside and Northwest Wales.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective

To improve the actual and perceived safety and personal security of all transport users in the study area.
This package should improve the safety and security of existing walking and cycling routes along the corridor between Wrexham and Deeside.

Improved integration between transport modes, including bus, rail and walking and cycling should improve the safety of transferring between these modes and reduce the fear of crime associated with switching modes. The package should also encourage higher levels of bus and rail use, through mode shift from car use. This will improve transport safety as these modes are typically safer than private car use. It should also increase perceived and actual personal security when using these modes due to higher levels of informal surveillance.

Improvements to walking and cycling facilities will also encourage higher levels of walking and cycling, which may lead to higher numbers of vulnerable road users, but should also help to create a culture of walking and cycling where drivers are aware of the likelihood of seeing walkers and cyclists and drive appropriately.

Improvements to the A541 between Mold and Wrexham should help to improve the safety of this route for all users of the road.

Overall it is anticipated that this package will have a **moderate beneficial** impact on this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services. Whilst no new routes or services are proposed as part of this package the improvements to existing facilities and improved integration should help those without access to a car to access important destinations, promoting social inclusion.

Overcoming pinch points in the Hope/Caergwrle area and improvements to the A541 should help to improve accessibility along the corridor for all road based modes, helping to improve access to key destinations.

These improvements should all help to improve access to employment opportunities including those at Deeside Park for deprived areas including the parts of Wrexham and Buckley suffering from multiple deprivation problems.

Overall it is anticipated that this package will have a **slight beneficial** impact on this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package seeks to make best use of the existing transport infrastructure between Wrexham and Deeside. Maintenance as well as safety and security improvements are proposed on existing walking and cycling links.

Public transport integration improvements, station improvements and bus priority are proposed to help these modes of transport to operate more efficiently.

Pinch points and localised problems are also identified on the highway network. Resolving these issues should help these routes to operate more efficiently.

Overall it is anticipated that this package will **moderately contribute** towards this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package is anticipated to result in some mode shift towards more sustainable transport modes alongside a reduction in travel delays caused by congestion. This will help to reduce carbon emissions from transport in the study area. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package is anticipated to have a slightly beneficial impact upon local air quality levels due to mode shift towards more sustainable travel modes alongside a reduction in travel delays caused by congestion. This will help to reduce local air quality problems, particularly in locations which currently suffer congestion problems. The impacts of this package on water, soil pollution and biodiversity are considered to be neutral during the operation of the package assuming that suitable mitigation is included as part of the package. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.
This package is anticipated to have a slightly beneficial impact upon local air quality levels due to mode shift towards more sustainable travel modes alongside a reduction in travel delays caused by congestion. This will help to reduce local air quality problems, particularly in locations which currently suffer congestion problems which are focused on the human environment. The impacts of this package on noise and light pollution are predicted to be neutral during the operation of the scheme assuming suitable mitigation is included in the package. The landscape and townscape impacts of the scheme are anticipated to be slightly adverse subsequent to mitigation due to the cumulative impacts of the scheme on listed buildings, conservation areas, SAMs and a Local Landscape Area. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

Package 5: Capacity Enhancements (Wrexham – Deeside)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of the Wrexham - Deeside – Level 3 package is estimated at £292.5 million (2010 prices) including long term options and £92.5 million excluding long term rail options.

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- The provision of safe walking and cycling routes from communities to public transport interchanges.
- The provision of new walking and cycling links leading to a small decrease in VOCs using the A494.
- New walking and cycling routes to key employment sites.
- A multi-model hub at the existing Wrexham General Rail Station.
- New bus routes and improvements to existing bus services linking key employment sites with railway stations and key employment sites leading to a small decrease in VOCs on the A494 and A550.
- The increase in frequency of existing rail services on the Borderlands line (Wrexham to Bidston) with increased parking provision at stations along the line.
- A new railway station to serve industrial development in Deeside which would replace the existing poorly used station at Hawarden Bridge leading to a reduction of VOCs on the A494/A55 including local movements.
- Introduction of a rail service between the Borderlands line and Chester will make rail more attractive relative to car for north-south movements using A494, particularly movements serving Deeside Industrial Park.

The introduction of new bus routes will increase the vehicle operating costs of bus operators but should be offset by increased patronage and ticket revenues.

Rail fuel and non-fuel operating costs will increase as a result of additional services, but should be offset by an increase in ticket revenues.

The introduction of a rail service between the Borderlands line and Chester will facilitate rail freight links into Deeside Industrial Park from (key) Warrington/Crewe direction. This will reduce traffic flow on A494/A55 including local movements reducing congestion and decreasing VOCs freight operators and other road users.

Promotion of car clubs and car sharing will reduce the number of private car trips particularly in peak times leading to a small reduction in VOCs across the study area.

Highway improvements such as providing direct access to Deeside Industrial Park from the A55/A548 and improved interconnections between sections of the industrial estate will reduce local congestion particularly during peak times. This will lead directly to a reduction in vehicle idle time and hence fuel costs for all motorised modes.

A new road bridge between Connah's Quay and Deeside Industrial Park would provide a direct link in to Deeside from the B5129. VOCs of local trips for local trips from Shotton and Connah’s Quay will reduce due to a reduction in journey distance. VOCs of other road users will reduce due to reduced congestion through Queensferry and the A55/B5129 junction leading to a reduction in vehicle idle time and hence fuel costs.

New crawler lanes on existing single carriageway roads in the study area will reduce journey times for faster moving vehicles and potentially reduce congestion and lead to a reduction in vehicle operating costs.

Travel Time Savings
The options identified as encouraging a mode shift away from private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes such as A55/A494, A550 and throughout the study area.

Travel times of existing bus services would potentially increase due to higher bus patronage and longer stop dwell times.

Rail travel times will remain unchanged.

The introduction of a rail service between the Borderlands line and Chester will facilitate rail freight links into Deeside Industrial Park from (key) Warrington/Crewe direction. This will decrease travel times on the A494/A55 for road users.

Providing direct access to Deeside Industrial Park from the A55/A548 and improved interconnections between sections of the industrial estate will reduce local congestion improving travel times.

A new road bridge between Connah's Quay and Deeside Industrial Park would provide travel time savings for local trips from Shotton and Connah's Quay. Travel times of other road users will reduce due to reduced congestion through Queensferry and the A55/B5129 junction.

New crawler lanes on existing single carriageway roads in the study area will reduce journey times for faster moving vehicles.

Revenues and User Charging
A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues; however this will be partially offset by an increase in the number and frequency of bus and rail services increasing fuel tax revenues.

Bus and rail operator revenues will increase as a direct result of increased patronage.

More efficient use of existing road freight and a mode shift to rail will decrease fuel tax revenues.

Reliability
A mode shift away from private car use to public transport or walking/cycling will reduce congestion increasing journey reliability. Reliability improvements will be expected on roads such as A55/A494, and A550 and throughout the study area.

Increased bus patronage on existing bus services has the potential to decrease bus reliability.

New crawler lanes on existing single carriageway roads will make journey times more reliable for faster vehicles.

Grant, subsidy and any developer contributions
There is potential for bus operator contributions towards a new cross Dee bus route between Mold and Ellesmere Port and rail link bus routes from train stations to key employment sites

All rail options included in this package could be subject to contributions from Network Rail/Train operators.

Economic Activity and Location Impacts (EALI)
In principle this complete package is likely to generate a significant increase in the level of economic activity and productivity within the study area through the provision of multi modal facilities and accessibility to the Deeside Industrial Park, primarily rail based, such as the new rail station at Deeside Park. However the options included within this package fail to alleviate the primary constraints within the highway network, such as the A55/A494 trunk road, therefore the scale of any potential economic response is likely to be restricted.

This package facilitates and encourages employment growth within the corridor through the expansion of existing businesses and the attraction of additional investment, primarily within the Deeside Industrial Park, contributing towards the creation of 5,500 programmed new jobs. Within the package certain public transport options lead to direct job creation i.e. staffing of new rail stations.

The positive impact within this corridor is likely to lead to a minor economic displacement response towards the corridor from competing locations, both within the study area and broader locations i.e. Northern England and Wales.

Overall it is anticipated that this package will have a **moderate beneficial impact** on the level and location of economic activity within the corridor and study area. This package is unlikely to increase the overall level of economic interaction between Wrexham and Chester.

Environment

Noise
Non-highway options including some increases in rail service will have negligible increase in noise levels. There is a possibility for a slight adverse noise impact alongside improved crawler lanes due to increase in overall traffic speed. Slight adverse and beneficial impacts due to changes in traffic as a result of improved road connections including new bridge would be expected. Overall assessment is **neutral**.

Local Air Quality
Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in overall road traffic volumes within the study area.
Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality. However, there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.
The highway options have the potential to have an **adverse impact** on local air quality should they lead to a significant increase in traffic volumes or changes in road alignment.

Greenhouse Gas Emissions
Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions.
Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions.
The highway options have the potential to have an **adverse impact** on greenhouse gas emissions should they lead to a significant increase in traffic volumes.

Landscape and Townscape
A number of proposals will have a Neutral impact on landscape/townscape as they comprise purely operational improvements to bus or rail services or are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal.
Proposals to enhance walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource. The package includes an option to create a multimodal hub at Wrexham Station which is a Grade II Listed Building, and a section of Wat's Dyke (SAM) lies immediately south of the station. Due to the proximity of the proposals, the options have potential to detrimentally affect sensitive townscape features and their setting, due to their inherent sensitivity. The package proposes a new railway station at Deeside Park which could be accommodated without significantly affecting the character of the landscape/townscape. The new station would be likely to be small in scale, relative to the surrounding built environment.
A new road bridge across the Dee is proposed to the east of the existing rail bridge between Shotton and Deeside Industrial Park. Assuming that the design of the proposed bridge would be appropriate, it would be in keeping with the semi-industrial character of the river corridor in this location and would not have a significant impact on landscape character or visual amenity. Construction of crawler lanes at inclines on key trunk roads and other single carriageway A-roads has potential for significant adverse effects as works could detrimentally affect the setting of numerous designated features which lie adjacent to the highway network.
Overall the package could have a potentially **Large – Moderate Adverse** effect.

Biodiversity
Works such as new cycle routes, increased parking provision and construction of crawler lanes could have an adverse impact on designated sites.
Through the fragmentation of habitats and habitat corridors, smaller areas of land may be more vulnerable to loss, damage or change, and may be unable to continue to support their original number and diversity of species.
The foraging routes of animals could be disturbed by developments or transport infrastructure which could divide habitats or wildlife corridors.
An increase in external lighting, especially in areas not previously lit, will fragment existing dark wildlife corridor and foraging areas for nocturnal animals, if appropriate mitigation options are not implemented.
Increase in the area of hard standing will reduce infiltration and increase the volume of run-off which can overload the capacity of water courses. Run-off from road can contain oil, de-icing salt, particulates and accidental spillages. These pollutants and changes in flow could impact on the local water quality and the species associated with the watercourses, if appropriate treatment/containment facilities were not installed as part of the road drainage.

Heritage
The cultural heritage assets which could be impacted with the proposed changes in the area are listed buildings within the town centres of Wrexham, Chester, Mold and Shotton as part of new cycle and bus routes, and increased parking provision. There are also likely to be impacts on assets within the towns and villages of Buckley, Deeside, and Wrexham as part of

highway improvements and creation of a multi-modal hub at Wrexham General station. These assets are likely to be impacted visually rather than physically. There could be **adverse impacts** on Conservation Areas in the study area, especially where options pass through the towns.

Soils
Construction impacts of this package are potential instigation of stability hazards and potential creation of new pollutant linkages to pre-existing contamination. The operational impacts of this package are potential creation of migration pathways for contaminants.
This package is predicted to have a moderate adverse impact. However, providing appropriate mitigation is implemented, the impacts can be effectively reduced to **neutral**.

Water Environment
Assuming good practice is implemented during construction, impacts on surface water can be effectively mitigated. During the operation phase it is unlikely that any changes could occur on the pollutant loading of the road runoff and spillage risk. It is likely that some adverse effects might occur as a result of the operation of the new road bridge over the River Dee.
Both construction and operational effects are anticipated to be slight adverse, due to the sensitivity of the groundwater as a designated aquifer and the potential for creating both pathways to pre-existing contamination as well as new pollution. With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial and as neutral during the operational phase.
Assuming good practice is followed during construction, impacts on flood risk can be effectively mitigated. During the operation phase impacts are all assessed to be **neutral**, assuming mitigation options are implemented where required.

Social

Transport safety
This package should improve safety for walkers and cyclists through providing safe links from communities to public interchanges, providing safe off road provision between Mold and Deeside and from communities to major employment sites. This should reduce conflicts with motorists, increasing safety.

The bus elements of the package will reduce the need to walk between stops and employment sites, and improve the safety of interchanging between modes with associated safety benefits.

The rail elements of the package will make rail a more popular mode of travel along the Wrexham/Deeside corridor, reducing the number of car trips made and transferring them to rail; a much safer mode of travel.

Park and ride and park and car share options will also help to reduce traffic levels along the corridor, with associated safety benefits.

Improved highway connections to Deeside Industrial Park and a new local road bridge across the River Dee will help to improve safety along the corridor through relieving some of the congestion pressures currently experienced along the network.

Overall it is anticipated that this package will have a **significant beneficial** impact upon safety along this corridor.

Personal security
The new walking and cycling links proposed should improve the perceived security of travelling through the Wrexham-Deeside corridor on foot or by bike as any new links will be constructed to current best practice standards. Increased levels of walking and cycle use as a result of the improvements should also promote greater levels of surveillance, improving perceived security.

The bus based improvements will reduce the need to walk to employment sites, which may be perceived as a personal security risk, with the Wrexham multimodal hub helping to improve perceived security when interchanging between transport modes.

Some may perceive the park and ride and park and car share elements of the package as a personal security issue, as cars will be left unattended at locations along the corridor, however this impact will be negated through security options integrated into the schemes.

The proposed new rail station at Deeside Park will be constructed to modern standards (with CCTV etc) to promote increased personal security. Rail service frequency improvements will help to promote an improvement in perceived personal security due to reduce waiting times.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon personal security.

Permeability

New walking and cycling routes between Mold and Deeside should help to overcome some of the severance barriers experienced currently by people who may wish to walk and cycle along this corridor. New routes to public transport interchanges and key employment sites should also help to increase the permeability of the corridor for non-motorised modes of transport.

Overall it is anticipated that this package will have a **significant beneficial** impact upon the permeability of this corridor.

Physical fitness

This option seeks to provide additional capacity through the provision of new infrastructure, and focuses on the transport corridor between Wrexham and Deeside, via Mold and Buckley. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Therefore encouraging a modal shift away from unsustainable modes towards walking and cycling will help improve physical fitness within this corridor.

It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options include a new cycle route between Mold and Deeside, the identification of new walking and cycling links with key employment areas, and new links to public transport interchanges. Mold to Deeside is approximately 7 miles as the crow flies, and a new cycle route direct to this major employment area would take around 35 minutes to cycle. Whilst challenging, this is not a substantial distance and could encourage commuters to use this mode to travel to work. Furthermore, creating new links to public transport interchanges, for example at stations on the Wrexham has the potential to encourage people who currently do not to walk or cycle to these places. This has the potential to increase the levels of physical fitness within this corridor.

The provision of a new cycle route between Mold and Deeside has the potential to incite a modal shift towards walking and cycling, improving physical fitness. The package of options is therefore considered to be of **moderate benefit** to physical fitness.

Social inclusion

This package will significantly improve access to employment centres, such as Deeside Park and Wrexham from communities within the study area, through provision of new walking and cycling links and bus routes, as well as increased opportunities for car sharing.

A new station at Deeside Park as well as a new rail service between the borderlands line and Chester will help to open up accessibility to work and other opportunities at these locations for communities currently with poor accessibility.

These opportunities will particularly benefit those without access to a car, promoting social inclusion.
A new road bridge between Connah's Quay and Deeside Park will help to increase accessibility to work opportunities at Deeside Park for those living in the Connah's Quay/Shotton area. This would benefit all road users.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon social inclusion.

Equality, Diversity & Human Rights

The new walking and cycling routes built to modern accessibility standards should improve accessibility for disability groups. The multi-modal hub at Wrexham should also improve interchange between modes for this group.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit particularly to deprived groups, woman and the young and old.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not yet been undertaken however it is not anticipated that any of the package elements would be strongly opposed.

Acceptability to other stakeholders
Stakeholder consultation has indicated support for this package. Stakeholders felt that the new bridge between Connah's Quay and Deeside Park was of little benefit considering its environmental impacts. Some consultees felt that a Wrexham bus hub already largely existed, but felt that a multi-modal hub at Deeside/Shotton would be beneficial.

Some consultees felt that improvements to the A55/A483 junction and A494 would also be required to improve connections between Wrexham and Deeside Park.

Technical & Operational Feasibility
The walking and cycling elements of this package are considered technically and operationally feasible, but may require some degree of land purchase to secure suitable routes.

Constraints on space will limit the extent to which Wrexham General Station can be converted into a suitable multimodal hub. The proposed bus route improvements are all technically feasible, with some potential to extend or expand existing services increasing operational feasibility. The business case for these routes has not yet been established, so the likely level of patronage and therefore the degree of public subsidy needed is not known.

Service frequency enhancements on the Wrexham-Bidston line would require additional rolling stock (2 units). Some signalling enhancements might be necessary. Birkenhead extension introduces pathing issues, turnback issues and would require further units, limiting the feasibility of this extension

A new rail curve connecting the Borderlands and North Wales coastal lines would be required to connect the Borderlands line to Chester. This last option is likely to be technically difficult to deliver due to land constraints in the Shotton area.

A new road bridge connection Connah's Quay with Deeside Park, whilst technically feasible would be complicated due to the relatively large span of the River Dee, the flood risk impacts and the requirement for a large river clearance to facilitate the transport of wings from the upstream Airbus site.

Crawler lanes would require land purchase, major engineering and disruption during construction.

Financial Affordability, Deliverability

Table 6.14 – Cost and Delivery Agents - Package 5: Capacity Enhancements (Wrexham – Deeside)

Them	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	0.15	Local Highway Authorities	37
	New walking and cycling links to key employment sites	0.15	Local Highway Authorities	100
	Mold – Deeside cycle route	0.3	Flintshire CC	104
Bus	Create a multi-modal hub at Wrexham General station	1	Wrexham CBC	
	New cross Dee bus route between Mold and Ellesmere Port	0.25	WG / Local Highway Authorities / Bus Operators	
	Rail link bus routes from train stations to key employment sites	0.1	Local Highway Authorities / Public Transport Operators	52
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	10	Network Rail / Train Operators	56

	Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool	200		58
	Increase parking provision at stations along the Wrexham - Bidston line (e.g. Penyffordd) to promote park and ride.	0.5 - 1	Network Rail / Local Highway Authorities	59
	New station at Deeside Park on the Borderlands line	7.5	Network Rail / Flintshire CC	70
	New rail service between Borderlands Line and Chester	20	Network Rail / Train Operators	72
Demand Management	Park and Car Share scheme	1	WG / Local Highway Authorities	94
	Park and Ride scheme	0.25	WG / Local Highway Authorities	95
Highway	Improve road connections to Deeside Industrial Park	7	WG / Flintshire CC	13
	New road bridge between Connah's Quay and Deeside Park	40	Flintshire CC	23
Freight	Crawler Lanes on the key trunk roads and other single carriageway A-roads	4	WG / Highways Agency	84

The total cost of this package excluding long-term rail options is approximately £92.5m.

The majority of this package is considered financially affordable and deliverable with the exception of the long term service frequency increase on Borderlands Line plus an extension into Liverpool. The substantial costs associated with the extension into Liverpool make this package financial unaffordable.

A new rail service between Borderlands Line and Chester would require the construction of the Shotton curve. The high cost and potential land take would make this difficult to deliver.

The financial risk associated with this package excluding the new rail service between Borderlands Line and Chester is moderate. .

Risk

The financial risk associated with this package excluding the new rail service between Borderlands Line and Chester is moderate. The financial risk including the new rail service between Borderlands Line and Chester is high.

There is a risk that there will be insufficient local traffic to justify a new road bridge between Connah's Quay and Deeside Park

Highway options are at risk of causing additional delays to traffic during the construction period.

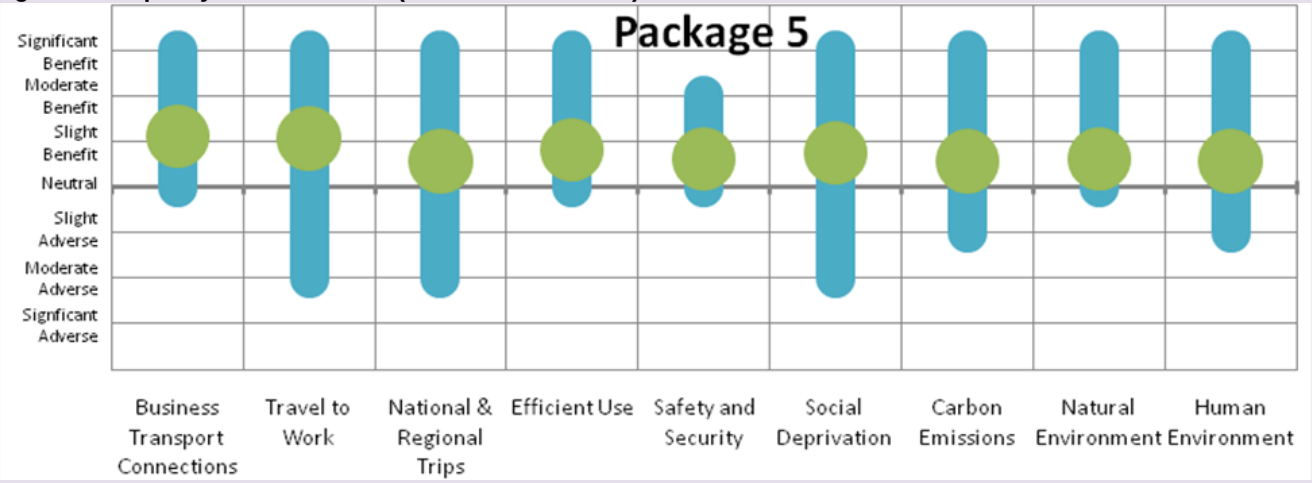
Rail and Bus options require full support from Network Rail and transport operators

Demand management option need to have a suitable staff resource available to help implement the included options. Many of the options also require employers or other groups to engage with the delivery agent to implement the package element. This requirement for third party involvement represents a risk to the deliverability of the package

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.5. In general stakeholders have indicated that the package would contribute positively to all of the Transport Planning Objectives, with it scoring least well against the objectives to facilitate national and regional trips and limit impacts on the human environment.

Figure 6.5 Capacity Enhancements (Wrexham – Deeside): Stakeholder Assessment



<u>To improve transport connections for businesses within the study area to key economic centres and employment sites.</u>

Improved road connections to Deeside Park would help businesses at this location to access the strategic road network and connect with economic and employment centres in North Wales and England.

A new station at Deeside Park would facilitate improved access for businesses at Deeside Park to economic centres on the rail network, with improvements to the service frequency along the Borderlands line improving connections to economic centres including Merseyside and Wrexham.

Local walking and cycling and public transport improvements will help to encourage mode shift away from car use for local and commuter trips. This will help to reduce traffic levels on the main highway routes through the study area, reducing the potential of delays for business trips.

Overall it is considered that this package will **moderately contribute** towards this Transport Planning Objective.

<u>To improve access between employment sites and workforce catchment areas.</u>

The walking and cycling elements of this package include providing new links between residential areas and key employment sites and to public transport interchanges. This will improve the ability to access work opportunities.

The bus elements of the package will also improve access to work opportunities providing more direct links between residential areas such as Mold and employment sites such as Deeside Park.

A new rail station at Deeside Park will help improve accessibility to this employment site from workforce catchments along the Borderlands line, with service frequency enhancements helping to increase the benefits.

Improved road connections to the Deeside Industrial Park and a new road connection between Connah's Quay and Deeside should help to improve accessibility between this major employment site and nearby workforce catchments.

Overall it is considered that this package will contribute a **large benefit** towards this Transport Planning Objective.

To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.

This corridor does not provide a particularly significant national link, but does connect the Wrexham and Deeside areas with the economic centre of Merseyside.

A new rail service between the borderlands line and Chester will help to facilitate improved transport connections between North Wales and Merseyside.

The rail service improvements proposed will help to facilitate improved transport links between Wrexham and Merseyside. The new cross Dee Bus route will also offer improved regional trip movements between Mold and Ellesmere Port.

The other capacity enhancements to the walking and cycling and public transport networks will help to increase sustainable travel use for local journeys. This will help to reduce traffic levels on the strategic road network. This will free up spare capacity for necessary national and regional trip movements.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To improve the actual and perceived safety and personal security of all transport users in the study area.
This package should improve safety and personal security for walkers and cyclists through providing safe and secure new links from communities to public interchanges, providing safe off road provision between Mold and Deeside and from communities to major employment sites. This should reduce conflicts with motorists, increasing safety. Increased levels of walking and cycle use as a result of the improvements should also promote greater levels of surveillance, improving perceived security.

The bus elements of the package will reduce the need to walk between stops and employment sites, and improve the safety and perceived security of interchanging between modes with associated safety and personal security benefits.

The rail elements of the package will make rail a more popular mode of travel along the Wrexham/Deeside corridor, reducing the number of car trips made and transferring them to rail; a much safer mode of travel.

Park and ride and park and car share options will also help to reduce traffic levels along the corridor, with associated safety benefits. Some may perceive these elements as a personal security issue; as cars will be left unattended at locations along the corridor, however this impact will be negated through security options integrated into the schemes.

Improved highway connections to Deeside Industrial Park and a new local road bridge across the River Dee will help to improve safety along the corridor through relieving some of the congestion pressures currently experienced along the network.

Overall it is anticipated that this package will have a **large beneficial** impact upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package will significantly improve access to employment centres, such as Deeside Park and Wrexham from communities within the study area, through provision of new walking and cycling links and bus routes, as well as increased opportunities for car sharing.

A new station at Deeside Park as well as a new rail service between the borderlands line and Chester will help to open up accessibility to work and other opportunities at these locations for communities currently with poor accessibility to suitable job opportunities.

These opportunities will particularly benefit those without access to a car, helping to reduce social deprivation.

A new road bridge between Connah's Quay and Deeside Park will help to increase accessibility to work opportunities at Deeside Park for those living in the Connah's Quay/Shotton area. This would benefit all road users.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package involves the construction of a large amount of new infrastructure such as a new road bridge across the River Dee, new rail station at Deeside Park and new walking and cycling links. These improvements cannot be considered to be making efficient use of or maintaining existing transport infrastructure. These improvements would help to make existing transport networks more efficient, with cycle links from communities to public transport interchanges for example helping the

public transport networks to penetrate communities better. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package is anticipated to have a slight beneficial impact on carbon emissions from transport in the study area due to mode shift of trips to sustainable transport modes as well as a reduction in delays due to congestion. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package should have a slight beneficial impact on the local air quality of natural environments due to a small reduction in traffic levels and reduced delays causing local air quality issues. Additionally the package should have a neutral impact on water, soil pollution and biodiversity during the operation of the package assuming suitable mitigation is included. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.
The impacts of this package on the human environment include an anticipated slight improvement in local air quality resulting from a reduction in traffic alongside reduction in localised congestion hot spots. The impacts of the package on noise and light pollution are anticipated to be neutral with suitable mitigation. The impacts on landscape and townscape character are anticipated to be slightly adverse subsequent to mitigation, due to the impacts of the improvements to Wrexham station on listed buildings and Wat's Dyke, and the impacts of junction improvements to the local landscape areas and designated features west of Wrexham and south of Chester. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

Corridor: Chester – Wrexham

Package 6: Making Best Use (Chester – Wrexham)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of the Chester to Wrexham – Level 2 package is estimated at £2.5 million (2010 prices).

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- Integrating walking and cycling with public transport will lead to a small reduction in VOCs across the corridor/study area.
- Safety and signing of walking and cycling routes will lead to a small reduction VOCs across the corridor/study area.
- Improving bus and rail integration making multi-modal journeys easier will lead to a small reduction in VOCs across the corridor/study area.
- The introduction of area wide ticketing and real time information at bus stops will lead to a small reduction in VOCs across the corridor/study area.
- Improved rail station accessibility throughout the corridor/study area.

Bus priority at key junctions and the A483/B5445 and area wide ticketing has the potential to decrease bus operating costs through a reduction in fuel and non fuel costs. Junction design favouring buses has the potential to increase delays for other (non-bus) road users leading to a small increase in VOCs across the study area.

Travel Time Savings
The options identified as encouraging a mode shift away from solo-private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes throughout the study area.

Travel time savings resulting from walking and cycling options are likely for road users. Short and medium car trips will reduce as a direct result of a mode shift from private car. Improved walking and cycling integration with public transport interchanges and improved railway accessibility will encourage longer distance trips to shift from private car use, further decreasing congestion and travel times.

Bus priority at key junctions and the A483/B5445 will improve bus travel times.

Reductions in bus journey times due to priority at key junctions and area wide ticketing has the potential to be offset by increased passenger numbers and bus dwell times from options aimed at increasing bus patronage. Similarly the time saving to other modes resulting from a modal shift to buses may be offset by bus priority at key junctions increasing the journey times.

Rail journey times will remain unchanged.

Revenues and User Charging
A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues

Bus operator revenues will increase due to increased passenger numbers from the following options:

- Improvements to cycling facilities at transport interchanges;
- Bus priority at key junctions;
- Area wide ticketing.

Rail operator revenues will increase due to improved station accessibility.

Reliability

The reliability of highway trips in the in the study area should increase due to the combination of walking and cycling, bus and rail options aimed at encouraging a mode shift away from private car use, reducing congestion.

The reliability of bus services should be expected to increase due to bus priority at key junctions. Integrated area ticketing would reduce bus dwell times and improve service reliability, even with increased patronage.

Bus priority at key junctions and the A483/B5445 would decrease the journey reliability of other motorised modes.

Grant, subsidy and any developer contributions
Potential for bus operator contributions towards area wide ticketing, provision of real time information and integrating cycling with passenger transport services

Improved rail station accessibility could be subject to contributions from Network Rail.

Economic Activity and Location Impacts (EALI)
The options within this package are likely to generate a minor increase in corridor specific GVA. In principle this package is likely to generate a minor increase in the level of economic activity within the corridor, due to improvements in local labour market accessibility to Chester and Wrexham from corridor commuter locations, leading to a minor increase in productivity, principally within Chester City and Wrexham Town. Employment responses are constrained by the level of accessibility provided by this package.

Generally this package provides a minor improvement in the level of public transport accessibility within the Wrexham to Chester corridor, through options that “Make Best Use” of existing services and facilities, such as bus priority. However the scale of positive economic response is dependent on the adoption of sustainable modes.

Overall it is anticipated that this package will have a **slight beneficial** impact on the level and location of economic activity within the corridor and study area. This package is unlikely to increase the overall level of economic interaction between Wrexham and Chester.

Environment

Noise
The options associated with this package will have a negligible influence on noise levels, overall assessment is neutral.

Local Air Quality
Options aimed at encouraging walking and cycling are considered likely to have a **slight beneficial** effect on local air quality, however the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations.
Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality. It is important that these buses are of the highest emissions standard possible in order to maximise any air quality benefits. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.
Improved station accessibility is unlikely to have a significant impact on local air quality unless it significantly reduces congestion outside the station.

Greenhouse Gas Emissions
Options aimed at encouraging walking and cycling are considered likely to have a **slight beneficial** effect on greenhouse gas emissions, however the magnitude of such impacts are likely to be relatively small.
Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions. It is important that these buses are low carbon emitters in order to maximise any reduction in greenhouse gas emissions. Improved station accessibility is unlikely to have a significant impact on greenhouse gas emissions.

Landscape and Townscape
The majority of options proposed are not relevant to the landscape/townscape assessment as they comprise purely operational improvements to existing bus services or are unquantifiable in landscape/townscape terms due to the type or scale of the proposal. All operational or unquantifiable options would have a Neutral impact on landscape/townscape accordingly.
The package also includes proposals to improve non-car access at Wrexham General Station, it is considered likely that the proposals could be accommodated within this setting without detriment to the Listed Building. Bus priority options proposed at the junction between the A55 and A483 (option 43) would have little effect on the landscape resource due to the scale of proposal, which it is assumed could be accommodated within the existing highway.
Overall the package could have potentially **neutral effect**.

Biodiversity
The walking, cycling, bus and rail options which aim to reduce traffic flow within the study area, could have positive effects on the designated sites, habitats and species within the study area through reduced emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions. However the package causes some ecological risk through the installation of signage, and improving walking and cycling facilities, and minor station improvements which may infer the loss of mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species.

Heritage
The cultural heritage assets which could be impacted with the proposed options in the area are listed buildings within the town centre of Wrexham as part of secure cycle parking and improved station accessibility. These are likely to be impacts on the setting of the buildings. There could be **adverse impacts** on Conservation Areas in the study area, especially where options pass through the towns.

Soils
Construction impacts of this package are potential creation of new pollutant linkages to pre-existing contamination. There are no significant operational impacts associated with this package.
This package is predicted to have a moderate adverse impact. However, providing appropriate mitigation is implemented, the impacts can be effectively reduced to **neutral**.

Water Environment
It is predicted that the potential to affect surface water bodies is very low, therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected, therefore, impacts are assessed to be negligible.
Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone (other areas of the site are of high importance due to Principal Aquifers in the north-east and generally being classified as total-catchment source protection zone). With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial and as neutral due to operation.
Some minor construction work may be required to improve station accessibility. Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operation phase impacts are all assessed to be **neutral**, assuming mitigation options are implemented where required.

Social

Transport safety
This package should improve the safety of existing walking and cycling routes between Chester and Wrexham. Improved integration between transport modes, including bus, rail and walking and cycling should improve the safety of transferring between these modes. The package should also encourage higher levels of bus and rail use, through mode shift from car use. This will improve transport safety as these modes are typically safer than private car use. Improvements to walking and cycling facilities will also encourage higher levels of walking and cycling, which may lead to higher numbers of vulnerable road users, but should also help to create a culture of walking and cycling where drivers are aware of the likelihood of seeing walkers and cyclists and drive appropriately.

Overall it is anticipated that this package will have a **moderate beneficial** impact on transport safety.

Personal security
This package should overcome some of the perceived personal security issues with the existing walking and cycling routes between Chester and Wrexham. Improved interchange facilities will also reduce the likelihood and fear of crime when switching between modes. Real time passenger information will provide better information about likely wait times, reducing uncertainty. The options in general should help to encourage higher levels of public transport use, walking and cycling improving perceived and actual personal security through greater levels of surveillance by fellow transport users.

Overall it is anticipated that this package will have a **moderate beneficial** impact on personal security.

Permeability
This package does not provide any new transport opportunities, instead it improves existing ones. The improvements to walking and cycling links may make certain routes suitable to people with limited mobility, who would otherwise be unable to use some current routes. Signage of walking and cycling links will make people aware of routes they may previously not have known about, offering increased permeability. Improved station accessibility may also make rail stations more accessible to pedestrians.

Overall it is anticipated that this package will have a **slight beneficial** impact on permeability within the study area.

Physical fitness
This option seeks to make more efficient use of existing transport facilities and infrastructure, and focuses on the transport corridor between Chester and Wrexham. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Encouraging a modal shift, increasing the levels of walking and cycling will help improve physical fitness.

It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options within this package include the provision of secure parking at public transport interchanges, better integration of cycling with other passenger transport services, and the provision of additional signage for walkers and cyclists identifying key routes between Chester and Wrexham. This should make this mode more attractive to both commuters and leisure users,

Following the guidance on increasing levels of physical fitness, encouraging people to walk 2Km or cycle 5Km daily would help achieve targets in improving fitness levels. Therefore, encouraging people to spend 30 minutes a day walking or cycling to public transport hubs such as the Wrexham and Chester Stations will improve the physical fitness of a much larger catchment area than the stations may already attract. As the crow flies, Chester is approximately 10 miles from Wrexham, which is likely to dissuade all but the keenest cyclists using this mode to travel to work. However, improvements to public transport interchanges may encourage more cyclists to travel to stations to link modes.

The options within this package are unlikely to encourage a substantial modal shift towards walking and cycling, it is therefore not predicted that these options will substantially improve physical fitness. This option package would provide **slight benefit** to physical fitness.

Social inclusion
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services. Whilst no new routes or services are proposed as part of this package the improvements to existing facilities and improved integration should help those without access to a car to access important destinations, promoting social inclusion.

Overall it is anticipated that this package will have a **slight beneficial** impact on social inclusion.

Equality, Diversity & Human Rights
The improved safety and security of existing walking and cycling routes should improve accessibility for disability groups as should improved non car accessibility at stations. Improvements to bus services, such as real time passenger information and integrated ticketing should benefit women, the young and old; who typically make the greatest use of bus services.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit to deprived groups.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not yet been undertaken, however it is anticipated that this package would be broadly supported.

Acceptability to other stakeholders
Stakeholder consultation indicates that this package would be broadly supported, but felt that capacity enhancements would also be required to resolve the issues on this corridor, feeling that improvements to the A55/A483 junction and new park and ride facility were also required to help promote public transport use along this corridor. Some stakeholders did not feel that integrated area ticketing would be viable.

Technical & Operational Feasibility

The majority of the walking & cycling options could be achieved using interventions that are proven to work effectively, such as secure cycle parking, lighting and signage of cycle routes. However, integrating cycling with other passenger transport services may prove less feasible on operational grounds. This is due to lack of space for cycle storage in train carriages and opposition to cycle carriers on buses from bus operators.

Simple integrated area ticketing such as ‘plus bus’ schemes are already operational at some rail stations in the area, more complex systems that use an ‘Oyster Card’ style system would be more difficult to implement. Bus priority options along the route between Wrexham and Chester appear technically and operationally feasible, but this may have negative impacts for general traffic and particularly during construction.

Improved station accessibility would be operationally and technically deliverable, but the scope for additional improvements at existing stations along this corridor may be limited.

Financial Affordability, Deliverability

Table 6.15 – Cost and Delivery Agents - Package 6: Making Best Use (Chester – Wrexham)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	0.05	Local Highway Authorities	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	0.1	Local Highway Authorities / Public Transport Operators	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.15	Local Highway Authorities	35
	Provide additional signage for walkers and cyclists	0.05	Local Highway Authorities	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	1	Local Highway Authorities	42
	Bus priority at the A483/B5445 junction to avoid traffic congestion	0.1	Cheshire West & Chester / Highways Agency	
	Improve rail and bus integration	0.15	Local Highway Authorities / Public Transport Operators	45
	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	46
	Real time passenger information at bus stops	0.2	Local Highway Authorities / Public Transport Operators	101
Rail	Improved station accessibility (non-car station access)	0.1 – 0.3	Network Rail / Local Highway Authorities	55

The total cost of this package is approximately £2.5m. This package is considered financially affordable and deliverable. There are potentially 4-5 delivery agents identified for this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, integrating cycling with other passenger transport services will be more difficult to deliver due to the required negotiations with public transport operators.

Despite the benefits to bus passengers, bus priority at key junctions and along the A483/B5445 is likely to be difficult to deliver due to lack of support from the local highway authority.

Risk
The low cost of this package means that the financial risk is low.

A risk associated with this package is the deliverability issues associated with the bus priority and providing the additional facilities required to integrate cycling with passenger transport services.

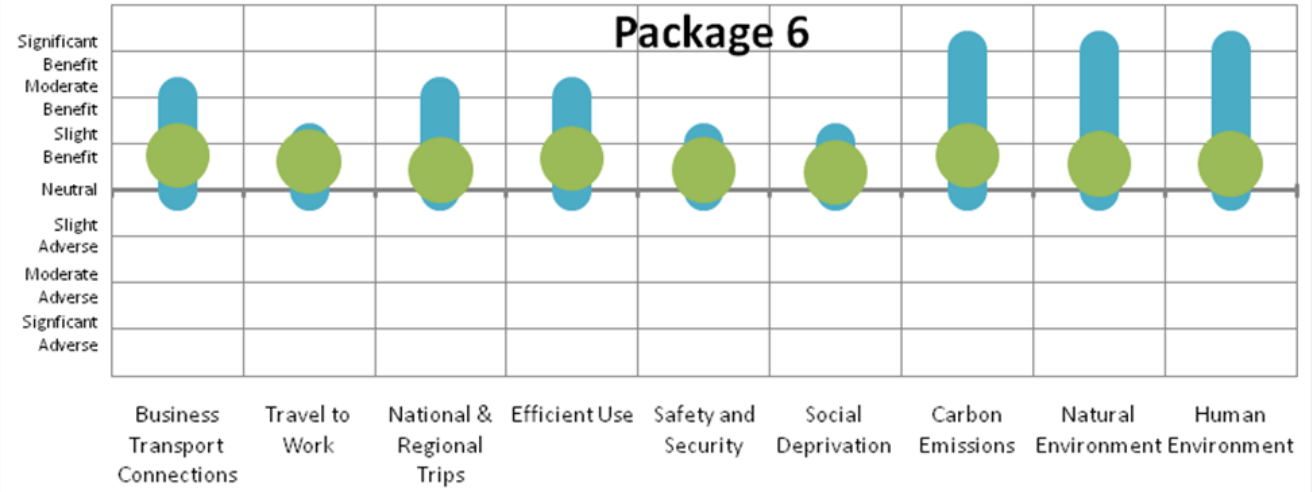
Rail and bus options require full support from Network Rail and transport operators

There is a risk that bus priority at key junctions has the potential to cause additional delays to other motorised vehicles.

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.6. This shows that in general stakeholder consultees felt that the package would contribute in a slight positive way to all of the Transport Planning Objectives. The package was also scored highly against the carbon, natural and human environment objectives by some stakeholders, with no stakeholder feeling that the package would have a negative influence.

Figure 6.6 Making Best Use (Chester – Wrexham): Stakeholder Assessment



<u>To improve transport connections for businesses within the study area to key economic centres and employment sites.</u>
The improvements proposed as part of this package are not anticipated to have a direct impact on business transport connections as they relate to commuter and local transport movements only. The package includes a number of improvements to walking, cycling, bus and rail transport. These improvements should encourage mode shift away from private car use for local and commuter trips. This should help to reduce traffic levels along this corridor. This will free up additional highway capacity to facilitate improved transport connections for businesses to access economic centres such as Wrexham and Chester.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

<u>To improve access between employment sites and workforce catchment areas.</u>
This package should help to slightly improve accessibility between Wrexham and Chester by bus due to the provision of bus priority. This will help people living along the corridor to access employment sites, such as the Wrexham Industrial Estate and Chester by bus. Improved integration between bus and rail will help to improve the ease with which people living in settlements along the corridor can access rail services and therefore access work opportunities further afield, such as in Merseyside.

Overall it is anticipated that this package will have a **slight beneficial** impact on this Transport Planning Objective.

<u>To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.</u>
The improvements proposed as part of this package are not anticipated to have a significant impact on national and regional trips as they relate to local transport movements only. The package includes a number of improvements to walking, cycling, bus and rail transport. These improvements should encourage mode shift away from private car use. This should help to reduce traffic levels on the A483, the strategic highway link through this corridor. This will free up additional capacity on this link for use by necessary national and regional trips.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

<u>To improve the actual and perceived safety and personal security of all transport users in the study area.</u>
This package should improve the safety and security of existing walking and cycling routes between Chester and Wrexham. Improved integration between transport modes, including bus, rail and walking and cycling should improve the safety and perceived security of transferring between these modes. The package should also encourage higher levels of bus and rail

use, through mode shift from car use. This will improve transport safety as these modes are typically safer than private car use and will improve perceived and actual personal security due to greater levels of informal surveillance.

Improvements to walking and cycling facilities will also encourage higher levels of walking and cycling, which may lead to higher numbers of vulnerable road users, but should also help to create a culture of walking and cycling where drivers are aware of the likelihood of seeing walkers and cyclists and drive appropriately.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services. Whilst no new routes or services are proposed as part of this package the improvements to existing facilities and improved integration should help those without access to a car to access important destinations, reducing social deprivation.

Overall it is anticipated that this package will have a **slight beneficial** impact on this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package seeks to make best use of existing walking, cycling, bus and rail infrastructure to help improve the efficiency of these transport modes. Existing walking and cycling links will be improved to address safety, security and maintenance issues with these routes. Bus priority improvements will try to overcome some of the pinch points causing bus punctuality problems. Improved integration between modes will help to improve the efficiency of interchanging between modes. Overall it is anticipated that this package will **moderately contribute** towards this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package is anticipated to have a slight beneficial impact on carbon emissions from transport in the study area due to mode shift of trips to sustainable transport modes. It is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package is anticipated to have a slight beneficial impact on the local air quality of the natural environment due to a shift to sustainable travel modes helping to reduce air pollution from traffic. The impacts on water, soil pollution and biodiversity are anticipated to be neutral during the operational phase of the proposals subsequent to suitable mitigation. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape
This package is anticipated to have a slight beneficial impact on the local air quality of the human environment due to a shift to sustainable travel modes helping to reduce air pollution from traffic. The impacts on noise, light pollution and landscape and townscape are anticipated to be neutral if suitable mitigation is undertaken. Overall it is anticipated that this package will have a **neutral impact** on this Transport Planning Objective.

Package 7: Capacity Enhancements (Chester –Wrexham)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of the Chester to Wrexham – Level 3 package is estimated at £93 million (2010 prices); approximately half of this cost is associated with rail options.

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- The provision of safe walking and cycling routes from communities to public transport interchanges
- The provision of new walking and cycling links leading to a small decrease in VOCs the A483.
- New walking and cycling routes to key employment sites.
- A multi-model hub at the existing Wrexham General Rail station.
- New bus routes and improvements to existing bus services linking key employment sites with railway stations and key employment sites leading to a small decrease in VOCs across the study area.
- A shuttle service between Chester and Wrexham operated alongside existing services to give a basic half-hourly service between Wrexham and Chester will reduce traffic flow and VOCs of road users on the A483.
- New station at Rossett located north of Wrexham and next to the A483 reducing VOCs of road users on the A483 and around Wrexham station.

Rail operating will increase as a direct result of introducing new services.

Promotion of car clubs and car sharing will reduce the number of private car trips particularly in peak times leading to a small reduction VOCs across the study area.

A higher capacity design for the A483/A55 junction and capacity improvements to key junctions along the A483 (B5445, A541 and A525) will relieve congestion on A483 and improve overall junction operation. The subsequent reduction in delays and journey times would reduce vehicle operating costs of all road users.

Travel Time Savings
The options identified as encouraging a mode shift away from solo-private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes such as the A483 and throughout the study area

Travel times of existing bus services would potentially increase due to higher bus patronage and longer stop dwell times.

Rail travel times will increase as a result of stopping at new stations.

The introduction of a new rail station at Rossett will increase the travel times of existing rail services.

A higher capacity design for the A483/A55 junction would reduce travel times on the A483 North and A55 slip road traffic and improve the overall junction operation. Capacity Improvements to key junctions along the A483 (A483 (B5445, A541 and A525) will decrease travel times for all road users on the A483 and many of the local connections around Wrexham.

Revenues and User Charging

A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues; however this will be partially offset by an increase in the number and frequency of bus and rail services increasing fuel tax revenues.

Bus and rail operator revenues will increase as a direct result of increased patronage.

More efficient use of existing road freight and a mode shift to rail will decrease fuel tax revenues.

Reliability
A mode shift away from private car use to public transport or walking/cycling will reduce congestion increasing journey reliability.

Increased bus patronage on existing bus services has the potential to decrease bus reliability.

Grant, subsidy and any developer contributions

There is potential for bus operator contributions towards new rail link bus routes from train stations to key employment sites

All rail options included in this package could be subject to contributions from Network Rail and/or train operators.

Economic Activity and Location Impacts (EALI)
This package is likely to generate a positive economic impact on the level of GVA and jobs within the Chester – Wrexham corridor. The package contains a series of options designed to improve the level of multi modal accessibility within the Wrexham and Chester corridor, through the provision of public transport infrastructure and specific highway improvements at key congestion locations within either end of the A483 trunk road. Alleviating key A483 trunk road constraints improves the resilience and reliability of the corridor, to the benefit of both strategic and local traffic. Additional localised accessibility benefits are likely to be experienced within the corridor locations such as Rossett, through the improved rail services and facilities along the Wrexham to Chester line and the proposed Wrexham to Chester shuttle service.

The provision of improved multi modal accessibility between corridor labour market locations and employment centres of Chester City and Wrexham is likely to increase the level of economic activity and opportunity through the corridor. The additional highway capacity encourages existing corridor businesses to expand and facilitates additional development.

The scale of transport benefits delivered by this package is likely to increase the competitive status of the A483 corridor, leading to the potential displacement of GVA towards this enhanced corridor.

Overall it is anticipated that this package will have a **significant beneficial impact** on the level and location of economic activity within the corridor and study area. This package essentially enhances the linkage and economic interaction between Wrexham and Chester, however the potential for this package to have any effect may be limited by the strength of existing economic relationships.

Environment

Noise
Non-highway options including some increases in rail service will have negligible increase in noise. The new railway station at Rossett has an adverse impact due to increase in local traffic.
Highway options including increasing capacity on A483 and improving congestion is likely to have a slight adverse impact with regard to noise. However, traffic on other roads may decrease and provide slight beneficial impacts. Overall assessment is **neutral**.

Local Air Quality
Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality.
Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality, however there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.
The highway options have the potential to have an adverse impact on local air quality should they lead to a significant increase in traffic volumes or changes in road alignment.

Greenhouse Gas Emissions
Options aimed at encouraging walking, cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions.
Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions.
The highway options have the potential to have an adverse impact on greenhouse gas emissions should they lead to a significant increase in traffic volumes.

Landscape and Townscape
A number of proposals will have a Neutral impact on landscape/townscape as the options comprise purely operational improvements to bus or rail services or are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal.

Options proposed to enhance walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource.
The package includes an option to create a multimodal hub at Wrexham Station, which is a Grade II Listed Building, and a section of Wat's Dyke (SAM) lies immediately south of the station. Due to the proximity of the proposals, the options have potential to detrimentally affect sensitive townscape features.
A new station is proposed on the western edge of Rossett, it is assumed that the scale of development would be in keeping with the adjacent settlement and as such could be accommodated without significant detriment to the wider landscape setting.
The two highway improvement proposals could have a detrimental effect on the character of the landscape in this area, though the scale of impact would be dependent upon the magnitude of the change proposed. There is potential for a **Moderate Adverse** effect without mitigation.

Biodiversity
Works such as new cycle routes and highway improvement schemes could have an adverse impact on designated sites. Through the fragmentation of habitats and habitat corridors, smaller areas of land may be more vulnerable to loss, damage or change, and may be unable to continue to support their original number and diversity of species. The foraging routes of animals could be disturbed by developments or transport infrastructure which could divide habitats or wildlife corridors.
An increase in traffic will increase noise and air pollution which will impact on habitats and species. Run-off from road can contain oil, de-icing salt, particulates and accidental spillages. These pollutants and changes in flow could impact on the local water quality and the species associated with the watercourses, if appropriate treatment/containment facilities were not installed as part of the road drainage.
Increased noise levels from an increase in human presence have the potential to disturb fauna and impact on habitats. An increase in external lighting, especially in areas not previously lit, will fragment existing dark wildlife corridor and foraging areas for nocturnal animals, if appropriate mitigation options are not implemented.

Heritage
The cultural heritage assets which could be impacted with the proposed changes in the area are listed buildings within the town centres of Chester and Wrexham as part of new cycle routes and improvements to Wrexham General station. There are also likely to be impacts within the villages of Burton and Rossett as part of the proposed new station at Rossett.
Highway improvements options will also have impacts upon heritage assets, these are likely to be impacted visually and physically. There could be impacts on Conservation Areas in the study area, especially where options pass through the towns.

Soils
Construction impacts of this package are potential creation of new pollutant linkages to pre-existing contamination and potential loss and destruction of agricultural soils. The operational impacts of this package are potential creation of migration pathways for potential contaminants.
This package is predicted to have a moderate adverse impact. However, providing appropriate mitigation is implemented, the impacts can be effectively reduced to **neutral.**

Water Environment
It is predicted that the potential for this package to affect surface water bodies is very low, therefore, it is unlikely that construction impacts would occur. During the operation phase, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes. No morphological changes are expected, therefore, impacts are assessed to be negligible.
Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone. With the application of appropriate mitigation options, construction impacts are assessed as slight beneficial and as neutral during the operational phase.
Assuming good practice is followed during construction, the impacts on flood risk can be effectively mitigated. During the operation phase of the proposed schemes impacts are all assessed to be **neutral**, assuming mitigation options are implemented where required.

Social

Transport safety
This package should improve safety for walkers and cyclists through providing safe links from communities to public interchanges, providing safe off road provision between Chester and Wrexham and from communities to major employment sites. This should reduce conflicts with motorists.

The bus elements of the package will reduce the need to walk between stops and employment sites, with associated safety benefits.

The rail elements of the package will make rail a more popular mode of travel along the Chester/Wrexham corridor, reducing the number of car trips made and transferring them to rail; a much safer mode of travel. Park and ride and park and car share options will also help to reduce traffic levels along the corridor, with associated safety benefits.

The improvement of junctions along the A483 will bring the junction design up to current standards, which should also help to improve safety.

Overall it is anticipated that this package will have a **significant beneficial** impact upon safety along this corridor.

Personal security

The new walking and cycling links proposed should improve the perceived security of travelling through the Chester and Wrexham corridor on foot or by bike as any new links will be constructed to current best practice standards. Increased levels of walking and cycle use as a result of the improvements should also promote greater levels of surveillance, improving perceived security.

The bus based improvements will reduce the need to walk to employment sites, with a Wrexham multimodal hub improving perceived security when interchanging between transport modes.

Some may perceive the park and ride and park and car share as a personal security issue, as cars will be left unattended at locations along the corridor, however this impact will be negated through security options integrated into the schemes.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon personal security.

Permeability

This package will improve permeability for pedestrians and cyclists through providing new links from communities to public transport interchanges, key employment sites and between Chester and Wrexham. A new station at Rossett will offer residents here a new opportunity to walk or cycle to access rail services.

Overall it is anticipated that this package will have a **slight beneficial** impact upon permeability.

Physical fitness

This option seeks to provide additional capacity through the provision of new infrastructure, and focuses on the transport corridor between Chester and Wrexham. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Encouraging a modal shift, increasing the levels of walking and cycling will help improve physical fitness.

It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes. Therefore cycling for 5km to work 5 days a week would satisfy the minimum recommendations for improving physical fitness.

The options within this package include the identification and provision of new routes to local communities and transport interchanges, and a new cycling and walking link connecting to the existing national cycle network route 5, to provide a link between Chester and Wrexham. As the crow flies, this is a distance of around 10 miles, which would take around 50 minutes to cycle. Whilst this is likely to dissuade all but the keenest cyclists, providing dedicated routes will help to encourage this mode, further increasing physical fitness levels.

Whilst the distance between Chester and Wrexham is unlikely to encourage substantial amounts of travelling by walking and cycling, and therefore will not improve physical fitness by a great deal, given there is no direct walking and cycling routes between the two areas this package will benefit physical fitness. Therefore this package is likely to be **moderately beneficial** in improving physical fitness.

Social inclusion

This package will significantly improve access to employment centres, such as Chester and Wrexham from communities within the study area, through provision of new walking, cycling and bus links, as well as increased opportunities for car sharing. These opportunities will particularly benefit those without access to a car, promoting social inclusion.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon social inclusion.

Equality, Diversity & Human Rights

The new walking and cycling routes built to modern accessibility standards should improve accessibility for disability groups. The multi-modal hub at Wrexham should also improve interchange between modes for this group.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit particularly to deprived groups, woman and the young and old.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not yet been undertaken, however it is anticipated that the public would broadly support the elements contained within this package.

Acceptability to other stakeholders
Stakeholder consultation has indicated support for a number of elements contained within this package. Improvements to the A483/A55 junction, and the improvements to rail services between Chester and Wrexham were particularly supported. There was some support for a new station at Rossett, with a station at Lache also proposed.

Technical & Operational Feasibility
New walking and cycling links are considered technically and operationally feasible, but some degree of land purchase will be required to secure suitable route alignments.

Constraints on space will limit the extent to which Wrexham General Station can be converted into a suitable multimodal hub. The proposed rail link bus routes are all technically feasible, with some potential to extend or expand existing services increasing operational feasibility. The business case for these routes has not yet been established, so the likely level of patronage and therefore the degree of public subsidy needed is not known.

A shuttle service between Chester and Wrexham would require doubling of the track between Wrexham & Chester (Saltney Jct), plus turnback facilities at Wrexham. A small amount of additional rolling stock would also be required (1 unit - 3 units if extended to Shrewsbury).

A new station at Rossett would be technically feasible to construct, as a station has previously existed at this site. Currently this is only a single-track section of line, which would mean that a poor level of service would be provided based upon current operations/timetable, but re-doubling of the line and the shuttle service proposed above should make this station operationally viable.

The proposed A483/A55 junction improvements would require construction at the English side of the border. The Highways Agency are planning a more minor improvement at this junction and may not be willing to undertake more major improvements. WG could fund these improvements, but the jurisdiction issues are likely to add significantly to the technical complexity of this.

Financial Affordability, Deliverability

Table 6.16 – Cost and Delivery Agents - Package 7: Capacity Enhancements (Chester –Wrexham)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	0.15	Local Highway Authorities	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	14	Local Highway Authorities	39
	New walking and cycling links to key employment sites	0.15	Local Highway Authorities	100
Bus	Create a multi-modal hub at Wrexham General station	1	Wrexham CBC	

	Rail link bus routes from train stations to key employment sites	0.1	Local Highway Authorities / Public Transport Operators	52
Rail	Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion	23	Network Rail / Train Operators	62
	Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury)	23	Network Rail / Train Operators	64
	New station at Rossett on the Wrexham to Chester line	3 - 5	Network Rail / Wrexham CBC	71
Demand Management	Park and Car Share scheme	1	WG / Local Highway Authorities	94
	Park and Ride scheme	0.25	WG / Local Highway Authorities	95
Highway	A483/A55 Junction Improvement	40	Highways Agency	17
	Improve key junctions on the A483	9	WG / Highways Agency	18

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The total cost of this package excluding long-term options is approximately £93m. Including long term options the total cost is approximately £116m. There are potentially 6 delivery agents identified in this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, the high cost associated with linking National route 5 from Chester to Denbigh would require significant funding. .

The delivery agent for a significant proportion of the total cost of this package has been identified as Network Rail and/or Rail Operators, Full support of these agents would be required to deliver the rail elements of this package.

The high cost of a shuttle service between Chester and Wrexham could prove difficult to fund.

Risk

The financial risk associated with this package is considered moderate.

There is a risk that there is insufficient benefits from walking and cycling options to justify the capital cost.

Rail and bus options require full support from Network Rail and transport operators.

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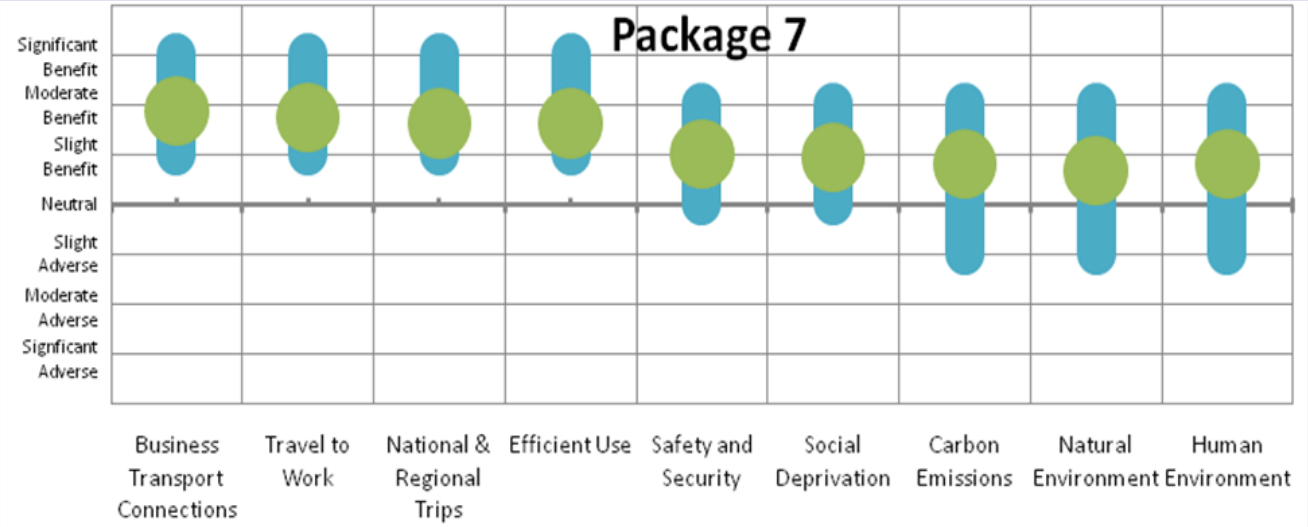
Highway options are at risk of causing additional delays to traffic during the construction period.

Demand management option need to have a suitable staff resource available to help implement the included options. Many of the options also require employers or other groups to engage with the delivery agent to implement the package element. This requirement for third party involvement represents a risk to the deliverability of the package

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.7. Stakeholders have indicated relatively positive views about this package in relation to the Transport Planning Objectives of this study. The package was considered particularly positive against the objectives of business transport connections, travel to work, national and regional trips and efficient use. The package was considered less positive against the natural, human and carbon emissions objectives.

Figure 6.7 Capacity Enhancements (Chester – Wrexham): Stakeholder Assessment



To improve transport connections for businesses within the study area to key economic centres and employment sites.

This package should help to facilitate improved transport connections between Wrexham and Chester by public transport and highway through improved rail service provision and junction improvements on the A483. This will help to facilitate increased trade between these economic centres.

Local public transport and walking and cycling improvements should encourage increased use of sustainable travel modes, helping to reduce traffic levels on the strategic road network, improving these connections for businesses.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.

This package should improve access to employment sites from workforce catchments through the provision of new walking and cycling links connecting employment sites and residential areas. New rail stations, service improvements and improved integration with bus routes should help to open up accessibility from Wrexham to opportunities in Chester and beyond utilising the rail network.

The proposed junction improvements will help to reduce traffic delays when travelling between Wrexham and Chester benefiting car users and buses and improving access to employment opportunities in Chester and Wrexham.

Overall it is anticipated that this package will provide a **moderate beneficial** impact upon this Transport Planning Objective.

To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.

Improvements to the A483/A55 junction and other junctions on the A483 should help to ensure that this route provides a suitable connection between the Midlands and North Wales and from Wrexham to destinations outside of the study area in North Wales and the north of England.

The rail service improvements will help to ensure a suitable regional connection between Wrexham and Chester and from Wrexham to Manchester and Llandudno.

Overall it is considered that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To improve the actual and perceived safety and personal security of all transport users in the study area.

This package should improve safety and security for walkers and cyclists through providing safe and secure links from communities to public interchanges, providing safe and secure off road provision between Chester and Wrexham and from communities to major employment sites. This should reduce conflicts with motorists. Increased levels of walking and cycle use as a result of the improvements should also promote greater levels of surveillance, improving perceived security.

The bus elements of the package will reduce the need to walk between stops and employment sites, with associated safety and personal security benefits. A Wrexham multimodal hub should improve perceived security when interchanging between transport modes.

The rail elements of the package will make rail a more popular mode of travel along the Chester/Wrexham corridor, reducing the number of car trips made and transferring them to rail; a much safer mode of travel. Park and ride and park and car share options will also help to reduce traffic levels along the corridor, with associated safety benefits. Some may perceive the park and ride and park and car share as a personal security issue, as cars will be left unattended at locations along the corridor, however this impact will be negated through security options integrated into the schemes.

The improvement of junctions along the A483 will bring the junction design up to current standards, which should also help to improve safety.

Overall it is anticipated that this package will have a **large beneficial** impact upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.

This package will significantly improve access to employment centres, such as Chester and Wrexham from communities within the study area, through provision of new walking, cycling and bus links, as well as increased opportunities for car sharing. These opportunities will particularly benefit those without access to a car, such as the deprived communities in the east of Wrexham.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
The elements contained within this package contain elements of significant new transport infrastructure, such as new rail stations, junction improvements and walking and cycling links. These elements cannot be considered to be maintaining or making efficient use of existing transport infrastructure. These options should help to make existing transport networks operate more efficiently, for example a multi modal hub at Wrexham would help to ensure convenient interchange between transport modes, facilitating improved efficient public transport interchange.

Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package is anticipated to have a slight beneficial impact on carbon emissions from transport in the study area due to mode shift of trips to sustainable transport modes as well as a reduction in delays due to congestion at locations such as the A483/A55 junction. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.

This package should have a slight beneficial impact on the local air quality of the natural environment due to mode shift to more sustainable transport modes as well as a reduction in air pollution from idling engines at locations such as the A483/A55 junction. The package should have a neutral impact upon water, soil pollution and biodiversity during the operational phase of the package assuming suitable mitigating options are included. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.
This package should have a slight beneficial impact on the local air quality of the human environment due to mode shift to more sustainable transport modes as well as a reduction in air pollution from idling engines at congested urban locations, such as the junctions on the A483.

The package is anticipated to have a neutral impact upon noise and light pollution. The impacts on landscape and townscape character are anticipated to be slightly adverse subsequent to mitigation due to the impacts on the

improvements to Wrexham station on listed buildings and Wat's Dyke and the impacts of junction improvements to the local landscape areas and designated features west of Wrexham and south of Chester.

Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

Corridor: Strategic Trips

Package 8: Making Best Use (Strategic Trips)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of the strategic level 2 package is estimated at £9 million (2010 prices). Approximately £5.5 million of this cost is associated with bus options.

This is comparably small, as transport infrastructure costs are limited to bus priority provision and slip lane closures.

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- Integrating walking and cycling with public transport will lead to a small reduction in VOCs across the study area due to a mode shift from commuter and leisure trips.
- Safety and signing of walking and cycling routes will lead to a small reduction VOCs across the study area due to a mode shift from short distance commuter and leisure trips.
- Improving bus and rail integration making medium to long distance multi-modal journeys easier will lead to a small reduction in VOCs across the study area.
- The introduction of area wide ticketing and real time information at bus stops will lead to a small reduction in VOCs across the study area.
- The extension of the Llandudno to Manchester rail service and improved station accessibility will lead to a small reduction in VOCs across the study area, particularly on the A55.

Bus priority at key junctions and area wide ticketing has the potential to decrease bus operating costs through a reduction in fuel and non fuel costs. Junction design favouring buses has the potential to increase delays for other (non-bus) road users leading to a small increase in VOCs across the study area.

Publicising the whereabouts and services from Port Rail & Inland Rail Terminals will help utilise existing infrastructure for intermodal distribution to its full potential. A shift of freight from HGV to rail would be expected. VOC savings for all motorised road users from reduced congestion are concentrated to strategic routes throughout the study area

Suspension of non essential road maintenance in peak times will reduce delays and hence operating costs for all motorised vehicles. As a consequence road maintenance would take longer increasing fuel during non peak travel.

The extension of the Llandudno to Manchester rail service will directly increase the VOCs of rail operators, non-fuel cost increases will be minimal as existing rail services have a long layover at Manchester Piccadilly.

A reduction in the number of slip roads will limit access on the strategic road network improving journey times and lowering operating costs for long distance/through trips on strategic routes. Local traffic and trips originating or ending in the study area may find that their vehicle operating costs increase due to greater local congestion and longer journeys.

Signing strategy options included in this package will reduce the use of minor routes for traffic travelling between North East Wales and further afield. Real-time signage allows for changes to traffic routing and speed based on the current highway operation. A reduction in delays and journey times on minor roads and strategic routes in peak times and after an incident will reduce vehicle operating costs of all motorised road users.

Travel Time Savings
The options identified as encouraging a mode shift away from private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes throughout the study area.

Reductions in bus journey times due to priority at key junctions and area wide ticketing has the potential to be offset by increased passenger numbers and bus dwell times from options aimed at increasing bus patronage. Similarly the time

saving to other modes resulting from a modal shift to buses may be offset by bus priority at key junctions increasing the journey times.

Suspension of non essential road maintenance in peak times will reduce travel times for all motorised vehicles during peak times. Off-peak travel times have the potential to increase.

The reduction in the number of slip roads will limit access on the strategic road network improving journey times for long distance/through trips on strategic routes. Local traffic and trips originating or ending in the study area may find that their travel times increase.

Signing options included in this package will reduce delays and journey times on minor roads and strategic routes in peak times and after an incident.

Rail travel times will remain unchanged.

Revenues and User Charging
A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues

Improvements to cycling facilities at transport interchanges will increase use of public transport and operator revenues.

Bus priority at key junctions and area wide ticketing will make the use of buses more attractive increasing operator revenues.

The extension of the Llandudno to Manchester rail service will increase rail operating revenues through increased patronage.

Reliability
Highway trips in the transport corridor should benefit from improved journey reliability from a combination of walking and cycling, bus and rail options aimed at encouraging a mode shift away from private car use.

The reliability of bus services should be expected to increase due to options included in this package.

Bus priority at key junctions would decrease the journey reliability of other motorised modes.

Suspension of non essential road maintenance in peak times will reduce delays and increase journey reliability. Off peak journeys would become less reliable due to prolonged periods of maintenance.

The reduction in the number of slip roads will limit access on the strategic road network improving journey time reliability for long distance/through trips; this is offset by a reduction in reliability of local trips.

Variable messaging signing on strategic routes should lead to a reduction in delays and journey times in the event of an incident increasing journey reliability.

Grant, subsidy and any developer contributions
There is potential for bus operator contributions towards area wide ticketing, provision of real time information and integrating cycling with passenger transport services.

All rail options included in this package including publicising the whereabouts of, and services from, possible Port Rail & Inland Rail Terminals could be subject to contributions from Network Rail and/or Train operators.

Economic Activity and Location Impacts (EALI)
The net economic impact of this package is likely to be a moderate increase in GVA and low level of job creation within the study area, primarily within transport network modification locations, such as those that benefit from improved highway network resilience and the quality of rail facilities. Improved rail connections between Llandudno and Manchester Airport are likely to benefit the broader economy of North Wales.

This package is unlikely to result in large scale job creation. However there is the potential for the expansion of existing businesses within the study area due to improved productivity through the provision of a more reliable highway network.

The economic responses generated though highway management options are likely to be restricted to the level of reliability benefit provided.

Overall it is anticipated that this package will have a **moderate beneficial** impact on the level and location of economic activity within the study area and wider economy of North Wales. This package is unlikely to generate a substantial increase in the level of economic interaction between economic centres.

Environment

Noise

Encouraging cycling, walking and bus travel may have benefits in term of noise impacts but these are likely to be imperceptible. Improving rail services and the shifting of freight from road to rail or from road to ship leading to reduced traffic volume will have some beneficial effects but only if traffic volumes reduce by at least 20%, and therefore again any benefits are likely to be imperceptible. Slight adverse and beneficial impacts due to re-routing of traffic from reducing number of slip roads. Some slight to moderate beneficial impacts along the A55/A494/A483 due to variable speed limits allowing reduced speed limits.

The overall assessment is a **slight beneficial** impact.

Local Air Quality

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality. However the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality. It is important that these buses are of the highest emissions standard possible in order to maximise any air quality benefits. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.

If options aimed at improving rail services lead to a reduction in traffic volumes on roads within the study area, this is likely to have a slight beneficial impact on local air quality.

Shifting freight from road to rail or from road to ship has the potential to have a slight beneficial impact on local air quality. However, there could also be localised adverse air quality impacts should greater volumes of traffic, in particular HGVs, be attracted to depot or terminal locations.

Those options aimed at improving highway traffic flows such as suspending non-essential maintenance works, signage strategies and variable message signs have the potential to have a slight beneficial impact on local air quality. However, whilst reducing the number of slip roads on the strategic highway network would reduce their use by local traffic and potentially lead to slight beneficial impacts, the 'diversion' of this traffic could have adverse air quality impacts elsewhere, which would be particularly significant should this traffic be diverted into more heavily populated areas.

Greenhouse Gas Emissions

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions, however the magnitude of such impacts are likely to be relatively small.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions. It is important that these buses are low carbon emitters in order to maximise any greenhouse gas benefits.

Options aimed at improving rail services could have a slight beneficial impact on greenhouse gas emissions by reducing road traffic.

Shifting freight from road to rail or from road to ship has the potential to have a slight beneficial impact on greenhouse gas emissions.

Highway options aimed at reducing congestion have the potential to have a slight beneficial impact on greenhouse gas emissions.

Landscape and Townscape

The majority of options proposed are not relevant to the landscape/townscape assessment as these comprise purely operational improvements to existing bus, rail and freight services or are unquantifiable in landscape/townscape terms due to the type or scale of the proposal.

Installation of VMS on A55/A494/A483 has potential to detrimentally affect the setting of a number of Listed Buildings, a small number of Scheduled Monuments and, in the case of the A483, a Local Landscape Area. It is likely this proposal would have a slight adverse impact on the landscape and townscape.

Overall the package could have a potentially **Slight Adverse** effect.

Biodiversity

The walking, cycling, bus and rail options which aim to reduce traffic flow within the study area, could have positive effects on the designated sites, habitats and species within the study area through reduced emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions.

The highway improvement schemes could have a slight/moderate adverse impact on designated sites including Natura and Ramsar if works will not be fully contained within the existing highway boundary when close to these sites.

Heritage
The cultural heritage sites which could be impacted with the proposed changes in the area are mainly listed buildings within the centres of the towns and villages. There are listed buildings at the majority of the railway stations where alterations are proposed as part of improved station accessibility and secure cycle parking. There could be adverse impacts on Conservation Areas in the study area especially where options pass through towns.

Soils
Construction impacts of this package are potential creation of new pollutant linkages to pre-existing contamination. The operational impacts of this package are potential creation of new contamination and potential creation of migration pathways for potential contaminants.
This package is predicted to have a slight adverse impact. However, providing appropriate mitigation is implemented, impacts can be effectively reduced to **neutral**.

Water Environment
Assuming that the scale of works is small during construction, it is predicted that the potential to affect surface water bodies is very low. Therefore, it is unlikely that construction impacts would occur. During operation, it is predicted that this package would not have the potential to either significantly modify the pollutant content in highway runoff or to influence significantly the spillage risk along the routes.
Although the construction activities are not very extensive, the areas onsite associated with a Principal Aquifer or areas of total-catchment source protection zone have a high importance. With appropriate mitigation, the impact on ground water will reduce to a neutral impact.
Assuming good practice is followed during construction, the construction impacts on flood risk can be effectively mitigated. During the operation phase impacts on flood risk are all assessed to be **neutral**.

Social

Transport safety
This package should improve transport safety for walkers and cyclists through improving the safety of existing routes and better signage of existing off street routes.

Improvements to all of the non-highway transport modes should help to encourage people to shift modes away from car, with associated safety benefits for those who continue to drive as well as those who change to safer non-highway modes.

The use of variable messaging signs, improved signage and the reduction in slip roads on the strategic highway network should all help to improve safety for users of the strategic network. The closure of slip roads is likely to increase usage of the local road network, which may increase accidents at these locations due to the urban nature of these roads.

Overall it is anticipated that this package will have a **slight beneficial** impact upon the safety of all transport users within the study area.

Personal security
This package of options should help to improve the personal security of walkers and cyclists through encouraging the provision of secure cycle parking at public transport interchanges, reducing the incidence of cycle theft. Improvements to existing walking and cycling routes should also improve the perceived security of users of the routes.

Overall it is anticipated that this package will have a **slight beneficial** impact upon the personal security of all transport users within the study area.

Permeability
This package does not provide any new transport opportunities, instead it improves existing ones. The improvements to walking and cycling links may make certain routes suitable to people with limited mobility, who would otherwise be unable to use some current routes. Signage of walking and cycling links will make people aware of routes they may previously not have known about, offering increased permeability. Improved station accessibility may also make rail stations more accessible to pedestrians.

Overall it is anticipated that this package will have a **slight beneficial** impact on permeability within the study area.

Physical fitness
This option seeks to make more efficient use of existing transport facilities and infrastructure, and focuses on the strategic trips through the study area, including the trunk road network. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Encouraging a modal shift within the work force, increasing the levels of walking and cycling will help improve physical fitness. It is recommended that the minimum level of physical

fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options included with the package goes some way to encouraging the use of walking and cycling, with the better integration of cycling with other passenger transport services, the provision of secure cycling parking at public transport interchanges and improved signage providing consistency across the existing cycle network. The improvement of facilities will help encourage people who wish to walk and cycle to complete at least part of their longer distance trips via this mode.

However, given this package relates to strategic trips through the region, it is unlikely that the options will incite a substantial modal shift to walking and cycling, therefore the impact on physical fitness is unlikely to be significant. This package is therefore judged to have **slight benefit**.

Social inclusion
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services.

The extension of the Llandudno-Manchester service to Manchester Airport should increase public transport access to international travel opportunities from the study area.

The improvements to existing facilities and improved integration proposed as part of this package should help those without access to a car to access important destinations, promoting social inclusion.

The reduction in slip roads on the strategic highway require some local trips to take longer routes to access their required destination, reducing accessibility.

Overall it is anticipated that this package will have a **slight beneficial** impact on social inclusion.

Equality, Diversity & Human Rights
The improved safety and security of existing walking and cycling routes should improve accessibility for disability groups as should improved non car accessibility at stations. Improvements to bus services, such as real time passenger information and integrated ticketing should benefit women, the young and old; who typically make the greatest use of bus services.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit to deprived groups.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability
Public consultation has not been undertaken for this package, however the package is anticipated to be broadly supported. Some local residents may protest the loss of local slip road accesses in some instances.

Acceptability to other stakeholders
Stakeholder consultation has indicated some degree of support for this package, but stakeholders did not feel that it would go far enough to resolve the issues affecting strategic travel through the study area. Elements such as a signage strategy were felt to have limited impact due to the use of satellite navigation systems. Variable messaging signs were considered important, but the lack of alternative routes and spare capacity limited the impact that this could have and cross border collaboration would be needed.

Technical & Operational Feasibility
The majority of the walking & cycling options could be achieved using interventions that are proven to work effectively, such as secure cycle parking, lighting and signage of cycle routes. However, integrating cycling with other passenger transport services may prove less feasible on operational grounds. This is due to lack of space for cycle storage in train carriages and opposition to cycle carriers on buses from bus operators.

Simple integrated area ticketing such as ‘plus bus’ schemes are already operational at some rail stations in the area, more complex systems that use an ‘Oyster Card’ style system would be more difficult to implement.

Extension of the Llandudno-Manchester service to Manchester Airport would be technically and operationally relatively straightforward to deliver. It does not require additional rolling stock. Arriva Trains Wales and Network Rail have already started to extend some of these services through to the Airport.

Improvements to alternative routes may be required to make the closure of slip roads on the strategic highway operationally feasible.

Suspension of non essential maintenance at peak periods may not always be possible because the trunk road agency already adopt an approach of avoiding peak period maintenance where this is practical.

Financial Affordability, Deliverability

Table 6.17 – Cost and Delivery Agents - Package 8: Making Best Use (Strategic Trips)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	0.2	Local Highway Authorities	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	0.1	Local Highway Authorities / Public Transport Operators	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.5	Local Highway Authorities	35
	Provide additional signage for walkers and cyclists	0.2	Local Highway Authorities	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	4	Local Highway Authorities	42
	Improve rail and bus integration	0.5	Local Highway Authorities / Public Transport Operators	45
	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	46
	Real time passenger information at bus stops	0.5	Local Highway Authorities / Public Transport Operators	101
Rail	Extension of Llandudno-Manchester service to Manchester Airport.	0	Network Rail / Train Operators	53
	Improved station accessibility (non-car station access)	0.5 - 1	Network Rail / Local Highway Authorities	55
Freight	Publicise the whereabouts of, and services from, possible Port Rail & Inland Rail Terminals	0.05	Taith / Network Rail	77
	Suspension of non essential maintenance at peak periods	0	WG	82
Highway	Reduce the number of slip roads on the strategic highway network. Reduce local distributer road access.	0.225	WG / Local Highway Authorities	1

	Consider a signage strategy for traffic travelling to/from the Midlands	0.2	WG / Highways Agency	2
	Consider a signage strategy for traffic travelling to/from North England	0.2	WG / Highways Agency	3
	Variable Messaging Signs	1	WG / Highways Agency	102

The total cost of this package excluding long-term options is approximately £9m. There are potentially 7 delivery agents identified in this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, integrating cycling with other passenger transport services will be more difficult to deliver due to the required negotiations with public transport operators.

Despite the benefits to bus passengers, bus priority at key junctions is likely to be difficult to deliver due to lack of support from the local highway authority.

Text for AST: The relatively low cost of this package means that it is considered to be financially affordable. Options are deliverable although lack of support from the local highway authority would make bus priority difficult.

Risk

The relatively low cost of this package means that it is considered financially affordable and deliverable.

A risk associated with this package is the deliverability issues associated with the bus priority and providing the additional facilities required to integrate cycling with passenger transport services.

Rail and bus options require full support from Network Rail and transport operators

There is a risk that bus priority at key junctions has the potential to cause additional delays to other motorised vehicles.

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.8. Stakeholders have indicated that the package would have a slight positive impact in terms of business transport connections and national and regional trips. The package was considered less positive in terms of carbon emissions and the natural and human environments.

Figure 6.8 Making Best Use (Strategic Trips): Stakeholder Assessment



<u>To improve transport connections for businesses within the study area to key economic centres and employment sites.</u>

This package contains a number of improvements to local public transport, walking and cycling. These elements should encourage some local and commuter trips to be undertaken by sustainable travel modes rather than private car use. This will slightly reduce traffic levels on the study area road network, freeing up highway capacity for business trips.

The package also includes a number of minor improvements to the strategic road network in the study area. These should help to reduce use of the strategic road network for local trips and increase the resilience of the network to incidents. This will help to ensure reliable journeys for businesses.

The package also includes the extension of rail services as far as Manchester Airport, which will facilitate improved access to international business travel for study area businesses.

Overall it is considered that this package will have a **moderate beneficial** impact upon this Transport Planning Objective.

<u>To improve access between employment sites and workforce catchment areas.</u>

This package includes improvements to existing walking and cycling routes, improved opportunities to interchange onto public transport and better bus and rail integration. These options will help to improve the public transport and walking and cycling connections between the major employment sites in the study area and workforce catchments.

Overall it is considered that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

<u>To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.</u>

Improvements to local walking, cycling and public transport links will help to encourage people to use sustainable travel modes, reducing car use for local journeys. This will help to reduce the traffic levels on the strategic roads in the study area, which currently contain relatively large amounts of local traffic. This will help to free up highway capacity to facilitate national and regional trips.

The reduction in slip road access onto the strategic road network will help to increase the capacity available to strategic national and regional trips. The signage strategies will also help to ensure that local journeys are undertaken on local roads, freeing up the strategic road network.

Through publicising the whereabouts of rail terminals it is hoped that more efficient means of moving freight regionally and nationally can be adopted.

Overall it is considered that this package will have a **moderate beneficial** impact upon this Transport Planning Objective .

To improve the actual and perceived safety and personal security of all transport users in the study area.
This package should improve transport safety and personal security for walkers and cyclists through improving the safety and security of existing routes and better signage of existing off street routes. The provision of secure cycle parking at public transport interchanges should reduce the incidence of cycle theft.

Improvements to all of the non-highway transport modes should help to encourage people to shift modes away from car, with associated safety benefits for those who continue to drive as well as those who change to safer non-highway modes.

The use of variable messaging signs, improved signage and the reduction in slip roads on the strategic highway network should all help to improve safety for users of the strategic network. The closure of slip roads is likely to increase usage of the local road network, which may increase accidents at these locations due to the urban nature of these roads.

Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package should improve the accessibility of the local population to key destinations using walking, cycling, bus and rail. The walking and cycling improvements should improve the environment for these modes, whilst offering better opportunities to interchange onto public transport. Bus priority improvements should make bus travel quicker, with improved integration with rail services.

The extension of the Llandudno-Manchester service to Manchester Airport should increase public transport access to international travel opportunities from the study area.

The improvements to existing facilities and improved integration proposed as part of this package should help those without access to a car to access important destinations, helping to reduce social deprivation.

The reduction in slip roads on the strategic highway require some local trips to take longer routes to access their required destination, reducing accessibility.

Overall it is anticipated that this package will have a **slight beneficial** impact this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
This package seeks to make best use of the existing transport networks and infrastructure in the study area. The package seeks to identify viable improvements to existing walking and cycling routes to improve the safety and security of these routes. It also seeks to identify areas where bus priority can be included to improve the punctuality and journey times of existing bus routes, helping to improve the efficiency of their operation.

The highway elements of the package aim to identify means of improving the strategic operation of the highway network without major infrastructure, through more efficient use of the existing network through signage and reduced slip road access.

These options will have a **large benefit** towards this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package should have a slight beneficial impact in reducing carbon emissions from transport in the study area. This is due to an anticipated mode shift towards more sustainable travel modes as well as reduced traffic delays resulting from the highway options proposed. This package should provide a **slight benefit** in contributing towards this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package will have a slightly beneficial impact upon the local air quality of the natural environment due to a shift towards more sustainable travel modes and reduction in localised congestion. The package is anticipated to have a neutral impact upon water, soil pollution and biodiversity during the operational phase of the package assuming necessary mitigation is include. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

This package will have a slightly beneficial impact upon the local air quality of the human environment due to a shift towards more sustainable travel modes and reduction in localised congestion**.** The package should also have a slight beneficial impact upon noise impacts due to variable speed limits, as well as neutral impacts on light pollution, landscape and townscape during the operational phase of the package, assuming suitable mitigation is included. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

Package 9: Capacity Enhancements (Strategic Trips)

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs

The capital cost of the strategic level 3 package excluding long term options is estimated at £417 million (2010 prices).. Approximately £332 million of this is associated with highway infrastructure options.

This cost is based on the assumption that the new road between the A55 and A458 is constructed along with enhancements to the A548. This is an arbitrary decision to avoid double counting major highway scheme costs, no preferred solution or package of solution has been arrived at yet. A55 improvements between Northop and Drome Corner are not included in this cost.

Vehicle Operating Costs (VOCs)
There are a number of options included in this package that will encourage a mode shift away from private car to walking/cycling or public transport. A consequence of a mode shift would be a reduction in highway congestion and traffic delays leading directly to a reduction in vehicle idle time and hence fuel costs for other road users.

The following options will encourage a mode shift away from private car and reduce vehicle operating costs:

- The provision of safe walking and cycling routes from communities to public transport interchanges leading to a small decrease in VOCs across the study area due to a mode shift from short distance commuter and leisure trips
- The provision of new walking and cycling links leading to a small decrease in VOCs on the B5129, A55/A494, A483, A5118/A51104 and local roads around key employment sites.
- New bus routes and improvements to existing bus services linking key employment sites with Manchester Airport, railway stations and other key employment sites leading to a small decrease in VOCs on the A55/A494, A550, A548 and throughout the study area.
- The increase in frequency of existing rail services (Wrexham to Bidston) and the introduction of a local Rhyl-Chester rail shuttle leading to a decrease in VOCs on the A541, A550 and the A55, A548,
- The creation of an hourly North Wales (Bangor/ Holyhead) to London rail service by extending the existing London to Chester rail service will lead to a small reduction in VOCs on the A55 and across the study area.
- A new fast rail service between Llandudno-Manchester and a new hourly rail service between Manchester and Chester will lead to a small reduction in VOCs on the A55, A494 and across the study area.

The provision of new walking and cycling crossing facilities on trunk roads has the potential to cause additional delay to motorised modes increasing vehicle operating costs of all motorised road users.

The introduction of new bus routes will increase the vehicle operating costs of bus operators but should be offset by increased patronage and ticket revenues.

Rail operating costs will increase due to

- The increase in frequency of existing rail services (Wrexham to Bidston) and the introduction of a local Rhyl-Chester rail shuttle.
- The creation of an hourly North Wales (Bangor/ Holyhead) to London rail service
- A new fast rail service between Llandudno-Manchester and a new hourly service between Manchester and Chester

The following freight options will directly reduce vehicle operating costs of freight companies and encourage a mode shift away from road. This will lead to a decrease in congestion, vehicle idle time and hence a decrease in fuel costs for other road users.

- Establishing a Freight Consolidation Centre serving Deeside Industrial Park will lead to a small reduction in VOCs on the A55 and local roads
- Electrification of freight locomotives will allow each train to pull heavier loads whilst also accelerating quicker. This will allow for fewer and quicker rail freight services, whilst leading to a small reduction in VOCs across the study area.
- An open access rail terminal will encourage transfer of freight onto rail leading to a small reduction in vehicle operating costs.

New crawler lanes on existing single carriageway roads in the study area will reduce journey times for faster moving vehicles and potentially reduce congestion and lead to a reduction in vehicle operating costs.

The provision of new truckstop facilities at both ends of the A55 aimed at reducing illegal parking and reducing crime would reduce the vehicle operating costs of road freight operators. There is potential that this could encourage road freight not currently using the A55 to switch routes, increasing congestion on the A55 and increasing vehicle operating costs of other road users.

Promotion of car clubs, car sharing and work place travel planning will reduce the number of private car trips particularly in peak times, leading to a small reduction in VOCs across the study area.

The introduction of managed motorways on the A55/A494 and A483 trunk road network and hardshoulders on dual carriageway trunk roads will increase the resilience of the network during peak times and incidents. This will contribute directly to a reduction in vehicle idle time and hence fuel costs for all road users.

Highway improvements on the A548 between Flint and the A550 east of Deeside Industrial Park, and a new road connecting the A55 and the A548 will allow the A548 to form a more strategic route through the study area. This will providing an attractive alternative for that element of traffic travelling to and from the A55 West relieving the A55 and the A494, leading to a reduction in vehicle idle time and hence fuel costs for all road users.

A higher capacity design for the A483/A55 junction and capacity improvements to key junctions along the A483 (B5445, A541 and A525) will relieve congestion on A483 and improve overall junction operation. The subsequent reduction in delays and journey times would reduce vehicle operating costs of all road users.

Options in this package that will upgrade the A55/A494 between Northop and the River Dee crossing are:

- A55 Ewloe to Northop widening,
- A55/A494 Ewloe Interchange capacity improvements,
- A494 Ewloe to Drome Corner widening,
- A494 River Dee crossing widening.

These options will upgrade the A55/A494 leading to a decrease in congestion and a reduction in vehicle idle time and hence fuel costs for all road users.

Travel Time Savings

The options identified as encouraging a mode shift away from private car use will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on the A55/A494, A550, A483, A5118/A51104 B5129, A548 and strategic routes throughout the study area.

The provision of new walking and cycling crossing facilities on trunk roads has the potential to cause additional delay to motorised modes.

Travel times of existing bus services would potentially increase due to higher bus patronage and longer stop dwell times.

The options identified as encouraging a mode shift away from road freight to rail will reduce highway congestion and traffic delays and improve the travel times of all motorised road users. A small improvement to travel times will be expected on strategic routes throughout the study area.

New crawler lanes on existing single carriageway roads in the study area will reduce journey times for faster moving vehicles.

There is potential that the provision of new truckstop facilities at both ends of the A55 could encourage road freight not currently using the A55 to switch routes, increasing congestion on the A55.

The introduction of managed motorways on the A55/A494 and A483 trunk road network and hardshoulders on dual carriageway trunk roads will increase the resilience of the network and decrease travel times for all road users during peak times and incidents.

Highway improvements on the A548 between Flint and the A550 east of Deeside Industrial Park, and a new road connecting the A55 and the A548 will lead to travel time savings on the A55 and A494.

A higher capacity design for the A483/A55 junction would reduce travel times on the A483 North and A55 slip road traffic and improve the overall junction operation. Capacity improvements to key junctions along the A483 (B5445, A541 and A525) will decrease travel times for all road users on the A483 and many of the local connections around Wrexham.

Options in this package that will upgrade the A55/A494 between Northop and the River Dee crossing will ease congestion and decrease travel times for all road users on the A55 and A494.

Revenues and User Charging

A mode shift away from private car use to public transport or walking/cycling will reduce fuel tax revenues; however this will be partially offset by an increase in the number and frequency of bus and rail services increasing fuel tax revenues.

Bus and rail operator revenues will increase as a direct result of increased patronage.

More efficient use of existing road freight and a mode shift to rail will decrease fuel tax revenues

Highway options on the A55/A494, A483, A548 will ease congestion and will reduce fuel tax revenues.

Reliability

A mode shift away from private car use to public transport or walking/cycling will reduce congestion increasing journey reliability. The provision of new walking and cycling crossing facilities on trunk roads has the potential to cause additional delay to motorised modes.

Increased bus patronage on existing bus services has the potential to decrease bus reliability.

New crawler lanes on existing single carriageway roads will make journey times more reliable for faster vehicles.

Freight options aimed at reducing the number of HGV trips will reduce congestion and improve journey reliability for other road users.

The introduction of managed motorways on the A55 A494 and A483 trunk road network and hardshoulders on dual carriageway trunk roads will increase the resilience of the network and improve journey reliability of all road users during peak times and incidents.

Highway options on the A55/A494, A483, and A548 will ease congestion and improve journey reliability of all road users, particularly during peak times.

Grant, subsidy and any developer contributions

All bus options included in this package could be subject to contributions from bus operators

All rail options included in this package including rail electrification and an Open Access Rail Terminal could be subject to contributions from Network Rail/train operators.

Economic Activity and Location Impacts (EALI)

This package is likely to generate a positive economic impact on the level of GVA and jobs throughout the study area as the package contains a series of options designed to improve the level of multi modal accessibility for both strategic and local trips through the provision of new infrastructure.

The majority of positive economic responses are delivered by the highway infrastructure improvements to the trunk road network within the Deeside area (A55, A494, A458 and A550). These options alleviate key highway congestion and pinch points, to the benefit of the economy and principally strategic traffic. In addition the highway improvements facilitate and encourage the expansion of existing businesses and attract additional investment, principally the Deeside Industrial Park which potentially generates up to 5,500 new jobs.

This package is likely to increase in the level of economic activity and productivity within the principle economic centres and broader economy, through the provision of highway options which alleviate key strategic network congestion and through the provision of multi modal accessibility. This is likely to result in an increase in GVA and employment levels within the study area, primarily within the Deeside Industrial Park, due to improved local labour market accessibility.

Overall it is anticipated that this package will have a **significant beneficial** impact on the level and location of economic activity within the study area and wider economy of North Wales. Based on the economic structure of the NEWABTS area and options included within this package, Flintshire represents the primary location to economically benefit from this

package. This package is likely to increase the level of economic interaction between economic centres. However each location will principally remain economically independent.

Environment

Noise
Non-highway options including some increases in rail services will have negligible increase in noise levels. Highway options will have an influence on noise levels at certain locations. Traffic management along trunk roads is likely to have slight beneficial benefits. However, moderate adverse impacts would be expected from a new road connecting the A55 to A548. Overall the assessment is **slight adverse**.

Local Air Quality
Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality.
Shifting freight from road to rail and freight consolidation centres has the potential to have slight beneficial impacts on local air quality. However, there could also be localised adverse air quality impacts as greater volumes of traffic, in particular HGVs, will be attracted to depot locations and consolidation centres.
Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality. However, there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.
The highway options have the potential to have an adverse impact on local air quality should they lead to a significant increase in traffic volumes or a reduction in the distance between road traffic and sensitive receptors as a result of road widening or realignment. Variable speed limits also have the potential to effect local air quality, albeit to a lesser extent, should they lead to a reduction in average vehicle speeds which can lead to increased emissions.

Greenhouse Gas Emissions
Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions.
Shifting freight from road to rail and freight consolidation centres has the potential to have slight beneficial impacts on an increase in greenhouse gas emissions. However the highway options have the potential to have an adverse impact on greenhouse gas emissions should they lead to a significant increase in traffic volumes.

Landscape and Townscape
The majority of proposals will have a Neutral impact on landscape/townscape as they comprise purely operational improvements to bus, rail or freight services or are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal.
Options proposed to enhance walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource.
The options for improvements to freight could potentially have significant adverse effects on the character of the landscape/townscape. Construction of crawler lanes at inclines on key trunk roads and other single carriageway A-roads also has potential for significant adverse effects as works could detrimentally affect the setting of numerous designated features which lie adjacent to the highway network.
There are numerous highway improvements proposed which could potentially affect the landscape/townscape resource to varying degrees depending upon the scale of change and sensitivity of receiving environment.
In isolation, individual proposals have potential to adversely affect the setting of designated features such as Listed Buildings and Scheduled Monuments where they are located in proximity to existing road corridors.
Overall package ST3 could have a potentially Large Adverse effect due to potential impacts of a new link road between the A55 at Northop and the A548 upon the rural landscape and an area of Ancient Woodland. The combined effect of numerous highway improvements would be likely to have a highly intrusive effect on visual amenity and landscape character.

Biodiversity
Works such as truck stops, construction of crawler lanes and highway improvement schemes could have a large adverse impact on designated sites.
Through the fragmentation of habitats and habitat corridors, smaller areas of land may be more vulnerable to loss, damage or change, and may be unable to continue to support their original number and diversity of species.
The foraging routes of animals could be disturbed by developments or transport infrastructure which could divide habitats or wildlife corridors.
An increase in traffic will increase noise and air pollution which will impact on habitats and species. Run-off from road can contain oil, de-icing salt, particulates and accidental spillages. These pollutants and changes in flow could impact on the local water quality and the species associated with the watercourses, if appropriate treatment/containment facilities were not installed as part of the road drainage.
An increase in external lighting, especially in areas not previously lit, will fragment existing dark wildlife corridor and foraging areas for nocturnal animals, if appropriate mitigation options are not implemented.
Increase in the area of hard standing will reduce infiltration and increase the volume of run-off which can overload the capacity of water courses.

Heritage
There are likely to be impacts upon heritage assets within the towns and villages of Northop, Ewloe, Broughton, Shotton, Buckley, Mold and Penyfford as part of new cycle routes and bus services. These heritage assets are likely to be impacted visually rather than physically.
The highway alterations may have physical impacts on heritage assets, located along these proposed routes, particularly those off-line. There is also the potential to impact on currently unrecorded heritage assets. There could be adverse impacts on Conservation Areas in the study area, especially where options pass through the towns.

Soils
Construction impacts of this package are potential instigation of stability hazards and potential creation of new pollutant linkages to pre-existing contamination. The operational impacts of this package are potential creation of new contamination, and potential creation of migration pathways for contaminants.
This package is predicted to have a moderate adverse impact. However, providing appropriate mitigation is implemented, the impacts can be effectively reduced to **neutral**.

Water Environment
Assuming good practice is implemented during construction, impacts on surface water can be effectively mitigated. Assuming new treatment and containment facilities are installed as part of the new drainage system of the road network, it is predicted that this package is likely to result in neutral or even beneficial impacts to surface water environment.
Although the potential for creating both pathways to pre-existing contamination and new pollution is considered minor, the receiving groundwater is sensitive due to an onsite area of inner source protection zone. With the application of appropriate mitigation options, construction impacts on ground water are assessed as slight beneficial and as neutral due to operation.
Assuming good practice is followed during construction, the construction impacts can be effectively mitigated. During the operational phase, impacts are all assessed to be **neutral,** assuming mitigation options are implemented where required.

Social

Transport safety
This package should improve transport safety for walkers and cyclists through the provision of a number of off-road routes along the main corridors within the study area, linking to key employment sites and public transport interchanges. This should reduce levels of conflict with motorised modes, improving safety. Additional crossing opportunities of the strategic road network should also reduce the incidence of unsafe pedestrian crossing behaviour improving safety.

Improvements to public transport, park and ride and car sharing should all help to encourage car users to shift to these modes, improving transport safety as bus and rail are generally safer forms of transport than the private car. The reduction in car trips throughout the study area should also help to improve transport safety for all road users.

The freight elements of the package aim to increase levels of rail freight, separate slow moving lorries from general traffic and give lorry drivers the safe opportunity to take a break. This will reduce the number of HGVs, reduce the friction between HGVs and general traffic and improve the alertness of HGV drivers, all helping to reduce the number of accidents involving HGVs in the study area.

The highway elements of the package should help to improve the transport safety of the study area through bringing the strategic highway network up to current design standards, overcoming some of the key road safety issues in the study area at present. These improvements will particularly benefit car and HGV trips, however public transport routes using the strategic road network will also benefit.

Overall it is anticipated that this package will have a **significant benefit** on transport safety levels within the study area, benefiting all transport users.

Personal security
This package will improve personal security for walkers and cyclists through the provision of new walking and cycling routes constructed to current best practice guidance to ensure good levels of perceived security amongst users. New crossing facilities will also be constructed to modern standards to make sure that they are not considered a crime risk.

The bus and rail improvements should help to provide a more direct service between populations in the study area and key destinations, such as employment centres, helping to provide a public transport solution that is perceived as secure, with fewer requirements to interchange or walk through unsecure areas.

Truck stops will provide a secure opportunity for lorries to park overnight, reducing the incidence of illegal overnight parking in lay-bys with associated vehicle crime issues and personal security risks for drivers.

Overall it is anticipated that this package will have a **moderate benefit** on personal security levels within the study area.

Permeability

Crossing facilities on the key trunk roads in the study area will help facilitate nearby residents being able to access opportunities on the other side of the road more easily. New walking and cycling links will also help to increase the permeability of the study area for walkers and cyclists.

A new road between the A55 and A548 may present a severance barrier for the small numbers of people living in the vicinity of the route, however there are no significant destinations in the vicinity of this route, so the impact is likely to be minimal.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon the permeability of the study area for walkers and cyclists.

Physical fitness

This option seeks to provide additional capacity through the provision of new infrastructure, and focuses on the strategic trips through the study area. As a general rule, the further and the longer you can encourage users to walk and cycle, the better for their health. Therefore encouraging a modal shift away from unsustainable modes towards walking and cycling will help improve physical fitness within this corridor. It is recommended that the minimum level of physical fitness for an adult should be at least 5 units of 30 minutes of exercise every week. It is considered that for commuters, a distance of 2Km is appropriate to walk to work, and 5km for cycling to work is considered comfortable. Taking an average walking speed of 3Km/hour, and an average cycling speed of 20km/hour, to walk 2Km would take 35 minutes, whilst cycling 5Km would take approximately 16 minutes.

The options within the package include the provision of several new cycle routes, including Mold to Saltney Cycle Way, the provision of a costal path along the Dee in Flintshire, a dedicated continuous route from Deeside to Neston and new walking and cycling routes to key public transport interchanges such as the Shotton Stations. These options should improve the modal share of walking and cycling, and therefore improve physical fitness. For example, A direct link between Neston and Deeside would cover a distance of approximately 4.5 miles, which at an average cycling speed of 20km/hour would take around 20 minutes to complete. Commuters completing this journey daily for work based trips would exceed the minimum requirements of 30 minutes of exercise for increasing physical fitness, and would therefore improve their health.

The improvements in infrastructure should encourage an uptake of walking and cycling, and improve physical fitness. However given the distances involved in strategic trips it is unlikely to create a substantial shift in modal split towards walking and cycling. Therefore, this package will have **slight benefit** on improving physical fitness.

Social inclusion

This package will help to promote social inclusion through improved accessibility for those without access to a car to employment opportunities and other key destinations. Deprived areas such as Flint and Connah's Quay will be able to utilise the public transport improvements to access work opportunities at destinations such as the Deeside Industrial Park, Broughton and Chester. Rail improvements and the Taith Express will also help residents of the study area and North West Wales to access opportunities in England (and vice-versa), helping to promote social inclusion.

Overall it is anticipated that this package will have a **significant beneficial** impact upon social inclusion.

Equality, Diversity & Human Rights

The improved safety and security of existing walking and cycling routes should improve accessibility for disability groups as should improved non car accessibility at stations. Improvements to bus services, such as real time passenger information and integrated ticketing should benefit women, the young and old; who typically make the greatest use of bus services.

The overall package should be particularly beneficial to those without access to a car, providing a positive benefit to deprived groups.

No disproportionate discriminatory impacts have been identified on any of the equality impact groups. Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public acceptability

Public consultation has not yet been undertaken for this package.

Acceptability to other stakeholders
Stakeholder consultation indicates moderate support for the options contained within this package. Stakeholders questioned whether the cycle routes proposed would help to reduce commuter car trips and whether these options represented value for money. Stakeholders questioned likely patronage of a Taith Express service and the cost of cross Dee bus routes.

Technical & Operational Feasibility
New walking and cycling links are considered technically and operationally feasible, but some degree of land purchase will be required to secure suitable route alignments, such as the Mold to Saltney cycle way.

The proposed bus route improvements are all technically feasible, with some potential to extend or expand existing services increasing operational feasibility. The business case for these routes has not yet been established, so the likely level of patronage and therefore the degree of public subsidy needed is not known.

Service frequency enhancements on the Borderlands line would require additional rolling stock (2 units). Some signalling enhancements might also be necessary. An extension to Birkenhead would introduce additional pathing and turnback issues and would require further units. A fast Llandudno to Manchester Airport service would require additional rolling stock (3 units). A new local service between Chester & Manchester would need to be pathed through Warrington & Manchester.

To extend the existing London to Chester service as far as Bangor or Holyhead would require suitable additional rolling stock. This could be costly and may not be feasible. The Bangor option would result in no London trains serving Holyhead to avoid gaps in the return service.
The Rhyl to Chester shuttle would require a new turnback facility at Rhyl and additional rolling stock (+4 units). The service is just feasible operationally, although resource inefficient.

A freight consolidation centre should be technically and operationally feasible. Extensive studies into a number of consolidation centre sites, are already underway. There are a number of sites available and a high level of demand is anticipated.

Truck stops have been notoriously difficult to deliver in recent years due to difficulties in getting planning approval and attracting private investors. Government backing may be required.

Crawler lanes would involve a large civil engineering program and create short term disruption in already congested points on the network.

An open access rail terminal is likely to be a technically and operationally feasible option. Extensive studies into a number of sites, are already underway. There are a number of sites available and a reasonable level demand is anticipated.

The highway improvements proposed are likely to be operationally and technically feasible, but may be complicated to deliver in some instances. Improvements such as the A494 Ewloe to Drome Corner and Ewloe Interchange schemes have been part of previous studies and are considered feasible, but with the requirement for significant land take.

Provision of hard shoulders may not be possible along all sections of the dual carriageway trunk roads in the study area due to physical constraints.

All online link and junction improvements proposed are likely to lead to delays and restrictions for traffic during construction. New links and significant widening are likely to result in difficulties relating to land purchase.

Improving the capacity of the A494 River Dee crossing will involve the construction of a new bridge structure, with associated technical and operational complexities.

A new link connecting the A55 and A548 would be feasible in engineering terms but would probably require significant cuttings and embankments.

Financial Affordability, Deliverability
Table 6.18 – Cost and Delivery Agents - Package 9: Capacity Enhancements (Strategic Trips)

Theme	Option Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Provide walking and cycling crossing facilities on trunk roads and associated junctions	0.4	WG / Highways Agency	33
	Provide safe walking and cycling routes from communities to public transport interchanges.	0.5	Local Highway Authorities	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	14	Local Highway Authorities	39
	Mold to Saltney cycle way	9.85	Local Highway Authorities	40
	Provision of a Dee Coastal Path in Flintshire	0.25	Flintshire CC	41
	Mold – Deeside cycle route	0.3	Flintshire CC	104
	New walking and cycling links to key employment sites	0.5	Local Highway Authorities	100
	Provide a cycle link between Deeside and Neston	0.5	Flintshire CC / Cheshire West & Chester	107
Bus	Taith Express coach services	0.25	WG / Taith / Bus Operators	
	Rail link bus routes from train stations to key employment sites	0.25	Local Highway Authorities / Public Transport Operators	52
	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	WG / Local Highway Authorities / Bus Operators	
	Improved cross Dee bus route between Mold and Ellesmere Port	0.25	WG / Local Highway Authorities / Bus Operators	
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	10	Network Rail / Train Operators	56
	Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool	200		58
	Fast Llandudno-Manchester Airport service	0	Network Rail / Train Operators	61
	Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion	23	Network Rail / Train Operators	62
	Extension of London-Chester services to Bangor/Holyhead	0	Network Rail / Train Operators	66
	Rhyl-Chester (with possible extension to Crewe) local shuttle	2	Network Rail / Train Operators	67

Freight	Freight Consolidation Centres including one at Deeside	0.5 – 1.5	WG / Taith	74
	Truckstops	3	WG / Taith	83
	Crawler Lanes on the key trunk roads and other single carriageway A-roads	20	WG / Highways Agency	84
	Rail electrification	5	Network Rail	87
	Open Access Rail Terminal	15	Network Rail / WG	105
Demand Management	Park and Car Share scheme	1	WG / Local Highway Authorities	94
	Park and Ride scheme	0.25	WG / Local Highway Authorities	95
Highway	Apply managed motorway concepts to key trunk roads	80	WG / Highways Agency	5
	Provide hard shoulders on dual carriageway trunk roads	50	WG / Highways Agency	99
	Enhance the A548 route between Flint and the A550	64	WG / Flintshire CC	10
	A483/A55 Junction Improvement	40	Highways Agency	17
	Improve key junctions on the A483	9	WG / Highways Agency	18
	New road connecting the A55 and A548	89	WG	21
	A55 Ewloe to Northop Improvements	32	WG	24

	Ewloe Interchange Improvements	96	WG	25
	A494 Ewloe to Drome Corner Improvements	65	WG	26
	Improve the capacity of the A494 River Dee crossing			27

The total cost of this package excluding long-term options is approximately £417m. Approximately £332m of this is associated with Highway infrastructure options. Including long term options the total cost of this package is £640m. This cost is based on the assumption that the new road between the A55 and A458 is constructed along with enhancements to the A548. Improvements to the A548 corridor and A55/A494 corridor is unlikely, the decision to include the A548 corridor improvements does not indicate that a preferred solution or package of solutions has been determined. A55 improvements between Northop and Drome Corner are not included in this cost.

There are potentially 10 delivery agents identified in this package.

The A55/A548 and A549 enhancement highway options associated with this package have significant financial cost, however if funding is available the schemes are considered deliverable.

The A55 highway options associated with this package have been reduced in scale when compared to the Ewloe to Drome Corner scheme that was rejected by the Inspector in February 2008 following the Public Inquiry. The highway options associated with this package have significant financial cost, however if funding is available the schemes are considered deliverable.

The majority of the walking and cycling elements of this package can be delivered relatively easily. However, the high cost associated with the Mold to Saltney cycle way would require significant funding.

The delivery agent for a significant proportion of the total cost of this package has been identified as Network Rail and/or Rail Operators, Full support of these agents would be required to deliver the rail elements of this package.

Deliverability of truckstops have been notoriously difficult in recent years due to planning restrictions and problems attracting private investors. The deliverability of crawler lanes could be studied in more detail if this package is taken forward to a Stage 2 WelTAG Appraisal.

Risk

The financial risk associated with this package is considered high. There is a significant cost in providing new walking and cycling, rail and highway infrastructure that would be all at risk of additional costs.

Long term rail options have significant financial risk.

There is a risk that there is insufficient benefits from walking and cycling options to justify the capital cost.

Rail and bus options require full support from Network Rail and transport operators

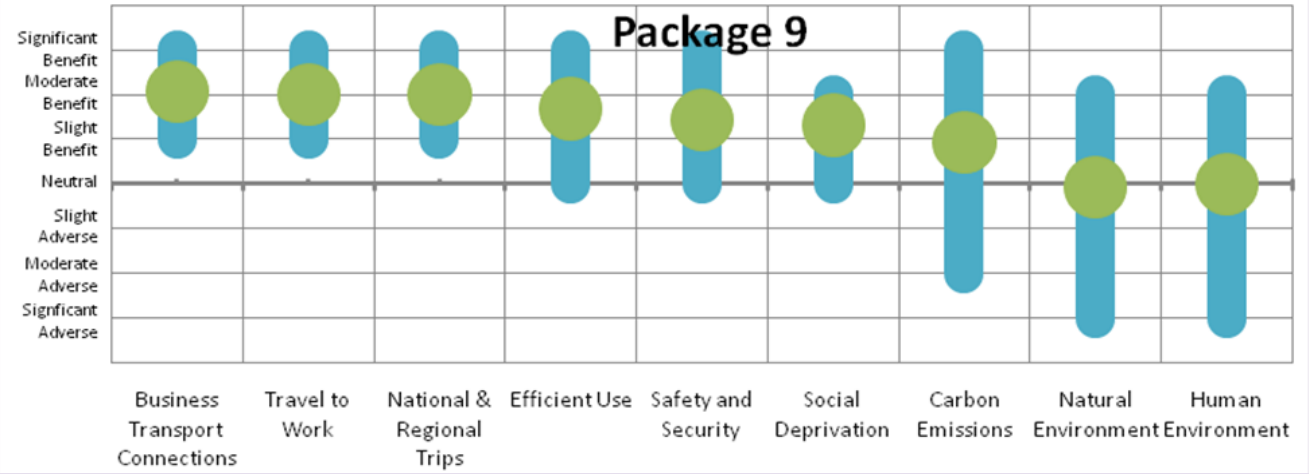
Highway options would cause significant additional delays to traffic during the construction period.

Demand management option need to have a suitable staff resource available to help implement the included options. Many of the options also require employers or other groups to engage with the delivery agent to implement the package element. This requirement for third party involvement represents a risk to the deliverability of the package

Assessment Against TPOs

The headings below indicate our qualitative assessment of the likely impact of this package of options on the Transport Planning Objectives for the study. Alongside this assessment the stakeholders who attended the consultation event were also given the opportunity to score the package against the Transport Planning Objectives. Their assessment of the package is shown in Figure 6.9. This shows that stakeholders considered this package particularly successful against the business transport connections, travel to work and national and regional trips objectives. The package is considered to have a neutral or slight disbenefit against the natural and human environment objectives.

Figure 6.9 Capacity Enhancements (Strategic Trips): Stakeholder Assessment



<u>To improve transport connections for businesses within the study area to key economic centres and employment sites.</u>

This package provides a number of highway and public transport interventions improving transport connections between the key economic centres in the study area including Deeside Park, Chester and Wrexham. The improvements should also improve transport connections to economic centres in the rest of North Wales and England through improved rail connections, resolving some of the issues with the strategic road network in the study area and the provision of express coach services.

The freight elements of this package should help to facilitate greater levels of rail freight and more efficient HGV freight transfer.

Overall it is considered that this package will have a **large beneficial** impact upon this Transport Planning Objective.

<u>To improve access between employment sites and workforce catchment areas.</u>

The walking and cycling elements of this package should help to provide improved access between major employment sites and nearby residential areas. Bus and rail service improvements should help to improve accessibility to employment sites such as Chester and Deeside Industrial Park from workforce catchment areas further away. The proposed highway improvements should help to overcome some of the delays currently caused by commuter congestion, improving the accessibility between employment sites and workforce catchment areas for those who access work opportunities by road.
Overall it is anticipated that this package will **large benefit** towards this Transport Planning Objective.

<u>To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.</u>

This package contains a number of walking and cycling and local public transport improvements. These elements will help to encourage mode shift away from private car use for local journeys, helping to free up capacity on the strategic road network for use by necessary national and regional trip movements.

The improvements proposed to the strategic road network will help to overcome some of the key pinch points on the strategic highway, creating additional capacity which can facilitate region and national trips for people and freight.

Improvements to regional public transport connections through rail service improvements and the Taith express will help to improve the public transport offer for people making regional and national trips between North Wales and England.

The freight elements of this package will help to encourage more efficient use of rail freight, with highway improvements helping to make the study area strategic road network suitable for road freight.

Overall it is considered that this package will have a **large beneficial** impact upon this Transport Planning Objective.

To improve the actual and perceived safety and personal security of all transport users in the study area.
This package should improve transport safety and personal security for walkers and cyclists through the provision of a number of new off-road walking and cycling routes constructed to current best practice standards along the main corridors within the study area, linking to key employment sites and public transport interchanges. This should reduce levels of conflict with motorised modes, improving safety. Additional crossing opportunities of the strategic road network should also reduce the incidence of unsafe pedestrian crossing behaviour improving safety. These crossing facilities will also be constructed to modern standards to make sure that they are not considered a crime risk.

Improvements to public transport, park and ride and car sharing should all help to encourage car users to shift to these modes, improving transport safety as bus and rail are generally safer forms of transport than the private car. The reduction in car trips throughout the study area should also help to improve transport safety for all road users. Greater levels of public transport use will increase perceived personal security through informal surveillance.

The freight elements of the package aim to increase levels of rail freight, separate slow moving lorries from general traffic and give lorry drivers the safe opportunity to take a break. This will reduce the number of HGVs, reduce the friction between HGVs and general traffic and improve the alertness of HGV drivers, all helping to reduce the number of accidents involving HGVs in the study area. Truck stops will provide a secure opportunity for lorries to park overnight, reducing the incidence of illegal overnight parking in lay-bys with associated vehicle crime issues and personal security risks for drivers.

The highway elements of the package should help to improve the transport safety of the study area through bringing the strategic highway network up to current design standards, overcoming some of the key road safety issues in the study area at present. These improvements will particularly benefit car and HGV trips, however public transport routes using the strategic road network will also benefit.

Overall it is anticipated that this package will have a **large benefit** for this Transport Planning Objective.

To reduce social deprivation through improved access to jobs and other key services.
This package will help to reduce social deprivation through improved accessibility for those without access to a car to employment opportunities and other key destinations. Deprived areas such as Flint and Connah's Quay will be able to utilise the public transport improvements to access work opportunities at destinations such as the Deeside Industrial Park, Broughton and Chester. Rail improvements and the Taith Express will also help residents of the study area and North West Wales to access opportunities in England (and vice-versa), helping to reduce social deprivation.

Overall it is anticipated that this package will have a **large beneficial** impact upon this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure in the study area.
The elements contained within this package contain elements of significant new transport infrastructure, such as new rail services requiring turnback facilities and track doubling, junction improvements and walking and cycling links. These elements cannot be considered to be maintaining or making efficient use of existing transport infrastructure. These options should help to make existing transport networks operate more efficiently, for example an open access rail terminal would help to facilitate greater use of existing rail freight infrastructure.

Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To reduce carbon emissions from transport in the study area.
This package should help to reduce carbon emissions from transport in the study area because the options contained within the study area should encourage mode shift to more sustainable transport modes. Additionally the highway improvements proposed should help to reduce delays on the strategic road network, however these capacity improvements may also induce vehicle trips which are currently suppressed by the transport problems in the study area. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package is anticipated to have a slight beneficial impact upon the local air quality in natural environments due to a shift towards more sustainable travel modes, alongside a reduction in congestion and delays at key junctions and links improved as part of this package. The impacts of this package on water, soil pollution and biodiversity are anticipated to be neutral during the operational phase of the package schemes assuming mitigating options are included. Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

This package is anticipated to have a slight beneficial impact upon the local air quality in human environments due to a shift towards more sustainable travel modes, alongside a reduction in congestion and delays at key junctions and links improved as part of this package. The package may have an adverse impact on noise for those living along the new road connecting the A55 and A548, but traffic management elsewhere on the trunk road should help to slightly reduce noise there. Landscape and townscape impacts due to the new A55 to A548 may also be moderately adverse subsequent to mitigation options. Overall it is anticipated that this package will have a **slightly adverse** impact upon this Transport Planning Objective.

Table 6.19 – Appraisal Summary

		Packages								
		Package 1 Area Wide: Managing Demand	**Package 2**: Making Best Use Flint / Mold – Chester (via Deeside / Broughton)	**Package 3** Capacity enhancements: Flint / Mold – Chester (via Deeside / Broughton)	**Package 4**: Making Best Use Wrexham – Deeside (via Mold / Buckley):	**Package 5** Capacity Enhancements Wrexham – Deeside (via Mold / Buckley):	**Package 6**: Making Best Use Chester – Wrexham:	**Package 7** Capacity Enhancements Chester – Wrexham:	**Package 8** Making Best Use Strategic Trips:	**Package 9** Capacity Enhancements Strategic Trips:
Economic	**TEE**	+	+	++	+	++	+	++	+	++
	EALI	+	+	++	+	++	+	++	+	+++
Environment	**Noise**	0	0	0	0	0	0	0	+	-
	Local Air Quality	+	+	+	+	+	+	+	+	+
	Green House Gases	+	+	+	+	+	+	+	+	+
	Landscape and Townscape	0	0	0	-	-	0	-	0	--
	Bio-Diversity	0	0	0	0	0	0	0	0	0
	Heritage	+	0	0	0	0	0	0	0	0
	Surface Water	0	0	0	0	0	0	0	0	0
	Ground Water	0	0	0	0	0	0	0	0	0
	Flood Risk	0	0	0	0	0	0	0	0	0
	Soils	0	0	0	0	0	0	0	0	0
Social	**Transport Safety**	+	++	+++	++	+++	++	++	+	+++
	Personal Security	0	++	++	++	++	++	++	+	++
	Permeability	+	+	+++	+	+++	+	+	+	++
	Physical Fitness	+	+	+	+	++	+	++	+	+
	Social Inclusion	+	+	++	+	++	+	++	+	+++
	Equality Diversity & Human Rights	0	0	+	+	0	+	+	+	+
Transport Planning Objectives	**Business Transport Connections**	+	+	++	+	++	+	++	++	+++
	Travel to Work	+	++	+++	+	+++	+	++	+	+++
	National & Regional Trips	+	+	++	+	+	+	++	++	+++
	Safety & Security	0	++	+++	++	+++	++	+++	+	+++
	Social Deprivation	+	+	++	+	++	+	++	+	+++
	Efficient Use	++	+++	+	++	0	++	0	+++	0
	Carbon Emissions	+	+	+	+	+	+	+	+	+
	Natural Environment	0	0	0	0	0	0	0	0	0
	Human Environment	0	+	0	0	0	0	0	+	-

Key			
+++	Large Benefit	---	Large Adverse
++	Moderate Benefit	--	Moderate Adverse
+	Slight Benefit	-	Slight Adverse
0	Neutral		

6.3 Summary of Assessment of Packages

This report section has presented the detailed appraisal of each of the proposed packages against the environmental, social and economic appraisal criteria as well as the studies Transport Planning Objectives.

Table 6.19 summarises the findings from this appraisal work. This shows that all of the packages appraised reasonably well against the various appraisal criteria. In general the capacity enhancement packages scored most highly against the objectives of the study, but these packages were also more likely to have negative environmental consequences.

Packages such as the area wide demand management package may not have scored as highly against the assessment criteria as capacity improvements, however demand management is a relatively cheap option and is in keeping with national and local objectives relating to reducing car journeys and reducing the need to travel. It therefore is considered important that these elements continue to form part of the developing strategy.

As part of this detailed appraisal process a number of the options contained within the packages have been identified as not being appropriate for further consideration. A number of different reasons have led to this decision; including lack of value for money, poor performance against the appraisal criteria and a lack of feasibility or deliverability. Table 6.20 indicates the options which will not be considered further, as well as the justification for these decisions.

Table 6.20 - Options which will not be considered in further appraisal

Option Name	Justification for removal/amendment of option	Reference
Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	Bus and rail operators consulted during stakeholder consultation did not consider this option to be feasible. The slow turnover of public transport vehicles means that even with operator support this option would have limited impact.	34
Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry	Appraisal indicated potential dis-benefits for general traffic. Going forward this option will be considered alongside highway options to reduce congestion along this route to ensure that bus priority does not overly delay general traffic.	44
Potential to link National cycle route 5 from Chester to Denbigh and Wrexham	Appraisal and stakeholder consultation has indicated that the Denbigh element of this option does not contribute strongly to the TPO's of this study (although there may be wider national benefits to this element). The option has therefore been reduced to just consider the Chester to Wrexham section. WG and Sustrans will consider to investigate this option in its entirety	39
Improved connection between rail and bus services at Shotton station	Stakeholder consultation has indicated that these improvements have now been completed. The opportunity for further improvements at this station will be considered as part of the wider 'improve rail and bus integration' option	106
New road bridge between Connah's Quay and Deeside Park	Appraisal has indicated that this option is of limited benefit in contributing to the objectives of this study. The construction cost and complexity of this option is likely to be high for the benefits provided. This option can be revisited as part of the improvements to road connections to Deeside Industrial Park which may be required as part of the potential Deeside Northern Gateway development – funded through developer contributions.	23
Crawler lanes on the key trunk roads and other single carriageway A-roads	Assessment has indicated that the only locations which may require crawler lanes where they are not currently present are on the A55/A494. The requirement for crawler lanes on these locations will be assessed as part of the A55/A494 WelTAG Stage 2 assessment.	84
Suspension of non-essential maintenance at peak periods	Consultation with the highway authority has indicated that this option is already being undertaken where feasible.	82

Establishing a Strategy Delivery Plan

7 Establishing a Strategy Delivery Plan.

7.1 Introduction

The previous section of this report outlines the appraisal of a number of packages of options to assess how well each contributes towards the Transport Planning Objectives of this study and the Welsh Impact Areas. This assessment has indicated that to varying degrees all of the packages offer benefits to the study area. It has therefore been determined that the identified strategy should be based upon elements from each of these packages, with the exception of some options which subsequent to the appraisal process have been identified as not suitable as outlined in table 6.20. This section of the report therefore takes the viable options and looks at how the various elements can be delivered in terms of the likely delivery agents and timescales. Options have been divided into those deliverable in the short, medium and long term.

7.2 Developments

7.2.1 National Transport Plan Prioritisation

The packages outlined in the previous section were established in 2011. At that stage it was not possible to finalise the NEWABTS Strategy due to the implications of the Welsh Government's ongoing reprioritisation of the National Transport Plan. This process was completed in December 2011 and has reaffirmed the need to '*address the transport issues in the Wrexham, Chester, Deeside triangle*'. The prioritised NTP also highlights the need to '*Continue work on the detailed design to redouble the section of railway between Saltney and Wrexham*' as a short term priority. The prioritised National Transport Plan has therefore confirmed the importance of the NEWABTS Strategy and its primary aim of improving connections between Wrexham, Chester and Deeside and the delivery plan presented in this section is consistent with achieving the NTP aim.

7.2.2 Deeside Enterprise Zone

In September 2011 Deeside was identified as one of five (subsequently expanded to seven) locations within Wales for the development of an 'Enterprise Zone', which is expected to create 5,000 jobs and promote economic development and prosperity in both the local and wider regional area. The Deeside enterprise zone will cover the Deeside growth zone which includes the Deeside Industrial Park, the Northern Gateway development and Sandycroft factories as well as the Airbus site at Broughton. It will focus on the advanced manufacturing sector, although the precise details of the proposals and the incentives for businesses have yet to be finalised. Transport provision to the new Enterprise Zone will be an integral part of ensuring its success and it is therefore important that the NEWABTS Strategy supports the requirements of the Enterprise Zone into the future.

The following NEWABTS Transport Planning Objectives will help support the needs of Enterprise Zone businesses:

- To improve transport connections for businesses within the study area to key economic centres and employment sites.
- To improve access between employment sites and workforce catchment areas.
- To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.
- To reduce social deprivation through improved access to jobs and other key services.

7.3 Delivery Plan Methodology

The identified NEWABTS strategy delivery plan seeks to identify a coherent strategy for the North East Wales area that is both realistic and deliverable; achieving synergies between the various strategy elements to help improve connections between the key settlements in the study area by all travel modes.

In developing this strategy delivery plan, the strategic importance of the trunk road network and strategic rail network through the study area is recognised. The A55, A494 and A483 trunk roads have a key role in facilitating access to the study area and through the study area to North West Wales, Northern England and the Midlands. These trunk roads play a

vital role in ensuring economic connectivity between North Wales and Northern England, and the Midlands. The North Wales Main Line which connects key settlements in North Wales with Northern England also passes through the study area. Improvements to these strategic transport networks are vital to the economy of North Wales and the wider area.

Due to likely funding restrictions anticipated to remain for the next several years it is prudent to identify a strategy which is low cost and represents value for money. For this reason the interventions considered viable in the short term focus on reducing the need to travel and making best use of existing transport resources, rather than more costly major road improvements. The strategy also concentrates on the delivery of strategy elements which are deliverable by Taith and the local authorities.

Flintshire County Council adopted the Flintshire Unitary Development Plan on Wednesday 28th September 2011. The Plan became operative on the date of adoption and will form the basis for all land use planning decisions affecting the County. The implementation of the NEWABTS delivery plan in Flintshire, should where appropriate be consistent with the adopted UDP.

Figure 7.1 illustrates the proposed strategy delivery plan for the whole of the NEWABTS study area. In some instances the plan does not focus on individual interventions or schemes but illustrates the type of interventions that will be considered in each timescale across the study area. In addition to this plan are individual delivery plans for each of the identified study corridors (figures 7.2 to 7.5). These identify how the interventions assessed as beneficial as part of the WelTAG Stage 1 processes could be applied to each of the corridors to help deliver the overall NEWABTS strategy. These lists are not exhaustive and it is anticipated that local authorities will wish to identify additional local schemes which can help to deliver the NEWABTS strategy goals for the individual corridors within the identified available funds.

Both the overall and corridor based delivery plans split the identified interventions into those deliverable in the short, medium and long terms:

- Short term has been taken to represent those interventions which could be delivered during the period of the current Taith Regional Transport Plan (the next 3 years).
- Medium term interventions are those considered realistically deliverable within the next 15 years (a timescale in which it is considered reasonable for a major infrastructure project to be deliverable if planning and design work commenced in the short term).
- Long term options are considered to be those not achievable within the next 15 years. These may be long term aspirations of Taith or the local authorities but due to large costs or design complexities they are not considered to be deliverable within the next 15 years.

7.4 The area wide strategy

Figure 7.1 illustrates the area wide NEWABTS Strategy and how this will be delivered in the short, medium and long term. Recognising the funding restrictions and the sustainability objectives of the study, a hierarchical approach has been applied to the overall delivery of the strategy:

1. Options which reduce the need to travel and manage demand will be considered in the first instance.

2. Walking and cycling improvements form the second tranche of the strategy, with public transport improvements also given consideration.

3. Where the sustainable travel improvements considered above are not able or appropriate to resolve the problems on the study corridors then appropriate highway improvements will be considered.

Figure 7.1: The Area Wide NEWABTS Strategy Delivery Plan

Theme	Measure (Subject to Business Case and funding availability)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Measure (Subject to Business Case and funding availability)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Measure (Subject to Business Case and funding availability)	Delivery Partners	Corridors affected: Strategic	Flint/Mold - Chester (via Deeside/Broughton)	Wrexham - Deeside (via Mold / Buckley)	Chester - Wrexham
	Short (Next 3 years)			Medium (4 to 15 years)			Long (Greater than 15 years)					
Demand Management	Local Authority Demand Management Strategies	0.3	FCC, WCBC	→	1.1	FCC, WCBC	→	FCC, WBC				
	Park and Ride/Park and Car Share Study	0.02	Taith	Implement recommendations of Park & Ride/Park and Car Share Study		Taith						
Walking and Cycling	Local Authority Walking and Cycling Strategy focusing on links to employment centres and public transport interchanges	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC	→	FCC, WBC				
	Provide leisure routes between the key settlements in the study area.	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC	→	FCC, WBC				
Bus	Identify/implement opportunities for bus priority at key junctions to avoid traffic congestion and improve service reliability to improve connectivity to and between key settlements.	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC						
	Real time passenger information at bus stops		Taith, FCC, WCBC	→	0.2	FCC, WCBC						
				Taith Express coach service - Study linked to Park and Car Share Study recommendations	0.25	Taith						
	Work with bus industry to develop and facilitate bus service enhancements, potentially through the development of Quality Bus Partnership.		Taith, CW&C, Merseytravel, Opeartors	→		Taith, Opeartors						
				Improve rail and bus integration	0.15	FCC, WCBC, CW&C, Merseytravel Operators						
				Integrated Area Ticketing	0.5	FCC, WCBC, CW&C, Merseytravel Operators						
				Improved cross Dee bus route between Mold and Ellesmere Port	0.25	FCC, WCBC, CW&C, Merseytravel Operators						IN
				New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	FCC, WCBC, CW&C, Merseytravel Operators						
				Rail link bus routes from train stations to key employment sites	0.25	FCC, WCBC, CW&C, Merseytravel Operators						
				Create a multi-modal hub at Wrexham General Station	1	WCBC, Operators						
Rail	GRIP Study, Service enhancement Wrexham - Bidston Line, **GRIP Study Now Completed, further Business Case work being undertaken**		WG, Taith, NR, Merseytravel	Service enhancement Wrexham - Bidston Line		WG, Taith, NR, Merseytravel						
				Service Extension Wrexham to Birkenhead North		WG, NR, Taith, Merseytravel	Service Extension Wrexham to Liverpool	WG, Taith, NR, Merseytravel				
				Increased parking provision along Wrexham - Bidston line to promote park and ride	1	Taith, NR, FCC, WCBC						
				Improved station accessibility (non - car station access)	0.3	Taith, FCC, WCBC						
				New station at Deeside Industrial Park	7.5	Taith, NR, Developer						
	Progress plans to double track Chester (Saltney Jct) to Wrexham	37	WG, NR	Additional services between Chester and WCBC stations. **Arriva Trains Currently assessing alternative options**	0.6	WG, Taith, NR						
				New station at Rossett on the Wrexham to Chester line	5	WG, Taith, NR						
				Increased parking provision WCBC stations	1	Taith, NR, WCBC						
	Work with Rail Industryfor extension of Llandudno - Manchester service to Manchester Airport		WG,Taith, Rail Industry									
	Work with Rail Industry to deliver a fast Llandudno - Manchester Airport service in the medium term		WG, Taith, Rail Industry									
							Extension of London - Chester services to Bangor/Holyhead	WG, NR, Taith				
				GRIP Study Electrification of North Wales Coast Main Line	0.1	NR, WG	Electrification of North Wales Coast Main Line	NR, WG				
				Increased Frequency North Wales Line		WG, NR, Taith						
				New station at Queensferry on the North Wales Main Line	5	WG, NR, Taith						
Freight	Freight Strategy, incorporating the promotion and publicity of rail freight opportunities and freight exchange concepts.	0.11	Taith, WG, NR									
	Monitor the requirement for a developer funded truckstop in the study area. **Planning Consent Granted for site in Deeside Industrial Estate**	Dev	WG, Taith, Developer									
	Deeside consolidation centre/open access rail terminal - establish firm commitment from potential users and rail operators before undertaking business case. **Exploratory study currently being undertaken**	0.05	WG, Taith, Developer	Deeside consolidation centre/open access rail terminal, potentially delivered with Waste Transfer Facility	5	WG, Taith, Developer						
							Shotton Chord Linked to Deeside Consolidation Centre	WG, Taith, NR, Dev				
Highway	Identification and implementation of local road safety enhancements and local pinchpoint improvements.	1.5	FCC, WCBC						IN			
	Minor junction improvement scheme at A483/B5445 junction	HA	HA, CWC									
	Junction improvement scheme at A55/A483 junction - **Now Completed**	HA	HA, CWC									
	Liaise with the Highways Agency regarding major scheme development		HA, WG, WCBC, CWaC	A483/B5445/A55 Junction Improvements		HA	A483/B5445/A55 Junction Improvements	HA				
	A483 junctions west of Wrexham KS2 / WelTAG 1&2	0.25	WG	Implement A483 junction improvements west of Wrexham	TBD	WG						
	A55/A494 WelTAG Stage 1 & 2	0.15	WG	Implement A55/A494 Study Recommendations	TBD	WG						
							Provide Hardshoulders on dual carriageway trunk roads	WG				
				Improve road connections to Deeside Industrial Park. **Outline Planning Consent Granted for part of Northern Gateway Development**	Dev	FCC, WG, Developer	Improve road connections to Deeside Industrial Park	FCC, WG, Developer				
							Improve road connections to Broughton area (west facing slips A55 Broughton jct)	WG, Developer			IN	
	Consider a signage strategy for strategic and local traffic	0.2	WG, Taith							IN		
		£44.1m			£46.0m							

7.4.1 Demand Management

The first element of the strategy for delivery in the short term is the development of a Demand Management Strategy based on the various elements assessed as part of the area wide Managing Demand Package 1. This should be coordinated by the local authorities in the area and focus on the key employment sites to help improve and promote the use of sustainable travel to these destinations. The local authority walking and cycling strategy (discussed later) also focuses on improved walking and cycling access to key employment sites from areas within 5km and it is anticipated that these two elements will work together to help increase walking and cycling mode share for these short journeys to work. It is anticipated that the Demand Management Strategy should be continued into the medium and long term.

Park and Ride and Park and Car Share options have been suggested by consultees as ways of reducing single occupancy car use through the study area. There are a number of locations where these principals could apply, including rail stations, existing car parks and new sites on the strategic road network. However, likely patronage levels have not been estimated as part of this overall strategy. Therefore it is recommended that a study be undertaken in the short term to establish the viability of these concepts to the study area and that the schemes identified should be implemented in the medium term. These interventions also fit in with the proposals for a Taith Express (TrawsCambria) coach service, so the benefits of such an option may be more significant in conjunction with these wider Taith proposals.

7.4.2 Walking and Cycling

The proposed walking and cycling strategy incorporates two elements; one focusing on necessary work, shopping and education trips; the other focusing predominantly on leisure use. The significant distances between the key settlements in the study area preclude walking and cycling from being viable travel modes for most people needing to travel between these destinations. A number of long distance routes have been appraised as part of this study. This has identified that these represent an important resource on health and well being grounds (and hence are considered an important part of the overall strategy), but are only likely to be used in small sections for utility trips. Therefore the main strategy focuses on improving access to employment sites and other centres from residential areas within 5km (a distance appropriate for walking and cycling trips).

Improved links to public transport interchanges and improved facilities at these interchanges forms the means of accessing key destinations and centres sustainably for longer journeys. The first stage of this strategy will involve auditing of existing routes to assess their suitability and marketing initiatives linked in with the local demand management strategy. Some specific route improvements have already been identified (see the individual corridors) but it is for the local authorities to identify suitable improvements and new routes which can seek to achieve these aims.

7.4.3 Bus

The proposed strategy for bus services recognises that bus travel is unlikely to offer a realistic alternative to the private car where parking restraint is relatively limited. However, improvements to bus provision are necessary from a social inclusion perspective due to the requirements of those without access to a car.

The local authorities will work with the bus industry to develop and facilitate bus service enhancements, potentially through Quality Bus Partnerships.

Bus priority is proposed as a means of reducing journey time variability and along corridors, such as between Flint and Chester, where parking restraint in Chester may make bus travel a more viable option for commuters with a car available. This will be taken forward in the short to medium term where the benefits are most cost effectively achieved.

The strategy also proposes improved integration between bus and rail at interchanges and bus routes from rail stations to key employment centres so that public transport can provide a more seamless end to end journey. As well as this two cross Dee bus routes have been identified in the medium term which seek to link key residential areas with centres of employment, education, health and retail to improve accessibility to necessary opportunities and services targeting those suffering social deprivation issues.

7.4.4 Rail

There are valuable rail assets within the study area, with three rail lines providing important connections between settlements in the study area and links to North Wales, Merseyside and the rest of the UK. All of these lines could benefit from investment to maximise their potential, but the identified strategy tries to prioritise those improvements which will be of maximum benefit to the study area considering their anticipated cost and complexity.

In the short term the improvement identified as a priority is the Double tracking of the Chester to Wrexham line, as any service improvements along this line and a new station at Rossett would not be viable opportunities without this improvement in place. Undertaking the detailed design work required for this improvement is also a key commitment outlined in the 2011 prioritised National Transport Plan in relation to improving north-south rail services through Wales.

The extension of the Llandudno – Manchester service to Manchester Airport and fast Llandudno – Manchester airport services are also considered important, having been highlighted in the Taith Regional Transport Plan. These improvements have been prioritised as they should help improve the strategic links between North Wales and North West England. Our economic analysis has identified this as a very important connection economically and improvements here will help to achieve the objectives relating to improved regional and national connectivity. The Northern Hub Study completed by Network Rail presents an opportunity for WG and Taith to actively engage with the rail industry for these improvements in the short term as there are potential synergies between these service enhancements and the new trans-Pennine services and wider proposals for the north of England.

To undertake the other rail improvements considered important in the medium term including service enhancements on the Wrexham-Bidston line and a new station at Deeside Industrial Park/Northern Gateway it is necessary to undertake further Business Case study work in the short term.

Other improvements to rail including the Shotton Curves, service extensions to Birkenhead North/Liverpool and electrification of the North Wales coast mainline are considered deliverable only in the long term due to the anticipated cost and complexity of these proposals as well as the likely priorities of Network Rail, a key delivery agent for these major rail improvements. GRIP studies may be required for these elements in the medium term.

7.4.5 Freight

The strategy for freight distribution focuses on publicising and promoting existing opportunities for rail freight in the study area to make best use of this currently under-utilised resource.

Alongside this the North Wales Rail Freight Strategy Phase II - Option Development and Feasibility Assessment Report has identified that a freight consolidation centre at Deeside is potentially a financially viable opportunity, particularly considering the recent drop in rail volumes at Deeside Park; making consolidation of train loads increasingly important for economic viability. This report recommends that a firm commitment is sought from rail operators and potential users of the facility before further study work to establish the business case is undertaken.

In addition to this a freight exchange is proposed to make road haulage more efficient. A truck stop on the strategic highway has been identified as a means of improving the safety of road based haulage. A site near the A483 at Deeside Industrial Estate has now been given planning approval to be used as a secure lorry park and a truck stop is also being developed for Anglesey. The success of these proposals will be monitored to establish the ongoing requirement for a truck stop in the study area.

7.4.6 Highway

From a highway perspective the identified strategy seeks to make best use of the existing highway assets as a first solution; only considering major highway schemes where more minor improvements will not suffice.

The overarching strategy focuses on making the strategic highway network fit for purpose through junction and link improvements along the A55, A494 and A483. Alongside this approach is a signage strategy to help ensure that different types of traffic are using the most appropriate routes through the study area (although it is recognised that the impacts of this will be limited in the era of ubiquitous SatNav usage).

In addition to this a number of more minor improvements have been identified as necessary along more localised routes between the key settlements. A hierarchical approach is proposed for these routes whereby bus priority and safety improvements are considered first before seeking to resolve localised congestion pinch points.

7.5 Corridor: Strategic Trips

7.5.1 Summary Characteristics of the Corridor

Problems

This strategy aims to solve the problems associated with strategic trips throughout the study area. The key problems that were identified on this corridor during the Planning Stage are:

- congestion at peak periods and during seasonally high flows on the strategic road network;
- safety concerns at Ewloe Interchange and lack of resilience of strategic road network;
- lack of freight (HGV) parking facilities along the trunk road;
- infrequent train services on some routes and a lack of strategic bus / coach services.

Transport Infrastructure

The present transport infrastructure for strategic trips across the study area comprises:

- the trunk road network along the A55, A494 and A483;
- rail services on the North Wales Main Line, the Borderlands Line and Chester to Wrexham General Line;
- elements of the national cycle network.

Delivery Plan Explanation

To maintain consistency with the overall delivery plan, a short-term, medium-term and long-term approach to the strategy is recommended for the strategic trips corridor.

There are a number of interventions such as major highway schemes and rail schemes that cannot be delivered in the short-term due to funding restrictions or until additional studies have been undertaken.

Figure 7.2 outlines the interventions proposed which seek to overcome the problems with making strategic trips through the study area.

Figure 7.2: The Strategic Trips NEWABTS Strategy Delivery Plan

Theme	Short (Next 3 years)			Medium (4 to 15 years)			Long (Greater than 15 years)	
	Measure (Subject to Business Case and funding availability)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Measure (Subject to Business Case and funding availability)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Measure (Subject to Business Case and funding availability)	Delivery Partners
				Taith Express coach service - Study linked to Park and Car Share Study recommendations	0.25	Taith		
	Work with bus industry to develop and facilitate bus service enhancements, potentially through the development of Quality Bus Partnership.		Taith, CW&C, Merseytravel, Opeartors	→		Taith, Opeartors		
				Improve rail and bus integration	0.15	FCC, WCBC, CW&C, Merseytravel Operators		
				Integrated Area Ticketing	0.5	FCC, WCBC, CW&C, Merseytravel Operators		
Bus	GRIP Study, Service enhancement Wrexham - Bidston Line, **GRIP Study Now Completed, further Business Case work being undertaken**		WG, Taith, NR, Merseytravel	**Service enhancement Wrexham - Bidston Line**		WG, Taith, NR, Merseytravel		
				Service Extension Wrexham to Birkenhead North		WG, NR, Taith, Merseytravel	**Service Extension Wrexham to Liverpool**	WG, Taith, NR, Merseytravel
Rail	**Progress plans to double track Chester (Saltney Jct) to Wrexham**	37	WG, NR	**Additional services between Chester and WCBC stations. Arriva Trains Currently assessing alternative options**	0.6	WG, Taith, NR		
				New station at Rossett on the Wrexham to Chester line	5	WG, Taith, NR		
				Increased parking provision WCBC stations	1	**Taith, NR, WCBC**		
	Work with Rail Industryfor extension of Llandudno - Manchester service to Manchester Airport		WG,Taith, Rail Industry					
	Work with Rail Industry to deliver a fast Llandudno - Manchester Airport service in the medium term		WG, Taith, Rail Industry					
							Extension of London - Chester services to Bangor/Holyhead	WG, NR, Taith
				GRIP Study Electrification of North Wales Coast Main Line	0.1	NR, WG	**Electrification of North Wales Coast Main Line**	NR, WG
				Increased Frequency North Wales Line		WG, NR, Taith		
Freight	**Freight Strategy, incorporating the promotion and publicity of rail freight opportunities and freight exchange concepts.**	0.11	Taith, WG, NR					
	Monitor the requirement for a developer funded truckstop in the study area. Planning Consent Granted for site in Deeside Industrial Estate	Dev	WG, Taith, Developer					
	Deeside consolidation centre/open access rail terminal - establish firm commitment from potential users and rail operators before undertaking business case. Exploratory study currently being undertaken	0.05	WG, Taith, Developer	**Deeside consolidation centre/open access rail terminal, potentially delivered with Waste Transfer Facility**	5	WG, Taith, Developer		
							Shotton Chord Linked to Deeside Consolidation Centre	WG, Taith, NR, Dev
Highway	Minor junction improvement scheme at A483/B5445 junction	HA	HA, CWC					
	Junction improvement scheme at A55/A483 junction - **Now Completed**	HA	HA, CWC					
	Liaise with the Highways Agency regarding major scheme development		HA, WG, WCBC, CWaC	**A483/B5445/A55 Junction Improvements**		HA	**A483/B5445/A55 Junction Improvements**	HA
	A483 junctions west of Wrexham KS2 / WelTAG 1&2	0.25	WG	**Implement A483 junction improvements west of Wrexham**	TBD	WG		
	A55/A494 WelTAG Stage 1 & 2	0.15	WG	**Implement A55/A494 Study Recommendations**	TBD	WG		
							Provide Hardshoulders on dual carriageway trunk roads	WG
				Improve road connections to Deeside Industrial Park. Outline Planning Consent Granted for part of Northern Gateway Development	Dev	FCC, WG, Developer	**Improve road connections to Deeside Industrial Park**	FCC, WG, Developer
							Improve road connections to Broughton area (west facing slips A55 Broughton jct)	WG, Developer
	Consider a signage strategy for strategic and local traffic	0.2	WG, Taith					
		£37.8m			£12.6m			

7.5.2 Short-term Strategy

A GRIP Study has been completed to assess the provision of service enhancements on the Borderlands Line, further business case work is being undertaken. This will enable benefits to be identified in the parallel A55/A494 corridor study. Progressing plans to double track the line between Chester (Saltney Jct) and Wrexham are important in the short term to enable service enhancements and a new station to be provided at Rossett in the medium term. Improvements to the rail service on the NWML between Llandudno and Manchester Airport are considered viable in the short term as they are linked to the Network Rail Northern Hub Study plans.

A series of freight improvements, such as a freight exchange and promoting services from rail terminals will reduce HGV movements on the trunk road network and increase the use of existing rail freight opportunities in a cost efficient manner.

Congestion to the south of Chester would be tackled through the implementation of minor improvement schemes at the A483/B5445 junction and A55/A483 junction (now completed) delivered by the Highways Agency. However, it is recognised that these minor improvements may not completely resolve the problems at this junction; therefore further medium and long-term improvements are proposed subject to monitoring of the success of these schemes.

A WelTAG Stage 1 & 2 assessment for the A483 junctions west of Wrexham and a WelTAG Stage 2 assessment for the A55/A494 would enable implementation of recommendations in the medium-term.

A signage strategy should also be implemented for strategic traffic travelling through the study area to ensure vehicles use the desired routes as much as possible.

7.5.3 Medium-term Strategy

Rail studies undertaken in the short-term, will also enable service enhancements on the Borderlands Line, additional services between Chester and Wrexham CBC stations and a new station at Rossett. A service extension between Wrexham and Birkenhead North will be progressed.

A GRIP Study should be undertaken to assess the potential for electrification of the North Wales Coast Main Line to allow these improvements to be implemented in the long term. Additional public transport improvements would include increased train frequency on the NWML, improved rail and bus integration, and integrated area ticketing.

Liaison with the Highways Agency regarding major scheme development should be undertaken to enable a major highway scheme at the A55 / A483 / B5445 junction to be constructed in the long-term following review of the success of the completed minor schemes at this junction. Studies undertaken in the short-term will enable junction improvements on the A483 to the west of Wrexham and the A55/A494 study recommendations to be implemented in the medium term.

7.5.4 Long-term Strategy

The service extension between Wrexham and Birkenhead North, implemented in the medium-term, will be extended through the Mersey Tunnels to Liverpool. Additional rail improvements include extension of London - Chester services to Bangor/Holyhead and electrification of the North Wales Coast Main Line.

Liaison with the Highways Agency in the medium-term will enable a major highway scheme at the A55 / A483 / B5445 junction to be constructed.

Improve road connections to Deeside Industrial Park and Broughton area are proposed linked to and funded by development proposals in these areas. These improvements could occur earlier if developer funding is identified, for example as part of the Enterprise Zone initiative.

7.6 Corridor: Flint / Mold to Chester (via Deeside / Broughton)

7.6.1 Summary Characteristics of the Corridor

Problems

The strategy for this corridor aims to solve the problems associated with travel between Flint / Mold and Chester. The key problems that were identified on this corridor during the Planning Stage are:

- congestion occurs on the B5129 through Connah's Quay, Shotton and Queensferry during peak periods in the day;
- the Alltami signalised junction constricts traffic flow along the A494 between Mold and the A55;
- public transport along this corridor is relatively good, but is still uncompetitive with car travel due to the cost of fares and the prevalence of free parking (excluding Chester);
- local trips reroute onto the strategic network to overcome localised congestion problems.

Transport Infrastructure

The key transport infrastructure on the Flint / Mold to Chester corridor comprises:

- the A494 / A55 trunk road between Mold and Chester, the A548 between Flint and Chester; and the A549 from Mold towards Broughton via Buckley;
- rail services on the North Wales Main Line;
- regular bus services on key routes in the corridor;
- a largely off road local cycle network between Flint and Chester.

Delivery Plan Explanation

To main consistency with the overall delivery plan, a short-term, medium-term and long-term approach to the strategy is recommended for the Flint / Mold to Chester corridor.

There are a number of interventions such as the cycle routes, new rail stations and major highway schemes that cannot be delivered in the short-term due to funding restrictions or until additional studies have been undertaken.

Figure 7.3 outlines the interventions proposed which seek to overcome the problems identified on the Flint to Chester Corridor.

Figure 7.3: Flint/Mold – Chester Corridor NEWABTS Strategy Delivery Plan

Theme	Measure (Subject to Business Case and funding availability)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Measure (Subject to Business Case and funding availability)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Measure (Subject to Business Case and funding availability)	Delivery Partners
	Short (Next 3 years)			Medium (4 to 15 years)			Long (Greater than 15 years)	
Demand Management	Local Authority Demand Management Strategies	0.3	FCC, WCBC	→	1.1	FCC, WCBC	→	FCC, WBC
	Park and Ride/Park and Car Share Study	0.02	Taith	Implement recommendations of Park & Ride/Park and Car Share Study		Taith		
Walking and Cycling	Local Authority Walking and Cycling Strategy focusing on links to employment centres and public transport interchanges	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC	→	FCC, WBC
	Provide leisure routes between the key settlements in the study area.	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC	→	FCC, WBC
Bus	Identify/implement opportunities for bus priority at key junctions to avoid traffic congestion and improve service reliability to improve connectivity to and between key settlements.	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC		
	Real time passenger information at bus stops		Taith, FCC, WCBC	→	0.2	FCC, WCBC		
				Improve rail and bus integration	0.15	FCC, WCBC, CW&C, Merseytravel Operators		
				Integrated Area Ticketing	0.5	FCC, WCBC, CW&C, Merseytravel Operators		
				New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	FCC, WCBC, CW&C, Merseytravel Operators		
				Rail link bus routes from train stations to key employment sites	0.25	FCC, WCBC, CW&C, Merseytravel Operators		
Rail	GRIP Study, Service enhancement Wrexham - Bidston Line, **GRIP Study Now Completed, further Business Case work being undertaken**		WG, Taith, NR, Merseytravel	Service enhancement Wrexham - Bidston Line		WG, Taith, NR, Merseytravel		
				Service Extension Wrexham to Birkenhead North		WG, NR, Taith, Merseytravel	Service Extension Wrexham to Liverpool	WG, Taith, NR, Merseytravel
				Increased parking provision along Wrexham - Bidston line to promote park and ride	1	Taith, NR, FCC, WCBC		
				Improved station accessibility (non - car station access)	0.3	Taith, FCC, WCBC		
				New station at Deeside Industrial Park	7.5	Taith, NR, Developer		
				Increased Frequency North Wales Line		WG, NR, Taith		
				New station at Queensferry on the North Wales Main Line	5	WG, NR, Taith		
Highway	Identification and implementation of local road safety enhancements and local pinchpoint improvements.	1.5	FCC, WCBC					
	A55/A494 WelTAG Stage 1 & 2	0.15	WG	Implement A55/A494 Study Recommendations	TBD	WG		
				Improve road connections to Deeside Industrial Park. **Outline Planning Consent Granted for part of Northern Gateway Development**	Dev	FCC, WG, Developer	Improve road connections to Deeside Industrial Park	FCC, WG, Developer
							Improve road connections to Broughton area (west facing slips A55 Broughton jct)	WG, Developer
		£6.5m			£32.8m			

7.6.2 Short-term Strategy

A range of local authority demand management strategies will aim to reduce the need to travel on this corridor. Whilst a local authority walking and cycling strategy will provide new links to employment centres and public transport interchanges and compete the National Cycle Network to the east of Flint.

Undertaking further Business Case studies to assess the provision of service enhancements on the Borderlands Line and a new station at Deeside Industrial Park/Northern Gateway will enable these schemes to be progressed in the medium-term and enable benefits to be identified in the parallel A55/A494 corridor study.

Bus travel and service reliability will be improved through identification of bus priority at key junctions and extending the provision of real time passenger information at bus stops.

Identification and implementation of local road safety enhancements and local pinch-point improvements will reduce congestion in the area for buses and general traffic.

The issues in the Shotton/Queensferry/Connah's Quay corridor across all modes are to be studied as part of a Masterplan study which will identify an appropriate package of measures for this area in the short term, meeting the objectives of this strategy as well as the requirements of the emerging Enterprise Zone status in the area.

A WelTAG Stage 2 study for the A55/A494 would enable implementation of recommendations in the medium-term.

7.6.3 Medium-term Strategy

Provision of the walking and cycling routes identified in the short-term would link key settlements and major employment sites along the corridor.

Service enhancements on the Borderlands Line and a new station at Deeside Industrial Park/Northern Gateway could be implemented due to studies undertaken in the short-term. A service extension between Wrexham and Birkenhead North will be progressed.

Additional rail improvements include increased parking provision along the Borderlands Line to promote park and ride, improved station accessibility for non-car modes and a new station at Queensferry on the North Wales Main Line.

Other public transport improvements would include improved rail and bus integration, integrated area ticketing and a new cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester.

The A55 / A494 WelTAG study undertaken in the short-term will enable the study recommendations to be implemented.

7.6.4 Long-term Strategy

The service extension between Wrexham and Birkenhead North, implemented in the medium-term, will be extended through the Mersey Tunnels to Liverpool.

Improved road connections to Deeside Industrial Park and the Broughton area are linked to and funded by development proposals in these areas. These improvements could occur earlier if developer funding is identified, for example as part of the Enterprise Zone initiative.

7.7 Corridor: Wrexham to Deeside (via Mold / Buckley)

7.7.1 Summary Characteristics of the Corridor

Problems

This strategy aims to solve the problems associated with travel between Wrexham and Deeside. The key problems that were identified on this corridor during the Planning Stage are:

- congestion and safety issues along the A541 and A550
- congestion along the A494 through Ewloe / Queensferry
- the Wrexham – Bidston rail service is too infrequent to encourage use by commuters
- local rail stations are not well located for local demands e.g. Deeside Industrial Park/Broughton (Airbus)
- bus services between Wrexham and Deeside are infrequent

Transport Infrastructure

The key transport infrastructure on the Wrexham to Deeside corridor includes:

- the A541 (Wrexham to Mold), A550 (Wrexham to Deeside) and A494 Mold to Deeside
- rail services on the Borderlands Line;
- a local cycle network in Wrexham and Deeside but a lack of routes connecting these locations.

Delivery Plan Explanation

To maintain consistency with the overall delivery plan, a short-term, medium-term and long-term approach to the strategy is recommended for the Wrexham to Deeside corridor.

There are a number of interventions such as major highway schemes, rail schemes and new rail stations that cannot be delivered in the short-term due to funding restrictions or until additional studies have been undertaken.

Figure 7.4 outlines the interventions proposed which seek to overcome the problems identified on the Wrexham to Deeside Corridor.

Figure 7.4: Wrexham - Deeside Corridor NEWABTS Strategy Delivery Plan

Theme	Short (Next 3 years)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Medium (4 to 15 years)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Long (Greater than 15 years)	Delivery Partners
Demand Management	Local Authority Demand Management Strategies	0.3	FCC, WCBC	→	1.1	FCC, WCBC	→	FCC, WBC
	Park and Ride/Park and Car Share Study	0.02	Taith	Implement recommendations of Park & Ride/Park and Car Share Study		Taith		
Walking and Cycling	Local Authority Walking and Cycling Strategy focusing on links to employment centres and public transport interchanges	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC	→	FCC, WBC
Bus	Identify/implement opportunities for bus priority at key junctions to avoid traffic congestion and improve service reliability to improve connectivity to and between key settlements.	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC		
	Real time passenger information at bus stops		Taith, FCC, WCBC	→	0.2	FCC, WCBC		
				Improve rail and bus integration	0.15	FCC, WCBC, CW&C, Merseytravel Operators		
				Integrated Area Ticketing	0.5	FCC, WCBC, CW&C, Merseytravel Operators		
				Improved cross Dee bus route between Mold and Ellesmere Port	0.25	FCC, WCBC, CW&C, Merseytravel Operators		
				Rail link bus routes from train stations to key employment sites	0.25	FCC, WCBC, CW&C, Merseytravel Operators		
				Create a multi-modal hub at Wrexham General Station	1	WCBC, Operators		
Rail	GRIP Study, Service enhancement Wrexham - Bidston Line, **GRIP Study Now Completed, further Business Case work being undertaken**		WG, Taith, NR, Merseytravel	Service enhancement Wrexham - Bidston Line		WG, Taith, NR, Merseytravel		
				Service Extension Wrexham to Birkenhead North		WG, NR, Taith, Merseytravel	Service Extension Wrexham to Liverpool	WG, Taith, NR, Merseytravel
				Increased parking provision along Wrexham - Bidston line to promote park and ride	1	Taith, NR, FCC, WCBC		
				Improved station accessibility (non - car station access)	0.3	Taith, FCC, WCBC		
				New station at Deeside Industrial Park	7.5	Taith, NR, Developer		
Highway	Identification and implementation of local road safety enhancements and local pinchpoint improvements.	1.5	FCC, WCBC					
	A55/A494 WelTAG Stage 1 & 2	0.15	WG	Implement A55/A494 Study Recommendations	TBD	WG		
				Improve road connections to Deeside Industrial Park. **Outline Planning Consent Granted for part of Northern Gateway Development**	Dev	FCC, WG, Developer	Improve road connections to Deeside Industrial Park	FCC, WG, Developer
	Consider a signage strategy for strategic and local traffic	0.2	WG, Taith					
		£5.2m			£23.3m			

7.7.2 Short-term Strategy

A range of local authority demand management strategies will aim to reduce the need to travel, whilst a local authority walking and cycling strategy will provide new links to employment centres and public transport interchanges.

Undertaking further Business Case studies to assess the provision of service enhancements on the Borderlands Line and a new station at Deeside Industrial Park/Northern Gateway will enable these schemes to be progressed in the medium-term.

Bus travel and service reliability will be improved through identification of bus priority at key junctions and extending the provision of real time passenger information at bus stops.

A WelTAG Stage 2 study for the A55/A494 would enable implementation of its recommendations in the medium-term.

Implementation of local road safety enhancements and local pinch point improvements on the A541/A550 identified by local authorities should be progressed in association with a signage strategy for traffic travelling between the A55 and Wrexham.

7.7.3 Medium-term Strategy

A Mold to Deeside cycle route is proposed however the potential route would need to take into account proposals for the A55/A494 corridor and therefore this intervention has been programmed for the medium term.

Service enhancements on the Borderlands line and a new station at Deeside Industrial Park could be implemented due to studies undertaken in the short-term. A service extension between Wrexham and Birkenhead North will be progressed.

Additional rail improvements include increased parking provision along the Borderlands Line to promote park and ride, and improved station accessibility for non-car modes.

Other public transport improvements would include improved rail and bus integration, integrated area ticketing and an improved cross Dee bus route connecting Mold and Ellesmere Port. It is also recommended that a multi-modal hub is created at Wrexham General Station.

The A55 / A494 WelTAG study undertaken in the short-term will enable the study recommendations to be implemented.

7.7.4 Long-term Strategy

The service extension between Wrexham and Birkenhead North, implemented in the medium-term, will be extended through the Mersey Tunnels to Liverpool.

Improved road connections to Deeside Industrial Park are proposed linked to and funded by development proposals in the area. These improvements could occur earlier if developer funding is identified, for example as part of the Enterprise Zone initiative.

7.8 Corridor: Chester to Wrexham

7.8.1 Summary Characteristics of the Corridor

Problems

This strategy aims to solve the problems associated with travel between Chester and Wrexham. The key problems that were identified on this corridor during the Planning Stage are:

- the A55/A483 junction acts as a significant pinch point for trips by car or bus between Chester and Wrexham;
- there are no dedicated cycling facilities between Wrexham and Chester;
- traffic congestion occurs at key junctions on the A483 to the west of Wrexham and is predicted to get worse with additional development in the area;
- northbound congestion occurs on the B5445 at the junction with the A483 near Chester.

Transport Infrastructure

The key transport infrastructure on the Chester to Wrexham corridor comprises:

- the A483 trunk road and the B5445 via the settlements of Gresford, Rossett and Pulford.
- frequent bus services between Wrexham and Chester;
- rail services on the Chester to Wrexham General Line;
- local cycle network in Chester and Wrexham but a lack of routes between these locations.

Delivery Plan Explanation

To maintain consistency with the overall delivery plan, a short-term, medium-term and long-term approach to the strategy is recommended for the Chester to Wrexham corridor.

There are a number of interventions such as new cycle routes, major highway schemes and rail schemes that cannot be delivered in the short-term due to funding restrictions or until additional studies have been undertaken.

Figure 7.5 outlines the interventions proposed which seek to overcome the problems identified on the Chester to Wrexham Corridor.

Figure 7.5: Chester – Wrexham Corridor NEWABTS Strategy Delivery Plan

Theme	Short (Next 3 years)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Medium (4 to 15 years)	Indicative Cost £m (Exc. Operational Expenditure)	Delivery Partners	Long (Greater than 15 years)	Delivery Partners
Demand Management	Local Authority Demand Management Strategies	0.3	FCC, WCBC	→	1.1	FCC, WCBC	→	FCC, WBC
	Park and Ride/Park and Car Share Study	0.02	Taith	Implement recommendations of Park & Ride/Park and Car Share Study		Taith		
Walking and Cycling	Local Authority Walking and Cycling Strategy focusing on links to employment centres and public transport interchanges	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC	→	FCC, WBC
Bus	Identify/implement opportunities for bus priority at key junctions to avoid traffic congestion and improve service reliability to improve connectivity to and between key settlements.	1.5	Taith, FCC, WCBC	→	5.5	FCC, WCBC		
	Real time passenger information at bus stops		Taith, FCC, WCBC	→	0.2	FCC, WCBC		
				Improve rail and bus integration	0.15	FCC, WCBC, CW&C, Merseytravel Operators		
				Integrated Area Ticketing	0.5	FCC, WCBC, CW&C, Merseytravel Operators		
				Rail link bus routes from train stations to key employment sites	0.25	FCC, WCBC, CW&C, Merseytravel Operators		
				Create a multi-modal hub at Wrexham General Station	1	WCBC, Operators		
Rail	Progress plans to double track Chester (Saltney Jct) to Wrexham	37	WG, NR	Additional services between Chester and WCBC stations. Arriva Trains Currently assessing alternative options	0.6	WG, Taith, NR		
				New station at Rossett on the Wrexham to Chester line	5	WG, Taith, NR		
				Increased parking provision WCBC stations	1	Taith, NR, WCBC		
Highway	Identification and implementation of local road safety enhancements and local pinchpoint improvements.	1.5	FCC, WCBC					
	Minor junction improvement scheme at A483/B5445 junction	HA	HA, CWC					
	Junction improvement scheme at A55/A483 junction - Now Completed	HA	HA, CWC					
	Liaise with the Highways Agency regarding major scheme development		HA, WG, WCBC, CWaC	A483/B5445/A55 Junction Improvements		HA	A483/B5445/A55 Junction Improvements	HA
	A483 junctions west of Wrexham KS2 / WelTAG 1&2	0.25	WG	Implement A483 junction improvements west of Wrexham	TBD	WG		
		£42.1m			£20.8m			

7.8.2 Short-term Strategy

A range of local authority demand management strategies will aim to reduce the need to travel, whilst a local authority walking and cycling strategy will provide new links to employment centres and public transport interchanges.

Bus travel and service reliability will be improved through identification of bus priority at key junctions and extending the provision of real time passenger information at bus stops. This is seen as a short term solution until suitable rail improvements can be implemented.

Progressing plans to double track the line between Chester (Saltney Jct) and Wrexham, will enable future service enhancements and a new station to be provided at Rossett in the medium-term.

Congestion to the south of Chester would be reduced through the implementation of minor improvement schemes at the A483/B5445 junction and A55/A483 junction (now completed) undertaken and funded by the Highways Agency.

A WelTAG Stage 1&2 study for the A483 junctions west of Wrexham would enable implementation of recommendations in the medium-term.

7.8.3 Medium-term Strategy

The recommendations of the Park & Ride / Park & Car Share study undertaken in the short-term, will be implemented.

Studies undertaken in the short-term will also enable provision of additional services between Chester and Wrexham CBC stations and a new station at Rossett to offer a significantly improve rail offer along this corridor.

Other public transport improvements would include improved rail and bus integration, integrated area ticketing and rail link bus routes from train stations to key employment sites. It is also recommended that a multi-modal transport hub is created at Wrexham General Station.

If the minor junction improvements completed in the short term do not fully resolve the problems on the A55/A483 junction then it is proposed that liaison is undertaken with the Highways Agency regarding major scheme development to enable suitable improvements to be constructed in the long-term. Studies undertaken in the short-term will enable junction improvements on the A483 to the west of Wrexham.

7.8.4 Long-term Strategy

It is anticipated that liaison with the Highways Agency in the medium-term will enable a major highway scheme at the A55 / A483 / B5445 junction to be constructed in the long term.

Conclusions

8 Conclusions

This report has outlined the assessment that has been undertaken for a number of possible packages which seek to resolve the transport problems currently experienced in the North East Wales Study Area. This report contains the second stage of the NEWABTS WelTAG assessment process (WelTAG Stage 1). The report has taken the outcomes from the previously undertaken WelTAG Planning Stage; a long list of possible options and a set of transport planning objectives for the study.

The identified options, which covered all transport modes have been refined and combined into mutually supportive packages for assessment purposes. The options were grouped into packages based on the concept of levels; firstly trying to reduce demand, then identifying ways to make best use of the existing infrastructure before finally considering major capacity improvements. This approach was adopted to ensure that means of reducing the need to travel and making best use of what infrastructure is already present were given due precedence in the assessment process.

In addition to this the options were divided by corridor; four key corridors were identified in the study area linking the key centres and catering for strategic trips. These comprised a corridor from Flint and Mold to Chester via Deeside and Broughton. A corridor connecting Wrexham and Deeside via Mold and Buckley, a corridor connecting Chester and Wrexham and a corridor representing strategic trips through the study area from North West Wales, the North of England and the Midlands. Through this approach of considering levels and corridors a set of nine packages were identified which seek to resolve the transport problems in the study area and meet the identified transport planning objectives.

The WelTAG Stage 1 criteria required the assessment of the identified packages against both the identified transport planning objectives and a number of other criteria specified by the Welsh Government under the headings of the Welsh Impact Areas of Economy, Environment and Society. Where possible a quantitative assessment methodology has been adopted and details behind this work can be found in the various appendices that support this main report.

Alongside the assessment process undertaken by experts in the various fields, stakeholder consultation has also been undertaken on the identified packages. This process allowed detailed local knowledge and understanding to be applied to help shape the assessment process and the development of a preferred strategy.

In summary the assessment of packages has identified that all of the various corridor packages go some way towards achieving the objectives of this study, however none are completely successful at achieving the full range of transport planning objectives required. For this reason it was determined that a suitable strategy should be developed based upon elements from all of the various corridor packages. The strategy considers the deliverability of the various options and policies in terms of their deliverability in the short, medium and long term.

Due to the likely funding constrains in the short term the strategy has focused on the delivery of demand management and making best use elements in the short term, with more significant major capacity options considered in the medium and long terms. The identified strategy also focuses on the elements deliverable by the local authorities and Taith, but recognises the need for involvement from the Welsh Government, Network Rail and the Highways Agency and Cheshire West and Chester in the delivery of some of the important improvements to strategic transport links.

The strategy is designed to form a framework under which Taith and the local authorities can develop additional local improvement schemes to try to achieve the NEWABTS strategy goals and objectives.

NEWABTS Stage 1 Appendix A: Stakeholder Consultation Summary Report



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NEWABTS Stage 1 Appendix A: Stakeholder Consultation Summary Report

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1 Introduction

1.1 Overview

Taith and the Welsh Government (WG) have appointed AECOM to undertake a Welsh Transport Assessment Guidance (WelTAG) Study. The aim of this study is to investigate the potential for improving connections between the key settlements in North East Wales.

The study has identified transport issues and will assess a number of solutions to resolve current and future issues within North East Wales. As a result of a previous stakeholder workshop, nine packages have already been developed.

The aim of this stage (Stage 1) in the study is to prioritise the packages, review these against the transport planning objectives for the study and obtain stakeholder acceptability. In order to do so AECOM has developed a consultation process, involving technical stakeholders who have local knowledge of the area. This report summarises the findings from the Stage 1 consultation process.

1.2 Format of Report

Following this introduction, the remainder of this section details the methodology used. Section 2 describes the main findings of the group discussions.

1.3 Methodology

A workshop event was arranged for the afternoon of Monday 29th November 2010 at St David's Park Hotel, Ewloe. The clients, Taith and WG, with the assistance of AECOM compiled a stakeholder list of 65 representatives. These representatives included County Council officers, emergency services, environmental groups and transport groups. AECOM was responsible for drafting and distributing the invitation letters to the 65 stakeholders inviting them to the workshop event. The letter provided a brief outline of the event indicating that delegates were to take part in group discussions. A copy of the letter can be seen in ***Annex C***. After the closing date for responses, AECOM re-contacted all non-respondents to determine their attendance.

Prior to the event, AECOM arranged the 16 stakeholders that were confirmed as attending the event into three mixed groups so that representatives from a variety of organisations were in each group, the aim being to stimulate discussion from a variety of viewpoints. Each group was facilitated by AECOM's trained moderators. The intention of these groups was to prioritise the packages, review these against the transport planning objectives for the study and gain stakeholder acceptability.

The workshop event started with a presentation providing a background to the study. A copy of the presentation slides is shown in ***Annex B***. Following the presentation, delegates had a short break before breaking off into three workshop groups. Each workshop group lasted approximately 2 hours and consisted of 5 or 6 delegates. Each group was facilitated by a trained moderator working from a discussion guide; all groups worked from the same discussion guide. Following a short discussion about each package delegates reviewed and scored each package against a range of transport planning objectives. Once each package had been discussed and reviewed, delegates were asked to rank the nine packages in order of preference of being taken forward.

Following a short break, a question and answer session took place. It should be highlighted at this point that the views given at the stakeholder workshop were not necessarily based on facts but attendees' perceptions of the transport system and the issues associated with it.

A list of the delegates (by organisation) who attended the event is shown in ***Table 1*** below, whilst a full list of delegates who were invited to the event can be found in ***Annex A***: Due to their knowledge of the public transport in the area, the representatives from Arriva Trains Wales were able to provide useful information relating to the bus operators.

Delegates from local businesses and health organisations did not attend this event.

Table 1 List of delegates (by organisation)

Organisation Name	Number of Delegates
Arriva Trains Wales	2
Cheshire West and Chester Council	2
Environment Agency Wales	1
Flintshire County Council	2
North Wales Police Force	1
North Wales Trunk Road Agency	1
Regional Ambulance Officer	1
Taith	1
Welsh Government	3
Wrexham County Borough Council	2

2 Group Discussion Findings

2.1 Overview

The workshop event was attended by 16 of the 65 stakeholders. Delegates were from a variety of organisations. As mentioned in the previous section, these 16 delegates were split into three groups, blue, green and red, for discussion in the afternoon session; the findings of which are highlighted in the following sections. The aim of the workshop groups was to seek views from the stakeholders on the acceptability of the packages which AECOM has developed to address the issues of the study area.

Each delegate was provided with a booklet which contained all of the packages devised for the study area, one table per package. A short discussion was held about each package. Following this delegates scored the overall package against the objectives of the study. This was done on an individual basis. All groups were moderated and worked from the same discussion guide (see ***Annex E***). The following sections highlight the group responses.

2.2 Package 1: Managing Demand

Delegates felt that the package either 'slightly contributed' or 'neither contributed or detracted' to/from the transport planning objectives for the area. Generally speaking the package contributed positively towards the environmental objectives and travel to work. See ***Figure 1***.

Group 1

Group 1 felt that demand management should be developed as an initial starting point and as part of an overall strategy. It should be supported by increased publicity and awareness of sustainable alternatives.

> *"I think … the sustainable measures and managing demand is a key element to any package and has to be your initial starting point."*

The group also felt that there would not be one package that would be deemed the most appropriate. Rather, they felt that certain aspects of each package could be combined to form a new separate package.

> *"My feeling is that you will have an overall package that might have elements of some of these in them and it won't be specifically the whole of a package."*

It was felt that demand should be identified, including demand from tourism so that the strategy could be related to the scale of movement and could be carefully targeted.

> *"Managing demand, it's identifying demand as well, I think you've got improved linkages between economic development plans and transportation plans, but tourism plans, because you're in a big tourism area, events, I mean large events, things like that, I wouldn't rule out tourism, because it can be a generator of traffic, obviously."*

Group 3 also felt that alternatives to car travel should be promoted.

> *"Mentioned the use of sustainable transport options for young people and for us older adults as well, for the point that* [stakeholder] *just mentioned as well to do with people being stuck in their ways and making them aware of, oh, I didn't know there was a bus service on my route, have actually known what they've got as well."*

> *"Yes, but promoting it in a positive way, a lot of people know there is a train or something like that, but they don't know the times in that it takes twelve minutes as opposed to forty five minutes by road, it's those sort of things that skew peoples' travel plans. The fact that you've got to get to the station is one thing, the fact that it might only take twelve minutes they would never recognise, they always assume it's the same amount of travel, whether it be car or train."*

It was thought that one way sustainable modes of transport could be encouraged was through implementing parking management strategies.

> *"Parking management is a key element of getting more sustainable transport, isn't it?"*

> *"Well, from a local point of view it's our most powerful tool."*

"The best option would be something like when you live at Chester, something along those lines, you know, if you have those alternative modes or you're trying to promote something like park and ride, then yes, you can manage more stringently your town centre parking to try and force people to use those alternatives."

Although the group felt that a parking strategy was needed, there were felt to be political difficulties as a result of the district council having different views on parking management. It was felt that one solution would be for the Welsh Government to standardise these strategies.

It was also felt that this may have a negative impact on local businesses.

"I was just going to say under parking management, we're looking at it just in transport terms. … but other places it's viewed in economic terms, from retailers as having a negative impact, so while we're trying to manage to impact on our network, they view it as if you charge you discourage people from going to shop in Wrexham or Chester or whatever, so that's the real political problem. It's not a transport issue."

A park and ride was suggested as a sustainable alternative to car travel.

"But I think if you've got sustainable other options in there, we're trying to get people to come to our shopping centres, not cars and providing we can demonstrate there's a good alternative option and it works in a different way and you get, not bums on seats, but feet in the door, that's what you're really trying to deliver."

In terms of the transfer from road to rail for freight, there were thought to be a number of restrictions.

"Yes, some elements of the route carry freight, there are some parts of the routes that have constraints on them, like level bridges, aren't there, I was thinking the A541 is restricted by a low structure and we have a low structure goes through Shotton as well and those do restrict the amount of heavy goods vehicles that actually can utilise routes, so it is restricted on some routes. Generally I'm trying to think, it's generally I think on most of the routes we're looking at between 6 and 10% heavy goods vehicles, so it's not a major element."

Group 2

Group 2 were unsure whether the package solved the issues and felt that there was a need to understand key movements across the study area.

"Has a demand been identified, where the strategic demand is, because without knowing that, how can you identify it?"

Group 2 thought that it was national policies, such as the cost of fuel, rather than local policies that would influence travel behaviour.

"In terms of particularly the bottom demand management, I think it's national policy that is more important, there's little that you can do on an area basis, I mean it's going to be cost of fuel, isn't it and things like that, determining what people do and the incentives to get out of the car and travel a different way."

It was felt that policies needed to be integrated across the region as well as nationally. Group 2 thought that car share schemes could be successful (element 93).

Group 3

Group 3 felt that it was important to ensure that future developments were planned to avoid impacts on the transport system. It was stated that transport is 'supply' and 'demand' led and that there were not enough contributions to transport from developments – financial or infrastructure. Group 3 felt that employers needed to plug the gaps in public transport.

"I think ensuring the future developments, that's particularly important because the large housing developments or industrial estates or shopping centres need to be planned to ensure that it doesn't impact."

"Well, it's the old case, the private developer comes along, develops whatever they want to develop, but then there's no sort of, I don't know whether it's legislation or not, but there's no sort of, used to planning game at one time, driving development, but there's not enough sort of what I call saying right, you get that development, you need to contribute towards the problems that are going to be created by having whatever it is, by increasing the effect on this, that and the other and unfortunately for local authorities they probably can't demand too much, otherwise the developer goes away and somewhere else for instance."

It was stated that it may be difficult to integrate bus services due to anti-competitive rules. It was suggested that longer distance bus incentives be provided.

"I just wouldn't, somebody who used to travel on the A55 here, you want to get off, you want to recommend you alight here at the park and ride and you then continue your journey into Chester on one of the existing bus services. But the existing bus services, okay they are really good frequency now, but they take the secondary routes and I just wonder how acceptable the existing network buses would be to, road trips, if people park and ride how would that longer distance?"

"Yes, I guess you've got this disjoint between the traditional bus network and anything you might want to do in terms of new strategic transport links and using buses on strategic park and ride, you might want to think about looking at faster routes."

"The only point about bus services the point is made by people who've queried some of the work that we're doing with the multi bus services that we've had a restricted, completely restricted bus service provision effectively for twenty five years now, since 1985 and from 1984, long distance accrued services, so the argument or the question perhaps would, if there were a market for these sorts of things that we're proposing, why hasn't it been provided already? Because all it needs is a registration from a registered operator and there's plenty of those around."

The package was felt to be acceptable "*in conjunction with some of the other packages*".

Figure 1 Package 1 Managing Demand Area Wide – SLIGHTLY/Neither CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++ (1)	++ (2)	+ (4)	0 (9)	-	- -	- - - (1)
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (2)	++ (1)	+ (8)	0 (5)	-	- -	- - - (1)
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++	++ (3)	+ (3)	0 (10)	-	- -	- - - (1)
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++ (1)	++ (3)	+ (5)	0 (7)	-	- - (1)	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (2)	+ (3)	0 (10)	-	- - (1)	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	+++	++ (2)	+ (6)	0 (7)	-	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (3)	++ (1)	+ (8)	0 (4)	-	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (3)	++	+ (9)	0 (3)	- (1)	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (3)	++	+ (8)	0 (4)	-	- - (1)	- - -

2.3 Package 2 Making Best Use Corridor: Flint / Mold – Chester (via Deeside / Broughton)

Delegates felt that this package 'slightly contributed' to all of the transport planning objectives for the study area (see ***Figure 2***). No element of the package was felt to detract from the study TPOs. Whilst delegates agreed with the principle of the package feeling that more local trips should be made by alternative non-car modes, they felt that delivery may be difficult due to the nature of the existing infrastructure. The bus lane was not favoured by a large number of delegates and it was mentioned that some elements of the package are already in place.

Group 1

Group 1 felt that there was limited cycle carrying capacity on trains in the area (element 34).

> *"I think one of the problems with cycling and trains is that you're very limited on how many bikes you can take on a train at the moment."*

As such, cycle parking at stations was seen to be important. Another solution that was suggested was a cycle hire scheme between the rail stations and the industrial park.

> *"So in terms of encouraging people to cycle and then use their bike on the train it's one thing, cycle parking may be different and I think it's a bit, if you're going to go to Harden bridge, you'll cycle there, lock your bike up and get on the train from Harden Bridge and if you're going to go to Shotton you'd do the same."*

It was also felt that there was limited potential for bus priority along the B5129 and the group questioned how it could be delivered (element 42). It was thought that this could create further congestion, delaying other traffic including buses.

> *"I thought just ask how it would be achieved, I mean you've no room for bus lanes through the major problem area and you could look at perhaps getting signals with transponders and things to allow buses through, but you've got congestion, but if you've got congestion it doesn't matter whether you've got a transponder or not, you still can't go anywhere, can you? I see that as being the difficult one to deliver, because if you've got congestion, if you're stuck in congestion, the public in Shotton believe the congestion is caused by the buses, but I've tried to convince them over the years it isn't, as the bus still remains in the queue, so it can't be the cause of it if it's in the queue."*

> *"I think it's one of those one it would be nice to have it added, but the question is how's it delivered, because in fact if you're taking capacity out of the network to give it, then the answer is it probably wouldn't be accepted locally."*

> *"There is potential for provision of bus lanes in certain sections, but they're not necessarily the areas where the biggest problems arise and I think that's the problem, where you've got to accommodate bus lanes and bus priority, you have the least problems, simply because of the nature of the network and it's in Shotton itself where most of the problems occur, because there's so much activity and you've got traffic signals and all sorts of other things at a lot of junctions where people are waiting to turn right and things like that with very restricted availability of road space."*

It was also felt that there was limited scope for on-highway cycle facilities (element 35).

> *"I think to factor in there as well, one of the things we found with cycling is people want cycling improvements on highways and again we've got the same constraints that you're squeezing into a junction where capacity is taken away as you give space to cyclists or pedestrians, pedal crossing facilities, so the top one there, walking and cycling, going back to the previous what most of you were saying, the impact of it, because if you give more to one the you're probably going to take away from the other."*

One solution that was suggested was for cycling and walking routes to be provided off the main B5129 route.

> *"I mean that's the key to dealing with it now is to look at provision of cycling routes and walking routes that are away from the main B5129 and trying to create better linkages between attractors, should we say."*

As most journeys were thought to be relatively short, it was suggested that car trips could be replaced by most sustainable modes away from the main routes.

> *"I must admit my feeling is that the only way to solve congestion in that area is to look at more sustainable measures, because Shotton has about 18,500-19,000 vehicles a day going through it, when you look at the nature of the road it's always going to be congested when you've got that volume in. The big thing is though that most of those journeys are potentially two to four miles, so could be undertaken with other measures, so I must admit, I think key to solving the*

problems in Shotton is to persuade people that because their origin or destination is within the area that they can solve their own problems by looking at travelling more sustainably and leave their car at home."

Group 2

With respect to the Alltami signals, there were felt to be problems with the junction and severe delays if signal failure were to occur (element 8).

"Well, immediately the one blind spot is the Alltami signals …. the dark art of traffic engineering."

"It's trial and error a lot of it, in terms of phases and settings."

"But that particular location there is becoming a frequent phone call, email complaint now."

"And we only need the slightest glitch in the equipment and we've got a two, three, four mile tailback, possibly, potentially. It does clear eventually."

Group 2 thought that for right turning vehicles, additional lane and MOVA loop could improve efficiency.

"The problem is all you need is a right turn into the large estate, housing estates, which are accessible from there and it snarls the traffic up straightaway."

"That could do with an extra lane, a widening. It's got to come in from Deeside to Mold, turning left by the pub or coming the other way and that's the key bit."

"The right turn, it doesn't have a loop on it at the moment, so that would help extend and make the signals a little smarter, but that would be a short term improvement with the way demand's going."

Group 2 mentioned that the Shotton rail station improvements had recently been opened (element 106).

"Connections, going onto the rail, this rail and bus, there's an hourly service from Shotton through to Llandudno, through to Manchester, through to Birmingham, so the connections are there and the local connections are there as well. They've just spent, I think it's two million on Shotton station, so there's improvement links there as well, that's been done."

It was suggested that real time information at bus stops is needed and that PlusBus schemes have been started in Chester and Wrexham (element 46).

"Looking at the bus side of things, bus priority is the key thing to get through Connah's Quay, Shotton is definite, what can be done about that I don't know, but that is quite a serious issue. Improved rail and bus integration, that's been done by the Plus Bus scheme, which covers the second area. The second one as well, we do an integrated ticket, it's been launched in Shotton and it operates in Chester so those two are existing. The Shotton one only got launched two week ago, so those two issues have been addressed totally and the other one is real time information, which is the key thing to any bus stop and for some reason the investment's not there in Flintshire, in Conway, Bangor it is, they've invested money in it, but for some reason Flintshire and Conway County Council don't believe in it, but it's a key thing for anyone getting to work, because you instantly know when you walk into the bus stop, the bus stop's there, it'll tell you how many minutes it's running late, so that's a key thing that needs to be done."

Again, there was felt to be limited scope for carrying bikes on trains (element 34).

"Yes. It all boils back to the old Connah's Quay, Shotton, it's a bottleneck, so it affects your whole Flint, Mold, Chester, all three areas, trying to get through to one place. Again for walking and cycling, public transport, bikes are not allowed to be carried on buses for health and safety reasons and I know you can only, there's a minimum I think of about two bikes on a train now, two or three bikes maximum. Whether, one of the key things that could happen, especially at train stations is they put up cycle sheds again like they used to have years ago to encourage people somewhere safe to leave their bike or again biking through to work, companies and businesses need to have proper cycle parks and I know a lot of the new buildings do."

Group 3

Group 3 stated that element 101, real time information, was already in place.

"Yes, one point, item number 101, I did actually point this out, provide real time information at key bus stops within the study area, we're already doing that."

"Yes, 2004 around the European procurement exercise, which implemented that. I did actually point that out, so that line should come out, because we're doing it."

"Is that on all bus routes, [stakeholder] *or is it just the major ones?"*

"It's supposed to be strategic routes, but it is virtually in all locations where there's any significant chunk of people."

It was felt that there was no space to provide bus priority lanes (element 44) and bus priority lanes through Queensway were felt to be unacceptable.

"The old A55 from Broughton through to Chester through Saltney, the old main road is not wide enough for a bus lane."

"… the provide bus priority measures to Shotton and Connah's Quay and Queensferry, well, there is nowhere to do it, it's single, single track, it's just impossible."

"There's only the one that I don't find acceptable, which is obviously the bus priority in Queensferry and Shotton, but otherwise everything's okay."

Overall, it was thought that the package would assist in solving the problems within the corridor but due to the range of journeys on the corridor there would be a range of different problems and therefore solutions.

"I mean the difficulty is that there's so many different journeys along there, people have got different, you know, there's people travelling to Mold, there's people travelling to Deeside and people travelling to Chester, travelling to Liverpool, Manchester, you know, that's the issue, there's so many different problems that you've got there."

It was thought that buses did not have the capacity to carry bicycles (element 34) but that cycle security and parking should be improved at rail stations similar to MerseyRail (element 35).

"Would buses with cycle carriers work?"

"Not if you're stuck behind one in Connah's Quay and someone shoves a bike on the back."

"Mersey Electrics have got a good scheme, they've upgraded all the cycle parking at all the main stations, on the Liverpool to Chester rail line, secure cycle parking, well lit and well promoted and I just wonder whether or not that's worth referring to."

Figure 2 Package 2 Making Best Use Corridor: Flint / Mold – Chester (via Deeside / Broughton) – SLIGHTLY CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++ (1)	++ (4)	+ (9)	0 (3)	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (2)	++ (5)	+ (9)	0 (1)	-	- -	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++ (1)	++ (1)	+ (9)	0 (6)	-	- -	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++ (2)	++ (4)	+ (11)	0	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (3)	+ (9)	0 (4)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	+++	++ (5)	+ (7)	0 (5)	-	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (3)	++ (1)	+ (9)	0 (4)	-	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (3)	++ (2)	+ (9)	0 (3)	-	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (3)	++ (1)	+ (11)	0 (2)	-	- -	- - -

2.4 Package 3 Capacity Enhancements Corridor: Flint / Mold – Chester (via Deeside / Broughton)

Delegates tended to indicate that this package 'slightly contributed' to all of the transport planning objectives for the study area. Some delegates identified negative impacts although the majority felt the package contributed to the study TPOs. (see ***Figure 3***).

Group 1

Group 1 felt that packages one and two were the most appropriate and that capacity enhancements would be difficult to achieve although cycling and walking facilities were felt to be key. Bus and rail elements were supported.

> *"I was looking at this to the provision of the additional cycling facilities and walking facilities, I think is key to the area, because I think that's how you achieve the sustainable measures in the area and also, you know, I think everything else, the bus and rail, I think again are key to achieving modal shift from the private car to other areas."*

Rail links between Broughton to Chester via Saltney were seen to be a problem and it was felt that better interconnection between zones on Deeside Industrial Park would improve accessibility and reduce congestion.

> *"I suppose one of the things that would be better on the Deeside industrial estate is interconnection between the zones, what you've got with many of the zones, there's only one route in and the same route out, so if there is any problem you get congestion. I mean I'm not keen on any industrial estate having only one connection into it, so I think interconnection between the zones, so it creates greater accessibility to those zones would be an improvement and would spread the traffic out more, so I think that is potentially key."*

Group 1 thought that a new station at Deeside Industrial Park / Northern Gateway could replace Hawarden station (element 70) and the Mold to Broughton cycle route was seen as a key link. Group 1 noted that Airbus have a travel plan that they are trying to implement.

> *"Also key to that is that Airbus actually have a travel plan, which they are trying to implement, you know and they are encouraging people to cycle."*

It was felt that a park and ride site and a multimodal interchange (elements 95 and 42) would be good but would need to target the problem.

> *"Park and ride, I think there's an area where we've had this, saying oh, we need a park and ride for Ellesmere Port and we're saying why, because Ellesmere Port doesn't have a specific congestion problem. Now if you've got in Wrexham or somewhere else a park and ride, a problem in the town centre, you might want to provide some park and ride on a congested corridor. If we haven't got a congested corridor it's a scheme looking for a solution rather than the solution to a particular problem."*

> *"I don't know how deliverable it would be these days, but I think because of problems of Sealand Road and various other areas at peak times, there is perhaps, knowing the amount of people who travel into Chester from the Deeside area and the surrounding area, it's probably to reduce travel between Deeside and Chester basically, but park and ride in the Deeside area could be beneficial for people travelling into Chester."*

Temporary congestion in the area was seen to result from the 2pm shift change at Broughton (element 14).

> *"I mean Broughton the biggest problem is shift changes at Airbus, but you're never ever going to resolve congestion problems with the shift change, are you, you've got what, probably 3,000 people heading to Airbus, it's the midday shift change that's the problem, you've got 3,000 people heading there for 2 o'clock and 3,000 heading out just immediately after 2 o'clock, so for a period of about twenty minutes, you've got congestion, but the problem you have with that is there is no way you're going to design that out, no matter what measures you introduce, that's still going to be an issue. So, I believe a lot of the problems there are associated with things that are already in existence and what it probably needs is better travel planning from within."*

Again, group 1 felt that the most successful package would be a combination of several different packages.

> *"I think as I said earlier, you know, it's a combination of all the packages basically at the end of the day that's needed."*

> *"Pick and mix."*

Group 2

Group 2 questioned whether highway improvement schemes were missing from the package and whether this is this needed in addition to making best use.

> *"Have I missed something, there are no sort of major highway improvements here?"*

It was also questioned whether the new route through Altami should be included along with the A55/A483 scheme.

"I was just thinking to get from Mold to there was again, the Altami Signals, that kind of thing, it's torturous, it's difficult and I think if you're looking at sort of, I don't know, if people choose to work in Wrexham, rather than work in Chester if they lived in Mold. I mean okay, that's a drive, but in this particular area you've got the Deeside industrial estate as well, haven't you, which people going there, just going to one place, it just seems there's no real suggestion that you should improve any of the roads."

It was felt that cycle routes would not add much as there are too few users.

"I don't know how many people used to cycle from Mold to Broughton every morning, I don't know why they go to Saltney, because there's nothing at Saltney. I can understand them cycling to Airbus in Broughton, which is a major employer."

"Well, the cycle routes, they're not really going to add any improvements anywhere, very few people will actually use them."

Overall, group 2 preferred the capacity enhancements package to the making best use package.

"This one, yeah, I prefer the other one to this one."

"I think from my point of view it seems to deal with more specific issues."

Group 3

Group 3 felt that there should be a new station at Deeside College (elements 69 and 70). It was suggested that planners look at Connah's Quay.

"New station at Queensferry on the North Wales main line, now that may well be a good thing, but I would suggest that what would be an even better thing would be a new station at Deeside College that goes to town, because I have pointed out that there's something like 12,500 staff and students at Deeside students and a very high proportion of the students have no access to a vehicle of any description and it's across the road, for goodness sake. Now, Queensferry is actually quite a small settlement. If you're looking to have a new station on the main line, if you're looking to provide it in the Deeside area, I would suggest you build it at Connah's Quay or Queensferry."

With respect to element 40, a Mold to Saltney cycle way, it was felt that the large number of landowners would make this complicated.

"The Mold to Saltney cycle way, the greenway, it's utilising the old former railway alignments from Mold to Saltney, but there's two hundred landowners involved, so it's limited, it gets more stretches done, then you hit, that's the problem, at the moment we're trying to integrate going from Mold to Padeswood utilising the highway along the verges there, but there's two hundred, but the landlords, there's one who acquired bits and bobs of the railway and it's very difficult to get a consistency, you know."

It was also felt that the railway line would be too far from commuters and residential settlements.

"And the other problem with that sort of thing, I'm aware is a general problem which we've seen elsewhere in North Wales, in Clwyd, for example, the lines, they may have intended to avoid existing settlements, because obviously it was easy to build a railway line in the 19th century on open land. They got as close as they could to the settlements. That means that in a lot of cases the old railway lines are nowhere near where the cyclists would want to go. Cyclists actually want probably want to be fairly close to the existing settlements, the Dutch or Belgian approach of having a cycle track alongside the road is the way to go.... When I first saw them being put in, I thought, mmm, is anybody going to use that. A lot of people do use it, not just cyclists, but people walking their dogs, people walking children, very well used and it's alongside the main road, so it's there, if somebody has a problem, if they're taken ill or something they can ring somebody up and they can be collected, whereas if you're way into the middle of nowhere along an old railway line and you hit some sort of a problem or you have somebody who's some sort of character you don't like the look of, how do you get away from them. Well, you can't sort of just step into the road and flag down a passing motorist, can you?"

For element 39, lining National cycle route 5 from Chester to Denbigh and Wrexham, Denbigh was felt to be too far for a commuter route.

"The problem with these roads is they're more for the recreational cyclists and the Sunday cyclists, not for people cycling to and from work, which is what these are supposed to address."

Group 3 thought that there were signalling constraints on the rail network.

"I like this idea of extending, having the rail options extending, the train operation between Rhyl and Chester, that would put some further improvements to the likes of Shotton and the interchange at Shotton and that must have quite a lot of additional patronage on that line, I suppose that would link into the idea of new stations to serve the college site. You make sure obviously the rail industry are plugged into that, because I think the chap from Trains Wales was last here said there was quite a lot of signalling constraints on the North Wales line that would affect the number of train paths, so that would require some quite big investment with the signalling to enable that, but it sounds a really good idea on quite a busy section of road."

"I think there's four train paths an hour or something on the North Wales line and one of them's reserved for freight, so that's helping to do that, x millions of pounds upgrading it."

"Well, this is often the problem that the rail authorities over the years, the Government have reduced the capacity of the whole network and this spare capacity is not there anymore."

"I mean you look at North Wales and you think there's loads of capacity on it, but you're actually quite restrained by the signalling paths there, it's like you say technology hasn't been invested in it."

"Well, they reduce the actual capacity, well, literally the capacity of the lines, although I suspect in fact if they were a little bit more enthusiastic about it, they probably could squeeze more than four in."

Bus service reliability was seen to be dependent on the congestion on the roads and so it was felt that planners need to solve these problems before implementing other measures.

"It would be interesting to see what the chaps from the bus companies think, from Arriva and the Metro. The key thing with the public transport options is takes the rail stuff on for the corridor, the key to me is the bus service reliability and the bus service reliability is affected by movements into and out of Chester and from Broughton into Chester and also the bits through Shotton, that can completely scrub the timetable and reliability, if the Broughton network is having problems on those two sections and there's three different tactical ones, for instance, there's the Dee one, but that would even affect the bus networks in this corridor."

Overall it was felt that the package contributed to solving the problems within the study area and so it was felt that the package was acceptable. It was thought that the demand option would not solve the problems in the study area and would need investment.

Figure 3 Package 3 Capacity Enhancements Corridor: Flint / Mold – Chester (via Deeside / Broughton) – SLIGHTLY CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++ (3)	++ (3)	+ (7)	0 (3)	- (1)	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (3)	++ (4)	+ (7)	0 (2)	-	- - (1)	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++ (1)	++ (3)	+ (5)	0 (5)	- (2)	- - (1)	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++ (2)	++ (4)	+ (9)	0 (2)	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (3)	+ (6)	0 (6)	- (1)	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	+++ (1)	++ (3)	+ (8)	0 (4)	-	- - (1)	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (1)	++ (4)	+ (8)	0 (4)	-	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (1)	++ (4)	+ (7)	0 (3)	- (2)	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (1)	++ (4)	+ (7)	0 (3)	- (2)	- -	- - -

2.5 Package 4 Making Best Use Corridor: Wrexham – Deeside (via Mold / Buckley)

Delegates felt that this package 'slightly contributed' to all but one of the transport planning objectives for the study area. Half the delegates felt that the package 'neither contributed nor detracted' from National and Regional Trips and half felt the package contributed to this TPO. See ***Figure 4***.

Group 1

Group 1 stated that transport problems between Wrexham and Deeside were only an issue during the peak periods.

"I mean my initial reaction to this Wrexham to Deeside is at the moment from here to here, it's knowing what that is, because Wrexham to Deeside to me just doesn't jump out as saying, I might be completely wrong, but …"

"This is basically only a very small a.m. and p.m. problem, the rest of the time it's just not a problem."

"I mean this one is purely peak times and I think it's because of problems there, people don't utilise this and it causes queuing there, A541, A550 junctions and particularly the Penn and Muller roundabout, there seems to be major queuing there, I get complaints all the time about morning and evening peaks."

The A483/A55 junction capacity problem was seen to result in congestion along the route and displaced traffic onto other routes including the A550.

"It does cause problems, I mean if you've come to this area, along this route in the morning there's quite a lot of traffic comes this way to either the A55 there and goes down to Deeside and you get major queuing."

One solution put forward was to improve the signage of the route.

"We've always said this, no matter how many strategies or studies we have, the ideal way of resolving any issues on there is to sign and get people to use that route, but they're never going to use it as long as there is the issue of that junction."

It was thought that the signage strategy (element 4) would have little impact because most of the traffic is commuter traffic.

"Well, there are some things in here which I'd say depend on who you're trying to address, for instance the highway improvements consider signage strategy for people going between the A55 and Wrexham. Well, if it's mainly a commuter problem signs won't make a jot of difference, because people don't even look at them, they'll just know where they're going, so if we're looking at tourism, then obviously you've got an issue, haven't you."

Another solution that was suggested included improving the frequency of the train service and the accessibility of some of the smaller stations in the area.

"Well, if you had a double track between Saltney and Wrexham and you could operate a quarter hour service between Wrexham and Chester, your road demand would drop."

"A lot of these little train stations, like Caergwrle and Gwersyllt again there's no availability for parking."

Caergwrle and Gwersyllt, they're not accessible stations.

Group 2

Group 2 felt that this corridor did not experience much demand and stated that there was little industry in Wrexham. Wrexham was seen as a retail centre with good train links into centre.

"My perception in terms of demand, this is probably the least sort of global demand corridor of this triangle, is that …"

"I would think you find very few people worked in Deeside that travel from Wrexham and very few from Deeside into Wrexham."

Group 2 felt that the bus services along the corridor were limited but that this was because the demand did not exist.

"People don't really want to go to Wrexham via Deeside. That to me is the key is where in your bus routes, where most people want to go."

"Because we're not going to operate if people don't want to go there and Arriva don't operate a service, those are by other operators, small one man band operators."

Highway improvements to pinch points were seen to solve problems due to recent developments.

"I used to work for Clwyd County Council twenty five years plus ago and we had a load of schemes on the A541, links to make a strategic route improvement, really and then they go and allow these housing estates and mini roundabouts to sort of interrupt the general flow, which seems a complete policy change to me, this. So, you know, you're overcoming pinch points which have been created in the last ten or fifteen years."

Group 3

Group 3 felt that the rail elements of the package would try to squeeze too much out of an already stretched service.

"It's quite a difficult line to try and do anything with and if you try and pin too many hopes on affecting travel behaviour using the existing line, it's going to be quite constrained, I would argue."

It was thought that the rail service needed to connect to Birkenhead North.

"Bidston is quite a destination in itself, its connection onto the Mersey Rail line into Liverpool at Birkenhead and the existing service, a half hourly through a heavily populated area should be the basic minimum and it should go through to Birkenhead North, if we want to make sure it connects with services, not just coming from West Kirby about every fifteen minutes, but services from New Brighton, so you get effectively a five or seven minute service and there is actually a reverse crossover at Birkenhead North"

There were thought to be too little resources at Shotton, however connections were said to be poor.

"At the moment it wouldn't manage to meet the objectives with the arrangement on the rail line, it's very underutilised and part of the problem is there's just too little resource going into it and also the connections at Shotton, despite the work time they're putting in, the structure improves at the station, the connections don't work, because they're too tightly timed."

It was felt that parking at station was needed.

"And there's nowhere to park at any of these stations anyway."

Overall, the package was seen to make a contribution to solving the issues in the study area but would not solve the problem. Again, integrated fares were not seen to be possible (element 46).

"I think as I said before, integrated area ticketing, we have a limited authority on fares outside the ITAs, really no authority on the fares at all and there are competition issues, which the Competition Authority seem to think might apply to these sorts of things, so it might be that some of these might not be possible, unfortunately, no matter how desirable."

Figure 4 Package 4 Making Best Use Corridor: Wrexham – Deeside (via Mold / Buckley) – SLIGHTLY CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++	++ (2)	+ (10)	0 (5)	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (1)	++ (2)	+ (8)	0 (5)	-	- - (1)	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++	++ (1)	+ (7)	0 (8)	-	- -	- - - (1)
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++	++ (2)	+ (12)	0 (3)	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (1)	+ (9)	0 (6)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access t**o **jobs** and other **key services**.*	+++	++ (2)	+ (9)	0 (5)	- (1)	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (1)	++ (1)	+ (8)	0 (6)	- (1)	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (1)	++ (1)	+ (7)	0 (7)	- (1)	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (1)	++ (1)	+ (7)	0 (7)	- (1)	- -	- - -

2.6 Package 5 Capacity Enhancements Corridor: Wrexham – Deeside (via Mold / Buckley)

A large proportion of delegates felt that this package 'slightly contributed' to all of the transport planning objectives for the study area (see ***Figure 5***).

Group 1

Group 1 did not support the new bridge between Connah's Quay and Deeside Park (element 23) as it was seen to be of little benefit and create environmental problems.

"I must admit I couldn't see any benefit to it at all, we've got the Flintshire bridge which links through on one side and you've got the A494 and the blue bridge on the other side, so another bridge to me, it seems a heck of a lot of expense and you've got all the environmental issues that they use, the Dee has got all the environmental status these days with SSSI etc."

Group1 pointed out that the Wrexham bus hub already largely exists (element 47) but that a multi-model hub at Deeside/Shotton may be beneficial. It was thought that a strategic park and ride at Shotton/Deeside may be better and may improve rail and bus services.

"I thought we'd more or less created one at Wrexham General."

"Do we need another one at Deeside, then, I mean that's the thing, you've got a hub there, but it's serving the Wrexham area, isn't it and the rail. I mean I must admit, if you look at another potential hub you've got two railway lines crossing in Shotton, you've got good bus services in Shotton, so if you're looking at another hub in the locality, that would be another key I'd have said that Deeside is an ideal spot for creating another transport hub."

"No, I still feel that if you're looking at some sort of major hub that Deeside, Shotton, Deeside is the place to locate it and incorporate a park and ride and even your freight interchange as well potentially in that locality, you know, that's an ideal place, I would have thought for freight interchange."

"Would you not be better still to look at Deeside as the place to provide that, because your linkages off the A494, which does link to the A55 and then you've got greater access to two railway lines for one thing there, so you can go east west or north south and you've also probably got far better bus interchange at that location, than you have anywhere. Penforth is not that accessible, I mean buses do go through, but they are tending to head potentially to Chester, aren't they if they go through there."

Group 1 also felt that there was potential for a freight interchange.

Group 2

Group 2 felt that element 23 was not required and should be removed from the package.

"No. Forget the bridge. How can you improve roads better than what we've got now into Deeside, you can't, they're all brand new."

The group questioned the need to improve Wrexham General Station as shoppers will use Central Station. It was also questioned whether a multi-modal hub at Wrexham General Station or a park and ride were needed.

"I don't know about creating a multi modal hub at Wrexham general station. People don't get off at the general, if they're going shopping into Wrexham or they want to go into Wrexham, they'll go into the Central, which is the middle of all the shops in Wrexham."

"You couldn't operate a park and ride in Wrexham, because there's plenty of parking anyway. I don't think it's ever full."

It was felt that improvements to the A55/A483 and A494 needed to be added.

"I think the philosophy of this is missing something, because the 55/483 junction, I mean that's the key to improving."

"That's the big thing, isn't it?"

Group 2 preferred the making best use package to the capacity enhancements package.

"I tend to fall under making best use, because I can't see any advantages in throwing loads of money onto it."

Group 3

Group 3 felt that the capacity enhancements were required and overall, the package was felt to be acceptable. Group 3 questioned whether there would be the demand for element 72, a new rail service between Borderland Line and Chester and it was thought that there would not be enough room for the curve.

"I don't think you've got the space to do that."

A multi-modal hub at Wrexham General Station was felt to be good. It was noted that there was no cycling provision between Wrexham and Mold.

"I like the idea of more at Wrexham general, that's good, because obviously the main rail station is joined to the bus station at the moment, it could bring them altogether at a major centre."

"And obviously there's no cycling provision to get from Wrexham to Mold."

For element 13, it was felt that connections to Deeside Industrial Park were already good.

"I think it's got good links into the industrial estate."

Figure 5 Package 5 Capacity Enhancements Corridor: Wrexham – Deeside (via Mold / Buckley) – CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++ (3)	++ (3)	+ (6)	0 (5)	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (3)	++ (2)	+ (9)	0 (2)	-	- - (1)	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++ (1)	++ (3)	+ (4)	0 (8)	-	- - (1)	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++ (2)	++ (1)	+ (8)	0 (6)	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (2)	+ (6)	0 (8)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	+++ (2)	++ (1)	+ (9)	0 (4)	-	- - (1)	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (2)	++	+ (7)	0 (7)	- (1)	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (2)	++	+ (7)	0 (8)	-	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (2)	++	+ (7)	0 (7)	- (1)	- -	- - -

2.7 Package 6 Making Best Use Corridor: Chester – Wrexham

This package did not generate any negative scores and delegates tended to feel that the package 'slightly contributed' or made little difference to the TPOs. See ***Figure 6***.

Group 1

Group 1 thought that bicycles on buses were not practical for commuter routes (element 34).

"I think it's mentioned in all of them about the integrated cycling with other passenger transport services with the buses with cycle carriers. I didn't think that was quite feasible these days, having seen it started in other places and stopped for health and safety reasons and all sorts. I'm just wondering how practical it is, you know, we've got a ten minute bus service between Wrexham and Chester, haven't we and for somebody to particularly get off and have to load a bike on the back to take it off the other end, I'm just wondering if that's feasible."

The group supported element 46, integrated area ticketing, but felt that the package would not solve the problems and capacity enhancements would be required.

"Things like the integrated area, I think those things that are there, that make moving what's already there easier."

Again, bus priority was not deemed to be feasible.

"I mean it's just again how the heck would you provide bus priority?"

Group 2

Group 2 felt that element 43, bus priority, was important for the corridor.

"Bus priority is key for Chester, Wrexham."

A question was raised over improved access to rail in Wrexham (element 55).

"I don't know about improved station accessibility, though."

"There's a lot of stations on the Chester, Wrexham where there's no car parking facilities, that's the key thing."

"Yes, if you're trying to encourage people to do that you need to provide them with somewhere to keep their car, that's why I'm comfortable with doing the park and ride, because I know my car's going to be fairly safe and it saves me all the hassle of it driving to Chester."

Group 2 felt that a park and ride should be to the south of the A55 as well as major movements at the A55/A483 junction in Chester.

"Park and ride works for me."

"The key thing, though is was the park and ride put in the right place. Should it have been the Wrexham road side, the congestion in the morning is always from the Wrexham side."

"Not from the Chester side. Okay, you've got the Mold, Buckley coming in, but if they were to go out and around the roundabout to the next roundabout, then have the park and ride there, you're going against, you're not meeting any queues going out, therefore the park and ride is also picking up the Wrexham people, so therefore you've got the Wrexham, the Mold, the Buckley, so it alleviates the road all the way in, instead of having the big bulk just as you come off the bypass."

"So the sensible place would have been to put the other side of the, the Wrexham side of the 55."

"Yeah, because I avoid that like the plague in the mornings if I have to go into Wrexham, because it's just a bottleneck, I drive down the A5 from Anglesey and I get caught up here with traffic backed up to the dual carriageway and it's deadly, the cars are travelling at speed on that road and they fill the filter lane all the way back to the 55 and it's quite scary being sat there."

"I think one of the problems with the junction is the predominant flow from Chester over towards England and the reverse, that's the predominant flow. I think that's why the park and ride is where it is."

"In terms of the park and ride, you wouldn't want people coming from the east going south, parking up and then …, that is the predominant flow. I mean I know we focus on the Welsh issues, don't we, but the actual major issue there, it's actually in England as well, the junction."

It was stated that incidents on the A55 cause major delays and a quicker bus journey would encourage public transport usage (elements 42 and 43).

"Well, it's busier east, but west is, I think the recession has probably kept it okay, but there is an issue, those two slip roads have just been added at Warren Hall, now if, in the future, the two slip roads are added at the retail park, then that section in between there would become under strain in terms of its capacity, because having two full junctions it will suck in more traffic and the traffic that's going along the …, that goes straight on and you can go straight up and down there, so that particular section might need additional lanes in the future even."

"Again it's the same old story, without the slip roads off, you're stuck if something happens in the morning, like it did the other week, there was an accident just before the slip road on the 55, on the Wrexham road, it was backed all the way up through Broughton, two lanes, 8 o'clock in the morning, an accident, the whole bypass is shut and people could not get off, from just down the road from Dogs Hill basically and that was full of Aerospace traffic."

"If there's any way you're going to try and encourage people to jump on the bus, you've got to improve the way that the buses travel, i.e. that they have priority in awkward junctions and what have you and to me that's the key that you've got the choice of either sitting in your car, twiddling your thumbs or you jump on a bus."

Group 2 felt that there needed to be viable alternatives to sitting in traffic queue in car.

Group 3

It was again pointed out that real time information was already in place.

"I'll say again, point number 101 should not be there."

"Yeah, that's already done."

Group 3 felt that element 43 was not needed as the junction on the A483 is a small roundabout with traffic lights on the A483.

"It's only small, how are you going to get, you're going to have to alter the roundabout, aren't you?"

"And the route at the moment comes through from Pulford, so it would have to stop, you'd have to have traffic lights on the main 483, so that's just not an issue."

With respect to element 55, group 3 stated that the line was a single track and the highway bridge was not wide enough to allow for a double track. It was suggested that a park and ride at Rossett provided lots of opportunity. It was felt that this element should go in the capacity enhancements package.

"I notice for the rail, that line is only single, single track and that needs upgrading and you could have a park and ride in the likes of Rossett or somewhere."

"First of all you've got the problem of the fact that when they built the bypass the railway line was single at that time and the highways engineers did not put in sufficient to allow it to be doubled again, so you've got a single line in the middle. I mean on the same line is doable, but perhaps more to the point is with the comprehensive spending review, if the Oxford to Gloucester line is not going to be redoubled entirely within the new few years, they're going to finish off what they're doing at the moment, then the rest is on hold for the time being and the chances of us getting anywhere frankly are negligible. I've shown him the programme at the moment and I'm glad to say it's not going to happen, because it needs infrastructure which is, as I say, if they're not going to do that from Oxford to Cheltenham and Gloucester, what chance that they're going to do it for this? No chance with the best will in the world, I fear."

"Yes, obviously a single line has major capacity constraints, because if you send one train down the line, you've got to wait for that train to clear before you send another one back up, so that really does have the capacity of about four trains an hour maximum, if that, which if you doubled it, apart from the section in the middle where it's got to go down to one line, then it's not going to increase that by two."

It was questioned whether element 46, integrated area ticketing, could be implemented as there is no control over ticket prices and companies could not talk to each other due to competition laws. It was suggested that an extra zone is added to MerseyRail tickets.

"You know this thing about integrated area ticketing, this particular package is integrated with Merseyside's ticketing scheme, I suppose that the same would apply on the previous corridor with Chester, Mold, Deeside, it wouldn't be the same whether or not there's a case to link in with the Merseyside scheme as well as the Welsh scheme, because of cross boundary movements."

"I doubt if it's that simple, I'm afraid, we have had some ticket, this is in collaboration with what is now Cheshire, but it relies upon the operators agreeing to come into it and if they decided not to come into it, then we'd have very limited powers to force them in."

Overall, the package was felt to be acceptable but would not enough to solve the issues within the study area.

Figure 6 Package 6 Making Best Use Corridor: Chester – Wrexham – SLIGHTLY CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++	++ (2)	+ (10)	0 (5)	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (1)	++	+ (10)	0 (6)	-	- -	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++	++ (1)	+ (6)	(10)	-	- -	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++	++ (2)	+ (9)	0 (6)	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++	+ (7)	0 (9)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access t**o **jobs** and other **key services**.*	+++	++ (1)	+ (6)	0 (10)	-	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (2)	++ (1)	+ (7)	0 (7)	-	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (2)	++	+ (6)	0 (9)	-	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (2)	++	+ (6)	0 (9)	-	- -	- - -

2.8 Package 7 Capacity Enhancements Corridor: Chester – Wrexham

Delegates felt that the package 'moderately contributed' to three of the transport planning objectives: Business Transport Connections; Travel to Work; National and Regional Trips; Efficient Use was more divided but always scored positively. Although the majority of delegates scored the packages positively against the environmental objectives, some negative scores were awarded. See ***Figure 7***.

Group 1

Group 1 stated that the multi model hub in Wrexham was complete (element 47).

"Well, I think we've done again the multi modal hub at Wrexham is complete and the new station wasn't exactly Rossett, it was south of Rossett, Rossett Parkway, it was just before the junction off the A483 to Rossett on land there, that was close to the railway, so you wouldn't destroy Rossett and bring all the traffic back into Rossett old station, it would be a Parkway station which would capture the traffic before it got to your bottleneck at Chester business park."

The new station at Rossett Parkway would be supported if the Saltney – Wrexham double track will assist with congestion on the A483/A55 (element 71). Also, it was felt that a station at Lache would serve Chester Business Park via a shuttle bus service.

"And the station wouldn't go ahead unless Saltney to Wrexham was double tracked, because you wouldn't want to put a station on the single track. So it came with provisos."

"It would assist with the bottleneck at Chester Business Park for people, what we were hoping was as well as Rossett there would be one at Baych for the business park."

"You couldn't serve them all, but you would reduce some of the peak time car travel onto rail, that's what the study …"

Group 1 agreed that the A483/A55 junction needed improving (element 17) and felt that is would also have a safety and capacity impact on the A55 mainline.

"Because I'll be honest, that approach, travelling up it, in the morning, very dangerous, you take your life in your hands on that one, you've got standing traffic on the live carriageway and traffic on the right hand side hurtling past you, it's probably not 70, but …"

"Then you get people who obviously know what's going on, but Hursley Park is still trying to squeeze back in at the last minute and then they end up blocking the carriageway and I mean I would have thought by now the Highways Agency would have implemented at least some form of active traffic management, not even queues or something on the slipway, warning you know, you come round that corner and then there's a slight bend."

"But again I think it's an area where in an ideal world maybe from a capacity point of view there would be a much more comprehensive scheme that would link the 55 through to the 483 with more slips, somehow get rid of that roundabout, but put in like grade crossings and whatever through there, I mean grade separated through here is expensive."

The group stated that this group was being looked at by the Highways Agency.

"What we are aware of from the Highways Agency is that they've got a minor improvement scheme that they're about to implement at the A55, A4, A3 junction which includes some of the slips and some green marking of the carriageway, so particularly unless they do something at the traffic lights …"

"It's in the Highways Agency control, I mean it's been supervised and there's certainly improvements for the slip roads off and the slips going out the business park, coming round, which has helped a bit and then you've got obviously a phenomenally long slip off here, but that's sort of the main line junction, but it's this secondary roundabout which has got design characteristics."

It was felt that the Highways Agency scheme was welcome but more extensive improvements were needed. It was also noted that the Highways Agency were to consider the Rossett junction A483 in 2011.

"They've also indicated, the Highways Agency that they are potentially going to look at the Rossett junction next year."

"Because if you don't know it, it's a very tight small roundabout as you come into it and basically it's just not got any capacity and I don't know why it was ever designed like that in the first place."

Group 2

Group 2 felt that A55/A483 junction improvements were needed but questioned whether this would help local trips (element 17).

"It's needed but I'm not sure it's helping the Chester to Wrexham corridor, I suppose it is, isn't it, local commuter routes, they're bound to."

A direct cycle route would be used, in particular by those travelling top the business park (element 100).

"That's about one of the best cycle routes I've seen and people would use that Wrexham to Chester, especially to the business park."

It was felt that a new station at Rossett would have limited use as this is only a small village (element 71).

"I don't think the new station at Rossett would help."

"Very few people around there, it is a very very small village and there are good road links around there, that's the key thing, you're only a mile off the 483. I know what the reason for that would be, why they want a new station at Rossett, the Queen parks there, doesn't she, that's where they leave the royal train overnight, that's why."

Group 3

This was seen as a major link. There were seen to be bottlenecks on the A483 that would be exacerbated by the new development and two new junctions.

"Yes, I think it's a major link, Wrexham and Chester and the main bottleneck is the 483, A55 junction."

"On that note there is actually potentially a massive new development proposed, right at that junction and I think I've looked at the plans, it's tens of thousands of pounds."

The park and ride (element 95) was felt to be on the wrong side.

"And what you've got is, I mean the park and ride is ideal, but the park and ride is the wrong side of the junction, you could do with a park and ride that other side."

Group 3 noted that the cycling and walking link in element 39 was being looked at already. It was felt that the railway needed lots of investment, in particular as it is only single track. The single track was seen to limit the capacity of the rail system to four trains an hour (element 47).

"There's a railway, as has been discussed it needs an awful lot of money spending on it, because it's only a single track, but you know, everything that you've said about the rail is right and we need those junctions improving and when you come to the bus, create a multimodal hub at Wrexham general station, great idea, but if the capacity as we've just been told is only four trains an hour, well, what's the point of that unless you do the rail improvement. Great idea, but again it's chicken and egg, isn't it?"

Group 3 felt that junction improvements were needed with free flow into the park and ride. It was felt that the network was already under stress and a bypass was needed.

"Yes, but it misses the problem here on the 483, where you've got Belgrave roundabout there with traffic lights here and the queues all the way through to half way along to Rossett."

"In terms of the A4838, 55 junction improvement, I understand that all they're doing is a modification, some slight minor modifications to the off slip on the A55 going east and into Chester."

It was thought that capacity enhancements were needed in Cheshire and although this is the responsibility of the Highways Agency, the Welsh Government could pay if shows benefits.

"Yes, try to bypass it and go through Ecclestone on that road is awful."

"Well, if you're going to somewhere like Cheshire College, West Cheshire College, that's the way you go in."

"But it definitely needs capacity enhancement and that's in Cheshire, on the Highways Agency. So the Welsh Government can't do much with that."

Figure 7 Package 7 Capacity Enhancements Corridor: Chester – Wrexham – CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++ (4)	++ (8)	+ (5)	0	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (3)	++ (8)	+ (6)	0	-	- -	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++ (1)	++ (9)	+ (7)	0	-	- -	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++ (3)	++ (6)	+ (8)	0	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (3)	+ (10)	0 (3)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access t**o **jobs** and other **key services**.*	+++ (1)	++ (3)	+ (9)	0 (4)	-	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (1)	++ (2)	+ (10)	0 (3)	- (1)	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++ (1)	++ (3)	+ (7)	0 (4)	- (2)	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++ (1)	++ (3)	+ (8)	0 (4)	- (1)	- -	- - -

2.9 Package 8 Making Best Use Corridor: Strategic Trips

Delegates felt that the package 'slightly contributed' to four of the transport planning objectives: Business Transport Connections; Travel to work; National and Regional Trips; and Efficient Use. Delegates felt that the package 'neither contributed nor detracted' from five of the objectives: Safety and Security; Social Deprivation; Carbon Emissions; Natural Environment; and Human Environment. See ***Figure 8***.

Group 1

Group 1 felt that rail connections between Wrexham and Manchester including Manchester Airport were poor (element 53).

> *"I certainly appreciate them, the desire for people from Llandudno to go to Manchester Airport, the desire from people from Wrexham to go up to Manchester Airport is just as great and we have considerably longer wait times at Chester for a Manchester train than you do at Manchester Piccadilly for the airport. I don't think we do enough to encourage people to go to the airport by rail, because you've got to change trains at Chester and there is a long wait, sometimes about half an hour and then you've got another fifteen minutes at Piccadilly. I'm not too sure why we're concentrating on Llandudno people for getting to the airport, when there are other people from other areas that want to get to the airport. We've got to direct them in an international service, which probably isn't promoted enough, because we've got capacity problems there, with the trains, the trains aren't big enough, but I do think there must be a desire form this area to go to Manchester Airport, just as there is from Llandudno."*

It was felt that the signage strategy (elements 2 and 3) would have limited impact because of the use of Satnavs.

> *"I mean signage strategy, anecdotally I know there was a great deal of concern from people on the A51, which comes through Cheshire from the M6 through Crewe or whatever that there was a lot of freight coming up that way and now it's signed off the M6, you're coming up the M6 and round the M56. I think HGV drivers either follow sat nav or have their own …"*

> *"Because putting the signage strategies that sometimes helps the local community think, well, you've done what you can, but we can't stop people driving where they want to go, but how much impact it makes on the overall network I'm not sure."*

Group 1 found it difficult to comment on elements of the package, for example bus priority, because of the potential for a large number of different movements.

> *"We're looking at the strategic corridor as a whole, aren't we, I think this is the problem, in some places it may be possible, in others it may not be and I think they've decided that perhaps the A483 is not achievable at this moment in time. I don't think through Deeside is achievable, but there are other areas where it could be."*

Group 2

Group 2 felt that element 102, Variable Messaging, was key to improving traffic flow in the area; however it was thought that there was a lack of extra/spare lanes or quality/viable alternative routes. This was something that the group felt needed cross border co-operation on.

> *"The key thing, the variable messaging sign has got to be a key thing that's going to help the area, out of all of that I think that's the key one, I don't know what anybody else thinks."*

Group 2 wanted real time facility in buses but not at bus stops as vehicles have GPD monitoring (element 101). It was suggested that this could be integrated with Traffic Wales. It was suggested though that although this would highlight congestion, it would not necessarily solve the problem.

> *"One of the key things is the technology is out there to send the message back when we've got traffic issues and problems. It's like every single bus on the ticket machine it's got built in GPS, so I know within a metre where any bus is at any time of the day. All that I need to do is put a big TV screen up at work, have the link into it and I could plot my buses as they're going round."*

> *"Flintshire county council haven't put real time in, but the technology is on the buses, where they haven't put it is in the bus stops, now if the investment was to go into the bus stops, that again would be an area where you could feed back traffic movement and traffic congestion, very simply and that could then automatically feed variable signs."*

"The key thing again about the bus service is, it runs regular daily trips, the same time every day, so you would then get the feedback of fairly accurate uniform, you've got a uniform timetable it has to operate to and then it would feedback very quick and that's all real time is, it sends a signal from the bus to say I will not be at my bus stop for another five minutes, you could get that into a signalling system via the link somewhere and you've got the information up and it's an accurate source of information."

"I've seen it in Yorkshire, I've been over to Arriva Yorkshire and they've got it up in their depot and it is, it's just a big television screen with every single bus route on and those give you guidelines that you've got to operate to and the minute that bus runs out of its guideline time to arrive at a station it flashes up red, so then the supervisor will ring up and say what's the issue, what's the problem, oh, there's traffic, so therefore they can guide times."

Group 3

Group 3 felt that the package would not be enough to solve the problems of the study area and instead needed to be strategic. Group 3 thought that the package looked like a number of local schemes rather than strategic schemes.

"Because it's strategic, the regions at the moment is broken down into, you might argue against it, but it reads like loads and loads of bus schemes, with this do we need it, like we're not going to create a number of strategic park and ride sites to address that sort of problem, like you experience in Chester and that would be linked to dedicated bus or rail services and then you'd have variable message signing on the street at highway network to bring car drivers into the park and ride. So I'm concerned the way this is constructed you don't really get that message, that sort of ballgame with this option. It's like loads of like separate sort of schemes, so we need a quite strategic sub regional sort of context, saying here are the key transport corridors and we'll take an integrated approach be it car, bus or rail or tram or what have you to manage movements within the corridors and we'll use ticketing, we'll use variable message signing to make it happen, because it's just a key strategic option, isn't it, the most expensive one out of the lot."

"Yes, because the walking and cycling, it's irrelevant, it's not strategic."

"It just looks to me like loads of local things all put together."

It was suggested that the package look at the A55/A534/A495 and required a sub-regional context.

"There's some good stuff in here, but some of the stuff's too localised, it's not strategic."

"Yes, to me it's just all about the 55 and the 483, those are the strategic routes, although we've not talked anything about the 525 which is a strategic route out as well toward the Midlands."

"The A534, isn't there, going across to Nantwich."

With respect to element 53, extension of the Llandudno to Manchester service to Manchester Airport, it was felt that trips to other cities were just as important.

"It's part of a trip, but not strategic and I also wondered about the rail one, having argued strongly for rail options, if Manchester Airport, I mean that specific market that trains Wales want to sort of capture is it strategic for this corridor, is it perhaps when we say you want more frequent services along the main North Wales line, is Manchester Airport, colleagues might be aware, is it that important to us?"

"No more than Liverpool."

"No more than Liverpool, Birmingham. Yes, or Heathrow or Stanstead, is it really that important every day movement in this corridor, I know it's something on real trains Wales."

"… one of the points I was going to make was that in practice, because the existing service between Chester and Manchester is so slow, dreadfully slow, slower than a hundred years ago, but that, to Manchester Airport …"

It was suggested that strategic trips would require capacity enhancements and better communication of problems (traffic/radio/web site).

"I mean strategic trips are all about the main trunks road, you know, we've got really good signage to them, okay, we've got pinch points on these, but the only way you're going to improve the strategic trips is by capacity."

"With one and two, for example in the same sort of approach to that, travellers result in incidents, that is an operational thing as much as you want to get the information out to radio stations, so that it goes on the traffic announcements and breaks into somebody's radio when they're in the car and they're told immediately that there's a problem on that route, you don't need a physical infrastructure, you need your people to get the information out."

Figure 8 Package 8 Making Best Use Corridor: Strategic Trips – NEITHER CONTRIBUTES NOR DETRACTS

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++	++ (1)	+ (10)	0 (6)	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++	++ (2)	+ (9)	0 (6)	- (1)	- -	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++	++ (1)	+ (11)	0 (5)	-	- -	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++	++ (3)	+ (8)	0 (6)	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++	++	+ (6)	0 (11)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	+++	++ (1)	+ (5)	0 (10)	- (1)	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++	++	+ (5)	0 (11)	- (1)	- -	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++	++	+ (6)	0 (10)	- (1)	- -	- - -
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++	++	+ (5)	0 (11)	- (1)	- -	- - -

2.10 Package 9 Capacity Enhancements Corridor: Strategic Trips

Delegates felt that the package 'strongly contributed' to all four of the economic TPOs. It also scored positively against the social TPOs. Scores against the environmental TPOs were more mixed although overall more positive scores were awarded than negative ones in this area. See ***Figure 9***.

Group 1

Group 1 felt that rail capacity improvements between Saltney and Wrexham should be included.

"Just to say on the rail I would have expected capacity between Saltney junction and Wrexham to have been in there."

The improved rail access to Manchester Airport and London was supported by the group (element 61 and 66). With respect to the cycle improvements in the package, group 1 questioned whether the benefits justify the costs. The Deeside to Neston route was supported. It was felt that the highway elements of the package were mostly linked to outcome of the A55/A494 study and that the A483/A55 improvements were key to resolving the Wrexham to Chester and A550 issues.

Group 2

Group 2 felt that the expenditure would not deliver enough benefits. It was thought that the conflict between motorists and cyclist and walkers needed to be reduced.

"The first one we have a big issue with that, because it's that separation. A bridge or underpass is expensive, but we want that separation, because the conflict between cyclists and pedestrians causes all manner of problems."

"I think that's been the problem now, by Sainsbury's, Midland, they put the bypass in and if you've got to deal with the pedestrians between Midland and Sainsbury's, it's only a couple of hundred yards walk to Sainsbury's, so everybody wants to do it, they're all trying to cross the dual carriageway, at the end by the roundabout and people are there with three shopping bags in each hand, across four lanes."

Group 2 pointed out that there was already a Dee coastal path from Connah's Quay to Chester. It was questioned whether cycle routes should be included in strategic trips and it was felt that planners needed to look at highway and rail options.

"The Dee coastal path already exists and walking and cycling paths down the Dee from Connah's Quay all the way through to Saltney. You start at Connah's Quay and then you cross over by Blindup?? Brothers by the blue bridge there and then you can go all the way in basically then to Chester. So how far they want to extend it, I don't know, unless it's down to Flint."

"It sounds pushing it to suggest that it's strategic. I can understand the local packages, but this is meant to be distance, isn't it. You can have national cycle routes and the like …"

"Nobody's going to bike from Flint to Chester, are they?"

With respect to element 51, the Taith Express link between Holyhead and Manchester, it was felt that there would be a lack of users. The Cross Dee bus routes were not thought to be financially viable (element 49).

"But there are already a lot of existing bus routes from stations and past stations. I think if they were being used we would be operating from them. The cross Dee bus route, again it's down to punctuality and maintaining time, you've got people trying to get to work, they can't be stuck in the traffic in Connah's Quay and Shotton. If you had a dedicated bus lane through there, great, but you won't, you won't get one through, because the road's not wide enough to take it and improved Dee bus route between Mold and Ellesmere Port. We ran one between Chester and Ellesmere Port and we pulled the plug on it because it wasn't paying and so did Flintshire county council, they used to subsidise and they pulled out, because there was nobody travelling on it. So, if people don't want to go from Chester to Ellesmere Port. Mold to Ellesmere Port is not going to be an inviting tour. There's only Cheshire Oaks to go and see in Ellesmere Port, isn't there?"

Group 2 questioned how many rail users there were between Wrexham and Bidston. The group pointed out that there is currently a slow train service between Rhyl and Crewe. Deeside Industrial Park was suggested for a truck stop location.

"This truck stop keeps coming up all the time, you know, I was part of a group that developed a plan for Anglesey if both bridges were taken out and the one thing that would confound everything would where do we put the wagons, desperate for a truck stop somewhere."

"And looking at a truck stop, Deeside, you've got to look at Deeside industrial park for a truck stop if you're going to look anywhere. All your major repair service stations are in there. The main dealers are in there, that's where we'd look for a truck stop personally."

Group 3

Group 3 felt that strategic trips should not cover walking/cycling. The package was felt to be better than the making best use package but still does not include everything.

"You've got your strategic highway and rail network and what have you and everything on there needs to be strategic, so it's variable messaging sign is to get the networks congested onto park and ride into the major centres to cope with volume and people, intelligent ticketing, all of the stuff that makes strategic stuff work, you know, the railway enhancements along the main line, which are in here. Yes, it just needs to be brought together a bit more strategically and again because you've got walking and cycling in there, walking and cycling will be part of the strategic, it will have a role to play, but it is that strategic …"

It was suggested that intelligent ticketing was needed and problems needed to be communicated. It was felt that people should be encouraged to use the park and ride facilities. Rail electrification for freight (87) was not seen to be an advantage. It was felt that planners should concentrate on the improvement of the rail network.

"Basically further down you've got implementation of the freight, I don't actually think, I suppose it would be a good idea freight as such, for the passenger operators to keep freight trains out the way. But the freight operators, the network in Great Britain is insufficiently electrified to make it likely that many, if any freight operators are going to use much by the way of electric power between say London and Glasgow, something like that. For anywhere else then they use diesel trains, because they can get the whole way through."

"The North Wales line has been electrified and borderland has been electrified, so it's struggling with Great Western at the moment."

With respect to elements 5 and 99, it was felt that technology would be needed to enforce restrictions on lorries and managed motorways.

"Another thought that occurs here is that the problem with lorries on the motorway network and the problem is lorries in the middle lane, trying to overtake and taking ten miles to do it and I do mean ten miles sometimes and saying that what you should do when you have problems with lorries causing congestion is to say, they've all got the same maximum, which is 56 miles an hour and if they're fully loaded they can't even do that, so why do they need to use the lane at all, so you could say take, from the same junction, southwards through to the west Midlands counties, at Coventry you could say lorries are restricted to the side lane and that's it and they won't be any slower going through, exactly the same as you ever do and it frees the middle lane for everybody else. Just the same as once upon a time coaches were allowed to use the outside lane, they no longer are. They can do 62 miles an hour, whereas lorries are 56."

"Yes, it's easy, but it needs technology."

"You need active traffic management on the 55, whereby you've got similar to what's going on the M6, M42, variable speed limits, etc, etc, ANPR cameras on each lane and then you could enforce those types of issues with the lorries, keeping them into lane one, especially on the uphill through Halking, …inaudible Hill and all those sorts of areas, that would certainly increase the travelling times across or decrease travelling times."

It was pointed out by the group that links to South Wales were poor.

"But then you've got the other links to the motorways through the 525, the West Midlands, how the hell do we also get to south Wales, you know, from this area, that's absolutely impossible to get to South Wales from here, unbelievably difficult, you have to go through Birmingham and stuff like that and on a road you're taking four and a half to five hours to get there."

"It used to be the case that provided you were in Birmingham peak periods, which of course is increasingly longer and longer periods of time, the fastest way from North Wales to Cardiff is by the West Midland motorway system, out on the M56, down the M6, down the M5, down the M50 and the A49. It's not much faster, but it is faster than going down through Hereford or indeed through mid Wales. Most of those areas are outside our region anyway."

Figure 9 Package 9 Capacity Enhancements Corridor: Strategic Trips – CONTRIBUTES

	Transport Planning Objectives		**Strongly** contributes to TPO	**Moderately** contributes to TPO	**Slightly** contributes to TPO	**Neither** contributes or detracts from TPO	**Slightly** detracts from TPO	**Moderately** detracts from TPO	**Strongly** detracts from TPO
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	+++ (7)	++ (5)	+ (5)	0	-	- -	- - -
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+++ (8)	++ (2)	+ (7)	0	-	- -	- - -
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	+++ (6)	++ (5)	+ (6)	0	-	- -	- - -
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+++ (5)	++ (5)	+ (5)	0 (2)	-	- -	- - -
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	+++ (1)	++ (8)	+ (6)	0 (2)	-	- -	- - -
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	+++	++ (7)	+ (9)	0 (1)	-	- -	- - -
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+++ (1)	++ (5)	+ (8)	0	- (2)	- - (1)	- - -
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+++	++ (4)	+ (5)	0 (2)	- (1)	- - (4)	- - - (1)
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+++	++ (3)	+ (7)	0 (1)	- (2)	- - (3)	- - - (1)

2.11 Overall Individual Priority

Figure 10 shows the previous nine packages ranked in order of preference of being taken forward, where one is the most preferred and nine is the least preferred. All packages scored well against the Transport Planning Objectives, however, it can be seen that the top three packages were as follows:

1. Package 7: Chester – Wrexham Capacity Enhancements
2. Package 3: Flint/Mold – Chester Capacity Enhancements
3. Package 6: Chester – Wrexham Making Best Use

Note that the priority ranking may have been affected by the areas that the delegates were representing. In particular, there were two representatives Chester and Cheshire West, two representatives from Flintshire County Council and two representatives from Wrexham County Borough Council.

Figure 10 - NEWABTS – Overall Individual Priority Sheet

In total, the area wide managing demand package and the Making Best Use and Capacity Enhancements packages for the three corridors and strategic trips generate nine packages. Please rank them in order of preference of being taken forward where one is the most preferred and nine is the least preferred.

Corridor	Package	Level	Overview	Priority
All	Package **1**	Managing Demand (area wide)	Options which aim to reduce the demand for travel	**4**
Flint/Mold – Chester (via Deeside/Broughton)	Package **2**	Making Best Use	Options which seek to make more efficient use of existing transport facilities and infrastructure at minimal cost	5
	Package **3**	Capacity Enhancements	Options involving the provision of new infrastructure and significant service enhancements	2
Wrexham-Deeside (via Mold/Buckley)	Package **4**	Making Best Use	Options which seek to make more efficient use of existing transport facilities and infrastructure at minimal cost	6
	Package **5**	Capacity Enhancements	Options involving the provision of new infrastructure and significant service enhancements	9
Chester-Wrexham	Package **6**	Making Best Use	Options which seek to make more efficient use of existing transport facilities and infrastructure at minimal cost	3
	Package **7**	Capacity Enhancements	Options involving the provision of new infrastructure and significant service enhancements	1
Strategic trips	Package **8**	Making Best Use	Options which seek to make more efficient use of existing transport facilities and infrastructure at minimal cost	6
	Package **9**	Capacity Enhancements	Options involving the provision of new infrastructure and significant service enhancements	8

It can be observed from this figure that low priority scores have been given to the Strategic Trips packages. Whilst stakeholders recognised the importance of the dealing with issues affecting strategic trips, higher priority has been given to other transport corridors within the study area. In many cases, improvements on these other transport corridors will benefit strategic trips.

3 Conclusion

The table overleaf shows that the average score received by each Transport Planning Objective (TPO). In general, the packages scored positively against the TPOs. Four packages receive positive scores for all elements of the TPO; all being seen as slightly or moderately contributing towards the TPO. These packages were:

- Package 2: Flint/Mold – Chester: Making Best Use
- Package 3: Flint/Mold – Chester: Capacity Enhancements
- Package 5: Wrexham – Deeside: Capacity Enhancements
- Package 7: Chester – Wrexham: Capacity Enhancements

Package 1: Managing Demand: Area Wide slightly contributes to all bar four of the TPOs with the package being seen to neither contribute nor detract from business transport connections, national and regional trips, safety and security and social deprivation.

Package 2: Flint/Mold – Chester: Making Best Use slightly contributes to all of the TPOs

Package 3: Flint/Mold – Chester: Capacity Enhancements slightly contributes to all of the TPOs

Package 4: Wrexham – Deeside: Making Best Use slightly contributes to all bar one of the TPOs with the package being seen to neither contribute nor detract from national and regional trips.

Package 5: Wrexham – Deeside: Capacity Enhancements slightly contributes to all of the TPOs

Package 6: Chester – Wrexham: Making Best Use slightly contributes to all bar three of the TPOs with the package being seen to neither contribute nor detract from national and regional trips, safety and security and social deprivation.

Package 7: Chester – Wrexham: Capacity Enhancements slightly contributes to all bar four of the TPOs with the package being seen to moderately contribute towards the four economy TPOs.

Package 8: Strategic Trips: Making Best Use slightly contributes to the four economy TPOs with the package being seen to neither contribute nor detract from the social and environmental TPOs.

Package 9: Strategic Trips: Capacity Enhancements moderately contributes towards the economy TPOs, slightly contributes towards the social TPOs and neither contributes nor detracts from the environment TPOs.

The scores from the package prioritisation exercise indicate that Package 5 has the lowest priority of being taken forward. Packages 7, 3 and 6 are seen as being important to take forward. These measures were not seen to be able to solve the issues of the study area in their own right with a hybrid of elements being required.

Stakeholders recognised the importance of the dealing with issues affecting strategic trips and the potential impact of strategic trip packages. This is reflected in the scores against the TPOs. The lower priority scores for the strategic trips packages, shown in Figure 10, is an indication of the financial affordability and deliverability of these packages.

NEWABTS – Average Scores from Stakeholder Consultation Event

Transport Planning Objective			Package 1	Flint / Mold – Chester		Wrexham – Deeside		Chester – Wrexham		Strategic Trips	
				Package 2	Package 3	Package 4	Package 5	Package 6	Package 7	Package 8	Package 9
Economy	**Business Transport Connections**	*To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*	0	+	+	+	+	+	++	+	++
	Travel to Work	*To improve access between **employment sites** and **workforce** catchment areas.*	+	+	+	+	+	+	++	+	++
	National & Regional Trips	*To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*	0	+	+	0	+	0	++	+	++
	Efficient Use	*To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*	+	+	+	+	+	+	++	+	++
Social	**Safety and Security**	*To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*	0	+	+	+	+	0	+	0	+
	Social Deprivation	*To reduce **social deprivation** through improved **access to jobs** and other **key services**.*	0	+	+	+	+	0	+	0	+
Environment	**Carbon Emissions**	*To **reduce carbon emissions** from transport in the study area.*	+	+	+	+	+	+	+	0	+
	Natural Environment	*To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*	+	+	+	+	+	+	+	0	0
	Human Environment	*To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*	+	+	+	+	+	+	+	0	0

Annex A – Attendance List

Organisation Name	# of delegates invited	# attended NEWABTS
Welsh Government	12	3
Arriva Trains Wales	1	2
Cheshire West and Chester Council	5	2
Flintshire County Council	5	2
Wrexham County Borough Council	6	2
Environment Agency Wales	2	1
North Wales Police Force	2	1
North Wales Trunk Road Agency	3	1
Regional Ambulance Officer	2	1
Sustrans	1	1
Taith	2	1
Highways Agency	3	0
Arriva Bus Cwmru	2	0
Betsi Cadwaladr University Health Board	1	0
Cable & Wireless Communications	1	0
Cadw	2	0
CBI Wales	1	0
CCW	2	0
Chamber of Commerce	1	0
Dee Valley Water Plc	1	0
Disability Wales	1	0
English Heritage	2	0
Environment Agency	1	0
Federation of Small Businesses - North Wales & Chester	1	0
First PMT Ltd	1	0
Freight Transport Association	1	0
GHA Coaches	1	0
Mersey Dee Alliance	1	0
Merseyrail	1	0
Merseytravel	1	0
National Public Health Service Wales	1	0
Natural England	2	0
Network Rail	1	0
North Wales Coach Operators Association	1	0
North Wales Fire and Rescue Service	1	0
North Wales Resources Centre for Disabled People	1	0
Road Haulage Association	2	0
Routes Data Research	1	0
Royal Mail	1	0
Tourism Partnership North Wales	1	0
Virgin Trains	1	0
Wrexham Hackney Carriage Association	1	0
Wrexham Private Hire Forum	1	0

Annex B: Presentation Slides

North East Wales Area Based Transport Study (NEWABTS)

Craig Bell

29th November 2010

Taith

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

AECOM

Introductions & Agenda for the afternoon

Carol Willgoose and Michael Whittaker, Taith

- Health & Safety

- Introductions and Thank you

Introductions

- Craig Bell (Project Manager)



- Maurice Houkes (Assistant Project Manager)



- Fiona Lever, Suki Moreno & Sonya Courtney (Consultation Facilitators)







- Jane Knowles (Environment)



Objectives of Today

- Update on Progress of Study to date
- Explain Transport Planning Objectives
- Discuss Option Packages and get your views
- Scoring of Option Packages against Transport Planning Objectives
- Explain what happens next

Agenda for the afternoon

North East Wales Area Based Transport Study (NEWABTS)	12:45-13:15	Registration (PM attendees only)
	13:15-13:45	NEWABTS Presentation
	13:45-15:50	Group discussions
	15:50-16:00	Q & A
	16:00	Close & Refreshments

Contents of Presentation

- Overview of Studies
- Progress to date
- Transport Planning Objectives
- Development of Option Packages
- Group Discussion Format
- Next steps

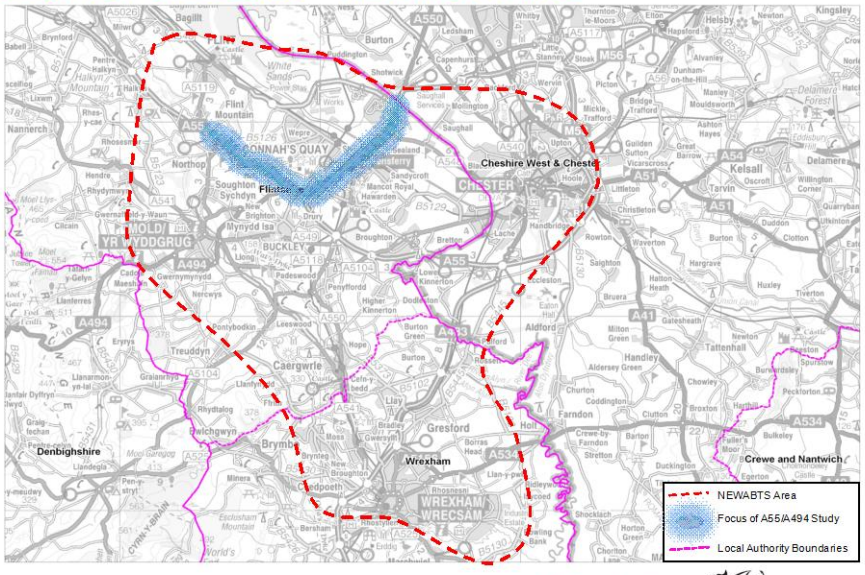
Overview of Studies

Overview of Studies

North East Wales Area Based Transport Study

- National Transport Plan Commitment
- Establish a transport strategy for North East Wales
- Concentrate on problems relating to access between key settlements
- Identify transport issues which impact on trips to/from and through the study area.
- Links with English authorities and cross border issues.

Overview of Studies – NEWABTS Area

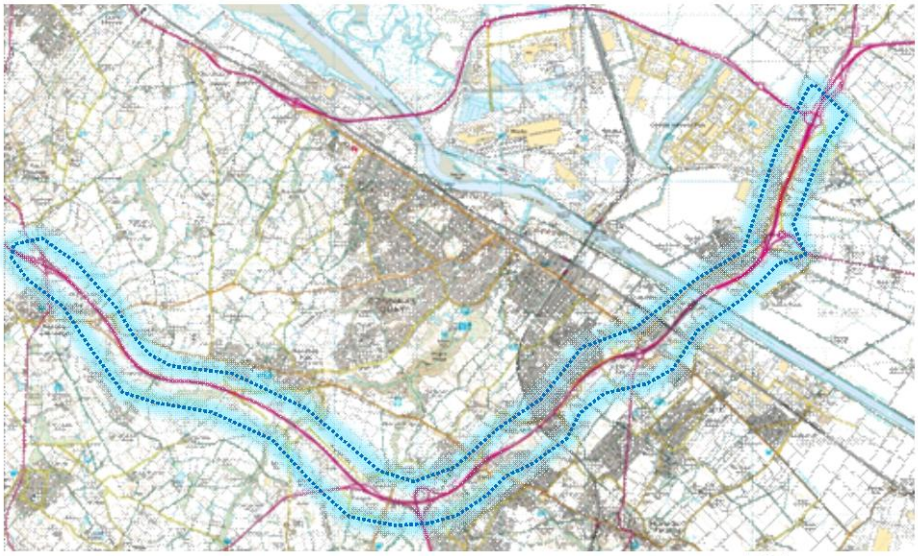


Overview of Studies

A55 A494 WelTAG Study

- Long history of proposals on A55 / A494 Trunk Road.
- A number of highway improvements schemes on the A494 corridor have already been implemented
- Ewloe to Drome Corner Public Inquiry decision (February 2008)
- Assembly Government have decided to look afresh at the corridor.

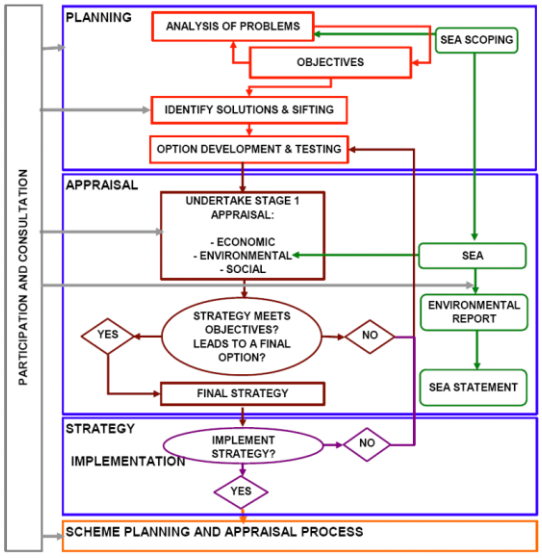
Overview of Studies - Focus of the A55/A494 Study



Progress to Date

Welsh Transport Planning and Appraisal Guidance – (WelTAG)

WelTAG strategy level





Transport Planning Objectives

- Based on review of problems identified during Planning Stage
- Consistent with Wales Transport Strategy Strategic Priorities
- Consistent with Taith Regional Transport Plan Objectives

Transport Planning Objectives - Economy

- **Business Transport Connections**: *To improve **transport connections for businesses** within the study area to key economic centres and employment sites.*
- **Travel to Work**: *To improve access between **employment sites** and **workforce** catchment areas.*
- **National & Regional Trips**: *To ensure that the study area transport network facilitates necessary **national** and **regional trip movements** of people and freight.*
- **Efficient Use**: *To **maintain** and make more **efficient use** of the existing transport infrastructure in the study area.*

Transport Planning Objectives - Social

- **Safety and Security**: *To improve the actual and perceived **safety** and **personal security** of all transport users in the study area.*
- **Social Deprivation**: *To reduce **social deprivation** through improved **access to jobs** and other **key services**.*

Transport Planning Objectives

- **Carbon Emissions**: *To **reduce carbon emissions** from transport in the study area.*

- **Natural Environment**: *To **minimise adverse impacts** on the **natural environment** including local air quality, water and soil pollution, and biodiversity impacts.*

- **Human Environment**: *To **minimise adverse impacts** on the **human environment** including air, noise and light pollution, and landscape and townscape.*

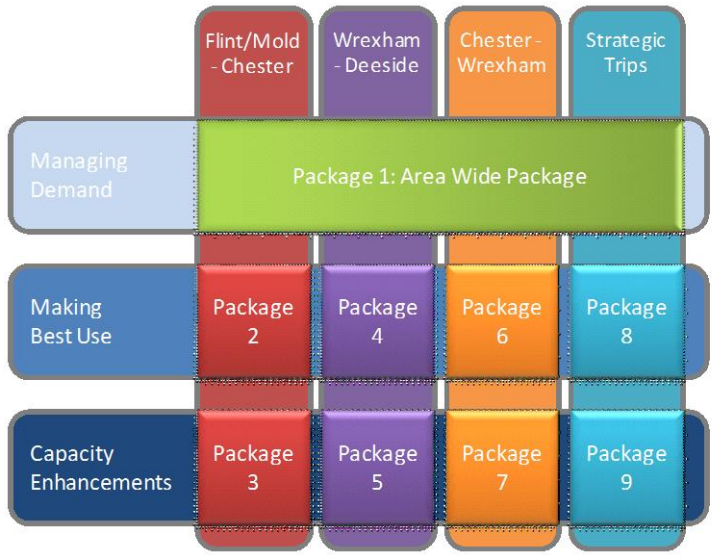
Development of Option Packages

Development of Option Packages

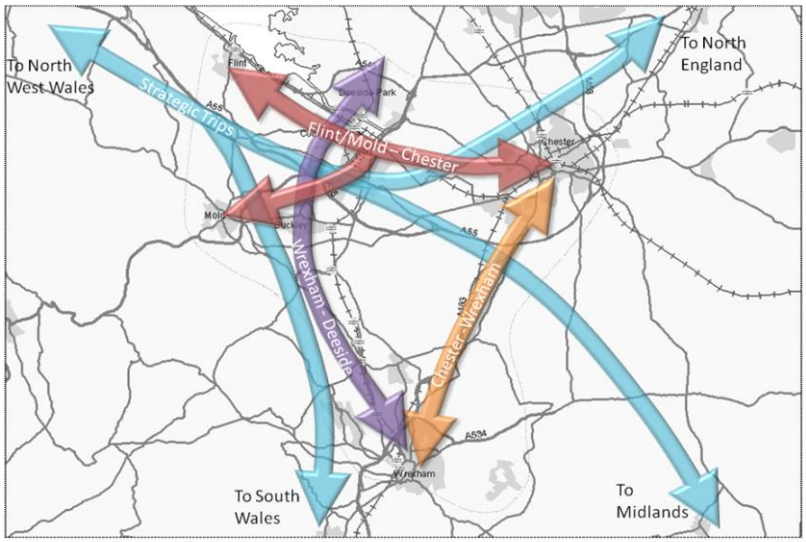
Options combined into Packages for Appraisal

- **Managing Demand**: options which aim to reduce the demand for travel.
- **Making Best Use:** options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.
- **Capacity Enhancements:** options involving the provision of new infrastructure and significant service enhancements

Development of Option Packages



Development of Option Packages



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Group Discussion Format

Group Discussion Format

- Discussion of each Option Package to gain your views

- Scoring of each Option Package against Transport Planning Objectives

Stage 1 Appraisal

Stage 1 Appraisal

WelTAG Stage 1 Appraisal includes:

- Economic Assessment
- Environmental Assessment including SEA
- Social Impact and Health Impact Assessment
- Technical & Operational Feasibility
- Financial Affordability, Deliverability & Risk
- Assessment against Transport Planning Objectives
- Stakeholder Acceptability

Next Steps

- Study will identify package of measures for each corridor
- Identify the relevant delivery agency for taking forward elements of packages
- Delivery agencies to determine priorities for advancing strategy in partnership with other agencies
- Further work needed to develop individual elements of the strategy
- Delivery agencies take forward prioritised interventions subject to availability of funding

Thank You

Group Discussions

Taith

Llywodraeth Cymru
Welsh Assembly Government

AECOM

Annex C: Invitation Letter

29 October 2010

Our Ref: 60155158/60155160-2

Dear
North East Wales Transport Studies
(A55 A494 WelTAG Study and North East Wales Area Based Transport Study)

AECOM has been commissioned by the Welsh Government and Taith to undertake the North East Wales Area Based Transport Study (NEWABTS) and by the Welsh Government to undertake in parallel the A55/A494 Transport Study. A map showing the focus of the A55/A494 study is enclosed.

The Planning Stage of both studies is now complete. A list of proposed packages for both NEWABTS and the A55/A494 Study include:

1. Managing Demand: options which aim to reduce the demand for travel.
2. Making Best Use: options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.
3. Capacity Enhancements options involving the provision of new infrastructure.

As part of Stage 1 we would like to invite you to attend a further stakeholder consultation event where we will update you on progress and discuss each of the proposed packages, to determine how well they meet objectives, to discuss which options within a package are most important and to help determine the preferred package for the study area.

Stakeholders are anticipated to have an interest in both studies and both events are planned for Monday 29th November 2010 at St David's Park Hotel, Ewloe. Delegates are free to attend either event or both. The A55/A494 event will take place in the morning with NEWABTS being discussed in the afternoon. Each event will follow a similar format beginning with a presentation about the study followed by group discussions. Each event is expected to last around three hours and lunch will be provided. A copy of the Agenda for the day is enclosed along with venue details. Please complete the tear off slip below and either fax, scan, phone or e-mail confirmation to Suki Moreno at AECOM by Friday 19th November 2010.

If you wish to contribute to these discussions through the medium of Welsh, please tick the appropriate box on the reply slip overleaf so that if appropriate a translator can be arranged. Please let Suki know if you have any special dietary requirements.

I look forward to seeing you.

Yours sincerely,

Fiona Lever
Associate Director
D +44 (0)121 262 1923
E fiona.lever@aecom.com

Enc.

✂ .....

Name from Company will be attending (please tick one box below):

- ❑ **Both** stakeholder events (A55/A494 and NEWABTS)
- ❑ The A55/A494 Stakeholder event (1000-1300)
- ❑ The North East Wales Area Based Transport Study Stakeholder event (1245-1600)
- ❑ Neither event

..... from ..... will be attending in Name's place.

❑ I wish to contribute to this event using the medium of Welsh

Please indicate any special dietary requirements below.

If you are not able to attend but would like to someone else to attend on your behalf, please contact Suki Moreno with their details.

Please return slip by **Friday 19th November 2010** to:

Suki Moreno

AECOM

Beaufort House

94/96 Newhall Street

Birmingham

B3 1PB

Or fax: **0121 262 1999**
'phone: **0121 262 6778**
e-mail: **suki.moreno@aecom.com**

Annex D: Agenda

AGENDA

A55/A494 Transport Study and North East Wales Area Based Transport Study (NEWABTS)

Stakeholder Engagement Event

Monday 29th November 2010

St. David's Park, Ewloe, Nr. Chester, Flintshire, CH5 3YB

A55/A494 Transport Study	09:45-10:00	Registration and refreshments
	10:00-10:30	A55/A494 Presentation
	10:30-12:35	Group discussions
	12:35-12:45	Q & A
	12:45-13:15	Lunch
North East Wales Area Based Transport Study (NEWABTS)	12:45-13:15	Registration (PM attendees only)
	13:15-13:45	NEWABTS Presentation
	13:45-15:50	Group discussions
	15:50-16:00	Q & A
	16:00	Close & Refreshments

Annex E: Discussion Guide

NEWABTS Stage 1 Discussion Guide

Introduction:

13:45 Welcome everyone.

Introduce yourself; explain your role (to keep discussion going, stick to aim) and the member of the steering group explaining their role (to write on the flip chart, answer specific questions)

Establish ground rules –

- Confidentially and anonymity
- listen to and show respect for the opinion of others, all views have equal value
- no criticism without a possible alternative
- only one conversation at a time – direct comments at me rather than between yourselves
- 'phones and pagers off
- Explain the 'park'

Ask each person in the group to **introduce themselves and state who they are representing**. (Write this down according to their position round the table so that you can use people's names).

Following this introduction session we will:

- Discuss the area wide managing demand package
- Discuss the making best use package for each corridor and whether the capacity enhancement package is required
- Score each package against the Transport Planning Objectives for this study
- Prioritise the packages

13:50 Package Overview and prioritisation

Explain that for each of the three corridors there are three packages:

- Managing Demand packages (which are the same for all three corridors),
- Making Best Use
- Capacity Enhancements

These three types of packages also apply to Strategic Trips. The group should be familiar with the nature of these packages and if have any people in your group who didn't attend the morning event, give a brief overview of the nature of the packages – reduce demand, make more efficient use of existing transport facilities and provision of new infrastructure.

State that as Managing Demand covers all three corridors along with strategic trips that we're going to talk about it first. We'll then spend 30 mins talking about the two remaining packages for each corridor and then discuss strategic trips before doing a prioritisation exercise.

13:55 Discuss Package 1 Managing Demand

This package contains a set of "soft" measures applied throughout the study area aimed at reducing the use of unsustainable transport modes by changing people's travel behaviour. This involves funding and support to aid businesses in encouraging sustainable travel, publicity and awareness raising, and strengthening of policies.

- *How well does this package address the issues within the study area?*
- *Which elements would you like to discuss (walking and cycling, freight, other, demand management)*
- *What impact will the package have on the following?:*
    - *economy*
    - *social*
    - *environment*

We're looking to achieve stakeholder acceptability – is the package acceptable to group members; is there anything which is not acceptable to them?

As this package is to be applied to all corridors and strategic trips, is there anything specific to a corridor which needs to be considered?

14:05 Score Package 1
Using the appropriate version of Sheet 2, ask delegates to rate the Package against the Transport Planning objectives for the study (rate whole package, not individual elements). This is to be done on an individual basis, not as a group.

14:05 Discuss the Flint/Mold – Chester corridor

Package 2 Making Best Use - This package contains a set of measures which seek to make more efficient use of existing transport facilities and infrastructure along the corridor between Flint, Mold and Chester (via Deeside or Broughton).

The walking and cycling elements of the package aim to improve safety, security and integration of walking and cycling as well as improved signage.

Bus improvements focus on giving buses priority over general traffic at key junctions and links, such as along the B5129 (ref 44). Also improving integration with rail and using integrated area ticketing and real time passenger information to improve the experience for bus users.

The rail elements of this package focus on improving access to stations and integration with bus services, particularly in Shotton (ref 106).

Finally the highway elements focus on bottlenecks along the existing corridor roads, including the A5104 between Mold and Chester (reference 103 on the map), the B4129 through Connah's Quay (9) and the Alltami signals (8).

- *Does the Making Best Use Package deliver enough to solve the problems of the corridor?*
- *What's good/effective/less effective?*

14:15 Score Package 2
Using the appropriate version of Sheet 2, ask delegates to rate the Making Best Use Package against the Transport Planning objectives for the study (rate whole package, not individual elements). This is to be done on an individual basis, not as a group.

Go round the group to see how well they feel the Making Best Use package addresses the TPOs.
Are any elements of the Capacity Enhancements package required?
Which elements of either of the packages are not required?

Using the appropriate version of Sheet 2, ask delegates to rate the Capacity Enhancements Package against the Transport Planning objectives for the study (rate whole package, not individual elements). This is to be done on an individual basis, not as a group.

14:35 Discuss the Wrexham – Deeside corridor

As 14:05 above

15:05 Discuss the Chester – Wrexham corridor

As 14:05 above

15:35 Discuss the Strategic Trips packages (only got 10 mins for this)

As 14:05 above

15:45: Prioritisation of the three corridors and strategic route packages

Using Sheet 3 ask them to rank the packages in order of preference for taking the package forward. Score 'one' for the package which they most wish to take forward and 'nine' for least like to take forward. Again this is done on an individual basis, not as a group.

15:50 Closing

Thank everyone for their time

NEWABTS Stage 1 Appendix B: Economic Activity and Location Impacts Assessment



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Principal Consultant

Approved by:  .....
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Principal Consultant

NEWABTS Stage 1 Appendix B: Economic Activity and Location Impacts Assessment

Rev No	Comments	Checked by	Approved by	Date
1	Initial Draft	S.L	M.H	26/01/2011
2	Final Report	S.L	M.H	31/05/2012

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Job No 60155160 Reference Date Created May 201

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1. Introduction

1. Introduction

1.1 Introduction

The Welsh Government (WG) and the regional transport consortia for North Wales, TAITH, have commissioned AECOM to undertake a transport study in North East Wales area, focusing on the connectivity between the key settlements of Wrexham, Chester and Deeside (A55/A494 corridor). This study follows the Welsh Transport Planning and Appraisal Guidance (WelTAG). The product of this transport study is a series of strategies for improving the transport provision within the area considering all modes of transport.

This report describes the outcome of the Economic Activity and Location Impacts (EALI) Stage 1 assessment, carried out for the options identified within the NEWABTS WelTAG.

This assessment has been carried out in line with EALI principles described within the Welsh Transport Planning and Appraisal Guidance (WelTAG) section 6.3 and supporting Technical Guidance Appendix D.

The principle of this assessment is to identify the potential economic locational responses generated by the proposed transport interventions.

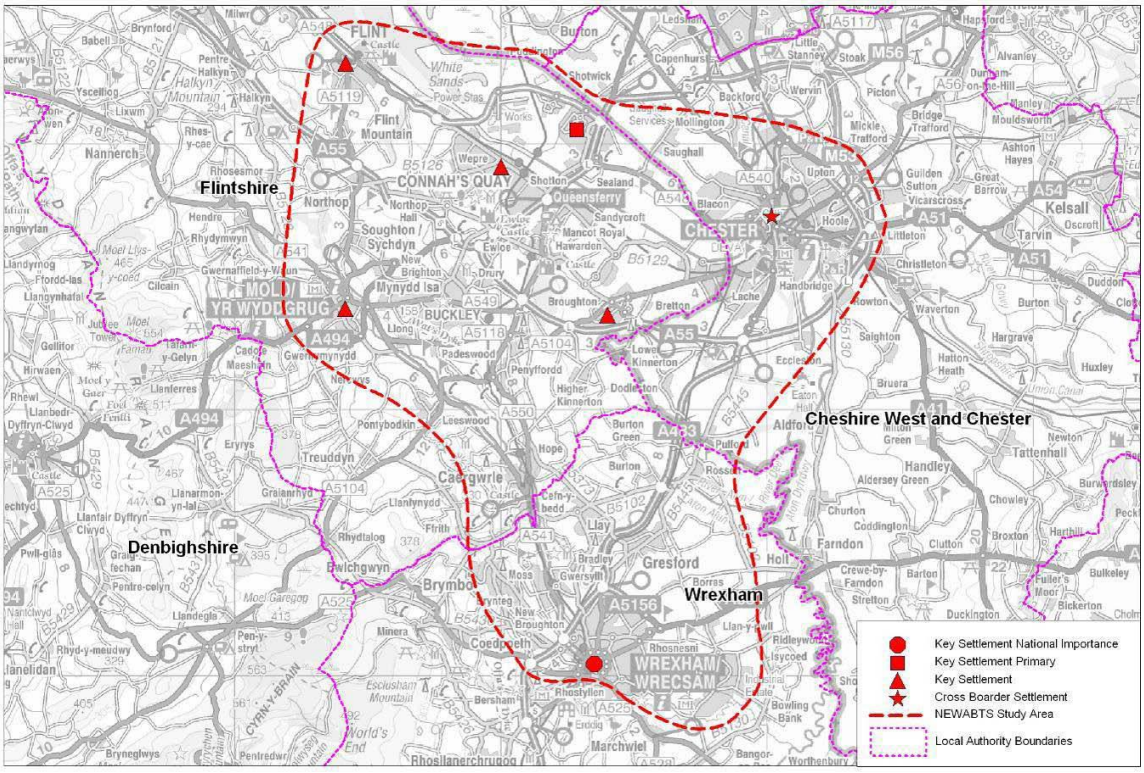
1.2 EALI Assessment Approach

The approach to this EALI assessment has been tailored to the NEWABTS Stage 1. Unlike standard transport assessments, this study is designed to identify a series of transport option packages, rather than a single scheme. Therefore, an assessment framework has been established to compare the potential economic impacts of the option and packages, using a standard method of comparison. The focus of this assessment is to evaluate the potential impacts on the level of income (Gross Value Added, GVA), employment and inward investment within the study area, in line with WelTAG guidance for a Stage 1 assessment. At this early stage the impact assessment provides only outline analysis of potential impacts. A more detailed assessment would be carried out as individual schemes are taken forward. Chapter 2 contains further details regarding this assessment framework.

1.3 NEWABTS Study Area

The NEWABTS area is shown below in Figure 1.1

Figure 1.1: The NEWABTS area.

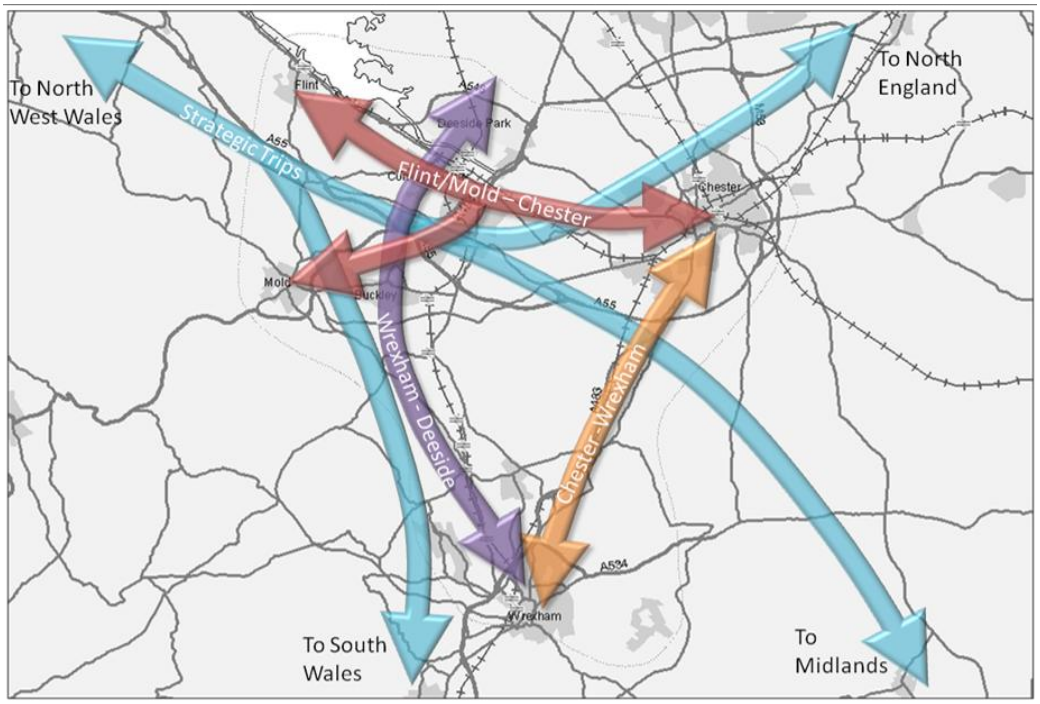


The transport study option

packages identified within the WelTAG planning stage have been divided into 4 classifications, based on the nature of travel (strategic or corridor based), as listed below and shown in Figure 1.2.

1. Strategic – trips travelling strategically through the study area between Wales and England
2. Flint/Mold- Deeside-Chester – corridor trips travelling between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Estate or Buckley and Broughton.
3. Wrexham-Deeside – corridor trips travelling between Wrexham and Deeside, via Mold and Buckley
4. Chester-Wrexham – corridor trips travelling between Chester and Wrexham

Figure 1.2: NEWABTS Corridors



Based on the high level nature of this EALI assessment and the geographical arrangement of the study area the following broad locations are considered within this study:

- Flintshire
- Cheshire West
- Chester City
- Wrexham
- Deeside (A55/A494 Corridor) including;
- Broughton
- Buckley
- Connah's Quay
- Ewole
- Flint
- Mold
- Northop
- Shotton
- Queensferry
- Deeside Industrial Estate

The focus of this study is to consider the potential general economic responses within the study area and identified corridors. Within the assessment reference is made to specific locations within certain corridors such as Penyffordd in the Wrexham to Deeside corridor and Gresford in the Wrexham to Chester corridor.

1.4 Option Overview

The successful options identified within the WelTAG Planning Stage have been divided into three distinct levels as described below;

1. **Managing Demand:** Options which aim to reduce the demand for travel.

   One area wide option package identified.

2. **Making Best Use:** Options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

   Four option packages identified 1 strategic trip package and 1 package per identified local corridor (Flint/Mold-Chester, Wrexham-Deeside and Chester – Wrexham).

3. **Capacity Enhancements:** Options involving the provision of new infrastructure and significant service enhancements

   Four option packages identified, 1 strategic trip package, 1 package per identified local corridor (Flint/Mold-Chester, Wrexham-Deeside and Chester – Wrexham).

The EALI assessment has been carried out for the nine option packages identified for the WelTAG Stage 1, as shown in Table 1.1 below;

Table 1.1: Potential NEWABTS option packages

Area wide package	1. Managing Demand
Flint / Mold – Chester (via Deeside / Broughton)	2. Making Best Use
	3. Capacity Enhancements
Wrexham – Deeside (via Mold / Buckley)	4. Making Best Use
	5. Capacity Enhancements
Chester - Wrexham	6. Making Best Use
	7. Capacity Enhancements
Strategic Trips	8. Making Best Use
	9. Capacity Enhancements

1.5 Transport Constraints

The WelTAG Planning Stage Report identified a series of transportation problems within the NEWABTS area as perceived by stakeholders and officers as part of a consultation exercise.

The following key transport problems have been identified as constraints to the level of economic activity within the NEWABTS area.

Flint/Mold-Chester Corridor

Perceived/Actual issues influencing the level of accessibility and productivity for strategic and local traffic within the corridor:

- Congestion occurs on the on the B54441 through Connah's Quay, Shotton and Queensferry during peak periods in the day – delaying cars and buses.
- The A548 section through Flint represents a key congestion pinch point along this route.
- Local trips reroute onto the strategic network to overcome localised congestion problems.
- Public transport cannot compete with private car travel, due to the cost of fares and the prevalence of free parking.
- The Alltami signalised junction constricts traffic flow along the A494 between Mold and the A55.

Wrexham-Deeside

Perceived/Actual issues influencing the level of accessibility and productivity for strategic and local traffic within the corridor:

- The section of the A550 through Hope acts as a bottleneck along this route.

- Road traffic travelling between the A55 and Wrexham is signed to use the A550/A541 route causing additional demands on this corridor.
- The Wrexham- Bidston rail service is too infrequent to encourage use by commuters and parking facilities at the stations are insufficient to promote park and ride.
- Local rail stations are not well located for local demands e.g. Deeside Industrial Estate and Broughton.
- Bus services between Wrexham and Deeside are infrequent with a requirement for bus interchange in Wrexham when travelling from outer Wrexham to Deeside.

Chester-Wrexham

Perceived/Actual issues influencing the level of accessibility and productivity for strategic and local traffic within the corridor:

- The A55/A483 junction acts as a significant pinch point for trips by car or bus between Chester and Wrexham.
- Northbound congestion on B5445 at junction with A483 near Chester.

Strategic Trips

Perceived/Actual issues influencing the level of accessibility and productivity for strategic and local traffic within the NEWABTS area included:

- Congestion occurring along the trunk road network at peak periods and during the summers seasonally high flows.
- Congestion at peak times on the A55 Chester Southern bypass.
- Congestion at the A483 junctions to the west of Wrexham.
- The A55/A483 junction acting as significant pinch point for strategic trips between the midlands and the study area.
- Strategic road traffic travelling between North Wales and North England is signed to use the A494 causing additional demands on this route.
- Freight travelling between the Midlands and Northwest Wales is directed through the study area on the A483, causing additional demand on this route.
- HGV traffic platoons from Holyhead port, generating specific localised congestion.
- There is a lack of strategic bus / coach services.

Other Constraints

Perceived/Actual issues influencing the level of accessibility and productivity within the NEWABTS area:

- Interchange between bus and rail is difficult throughout the study area.
- Local bus routes do not cater well for the desires of commuters.
- Lack of train stations in the Connah's Quay area.
- Poor quality interchange between train lines at Shotton train stations.
- Employment opportunities tend to be outside of the urban areas, increasing the need to travel.
- The study area is a net importer of workers, with people coming into the study area from North West England and parts of Wales to the west of the study area. This creates additional pressure on the transport network.

1.6 Structure of the Report

This report is subdivided into the following sections;

Section 2: EALI Assessment Framework Methodology

Section 3: Baseline Economic Conditions (2010)

Section 4: Do-Minimum Economic Forecast (2020)

Section 5: EALI Assessment of Do-Something Option Packages, including assessment conclusions

2. EALI Assessment Framework Methodology

2. EALI Assessment Framework Methodology

2.1 Introduction

This section provides details of the EALI assessment framework established and applied for the NEWABTS. The framework structure is intended to allow each of the packages to be evaluated through a consistent methodology.

2.2 Assessment Framework Methodology

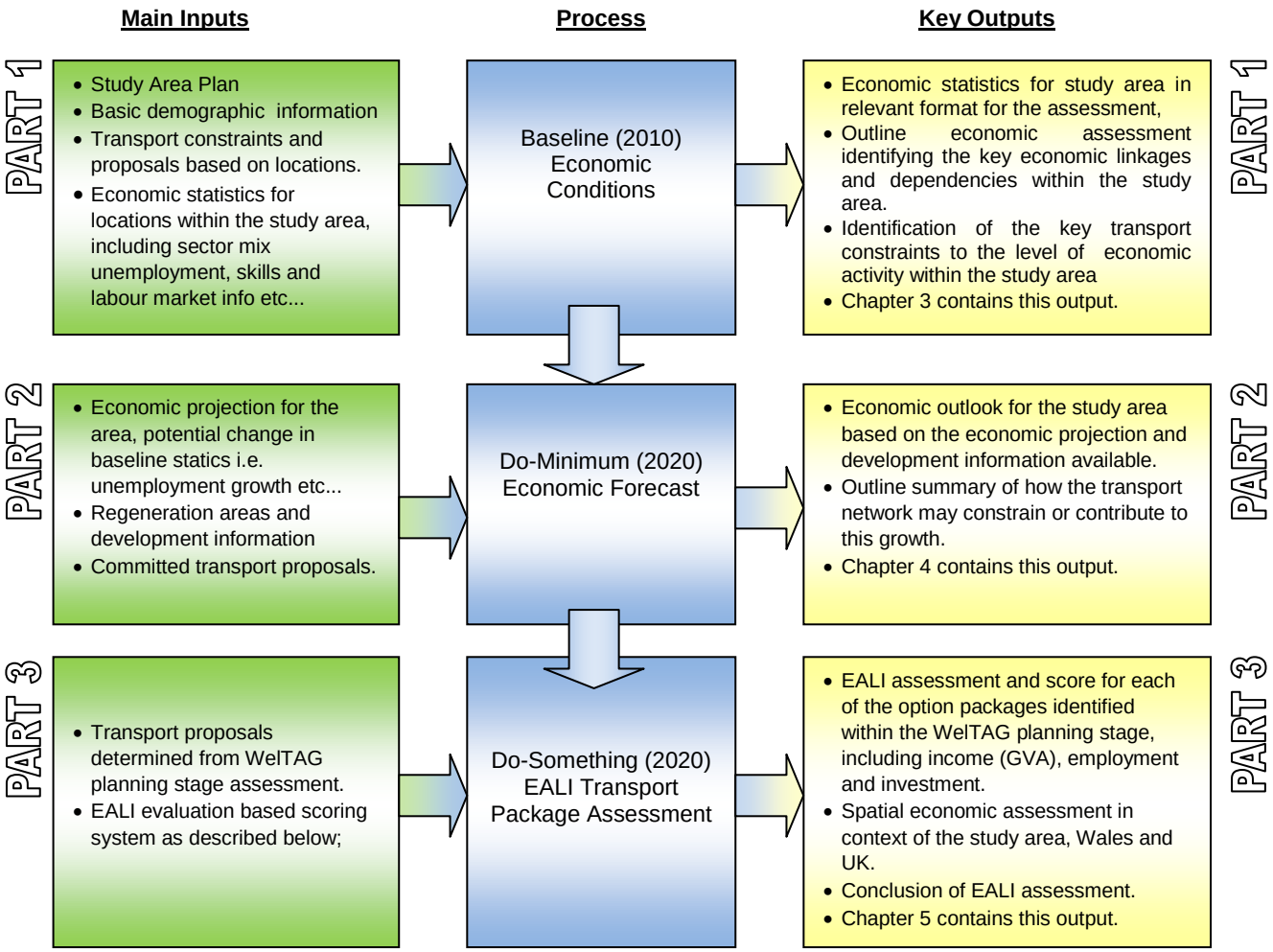
The applied EALI assessment framework has been split into three distinct parts, as listed below;

- Part 1 – Baseline Economic Conditions
- Part 2 – Do-Minimum (2020) Economic Forecast
- Part 3 – Do-Something (2020) EALI Transport Package Assessment

The objective of the assessment framework is to develop a clear understanding of how the study area economy is likely to operate over time (2010-2020) based on the transport constraints identified within the WelTAG planning stage assessment. The EALI assessment considers the economic responses to mitigating these identified transport constraints.

Figure 2.1 below outlines the structure and stages involved within the EALI assessment framework.

Figure 2:1 EALI Framework Structure



2.3 EALI Assessment Scoring

Within the EALI WelTAG assessment guidance there is a requirement to quantify the potential economic income GVA and employment impacts generated by the proposed transport interventions, considering both *Additionality* and *Displacement* responses.

Additionality – represents the added value impact which is due solely to the transport proposal

Displacement – is the process whereby the positive impacts for some economic actors are offset by the negative impacts on others

The net impact, particularly at Wales level, is often very small or even zero, as the positive and negative impacts, offset each other.

The objective of this assessment is to evaluate the potential economic impacts of the packages in a consistent format, however based on the volume of options considered within the WelTAG Stage 1 study, the precise economic return in GVA and jobs cannot be quantified, particularly at a sector level. Therefore, based on the EALI principles, the following assessment scoring system has been established to provide a comparative format for the assessment based on the general economic impact of the proposals, as shown within Table 2.1 below.

Table 2.1: EALI Assessment Scores

Score	Impact	GVA Income Impact Description	Jobs Impact Description	Economic Locational Reponses
3	High	> 1% Increase	25+ Jobs Created	Package stimulates existing economy and attracts additional investment to the location by alleviating transport constraints or providing new facilities.
2	Medium	0.25%-1% Increase	5-25 Jobs Created	Package facilitates the existing economy within the location by mitigating transport constraints through upgrading of facilities.
1	Low	0-0.25% Increase	1-5 Jobs Created	Package stimulates a minor response in the economy by partially mitigating the transport constraints on the local economy.
0	Neutral	No Impact	No Impact	No Economic Impact
-1	Low	0-0.25% Reduction	1-5 Jobs Lost	Package results in minor reduction and displacement of employment from the location.
-2	Medium	0.25-1% Reduction	5-25 Jobs Lost	Package results in reduction and displacement of employment.
-3	High	>1% Reduction	25+ Jobs Lost	Package results in reduction and displacement of employment from the location, with investment being attracted somewhere else.

* Based on national statistics the average increase in GVA per annum in England and Wales from 2000-2007 is 3%, the above GVA values have been tailored to a realistic return based on a transport proposal in the context of these national figures.

2.4 Presentation of Assessment

The EALI assessment is presented in a set structure per package, in order to provide a comparative format. The objective of this analysis is to consider the economic impact of the package as a whole, rather than individual measures.

The analysis is subdivided into the following items;

1. Package options.
2. Key economic options.
3. Package locational GVA impacts (Thematically Mapped).
4. Package location employment impacts (Thematically Mapped).
5. Package stimulated inward investment and contribution to delivery of Regional Development Plans.
6. Summary, including the spatial economic impact of the scheme at Wales and UK levels.

3. Baseline Economic Conditions (2010)

3 Baseline Economic Conditions (2010)

3.1 Introduction

This section of the report is intended to identify the current (2010) economic conditions within the NEWABTS area. The objective of this analysis is to develop a picture of how the current economy operates within the existing infrastructure. This forms an economic baseline for the study area from which the potential economic impacts of transport mitigation option packages can be determined. This analysis provides a high level overview of the NEWABTS area, covering Cheshire West & Chester City, Wrexham, Flintshire and the A55/A494 corridor.

This section contains the following baseline data; population density, employment/unemployment levels, skills, employment sector mix, average weekly wages, journey to work information and economic connectivity.

3.2 Census Information

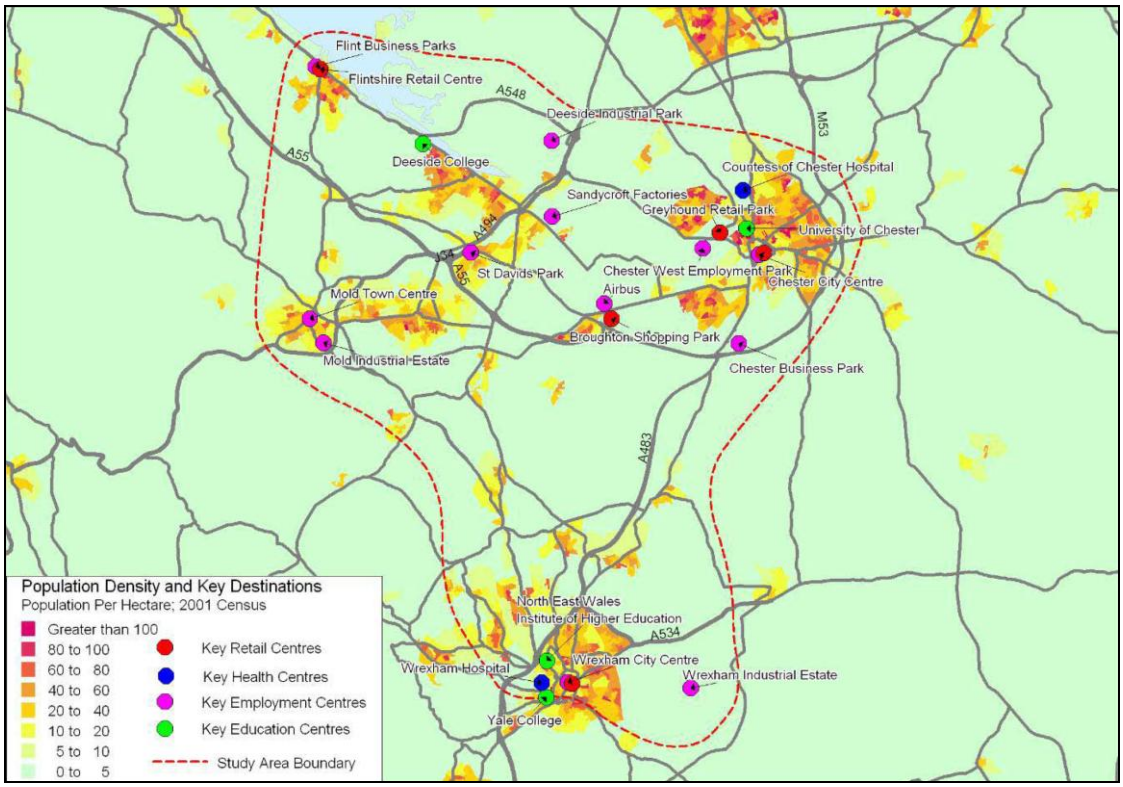
3.2.1 Population Density and Key Destinations within NEWABTS Area

Figure 3.1 below represents the population density within the NEWABTS area in relation to key economic centres such as employment centres. This analysis demonstrates that Chester City and Wrexham Town represent typical centralised population centres, which are surrounded by outlying commuter villages. Chester City represents the peak population centre within the NEWABTS area.

Flintshire, as a County, is unlike neighbouring locations such as Chester and Wrexham as it has no single population centre. The population is focused within the central and eastern parts of the County such as Mold, Buckley, Broughton and Queensferry (Deeside) & Flint.

A key consideration from this analysis is the distance between population centres and major employment centres as characterised by the relatively remote locations of the Chester Business Park and Deeside & Wrexham Industrial Estates.

Figure 3.1: Population Density and Key Destinations within Study Area



3.2.2 Population Information (2001 Census)

Figure 3.2 below shows the resident population totals and working population levels within NEWABTS area for the key areas considered within this assessment.

This analysis identifies Cheshire West & Chester as the location with the largest population within the study area. Chester City represents the main population centre within the area boundary, which equates to 40% of the total population of Cheshire West & Chester. The remaining population is distributed throughout the County, principally within Ellesmere Port, Northwich, Neston and Winsford, whereas the population of Wrexham is concentrated within Wrexham Town.

The population of Flintshire is distributed throughout the County, as the district has no defined centre. The majority of the County's population is located within the central and eastern parts of the County, particularly the A55/A494 corridor locations with 55% of the population distributed within urban areas of Broughton, Buckley, Connah's Quay, Ewloe, Mold, Northop, Queensferry and Shotton. Connah's Quay represents the peak population location within Flintshire at 11% of the total County population.

Figure 3.2: Population and Working Population within NEWABTS Area

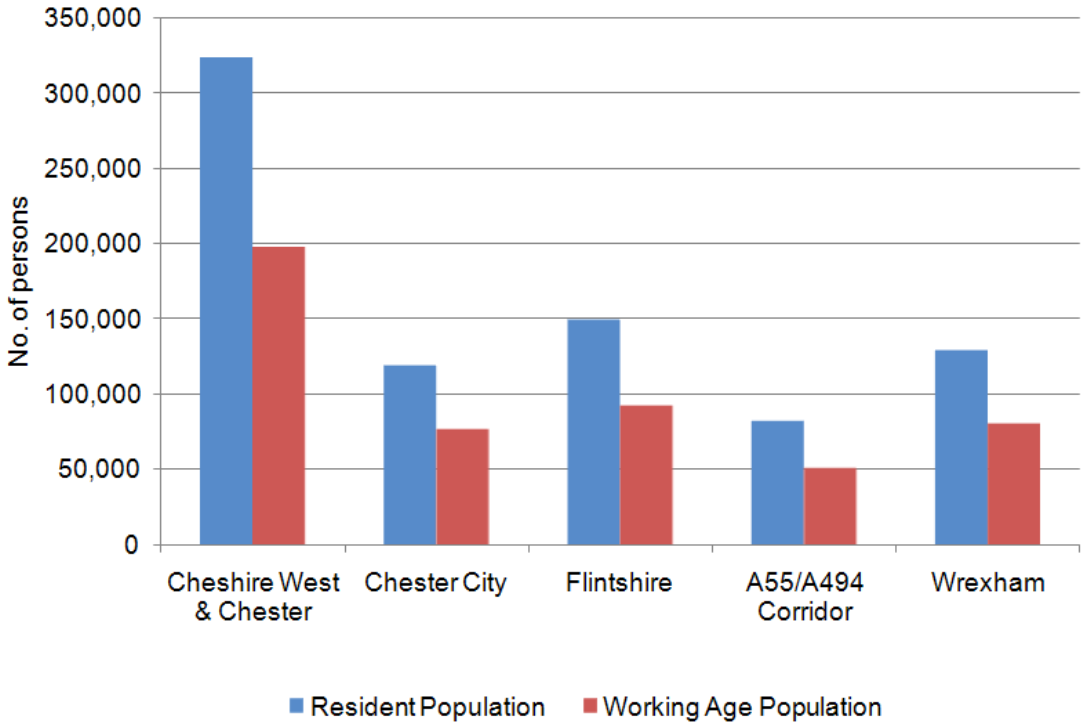
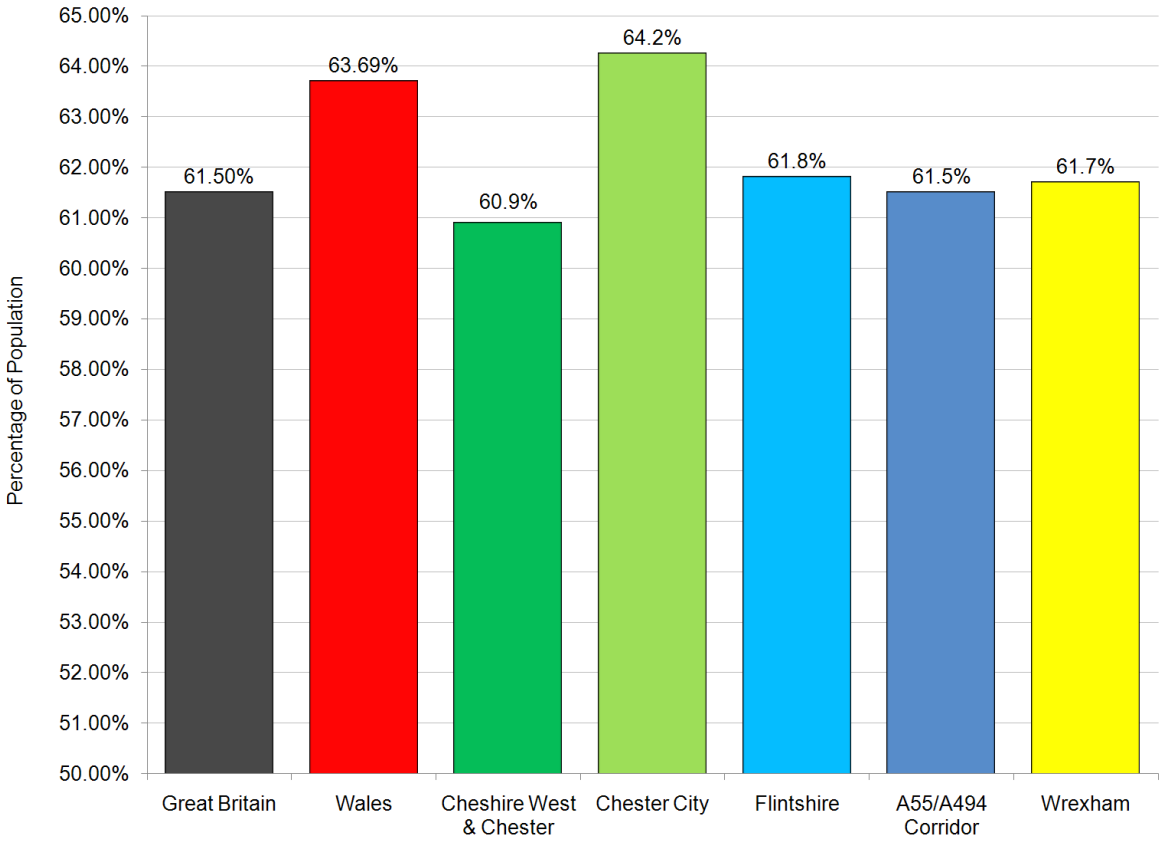


Figure 3.3 below shows the percentage working population levels nationally and within NEWABTS area.

This analysis identifies that the percentage working population within Flintshire, Wrexham and the A55/A494 corridor, are in line with average Great Britain levels, however each percentage is lower than the level for Wales, indicating a locally higher proportion of non-working age population within North East Wales.

Cheshire West and Chester as a County has a lower percentage of working age population in comparison to national levels, however Chester City alone contains a higher proportion working age population than both Great Britain and Wales levels, indicating that the working age population within Cheshire West and Chester is centralised within the City.

Figure 3.3: Percentage Working Population Nationally and within NEWABTS Area (Source: 2001 Census)



* Great Britain data excludes Scotland

3.3 Economic Information

This section provides a summary of baseline economic analysis for the NEWABTS area including; employment/unemployment levels, employment density, employment sector mix, qualifications, income and vacancies. The information is focused on the NEWABTS area and is presented by assessment regions of Cheshire, Flintshire and Wrexham, however where possible a comparison has been made against national Great Britain and Wales levels. Unless otherwise stated the analysis is based on 2001 Census information.

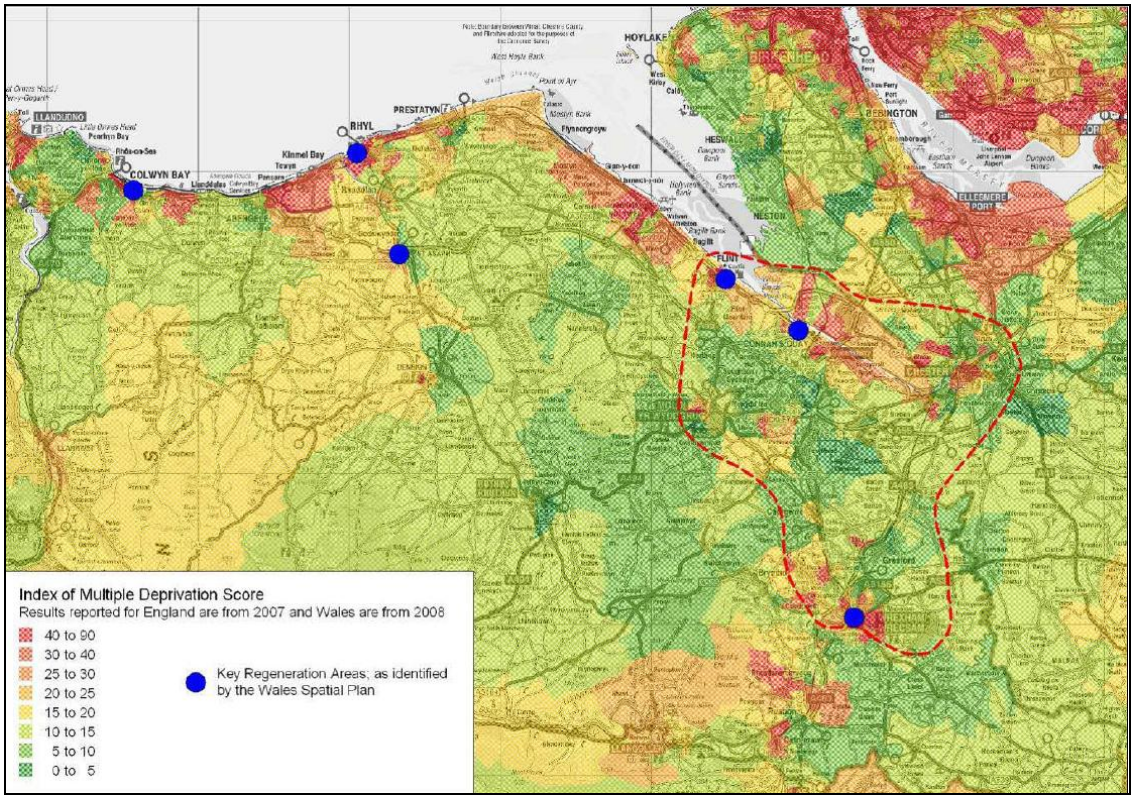
3.3.1 Deprivation

Figure 3.4 below shows the Index of Multiple Deprivation Score (IMD) for the NEWABTS area. This score is determined through the combination of a number of different socio-economic indicators of deprivation including transport deprivation as characterised by poor access to public transport services.

Transportation plays a key role in stimulating the level of economic activity within an area by providing accessibility between labour market locations and employment centres and increasing productivity, through reduced transport costs. Based on this deprivation analysis key economic responses are anticipated to be delivered by options which directly provide accessibility benefits to the key deprivation locations identified.

Within the study area deprivation is located within the certain parts of main urban centres of Chester, Wrexham and within specific locations along the Dee Estuary including Connah's Quay.

Figure 3.4: Level of Deprivation within NEWABTS Area



The Wales spatial strategy 2008 focuses on improving the wellbeing of communities through social, physical and economic improvements. For North East Wales, identified regeneration settlements include communities within Wrexham County Borough (such as Plas Madoc, Queensway, Caia Park and Gwenfro), communities within Flintshire (such as Flint, Holywell, Mold, Shotton, Mostyn, Ffynnongroyw and Gronant) and in Conwy and Denbighshire, the coastal towns of Colwyn Bay and Rhyl.

Key regeneration areas identified within the NEWABTS area in Figure 3.4 include:

- Flint
- Connah's Quay to Shotton Masterplan
- Wrexham Bridge Street Regeneration

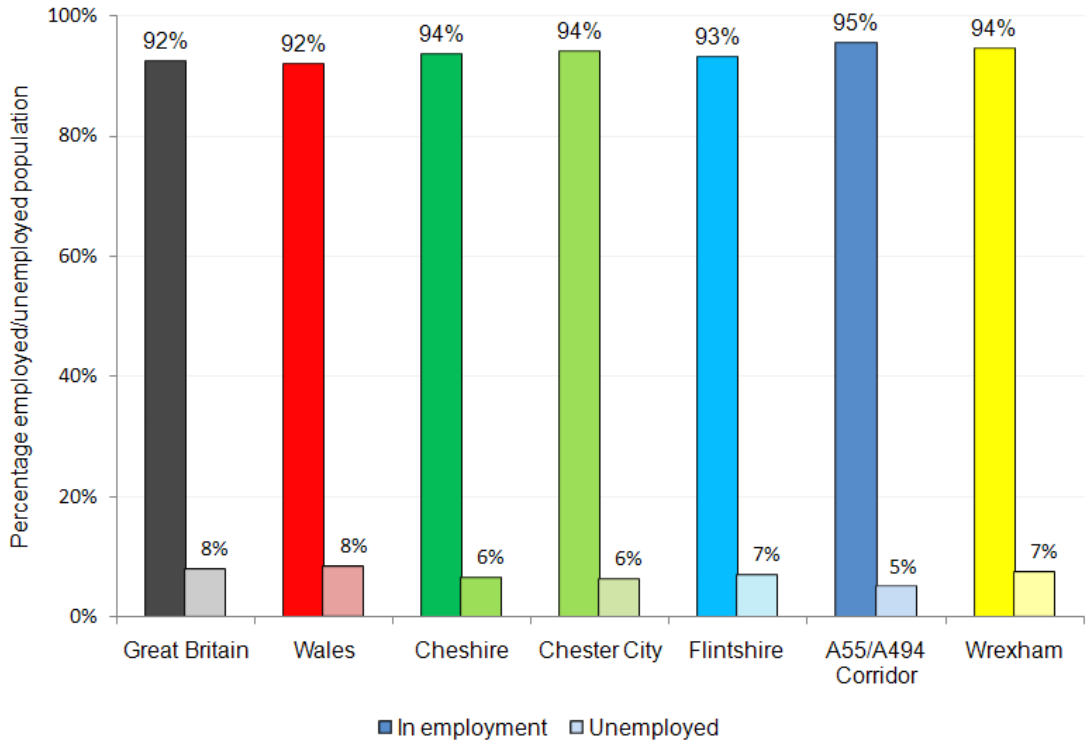
3.3.2 Economically Active Population Employed and Unemployed

Figure 3.5 below shows the percentage economically active employed and unemployed population nationally and within the NEWABTS area.

This analysis indicates that Great Britain and Wales experience similar levels of employment and unemployment. Within the NEWABTS area the average level of employment is greater than national levels, indicating a higher level of economically active population within the region.

Cheshire, Flintshire and Wrexham all retain a similar proportion of economically active employed population. The A55/A494 corridor locations represent the lowest ratio of unemployed to employed economically active population.

Figure 3.5: Percentage of Economically Active Population Employed and Unemployed within NEWABTS Area



*Great Britian data excludes Scotland

3.3.3 Employment Density

Table 3.1 below provides an employment density comparison between the NEWABTS area and comparative local and national locations. This analysis indicates that Flintshire and Cheshire contain relatively high employment densities, which are in line with national trends and exceed the average employment densities for Wales. Wrexham represents a different picture with an employment density which is significantly lower than Great Britain and Wales levels.

Chester City appears to be the strongest economic centre within the NEWABTS area with an employment density in excess of 1.

Table 3.1: Employment Density (Source: NOMIS 2008)

Employment Density (2008)	Great Britain	Wales	Flintshire	Cheshire	Wrexham County	Chester City
Employment Density	0.79	0.71	0.77	0.82	0.69	1.03
Total Jobs			74,000	360,000	59,000	79,000

3.3.4 Employment Sector Mix

Figure 3.6 below provides an employment sector mix comparison between national levels and within the NEWABTS area, based on the 2001 Census. The information has been presented in relation to Great Britain, with the data being ordered from higher to lower percentage.

At a Great Britain level the following key employment sectors are;

1. Public services; Great Britain 26% and Wales 30%
2. Financial; Great Britain 19% and Wales 13%
3. Wholesale & retail trade; Great Britain 18% and Wales 17%
4. Manufacturing; Great Britain 16% and Wales 19%

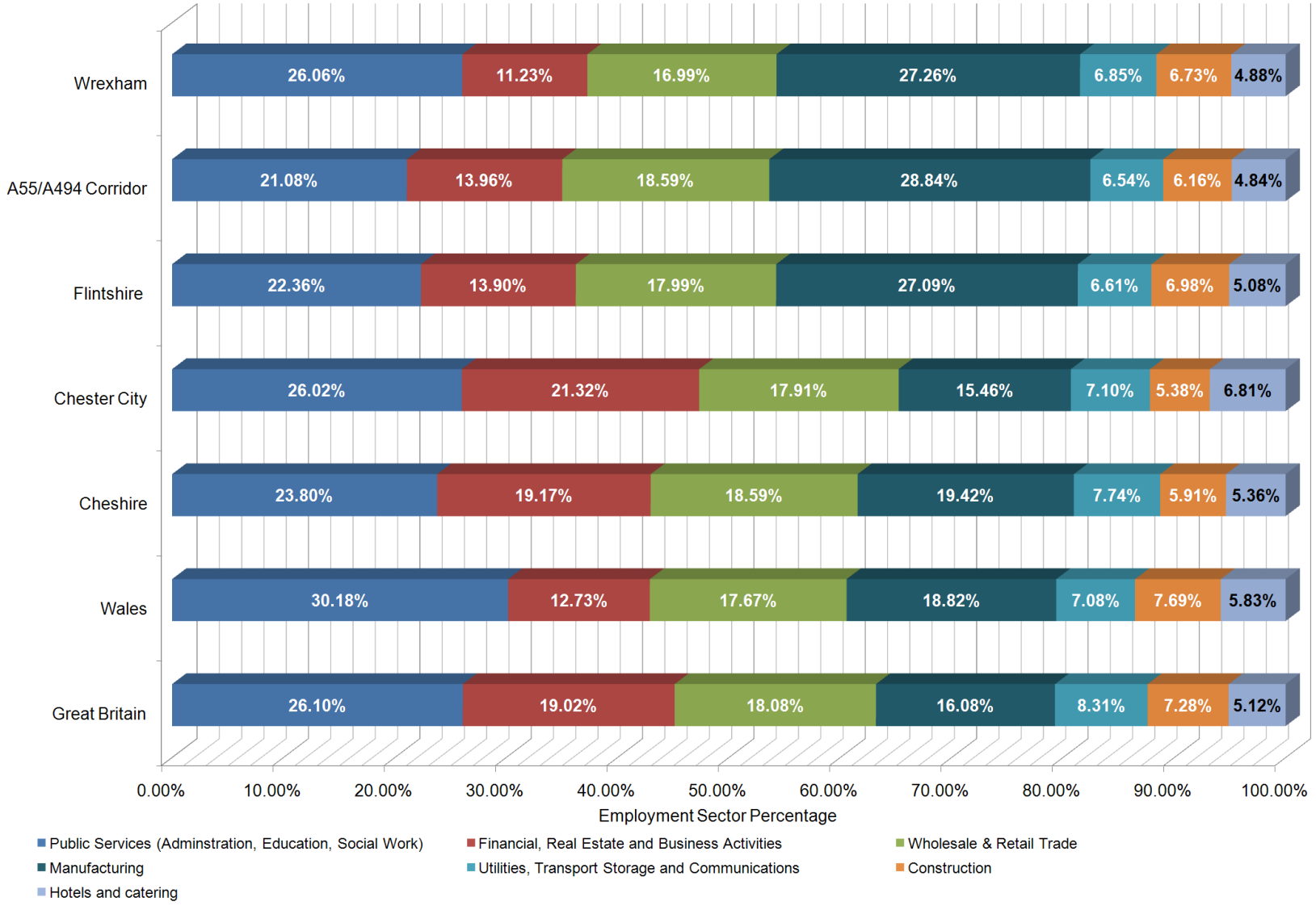
The above information indicates that within Wales, Manufacturing is the second largest employer followed by retail and financial.

Within the NEWABTS area the following trends are observed;

- Flintshire and Wrexham demonstrate a different employment sector order with manufacturing representing the key employment sector followed by public services, wholesale & retail and financial.
- Cheshire and Chester City align with the employment sector mix at Great Britain level, with tourism contributing a locally higher proportion within Chester City.
- Throughout the NEWABTS area the overall dependency on public services is lower than the 30% average figure within Wales. Wrexham and Chester City align with the proportion of public sector at Great Britain level (26%), with Flintshire and Cheshire as Counties experiencing a lower dependency at an average of 23%.

The overall analysis indicates that there is a clear dependency within the Flintshire and Wrexham on manufacturing and public services. Cheshire and Chester City contains a more balanced employment mix across public services, financial, retail and manufacturing, in line with overall employment sector mix for Great Britain.

Figure 3.6: Employment Percentage Sector Mix for NEWABTS Area (Source: 2001 Census) (Data order by highest percentages at Great Britain level)



* Employment sectors excluded for analysis – Agriculture, Fishing, Mining & Quarrying and Other.

* Great Britain data excludes Scotland

3.3.5 Skills

Skills and qualification levels are a key part of an areas ability to adapt to economic changes. Areas where there has been a large manufacturing base have tended to suffer from a low skilled workforce reliant on one industry for employment. The loss of this industry can have a devastating impact on the local economy.

In order to understand the current skill base in context of the employment market the following analysis considers qualification levels for all people both employed and unemployed within the NEWABTS area locations.

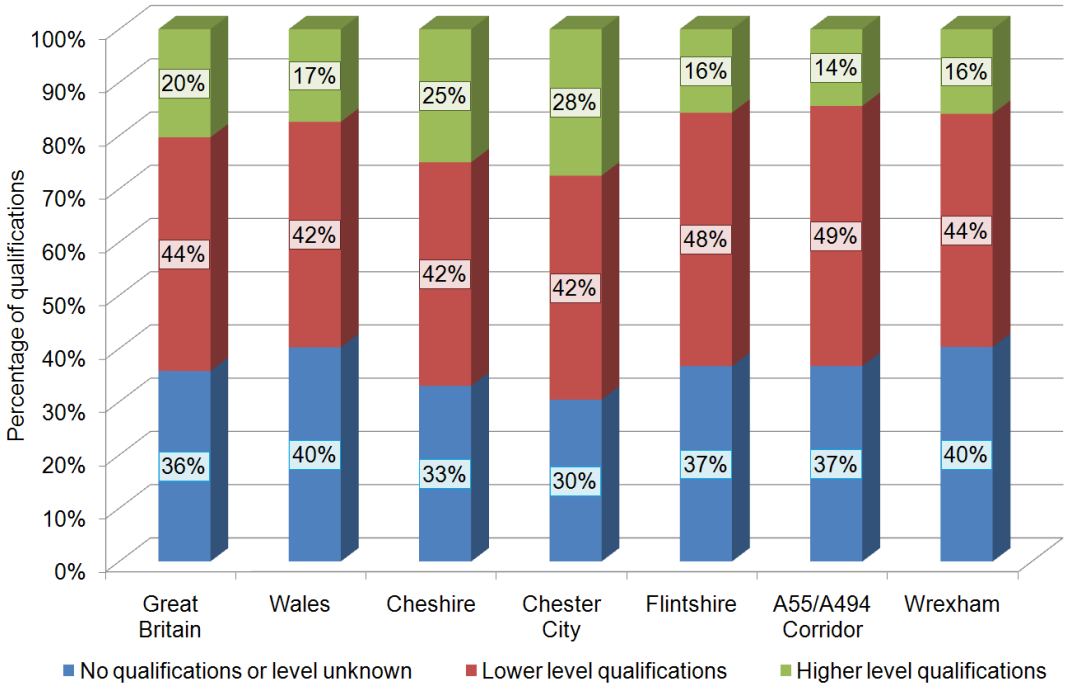
Within the 2001 Census, qualification levels are subdivided into the following categories;

- "No qualifications" describes people without any academic, vocational or professional qualification
- "Lower level qualifications" describes people with qualifications equivalent to levels 1 to 3 of the National Key Learning Targets (i.e. GCSE's O levels, A levels, NVQ levels 1-3)
- "Higher level qualifications" refers to qualifications of levels 4 and above (i.e. first degrees, higher degrees, NVQ levels 4 and 5, HND, HNC and certain professional qualifications).

3.3.6 Qualification Levels for All People within NEWABTS area

The overall analysis indicates that the percentage qualification mix within Flintshire and Wrexham align with national levels experienced at Great Britain and Wales levels. Cheshire and Chester City demonstrate a higher skill base with a greater proportion of overall qualifications, particularly at a higher level with an average of 10% difference. This links to the sector mix with larger proportion of financial and business activities.

Figure 3.7 below shows the percentage qualification levels for all people nationally and within the NEWABTS area



* Great Britain data excludes Scotland

Figure 3.7 indicates that:

- Within the study area, qualification levels are generally in line with national figures for Great Britain and Wales.
- Within the study area, Wrexham has the highest percentage of unqualified population, however this is no higher than the national average.
- Approximately 50% of all people within Flintshire have lower level qualifications, which is the highest proportion within the study area.
- Higher level qualifications represent a small proportion of the overall statistics for the NEWABTS area, with higher level qualifications peaking within Cheshire, primarily within Chester City at 28%.
- The NEWABTS area contains a mixture of employment sectors requiring employees covering a variety of skills, as demonstrated by the mixture of employees and related qualifications. Cheshire and Chester City contain a higher proportion of overall qualified population, which aligns with requirements of the balanced employment sector mix.
- The employment market within the NEWABTS area is dominated by employees with lower level qualifications. However this is in line with average figures for Wales and Great Britain.

3.3.7 Average Income (Weekly Wage and Hourly Pay)

Tables 3.2 and 3.3 below provide a comparison between gross weekly wage and hourly pay within the NEWABTS area and comparative local and national locations, based on resident population. This analysis indicates that the overall NEWABTS area is economically prosperous and competitive when compared against national figures, as demonstrated by both weekly wage and hourly pay, exceeding Welsh levels. Flintshire represents the most competitive region as wages align with average values for Great Britain and outperform competing neighbouring locations of Cheshire and Wrexham.

Cheshire and Chester City demonstrate average earning levels which are below national levels for Great Britain, indicating a locally weaker economy. However, this characteristic is likely to be a product of a diverse employment sector mix and volume of employees within the County, rather than a weak economy. The influence of diverse employment sector mix is demonstrated by the fact that the peak proportion of higher qualification within Chester City (28%) is not reflected within the wage structure. The employment density figure for Chester City indicates a strong economy at 1.03.

Flintshire represents the most competitive region within the NEWABTS area, based on the analysis of wages. The County remains competitive, with the average wage levels for Great Britain and outperforms competing locations of Cheshire and Wrexham. This wage structure is likely to be a product of the combination of locally prosperous and competitive industries, primarily within the manufacturing sector and the level of accessibility to wider employment opportunities within higher employment density locations, such as Chester City. Flintshire and the A55/A494 corridor locations principally represent labour market locations within the NEWABTS area. Flintshire is predominantly economically independent, however it does economically benefit from connections with Cheshire, as described further within this chapter.

Wrexham County is characterised as the weaker economy within the NEWABTS area, as shown by the low level of employment density 0.69 and high proportion of population with no qualifications (40%), which contributes to the low wage values demonstrated in Table 3.2 below. Although these values align with the averages for Wales, they are some way behind the averages for Great Britain, indicating a localised level of deprivation. This localised deprivation when combined with the commuter travel distance requirement to wider employment centres, such as Chester, leads to Wrexham being principally self reliant economy, dependent on local manufacturing and public services. A decline in either sector is likely to lead to the deterioration of economy within Wrexham.

In summary, within the NEWABTS area Wrexham, Cheshire and Chester City experience similar levels of earnings, with Wrexham representing the lowest employee wage return. Flintshire stands out as the strongest economy based on the average earnings.

Table 3.2: Earnings by Residence Gross Weekly Wage 2009 (Source: Annual Survey of Hours and Earnings (ASHE))

Gross Weekly Wage Median Earnings in (Pounds)	Great Britain	Wales	Cheshire	Flintshire	Wrexham County	Chester City
Full-time workers	£490	£441	£458	£482	£449	£455
Male full-time workers	£534	£479	£508	£527	£493	£500
Female full-time workers	£427	£383	£387	£397	£385	£396

Table 3.3: Earnings by Residence Hourly Pay Resident 2009 (Source: ASHE)

Hourly Pay Median Earnings in (Pounds)	Great Britain	Wales	Cheshire	Flintshire	Wrexham County	Chester City
Full-time workers	£12.46	£11.13	£11.60	£12.48	£11.13	£11.66
Male full-time workers	£13.14	£11.86	£12.60	£13.18	£11.86	£12.49
Female full-time workers	£11.44	£10.29	£10.27	£10.47	£10.29	£10.61

* Median earnings in pounds for employees living in the area, based on 1 percent sample of employees, information on whose earnings and hours is obtained from employers. Earnings information relates to gross pay before tax, national insurance or other deductions. * Great Britain data excludes Scotland.

3.3.8 Employment Vacancies

Table 3.4 below provides an employment vacancy comparison between the NEWABTS area and comparative local and national locations. The employment vacancy analysis indicates that Cheshire and Flintshire are prosperous locations within the employment market, outperforming Great Britain and Wales across key employment measures, particularly job seeker allowance claimants per unfilled jobcentre vacancy.

Chester City represents the centre for employment opportunities within the NEWABTS, with the lowest ratio of vacancies to job seekers allowance claimants. Based on existing journey to work information, Flintshire is likely to economically benefit from this trend by providing labour for these vacancies.

Wrexham County exhibits different characteristics, with a level of jobcentre vacancies that is lower than national levels for Great Britain and Wales. Within the NEWABTS area, Wrexham experiences the highest level of job seeker allowance claimants per unfilled vacancy, which indicates a local shortage of employment opportunities. The ability of Wrexham to increase its overall level of employment is dependent on the accessibility to wider employment centres and to generating local employment.

Table 3.4: Employment Vacancies (Source: Jobcentre Plus August 2008)

Employment Vacancies	Great Britain	Wales	Cheshire	Flintshire	Wrexham County	Chester City
Unfilled jobcentre vacancies	280,216	15,673	4,053	922	488	907
Unfilled jobcentre vacancies per 10,000 population aged 16-64	72	82	93	96	57	119
JSA claimants per unfilled jobcentre vacancy	5.0	4.4	3	3.3	6.3	2.2

* Great Britain data excludes Scotland

3.4 Journey to Work Information

This section provides a summary of the journey to work analysis based on the 2001 census for the NEWABTS area including; journey to work travel patterns, distance, mode share and car ownership levels.

3.4.1.1 Journey to Work Travel Patterns

Figure 3.8 below demonstrates the journey to work travel patterns within the North East Wales area based on the 2001 census for trips by all modes as a percentage of origin travel.

Based on the travel patterns demonstrated below, the following trends can be indentified:

- Flintshire and primarily the A55/A494 corridor locations are economically interdependent, with a clear requirement for commuter travel between labour market locations and employment centres, such as the Deeside Industrial Estate.
- Chester retains a strong internal employment market with 72% of all trips taking place internally. It also attracts significant commuter movement from the A55/A494 corridor particularly Connah's Quay and Broughton.
- Wrexham retains a high internal employment market with 50% of all trips taking place internally. However, Wrexham is more heavily reliant on external commuting at 50% of all trips, compared with Chester at 38% of all trips. The overall labour market contribution of Wrexham to the broader NEWABTS area is small, when compared to locations within Flintshire, as shown by the low percentages.

The overall travel patterns illustrated below, shows a clear triangle of dependency between the Deeside Industrial Estate, Connah's Quay and Chester, with the primary influence being the connections with Connah's Quay.

Figure 3.8: North East Wales Journey to Work Travel Patterns Percentages (All Modes) (Source: 2001 Census)

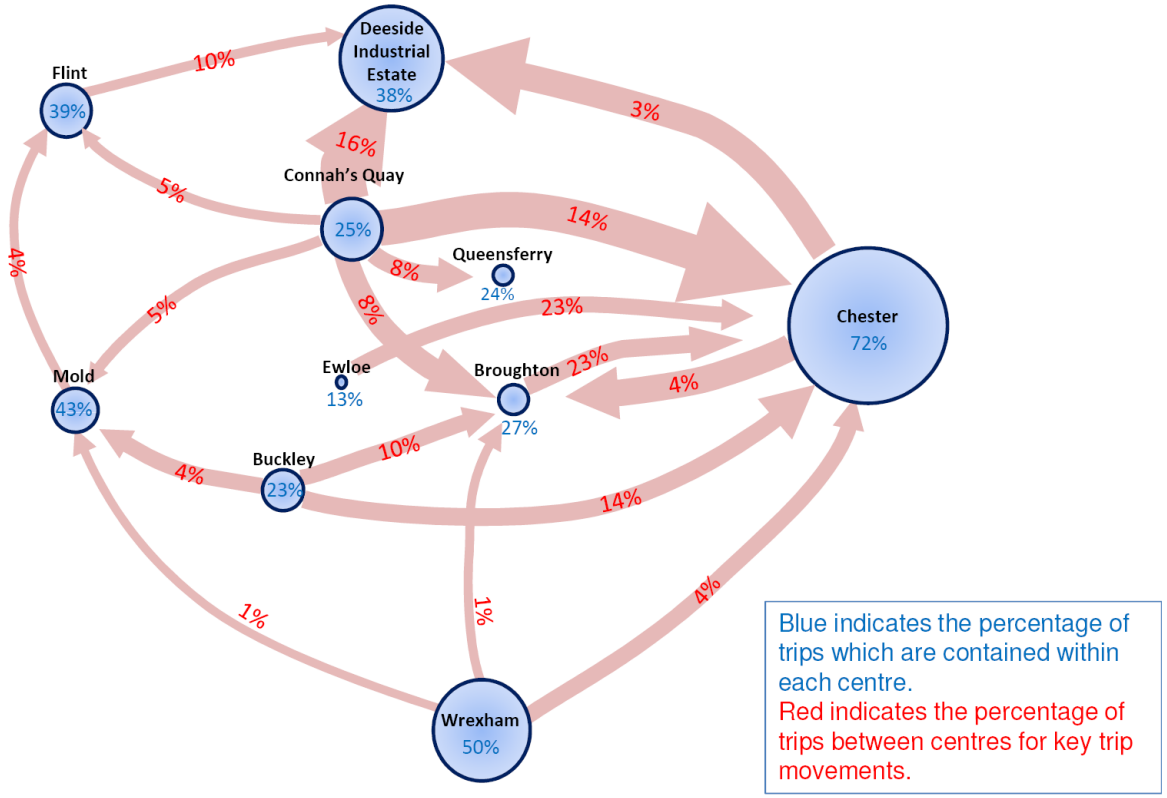


Figure 3.9 below shows the wider journey to work travel patterns to and from the study area to the rest of the UK, based on the 2001 census. This analysis indicates that the NEWABTS area is a net importer of labour, with ca.54,500 people commuting into the study area compared to ca. 30,200 out commuters. The strongest movements into the study area originate from North

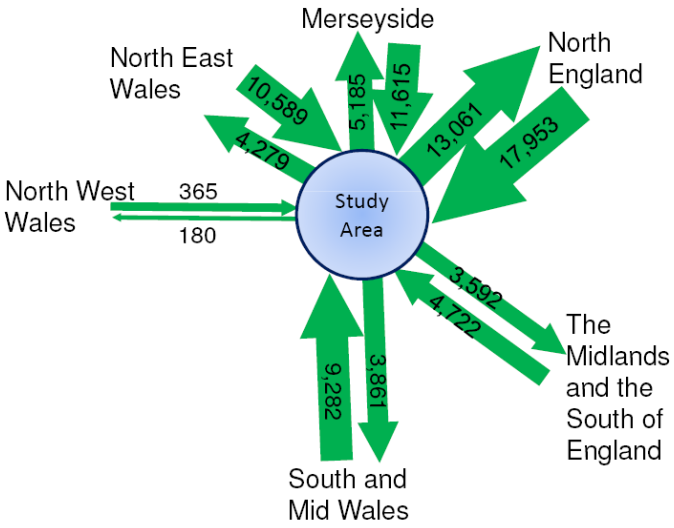
England 33%, Merseyside 21% and North East Wales 19%. There are few commuting to or from North West Wales and the English Midlands, primarily due to the travel distances and transportation linkages.

Within the study area, the overall portion of external commuter travel to key locations is related to the geographical location of the area along the regional and Country boarders. The following summarises these key linkages:

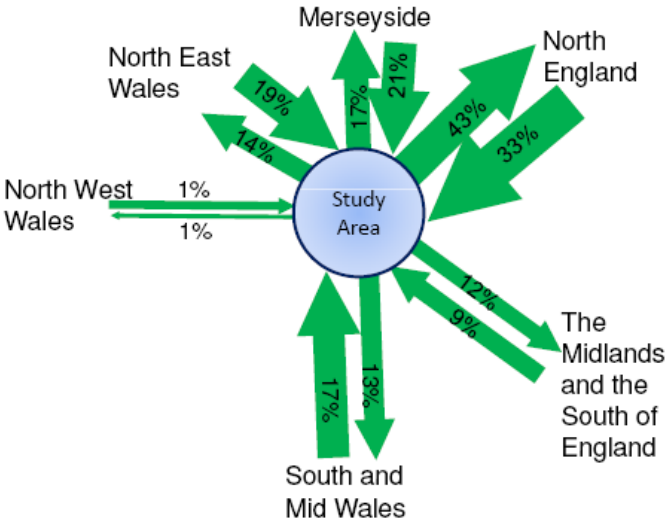
- Cheshire and Chester City attracts and contributes to the vast majority of travel to and from North England and Merseyside.
- Flintshire attracts and contributes to the vast majority of travel to and from North East and West Wales.
- Wrexham attracts and contributes to the vast majority of travel to and from South and Mid Wales.

Figure 3.9: Key Journey to Work Patterns to and from the Study Area (All Modes) (Source: 2001 Census)

Trips Volumes



Percentage Total Inbound and Outbound Trips



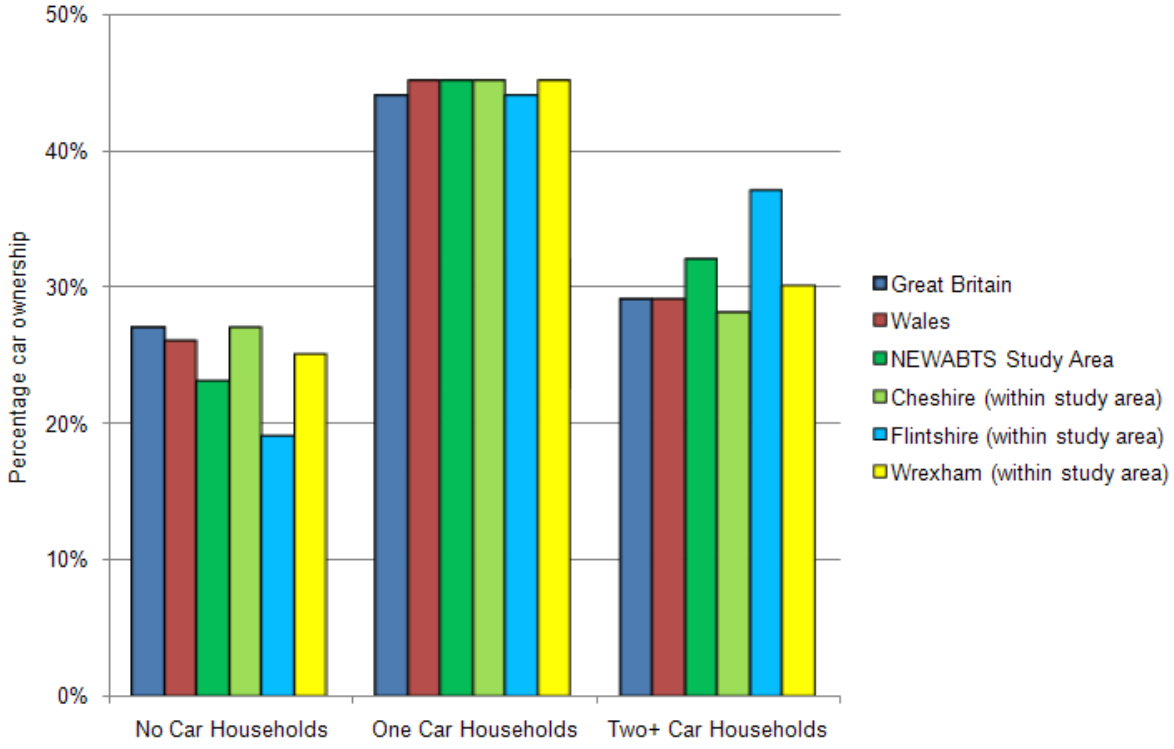
3.4.2 Car Ownership

Figure 3.10 below shows car ownership levels nationally and within the NEWABTS area, based on 2001 census.

- Within the NEWABTS area 23% of households do not have access to a car and are therefore likely to be reliant on public transport, walking and cycling. This is lower than the average for Great Britain and Wales indicating a higher local level of car ownership.
- Within the NEWABTS area 32% of households have two or more cars and are therefore heavily reliant on the private car mode of travel, this is significantly higher than at Great Britain and Wales level.
- Flintshire represents the peak area for car dependency within the study area, as demonstrated by 37% of households having two or more cars and 19% having no car. This is reflective of the distribution of urban locations within the County.
- Cheshire represents a lower level of car dependency within the study area, due to the centralised population within Chester City, supported by a dense urban public transport network. However, Cheshire represents a reasonably economically active location therefore the overall household car ownership is higher than national levels for Great Britain and Wales.
- Wrexham demonstrates a similar spread of car ownership levels to Wales, with a slightly higher proportion of overall car ownership, as shown by the higher percentage of multiple car households.

- The overall analysis indicates that the NEWABTS area is heavily dependent on the mode of private car with 77% of households having access to a car, which is interlinked to the journey to work distances discussed below.

Figure 3.10: Car Ownership Levels Nationally and within NEWABTS Area (Source: 2001 Census)



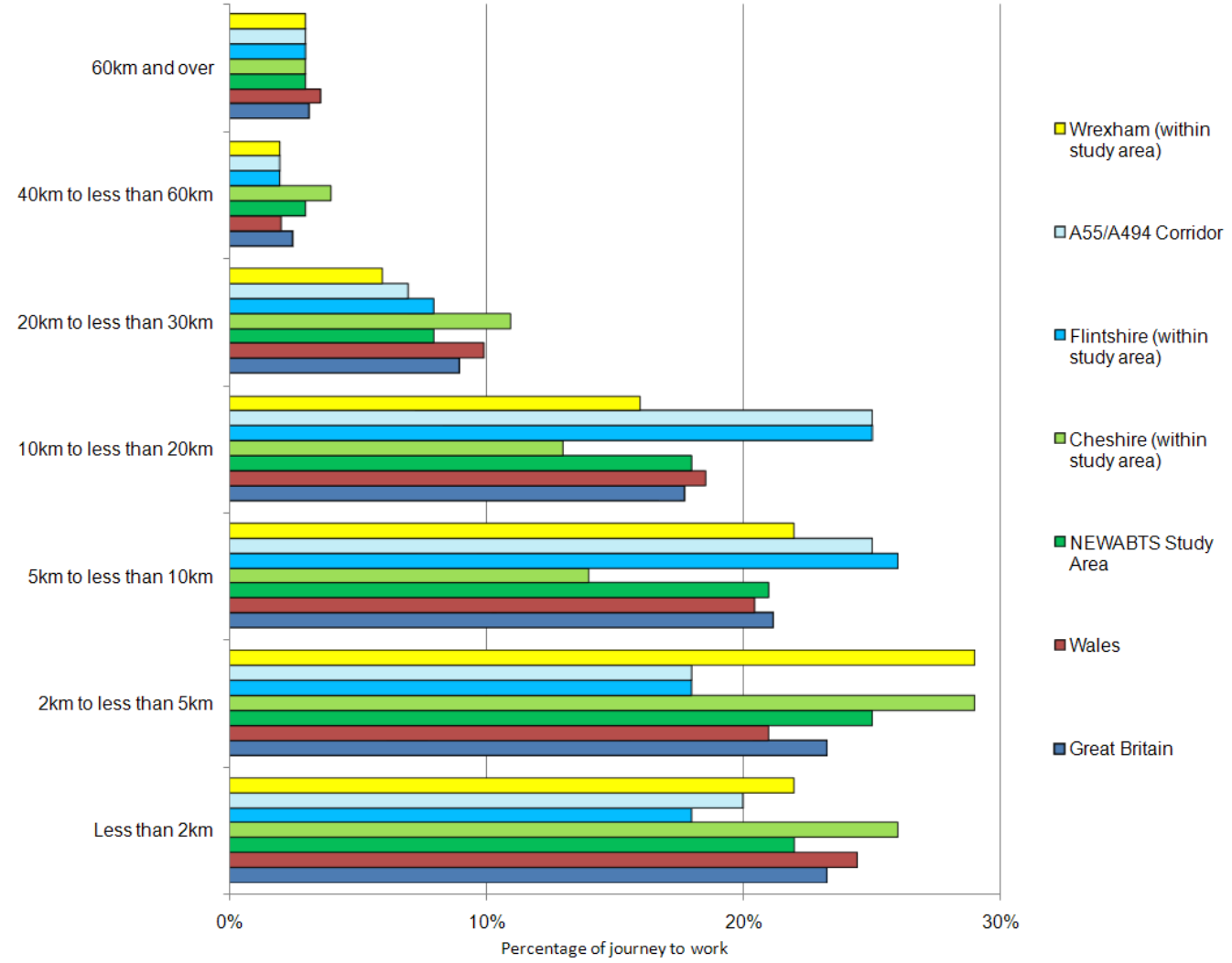
* Great Britain data excludes Scotland

3.4.3 Journey to Work Distance Travelled

Figure 3.11 below shows journey to work distances both nationally and within the NEWABTS area, based on 2001 census.

- Within the study area 47% of journeys to work are less than 5km which is in line with national average for Great Britain and Wales at 45%. However, at a detailed level the proportion of short distance trips (less than 5km) are centralised within urban locations of Cheshire (55%) and Wrexham (51%), with Flintshire representing lower proportion (36%).
- Within the study area there is scope to transfer to alternative modes for distances travelling less than 10km, however this is dependent on the locations e.g. spread of development, provision of public transport services and quality of walking/cycling environments. In principle there is scope for the transfer of short distance trips to walking and cycling, based on the acceptable threshold of 5km.
- The journey to work travel distance pattern indicates that the NEWABTS area aligns with the national averages for Great Britain and Wales with 39% of the population travelling 5-20km to access employment. However, at a local level the proportional distance distribution differs substantially between Cheshire, Flintshire and Wrexham. Flintshire for example, demonstrates a higher level of long commuter travel distance and car dependency shown by the spike in middle distance travel 10-40km in comparison to national levels (see Figure 3.10.
- Longer distance travel within the NEWABTS area, is in line with national averages for Great Britain, with the exception of Cheshire where there is a spike in the 40-60km travel distance.

Figure 3.11: Percentage Journey to Work Distance Travelled Nationally and within NEWABTS Area (2001 Census)



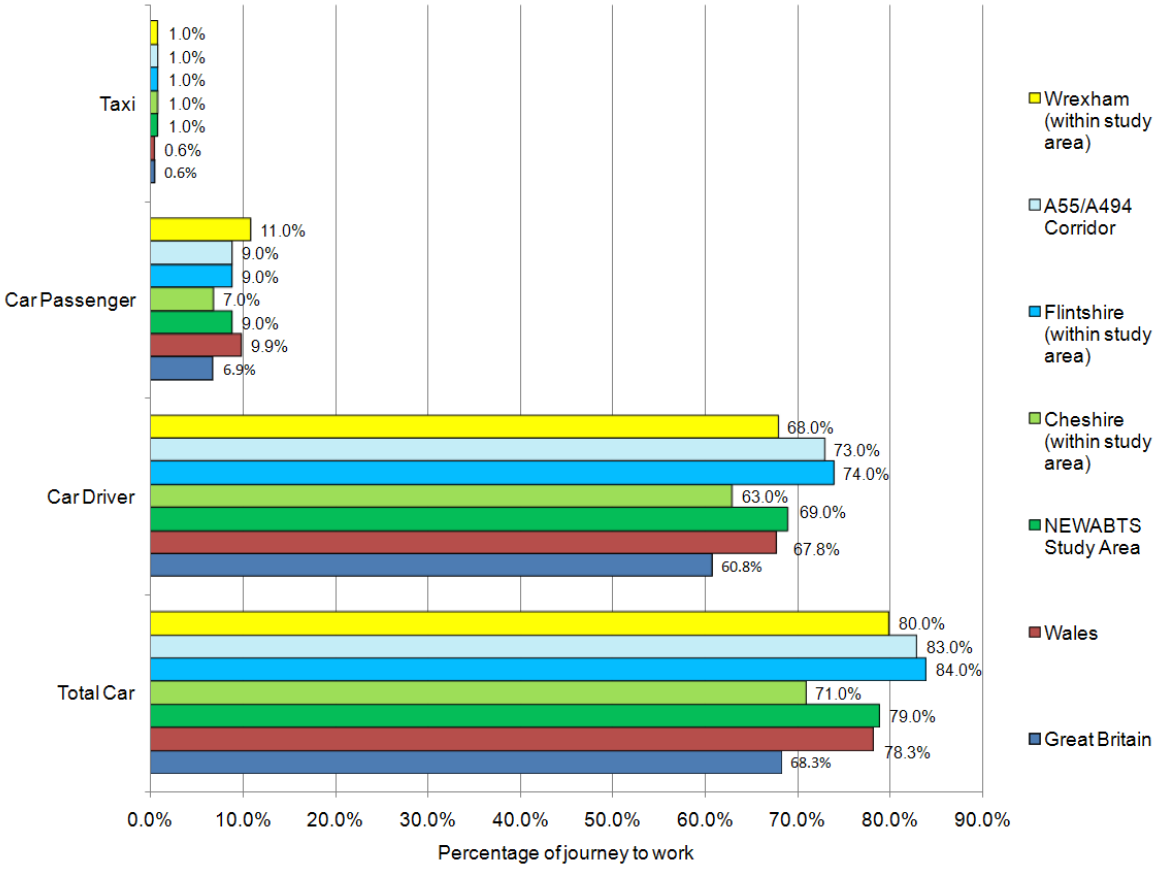
* Great Britain data excludes Scotland

3.4.3.1 Journey to Work Mode Share

Figures 3.12 and Figure 3.13 below show the journey to work mode share divided by car and other modes respectively, for the NEWABTS area.

- The majority of travel within the NEWABTS area (79%) is undertaken by private car or van as either driver (69%) or car passenger (9%) and taxi (1%). This is significantly higher than the national averages for Great Britain (68%) and slightly higher than Wales (78%), indicating a clear dependency on the private car.
- Car passenger values for the NEWABTS area are in line with national averages therefore car driver represents the difference between national proportions for car based travel. This infers a locally higher proportion of single occupancy vehicles; however a further detailed analysis is required to confirm this assumption.
- Flintshire and the A55/A494 corridor demonstrate locally higher levels of car dependency, in excess of 82%.
- Wrexham aligns with the total car mode share percentages shown for the NEWABTS area, with a locally higher proportion of car passengers at 11%.
- Cheshire aligns more closely with the car mode share for Great Britain, with a lower level of car mode share based on the centralised population and a more typical public transport network.

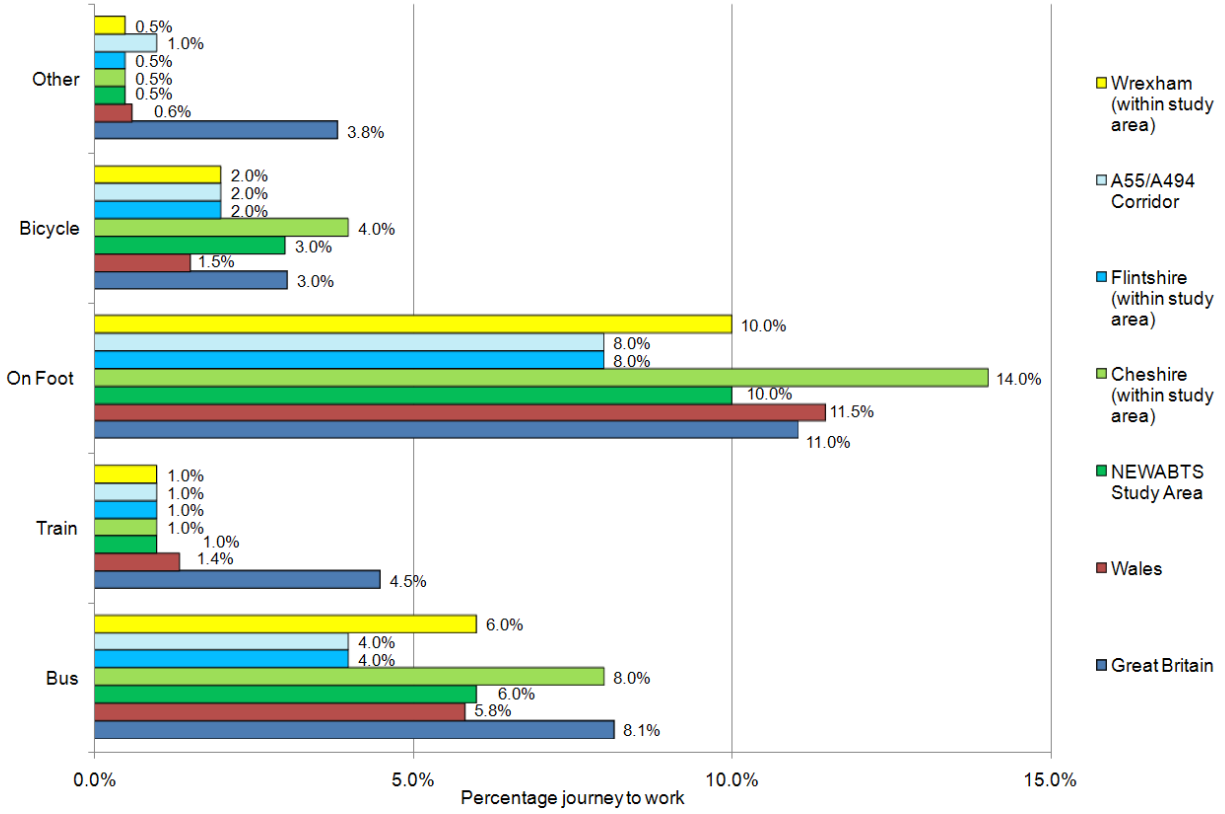
Figure 3.12: Percentage Journey to Work Car Mode Share Nationally and within NEWABTS Area (2001 Census)



* Great Britain data excludes Scotland

- Alternative modes of travel represent only 21% of NEWABTS area journey to work travel, which aligns with the level for Wales 22%, but is significantly lower than national levels of Great Britain at 32%. Key differences in mode share relate to use of bus 2% and rail 3.5%. This mode share trend aligns with the stakeholder perception of substandard public transport provision and walking/cycling facilities.
- Within the NEWABTS area, Chester City represents the focal point for sustainable modes, with 27% of travel made by alternative modes. A key statistic within this the percentage, is the high proportion of travel made on foot (14%) and by cycle (4%), which is representative of dense urban environment.
- Flintshire demonstrates a lower level of travel by foot and on cycle. This may support the perceptions that walking and cycling mode share is affected by poor local environments.
- Travel behaviours within Wrexham are in line with national mode share averages - but this may be due to deprivation rather than the quality of services.

Figure 3.13: Percentage Journey to Work Other Mode Share Nationally and within NEWABTS Area (2001 Census)



* Great Britain data excludes Scotland

3.5 Strategic Economic Connectivity

The NEWABTS area is a key economic hub within North Wales, with strong linkages to population centres within Northwest England, such as Manchester and Liverpool. Figure 3.14 below illustrates the economic connections between the centres of Flintshire, Chester and Wrexham and surrounding areas. The values shown are based on the GVA by business sector for each local authority in the area, weighted by reliance of that industry upon transport. A gravity model has been used to estimate the strength of the connection of each local authority in Great Britain to the local authorities within the study area.

Figure 3.12 identifies a clear economic dependency on the A55/A49/A550 trunk road network within the NEWABTS area, between Flintshire and Northern England. In comparison there are few other economic linkages using the broader transport network within the NEWABTS study area, such as the A541, A550 and A483.

Chester has strong economic links with authorities in the North West of England. Travel between these locations is primarily independent of the transport network within the study area.

The diagram demonstrates that economic connections to the rest of Wales are comparatively weak by comparison. However, the study area does act as an employment centre for residents within western Wales.

Figure 3.14: Economic Connectivity of the NEWABTS Area Local Authorities

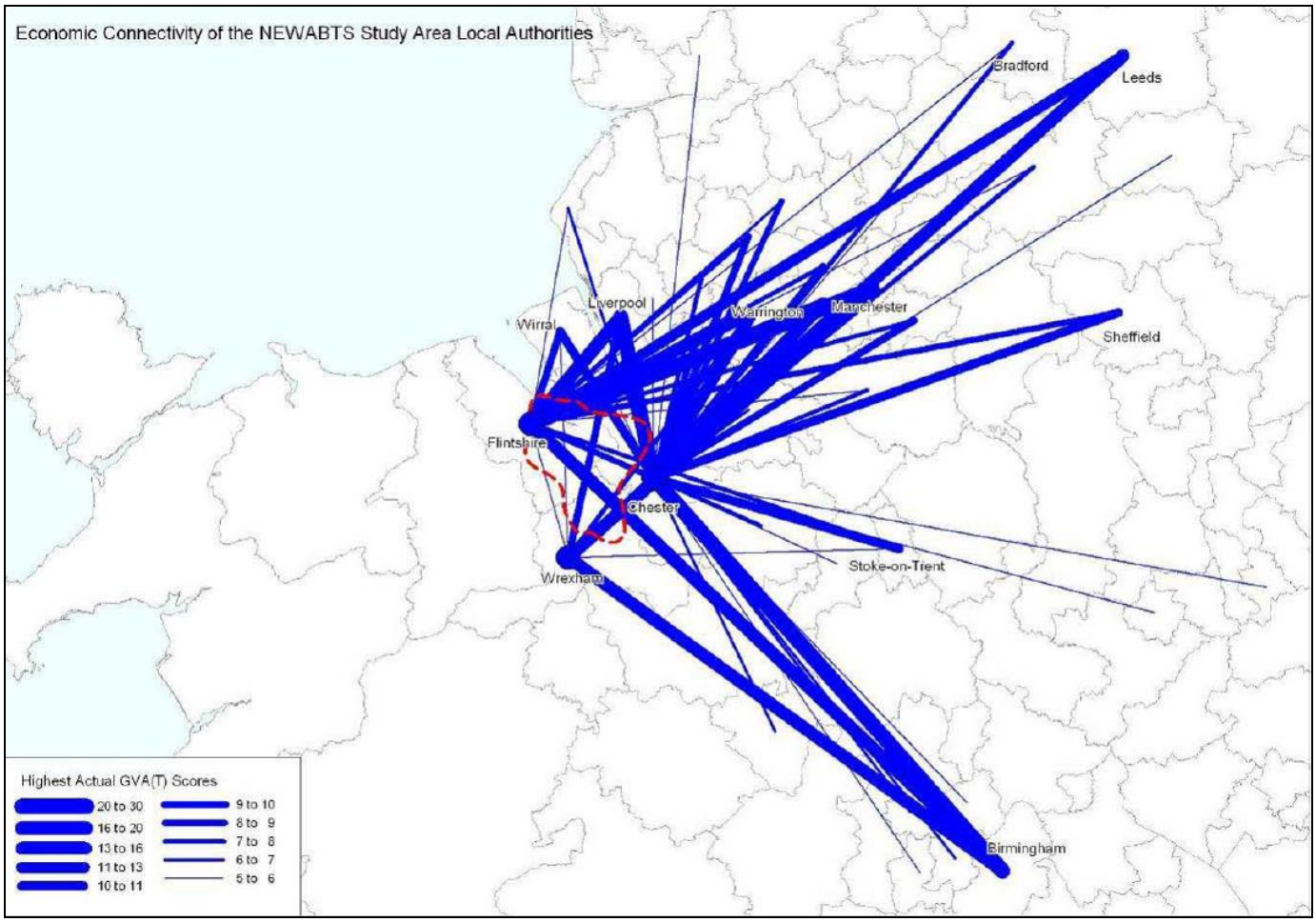
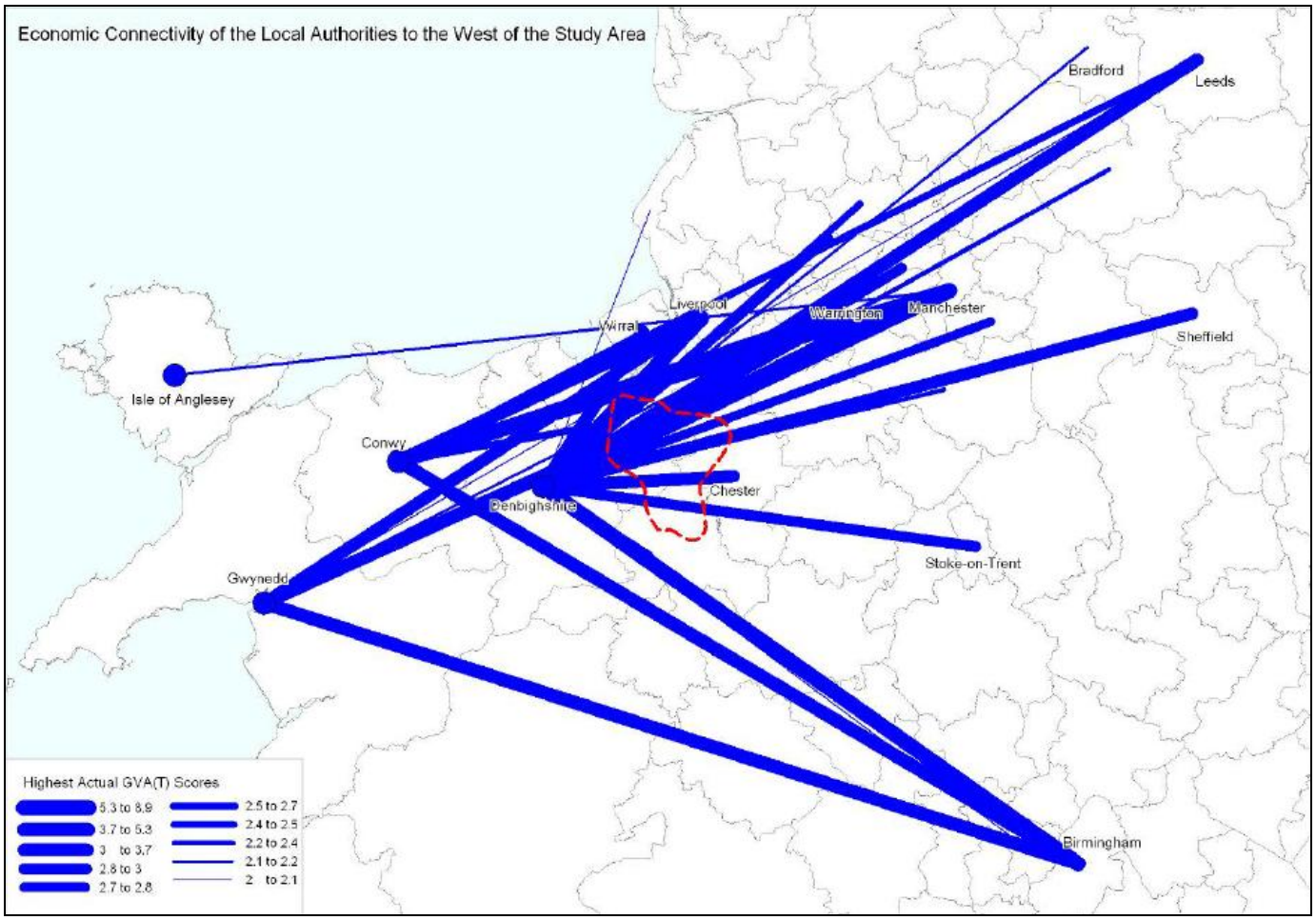


Figure 3.15 below illustrates the same GVA analysis for local authorities to the west of the study area, based on a lower level scale of GVA. This shows that the local authorities to the west of the study area have strategic economic linkages to destinations such as Chester, Liverpool, Birmingham and Manchester. These connections are significant as the majority of trade between the locations would involve travel through the NEWABTS area, therefore modifications to the transport network within the NEWABTS

area could impact upon the strength of these economic interactions and affect the rate of economic growth within North West Wales.

In conclusion this economic connectivity analysis, demonstrates that the maximum economic return is likely to be generated by options which directly improve the level of transport accessibility and highway reliability between Flintshire and North West England. The economic performance of Chester is independent of the NEWABTS area transport network. There are few economic connections to Wrexham, with the primary connection being the corridor A483 to Chester.

Figure 3.15: Economic Connectivity of the Local Authorities to the West of the Study Area



3.6 Economic Baseline Conclusion

In this chapter the economic position of the NEWABTS area has been examined against the wider Wales and Great Britain picture.

The evidence suggests that the overall study area is performing in line with national average values. However, there are clearly pockets of deprivation concentrated within the urban locations within Flintshire, Wrexham and Cheshire.

The travel distances, car ownership and mode share suggest that the overall NEWABTS aligns closely within national trends, with the private car equating to (39%) of the population travelling 5-20km to access work, which matches the averages for Wales (39%) and Great Britain (39%). At a sub-regional level, there are clear differences in the travel distance and mode share, based on the geographical arrangement of Flintshire, Cheshire and Wrexham.

The following provides a summary of the economic baseline conditions for the sub-regions within the NEWABTS area:

Cheshire and Chester City

Cheshire, primarily Chester City, represents the centre for economic activity with the NEWABTS area, based on high levels of employment density 0.82 and 1.03. Chester City demonstrates a strong internal economy, as shown in the proportion of internal journey to work trips (72%) and acts as primary employment centre within the study area, as shown within Figure 3.8. The centralised urban area which includes both labour market locations and employment centres is reflected in the locally high proportion of travel by sustainable modes (29%), particularly on foot (14%) and by bicycle (4%).

Cheshire and principally Chester City retain independent economies from the broader NEWABTS area. Figure 3.14 indicates that Chester City is economically connected with key locations within the North West and Central England, to a far greater extent than competing locations of Flintshire and Wrexham. Cheshire is primarily a self reliant economy, with over 60% of the journey to work travel being less than 10km.

The average wages within the County and City are lower than competing locations. However this is likely to be a product of the diverse employment sector mix and volume of employees within the County, rather than a weak economy. The influence of diverse employment sector mix is demonstrated by the fact that the peak proportion of higher qualification within Chester City (28%) is not reflected within the wage structure.

Chester City represents the centre for employment opportunities within the NEWABTS area, as demonstrated by the peak vacancies per 10,000 population and low level of job seeker allowance claimants per vacancy at 2.2. The journey to work analysis indicates a strong commuter link between A55/A494 corridor locations within Flintshire and Chester City, such as Broughton 23%, Ewloe 23% and Connah's Quay 14%. Chester City provides labour for the principal employment centre within the NEWABTS area, the Deeside Industrial Estate, as it is well connected by both car and public transport. The journey covers approximately 7.8 miles and takes 16 minutes by car and 45 minutes by bus (including an interchange). ([1] Source: Transport Direct, Department for Transport Online Journey Planner, November 2010)

Flintshire

Flintshire represent a prosperous local economy, principally within urban location along the A55/A494 corridor, as demonstrated within the above chapter. The overall economy within Flintshire is primarily dependent on manufacturing at 27% and is therefore heavily reliant on this industry. The A55/A494 corridor locations within Flintshire are principally economically interdependent, with a clear requirement for commuter travel between labour market locations and employment centres, such as the Deeside Industrial Estate, as demonstrated by the 16% proportion of journey to work travel from Connah's' Quay. Within the County there is a strong dependency on the private car with 37% of households having access to two or more vehicles and only 19% having no car access. This trend is representative of the geographical arrangement of the labour market and employment centres within the local area, such as the Deeside Industrial Estate. Flintshire represents the lowest level of alternative travel modes at 16%, which correlates with the journey to work travel distances which indicates that over 50% of journeys travel covers distances between 5-20km.

Flintshire and the A55/A494 corridor represent a prime location for manufacturing businesses, due to its location on a strategic route serving the ports of Mostyn Docks, Ellesmere Port and Holyhead and linkages into markets of Liverpool and Manchester.

The performance of these businesses is dependent on the provision of a reliable strategic links to get finished or part finished goods to a broad market.

Accessibility to the Deeside Industrial Estate from the local labour market locations by alternative modes remains a key factor in determining the local level car dependency. Based on journey planner information travelling by bus from Connah's Quay to the Deeside Industrial Estate, can take between 28-52 minutes, including a walk time of up to 20 minutes, whereas by car the journey time is 16 minutes, covering 6.1 miles. Based on the options available the private car will always be considered as first choice, depending on availability.

Wrexham

Wrexham represents the weaker economy within the NEWABTS area, based on the lowest level of employment density at 0.69, residential population earnings and employment vacancies with 6.3 job seeker allowance claimants per unfilled vacancy. This indicates that Wrexham experiences higher levels of localised deprivation in comparison with competing locations of Flintshire and Cheshire. Wrexham retains a high internal employment market with 50% of all trips taking place internally. However, Wrexham is more heavily reliant on external commuting at 50% of all trips, compared with Chester at 38% of all trips. The overall labour market contribution of Wrexham to the broader NEWABTS area is small, when compared to locations within Flintshire, as shown by the low percentages, such as Wrexham to Chester at 4%.

Based on the existing businesses, Wrexham demonstrates a strong internal economy, which is reflected in the travel to work distance and mode share patterns and retains its own employment centre of the Wrexham Industrial Estate. Wrexham is principally economically dependent on its internal economy and external connections with Central and Southern Wales. The overall County is heavily reliant of manufacturing (27%) and public services (26%), which equates to over 53% of the total employment sector mix. A decline is either employment sector is likely to generate a significant deterioration in the local economy.

Wrexham primarily suffers economically from its geographical locations in relation to wider employment centres, such as Deeside Industrial Estate and Chester City. The Deeside Industrial Estate is primarily accessible by car with a journey time of 35 minutes, covering a distance of 22.7 miles, alternative modes represent a limited choice for travel, as the journey requires multiple modes and interchanges including rail, bus and walking, with a total travel time in excess of 1 hour, including over 20 minutes on foot. In the reverse, Wrexham is relativity well connected with Chester City, with a competitive journey time with the private car of 24 minutes, covering 13.9 miles, with rail at 16 minutes and bus at 40 minutes. However, based on previously identified localised deprivation within Wrexham, the affordability and feasibility of these options for commuter travel to either the Deeside Industrial Estate or Chester City is limited. All journey time quoted within the above exclude additional access and egress time, which is likely to significantly increase the overall journey time.

In conclusion, the overall NEWABTS area baseline analysis indicates that the internal economic linkages within the study area are relatively weak, in comparison with linkages to broader economic markets, such as North Western England. Chester City maintains a strong internal economy and is linked with the broader employment and labour market locations within Cheshire West, such as Ellesmere Port. Similarly, Wrexham maintains a strong internal economy, which is supported by the local employment centre of the Wrexham Industrial Estate. Wrexham is also economically dependent on linkages within Central and Southern Wales, primarily the Wrexham suffers as it is relatively geographically isolated. Flintshire and primarily the A55/A494 corridor represent the main locations which are economically reliant on the transport network within the NEWABTS area.

The following section describes the Do-Minimum forecast for the study area for 2020, based on employment and housing allocations within the regional development plans. The baseline analysis described in the above has been used as reference material for the potential travel trends and patterns anticipated to be replicated in the forecast scenario.

4. Do-Minimum Economic Forecast (2020)

4 Do-Minimum Economic Forecast (2020)

4.1 Introduction

This section is intended to develop a picture of the forecast economy for the NEWABTS area for 2020 based on the aspirations of regions within the NEWABTS area, within the context of the transport constraints identified. The principle of the EALI assessment is to evaluate how a transport proposal is likely to influence the level and location of economic activity within the study area. Part of this evaluation considers the impact of proposals on the delivery of employment opportunities and the attraction of additional investment.

The following development plan documents have been used for this assessment:

- West Cheshire Growth Point Programme of Development 2008-2017, October 2008
- Flintshire Unitary Development Plan (UDP) 2000-2015, September 2003
- Wrexham Unitary Development Plan (UDP) 1996-2011, February 2005

In the context of this assessment, factors outside the control of local policy such as the recent change in the global economic climate, recession and government austerity measures, have been excluded from this assessment. In theory, based on current economic forecasts, the economy will be rebalanced beyond 2015 and therefore will be considered stable by 2020.

The information within the above documents covers a wide range of timescales. Allowing for this limitation, the regional development plans are considered as representative of 2020 conditions, based on the limited availability of consistent information and the fact that development plans are often over programmed.

4.2 Development Plan Strategies and Strategic Aims

Regional development plans are designed to develop a structure and vision for the delivery of continual economic growth and regeneration within the specific region.

The following provides a summary of the economic vision for sub-regions within the NEWABTS area:

West Cheshire Growth Point vision is to deliver sustainable housing growth, enabling the full economic potential of the region to be released. The proposal identifies challenges to housing and the requirement to balance the need for growth and regeneration, linking areas of opportunity with areas of deprivation, providing homes close to employment sites, bringing derelict land back into use and creating more sustainable forms of development.

The Flintshire UDP has been designed to provide a better place to live and work by enhancing the quality of life of its residents by improving their social and economic well-being.

The Wrexham UDP has been designed to reflect the Council's corporate vision for the County Borough's future based on:

- Aspiring to city status with Wrexham centre as its civic hub, developing a vibrant commercial centre, attracting visitors from North Wales and its borders.
- A modern robust economy across all sectors including health, education, commerce, tourism and manufacturing.
- An improving quality of life for its residents with an emphasis on supporting access to a variety of education and employment opportunities; providing care for more vulnerable in society; providing a decent place to live; conserving the environment; balancing rural and urban needs; and promoting leisure, culture and arts; promoting the Welsh language to encourage bilingual society; developing safer communities.

Within each Regional Development Plan, there are several common objectives and policies for development within the NEWABTS area. The following objectives are consistent within Cheshire, Flintshire and Wrexham.

A. Economy - to create a thriving and sustainable economy providing a wide range of quality employment opportunities for local people.

B. Community identity - to preserve community life by development to a level which can reasonably be sustained and assimilated within the existing communities.

C. Transport and access –to integrate new land uses with the existing transport network, and to improve accessibility by proving alternative transport modes other than the car, and to promote the integration of transport modes.

Within the EALI assessment, each option package has been evaluated against its contribution to the regional development polices.

Common Location of Development polices within Regional Development Plans, are listed below:

1. Create a sustainable settlement pattern;
2. Direct employment development to existing employment sites and buildings, allocating new sites which are well related to the existing population, services and public transport and promoting the diversification of the rural economy;
3. Development should use previously developed brownfield land comprising vacant, derelict or underused land in preference to the use of Greenfield land;
4. Locate major generators of travel demand in existing centres which are highly accessible by means other than the private car.
5. Improve major transport corridors through the County including the Wrexham-Bidston and North Wales Coast railway and the A55(T), A494(T) and the A548(T);
6. Resist pressure for sporadic unnecessary development in the open countryside, particularly the A55 (T) corridor and the undeveloped coast.

4.3 Development Allocations

In context of this EALI assessment the focus is the consideration of housing and employment development allocations within the NEWABTS area.

The Annex contains the following regional development plans:

Annex J.1 – West Cheshire New Growth Points (2008-2017) - this plan indicates housing growth within North Western Chester, Ellesmere Port and the Vale Royal (including Northwich and Winsford). A key consideration from this plan is the identification of major economic growth within the Deeside area and Ellesmere Port to Birkenhead corridor.

Annex J.2 – Flintshire Main Proposals (2000-2015) – this plan indicates development growth throughout Flintshire, based on specific site allocations across the County. However, on closer inspection of the actual UDP allocations, the focus of development growth within the County is within the A55/A494 corridor locations, in line with the County population densities and UDP policies.

Annex J.3 – Wrexham UDP Main Proposals (1996-2011) - this plan indicates development growth throughout Wrexham, based on specific site allocations across the County. However, on closer inspection of the actual UDP allocations, the focus of development growth is within the NEWABTS area, primarily within Wrexham Town.

The following development information for housing and employment development focuses on the allocations within the NEWABTS area.

4.4 Housing Allocation

The following provides a summary of the housing allocations for areas within the boundary of the NEWABTS area, covering Cheshire, Flintshire and Wrexham.

4.4.1 West Cheshire Growth Point Housing Allocation

Table 4.1 below shows the new housing trajectory for West Cheshire based on the primary development locations within the County. Chester has been allocated 20% of the total housing allocation, indicating that the priority within West Cheshire is to expand other urban areas within the County, primarily within Ellesmere Port.

On closer inspection of the housing allocations within Chester, the area identified for major housing growth is contained within North West of Chester and therefore is outside the direct consideration of the NEWABTS area. The delivery of this housing allocation is likely to result in an increase labour market competition for employment opportunities within Chester and the Deeside Industrial Estate.

Table 4.1: New Housing Development Proposals for West Cheshire Growth Point 2008-2017

Location	Housing Unit Allocation (2008 – 2017)	Percentage
Vale Royal	6,635	30%
Chester	4,502	20%
Ellesmere Port	10,938	50%
Total West Cheshire	**22,075**	**100%**

4.4.2 Flintshire UDP Housing Allocation

The primary policy in reference to housing within the Flintshire UDP is the creation of a sustainable settlement pattern which is sub-divided into the following categories;

Category A – most new development will be directed to the main towns (category A settlements which have indicative growth band 10%-20%) which have existing infrastructure, jobs and services, subject to environmental and other constraints;

Category B – new development will be directed to those semi-urban areas (category B settlements which have an indicative potential growth band of 8% - 15%) which have existing facilities, jobs and services subject to environmental constraints;

Category C – new housing is restricted in rural villages (category C settlements have an indicative potential growth band of a maximum of 10%) due to the general lack of existing facilities, jobs and services and presence of environmental and other constraints;

Table 4.1 below provides further detailed information regarding the quantum of housing allocated to the NEWABTS area. In accordance with the Flintshire UDP polices the area has been allocated 68% of the total area (ha) housing growth, equating to 93% of Category A allocation and 57% of Category B allocations. Based on this analysis key locations for housing growth has been allocated to the A55/A494 corridor, specifically Connah's Quay, Flint, Mold and Buckley.

In reference to the NEWABTS area corridor between Wrexham and Deeside, a substantial proportion of Category B housing development has been allocated to Penyffordd, 11.5 (ha) equating to 15%, this is outside the priority development locations within the A55/A494 corridor.

Table 4.2: New Housing Development Proposals for Flintshire UDP NEWABTS Area 2000-2015

Category A Settlements			
Settlement	**Area (ha)**	**Total Units**	**Percentage Area (ha) Total Category A Allocation**
Total UDP Category A	48.2	1389	100.0%
NEWABTS Area Locations			
Buckley	8	250	16.6%
Connah's Quay	15.5	466	32.2%
Flint	12.2	276	25.3%
Mold	7.9	246	16.4%
Shotton	1.4	43	2.9%
Study Area Total	45	1281	93.4%
Category B Settlements			
Settlement	Area (ha)	Total Units	Percentage Area (ha) Total Category B Allocation
Total UDP Category B	75	1645	100.0%
NEWABTS Area Locations			
Broughton	9.9	225	13.2%
Ewloe	9	228	12.0%
Hope (Caergwrle)	4.1	88	5.5%
Mancot (Queensferry)	4.3	108	5.7%
Northop	4.2	102	5.6%
Penyffordd	11.5	268	15.3%
Study Area Total	43	1019	57.3%
Category C Settlements			
Settlement	Area (ha)	Total Units	Percentage Area (ha) Total Category C Allocation
Total UDP Category C	5.3	108	100.0%
Study Area Locations Total	0	0	0.0%
Total Housing Development Allocation			
Total UDP Housing Allocation	128.5	3142	100%
NEWABTS Area Total	88	2300	68%
Other Sites	40.5	842	32%

4.4.3 Wrexham UDP Housing Allocation

The Wrexham UDP housing allocations between 2001-2011 have been developed with the objective of expanding the urban villages and Wrexham Town centre, whilst supplying the necessary allocations within the rural villages. Table 4.3 below identifies the new housing development allocations within Wrexham in the context of the NEWABTS area.

This analysis indicates that 66% of the total housing allocation is allocated within the NEWABTS area, primarily within Wrexham Town (46%). Within the identified NEWABTS area corridors of Wrexham to Deeside and Wrexham to Chester, 50% of the urban villages allocation is designated to key locations of Gwersyllt, Llay, Tanyfron and Broughton and 39% of rural villages allocations, primarily within Gresford.

Annex J.5 contains further detailed information regarding these housing allocations.

Table 4.2: New Housing Development Proposals for Wrexham UDP NEWABTS Area 2001-2011.

Urban Villages			
Settlement	**Area (ha)**	**Total Units**	**Percentage Area (ha) Urban Village Total Allocation**
Total UDP Urban Village	35.04	831	100%
NEWABTS Area	17.52	429	50%
Other Site Total	17.52	402	50%
Wrexham Town			
Total UDP Category B	24.63	863	100%
Rural Villages			
Settlement	**Area (ha)**	**Total Units**	**Percentage Area (ha) Rural Village Total Allocation**
Total UDP Rural Village	9.71	156	100%
NEWABTS Area	3.81	55	39%
Other Site Total	5.9	101	61%
Total Housing Allocation			
Settlement	**Area (ha)**	**Total Units**	**Percentage Area (ha) Total Allocation**
Total UDP Housing Allocation	69.38	1850	100%
NEWABTS Area	45.96	1347	66%
Other Site Total	23.42	503	34%

4.4.4 NEWABTS Area Housing Allocation Summary

In summary, Flintshire represents the primary region for housing growth within the NEWABTS area, focused within the A55/A494 corridor locations, such as Connah's Quay.

The housing growth within Chester is focused on improving connections between existing labour market and employment locations within West Cheshire. The overall allocation within North West Chester is likely to represent labour market competition for jobs within the Deeside Industrial Estate and Chester.

Within Wrexham, the housing allocations are concentrated within Wrexham Town. With 26% of the total housing allocation identified for villages located within the Wrexham to Deeside and Wrexham to Chester corridors.

Based on the timescales of the development plans above, it should be noted that a proportion of the housing allocations may have already been delivered.

4.5 Employment Allocations

The following provides a summary of the employment allocations for areas within the boundary of the NEWABTS area, covering Cheshire, Flintshire and Wrexham.

4.5.1 Cheshire West and Chester Employment Allocation

The Cheshire West growth point proposal identifies key economic growth within broader Cheshire West region, primarily Ellesmere Port area. Within the document reference is made to the potential employment opportunities within the Deeside Industrial Estate or Hub, which is discussed below.

The Chester City Renaissance programme represents the primary potential employment generator within the City and is described within section 4.6.1.

4.5.2 Flintshire UDP Employment Allocation

In line with the planning polices within the Flintshire UDP, 91.7% of allocated employment growth for categories B1,B2 and B8 has been allocated to the NEWABTS area, primarily consisting of 90.6% within the A55/A494 corridor, as shown in Table 4.3. The Deeside Industrial Estate represents the majority of this allocation equating to 63% of the total UDP hectare allocations.

Table 4.3: Flintshire UDP General Employment Land NEWABTS Area Allocations for B1, B2 and B8 employment uses Area (ha) 2000-2015

Settlement	Area (ha)	Percentage Area (ha) Total Allocation
Total UDP General Employment Allocation B1, B2 & B8	**326.7**	**100%**
Broughton	36.2	11.1%
Buckley	5.2	1.6%
Connah's Quay	21.1	6.5%
Deeside	205.8	63.0%
Flint	4.1	1.3%
Mold	6.4	2.0%
Queensferry (including Sandycroft)	15.4	4.7%
Shotton	1.8	0.6%
A55/A494 Corridor Area Total	**296**	**90.6%**
NEWABTS Area Total	**299.5**	**91.7%**
Other Sites Total	**27.2**	**8.3%**

Further employment land allocation details are included in Annex J.4

4.5.3 Wrexham UDP Employment Allocation

Table 4.4 below shows the general employment allocations for Wrexham, based on the allocations outlined within the Wrexham UDP.

A key consideration from this analysis is the Wrexham Industrial Estate, which accounts for 57% of the total allocation for employment. The Wrexham Industrial Estate, located to the east of Wrexham, represents a direct competing location to broader employment centres within the NEWABTS area, such as the Deeside Industrial Estate. However, the option packages assessed within this EALI do not address accessibility issues relating directly with this Industrial Estate, therefore economic responses to transport proposal within the broader NEWABTS area are likely to be minor. Although, it should be noted that a proportion of labour for the Wrexham Industrial Estate is likely to originate from the NEWABTS area, outside of Wrexham Town.

38% of the total employment allocation for Wrexham is located within the NEWABTS area, split between Wrexham Town 57% and Wrexham to Deeside corridor locations 43%, including Gwersyllt and Llay.

Table 4.4: Wrexham UDP General Employment Land NEWABTS Area Allocations for B1, B2 and B8 employment uses Area (ha) 2000-2015.

Settlement	Area (ha)	Percentage Area (ha) Total Allocation
Total UDP General Employment Allocation B1, B2 & B8	**114.0**	**100%**
Wrexham Industrial Estate	65.4	57%
Other Sites		
Total UDP Other Site Allocation	**48.6**	**43%**
Wrexham to Chester Corridor	18.6	16%
Wrexham Town	23.8	20%
NEWABTS Area Total	**42.4**	**38%**
Other Sites Total	**6.2**	**5%**

Further employment land allocation details are included in Annex J.6

4.5.4 NEWABTS Area Employment Allocation Summary

In summary, Flintshire and the A55/A494 corridor locations represent the key potential employment growth locations within the NEWABTS area, based on the allocations within the regional development plans. The Deeside Industrial Estate represents the primary employment site within the study area and is likely to attract employees from labour market locations throughout the region, primarily the local labour market of the A55/A494 corridor and Chester.

Cheshire West and Chester City are likely to generate a significant level of employment opportunities through the delivery of the Chester Renaissance programme and employment allocations within Ellesmere Port. However, the primary beneficiary to this employment growth is likely to be the labour market within Cheshire West and Chester itself. A proportion of the overall labour is likely to originate from within the NEWABTS area, therefore options which improve accessibility to Chester, are likely to generate a positive employment response.

The main employment allocation within Wrexham is the Wrexham Industrial Estate, which is outside the influence of transport options within this assessment. Within the NEWABTS area, employment is centralised within Wrexham Town and the surrounding urban villages, therefore labour is likely to be sourced locally, depending on the skill basis required.

4.6 Development Zone and Major Developments with NEWABTS Area

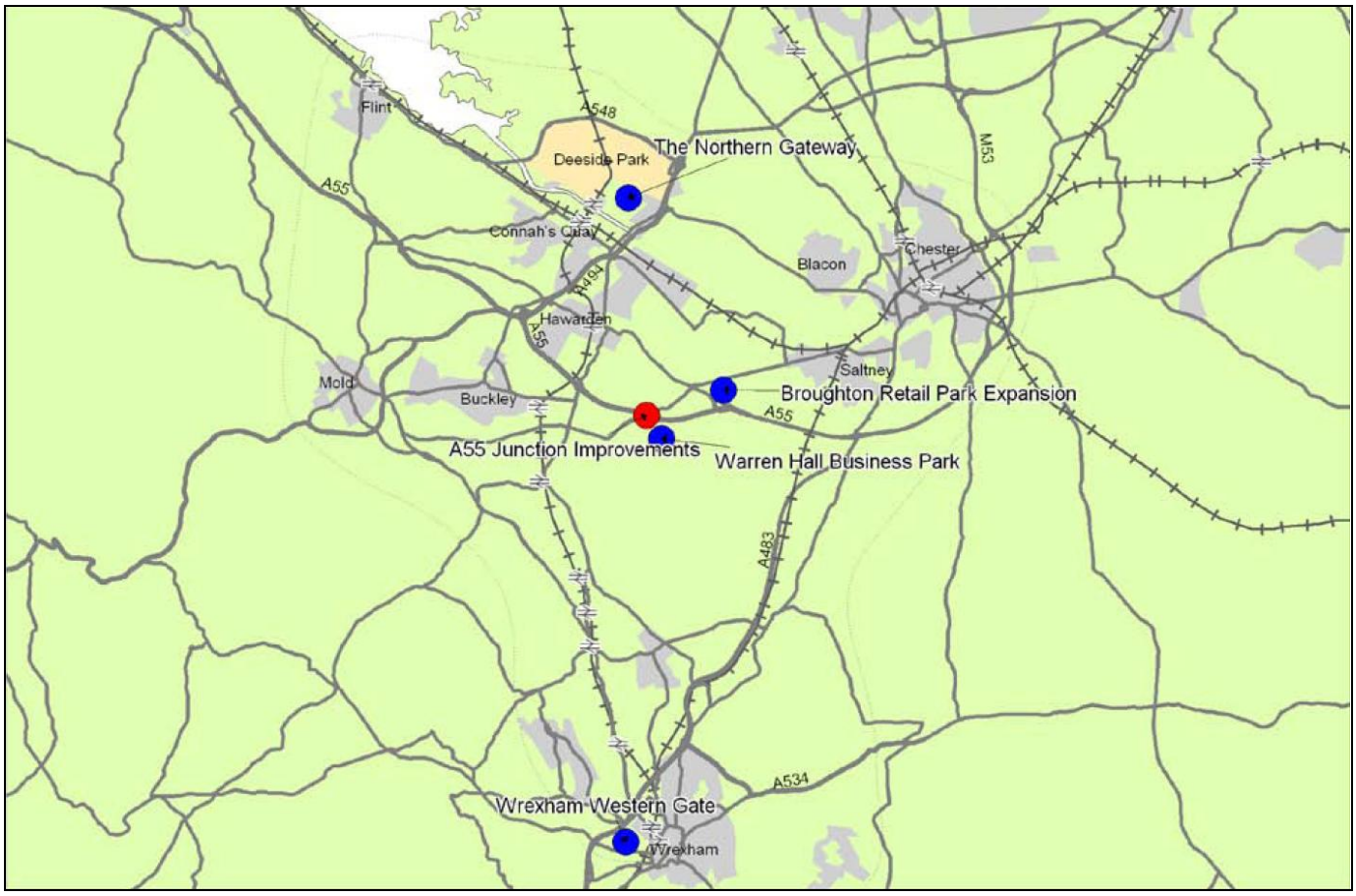
Figure 4.2 shows the major development sites within the NEWABTS area, which include;

- Northern Gateway land identified for employment development included within the Deeside allocations within Table 4.2.
- Wrexham, Western Gateway consisting of both employment land and residential units across 32 (ha). This development is anticipated to increase the size of the existing Wrexham Technology Park by a third and is included within the Wrexham Town allocations within Table 4.3

Developments with granted planning permission include:

- Warren Hall, near to Broughton, submitted by the Welsh Government for a 75,400sqm B1 Business Park, including a hotel, and associated facilities. The overall proposal is likely to create in the region of 7,000 new jobs, included within the allocations in Table 4.3.
- Broughton Retail Park extension of 11,755sqm of retail usage, equating to a 43% increase in retail floorspace.

Figure 4.2: Major Development Sites in the NEWABTS Area



4.6.1 Development Zones

The following development zones have been identified within the NEWABTS area:

Cheshire West and Chester Growth Point

The Chester City Renaissance programme represents the primary development zone within Chester, the programme includes following projects:

- Northgate – the biggest historic city centre regeneration project currently programmed within Britain, including 123 new homes, streets and open spaces, shops, restaurants, a new performing arts centre, market and library.
- Castle Gateway – major mixed-use development of 32,500 m^2 incorporating more than 6,000 m^2 of office space, a luxury hotel, restaurants and 35 apartments.
- Delamere Street – major development site that will transform a former bus station and car park into a vibrant new quarter providing 2,300 m^2 of offices, 229 homes, shops and a new underground public car park.
- Railands and Chester Station Gateway – regeneration of Chester station and its surroundings to create a key gateway into the city and enhance other historically important buildings along Brook Street and City Road.

Flintshire UDP

The Flintshire UDP identifies 3 key development zones as described below, as extracted from the Flintshire UDP;

• Deeside Development Zone: this area is of strategic economic importance within the sub-region of eastern Flintshire, west Cheshire and the Wirral, forming the 'Northern Gateway' to the County. The designation recognises its' current and long term development potential, specific employment land allocations and its existing and potential transport links. The proposed boundary has been drawn back to exclude land North of Shotwick Road which will now have a countryside designation and the former power station site to the south of the River Dee which is now more appropriately dealt with through a specific employment allocation. A minor extension is proposed to the east of the A550 to include the DARA site which has been highlighted as having potential for future high quality business use.

• Airport Development Zone: this is another area of existing employment uses and industrial estates and which also encompasses the Hawarden Airfield and the aerospace industry. Given the existing focus of employment, the expansion of Airbus and the growing potential for spin-off developments from the aerospace sector, the area has a strategic function in the context of the County's economy. The existing boundary of the Zone is proposed to be extended to the North West up to the B5129 and to the south to include a proposed new employment land allocation east of Manor Lane.

• Port Development Zone: this is a proposed new designation at Mostyn Docks in recognition of the growing strategic importance of the area as a sea/rail/road corridor. Development Zone status is designed to cater for the expected increase in demand for general employment and spin-off development in this corridor and to enable the docks site to accommodate further port related developments.

Wrexham UDP

The Wrexham Industrial Estate represents the primary development zone within Wrexham. However, the transport options which are considered within this study provide minor strategic highway accessibility benefits to this location, such as the highway modifications to A483. The Wrexham Industrial Estate is likely to benefit from the alleviation of strategic highway constraints, leading to the potential attraction of additional investment. However, local accessibility problems are likely to restrain this investment.

In context of the NEWABTS area the Deeside Development Zone represents the primary development consideration within this EALI assessment. However, substantial economic benefits are likely to be delivered through the support of large scale developments within Broughton, Warren Hall and the Wrexham Industrial Estate.

4.7 Transport Constraints

In line with regional development policies regarding the provision for sustainable transport, modifications are required to the existing transport network in order to facilitate the stated allocations for housing and employment, primarily within Flintshire and the A55/A494 corridor. The following EALI assessment considerers how each of the transport packages will contribute towards the delivery of regional development plans and land use allocations.

The transport constraints identified within the baseline economic scenario such as localised high car dependency, are likely to be exacerbated by the development allocations outlined within the regional plans, without transportation network modifications. The

deteriorating performance of the A55/A494 trunk road network will represent the primary economic constraint within the NEWABTS area for both local and strategic traffic. A55/A483 junction and general A483 congestion west of Wrexham represent the primary constraint to investment within the Wrexham and Chester corridor.

The continuation of the ongoing maintenance work on the A494 River Dee Bridge is considered as a committed transport option within the Do-Minimum scenario.

4.8 Estimated Input on Job Numbers

In order to provide an estimate of increased employment through the development of employment sites within the regional development plans for the NEWABTS area, the baseline hectares of proposed commercial development listed above have been used, for the stated allocations within Flintshire and Wrexham. For the purpose of estimation only 10% of the developable gross hectares are assumed to be actually built. This would provide a gross building space of 34.1 ha (4.2 ha within Wrexham and 29.9ha within Flintshire).

Assuming a split of;

- 20% B1 = 6.83 ha = 68,300sqm
- 30% B2 = 10.23 ha = 102,300sqm
- 50% B8 = 17.05 ha = 170,500sqm

English Partnerships and the RDA's (Regional Development Agency's) produced a report in July 2001 an employment densities for individual development classifications (1). The report advocates use of the number of workspaces as an indicator of regeneration/employment estimates. The following densities have been used;

	sqm/workspace	Total sqm development	Jobs
General Warehousing	50	170,500	3,410
General Industrial Buildings	34	102,300	3,008
Office (General) + purpose built	19	68,300	3,594
		Estimated Workspaces e.g. Jobs	**10,012**

* This analysis does not take into account FTE's (Full Time Employees) which may be higher than predicted workspace figure due to shift working etc..

Based on the original development allocation split, the above employment allocations are likely to generate 1,200 jobs (12%) within Wrexham and 8,812 jobs (88%) within Flintshire.

The UDP employment allocations for Flintshire is designed to provide 7,400 jobs, which indicates that the general workspace sqm areas within Flintshire are greater than those identified within the English Partnership and RDA report.

The overall figure provided above relates to all developments within the NEWABTS area, excluding commercial development, it is accepted that not all of this development will be constrained by transport factors. However the largest proportion of employment development is based in the Deeside Industrial Estate 205 ha. This location alone could provide between 4,400 and 5,500 jobs. This site and the types of development proposed would rely heavily on the A55 and A494 trunk roads to attract both labour and to provide access to wider markets.

The existing site access and permeability for other modes may therefore be significant constraint to development and hence new jobs in the area.

The other side of this equation is the productivity and hence competiveness of existing businesses at this location. Sporadic congestion, difficulties with access and reliability can have a serious impact on the competiveness of businesses in the warehousing/haulage industry. The continued reliance of manufacturing in this area therefore requires support in relation to reducing/stabilising transport costs. Given the economic reliance on this sector, transport investment may also be seen as a deterrent to the closure or movement of these businesses to other locations.

Chester City represents a primary employment centre within the NEWABTS area, as identified within the above. However, based on the level of quantified development information, it is difficult to estimate the potential level of job creation, although the overall scale is likely to be significant. Considering this, the primary labour market for these new opportunities is likely to be West Cheshire and Chester. However, a small proportion of labour is likely to originate from within the NEWABTS area, based on existing journey to work information.

4.9 Summary

In summary this Do-Minimum analysis has assessed the current regional development plans, in reference to the allocations for housing and employment within the NEWABTS area.

In context of this EALI assessment, the following provides a summary of the development status, based on the regional development plans:

West Cheshire and Chester – Chester City represents a primary location for housing and employment growth within the north east of the NEWABTS area. The analysis of the West Cheshire development plan, has demonstrated that the City has been programmed for extensive development and employment growth over the next 15 years. Transport options which improve the level of accessibility to Chester, are likely to support the delivery of development allocations and generate a positive economic response. However, based on journey to work information and West Cheshire Growth Point Programme, the majority of economic benefits are likely to be experienced internally within West Cheshire.

Flintshire – Flintshire and the A55/A494 corridor locations represent the primary area for economic activity within the NEWABTS area. This area has been programmed for extensive housing and employment growth between (2000-2015), including the principal location of the Deeside Industrial Estate/Development Zone. Transport options which improve the overall level of accessibility between local labour market locations and the principal employment centres are likely to generate a significant economic response.

Wrexham – the Wrexham UDP identifies substantial housing and employment allocations for Wrexham Town and the surrounding urban villages along the Wrexham to Deeside/Chester corridors. Transport options which improve the level of accessibility between Wrexham Town and the surrounding urban villages are likely to support the delivery of development allocations and generate a positive economic response. Wrexham maintains its own employment link with the existing Wrexham Industrial Estate.

In conclusion, Flintshire represents the principal region within the NEWABTS area that is likely to directly economically benefit from transport proposals within the area. The Flintshire UDP identifies the Deeside Industrial Estate/Development Zone as the primary economic centre within the study area, with the potential to generate 4,500 to 5,500 new jobs.

In order to align with the transportation and development polices outlined within the regional development plans, modification are required to the existing transport network to provide necessary accessibility between key growing labour market locations with the expanding and proposed employment centres.

5. EALI Assessment for Do-Something Options (2020)

5 EALI Assessment for Do-Something Package (2020)

5.1 Introduction

The following chapter contains the outcome of the economic activity and locational impact (EALI) assessment for the NEWABTS Stage 1 mitigation packages. This analysis has been carried out in line with the EALI principles within WelTAG, following the methodology outlined within chapter 2.

Primarily the assessment considers the potential income (GVA) and employment impacts generated by the package measures, based on the principles of *Additionality* and *Displacement*. Economic impacts are reported as Net impacts, rather than individual responses.

5.2 Package Overview

Table 5.1 below summarises the option packages determined for the NEWABTS Stage 1 EALI assessment.

The package options have been developed based on an increasing level of mitigation, from “smarter choices” based demand management through to providing heavy infrastructure to enhance transport accessibility.

Each package contains a series of measures designed to mitigate the existing transport constraints in order to benefit the existing economy and attract additional investment.

The following evaluation assesses, in principle, how the economic activity within the study area will be influenced by the proposed package measures.

Table 5.1: NEWABTS Option Packages

Area wide package	1. Managing Demand
Flint / Mold – Chester (via Deeside / Broughton)	2. Making Best Use
	3. Capacity Enhancements
Wrexham – Deeside (via Mold / Buckley)	4. Making Best Use
	5. Capacity Enhancements
Chester - Wrexham	6. Making Best Use
	7. Capacity Enhancements
Strategic Trips	8. Making Best Use
	9. Capacity Enhancements

5.3 Presentation of EALI Assessment

The EALI assessment is presented in a set structure per option package, in order to provide a comparative format. The objective of this analysis is to consider the economic impact of the package as a whole, rather than individual measures.

The analysis is subdivided into the following items:

1. Package options
2. Key economic responsive options
3. Package locational GVA impacts
4. Package location employment impacts
5. Package stimulated inward investment and contribution to the delivery regional development plans
6. Summary, including the spatial economic impact of the scheme at Wales and UK levels

Further detailed economic analysis for each option is included within the appendices.

Package 1: Managing Demand

5.4 Package 1: Managing Demand

This package contains a series of options which aim to reduce demand for travel, through primarily managing demand and promoting sustainable travel.

5.4.1 Scheme Options

Table 5.2: Package 1: Managing Demand

Theme	Name	Description	Ref
Walking and Cycling	Funds for businesses to invest in walking and cycling facilities	Provide grant funding which businesses in the study area can bid for to use on walking and cycling facilities.	29
	Encourage employers to increase cycling within its work force	Provide support to employers to help encourage walking and cycling to work.	30
	Develop a local publicity campaign to promote walking and cycling	Coordinated local publicity campaign to increase awareness of the benefits of walking and cycling and current facilities and support that is available.	31
Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	The traditional way of moving a large proportion of goods is by lorry. Many companies are not even aware of a possible alternative to this and there is an opportunity for TAITH to work with industry in an awareness campaign.	75
	Freight Exchange	There are a number of internet based freight exchanges but the membership of these by hauliers is still relatively low. This could be enhanced through an independent awareness campaign.	78
Other	Ensure that future developments mitigate any adverse impacts on the transport network	This would be a policy stance whereby the agencies in the study area who consider development control insure that future developments mitigate the adverse impacts on the transport network that they are anticipated to cause.	88
	Improve linkages between economic development plans and transportation plans.	Ensuring that economic development plans and transport plans are written in a coordinated manor so that they do not cause unintended consequences for each other.	90
Demand Management	Promoting car clubs and car sharing	Providing financial and other forms of support to help groups with the development of car clubs and car sharing schemes in the study area.	93
	Workplace Travel Planning	Work with employers at key employment centres in the study area to reduce car travel to work and promote alternative modes.	96
	Parking management strategy	Devise a study area wide parking management strategy to reduce demand for car travel during peak periods and incentivise travel by alternative means.	97

5.4.2 Key Options with Potential Economic Responses

The package contains a series of measures designed to reduce car demand by encouraging the adoption of sustainable modes.

In principle sustainable modes provide more opportunity for interaction with local communities and amenities, which potentially results in a minor increase in economic activity within the local area. However, based on the options within this package, the economic impact generated by this response is likely to be minimal.

Annex A contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

5.4.3 GVA Economic Impacts

This package encourages potential minor increases in GVA within option specific locations, improved productivity through associated employee health benefits and increased local community interaction.

5.4.4 Employment Economic Impacts

Measures within this package are unlikely to generate an employment response.

5.4.5 Stimulated Investment and Contribution to Regional Development Plans

Measures within this package align with regional development policies. However in isolation, these measures are unlikely to assist in delivering the land use allocation or attract additional investment.

5.4.6 Summary

In summary this package is likely to result in a minimal economic activity response, which is restricted to specific initiative locations.

Package 2: Making Best Use – Flint / Mold-Chester Corridor

5.5 Package 2: Making Best Use – Flint/Mold-Chester (via Deeside and Broughton)

Combined transport corridor between Flint / Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Estate or Buckley and Broughton.

5.5.1 Scheme Options

This package consists of options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

The elements within this package that can be identified as a location are shown in Figure 5.6 below.

Table 5.7: Package 2: Making Best Use – Flint / Mold-Chester

Theme	Name	Description	Ref
Walking & Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry.	Provide bus priority measures along the B5129 to allow buses to avoid traffic congestion when travelling through the Connah's Quay/Shotton area and improve service reliability.	44
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS area where improvements can be made.	55
	Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments.	106
Highway	Improvements to Alltami Signals	Improve the traffic signal arrangements at Alltami to reduce delays at this location.	8
	Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay	Identify a series of minor on-line highway improvements which can reduce the congestion problems currently experienced along the B5129 between Connah's Quay and Queensferry.	9
	Minor on-line improvements between Broughton and Saltney	Identify a series of highway measures which improve safety and relieve pinchpoints on the A5104	103

5.5.2 Key Economic Responses

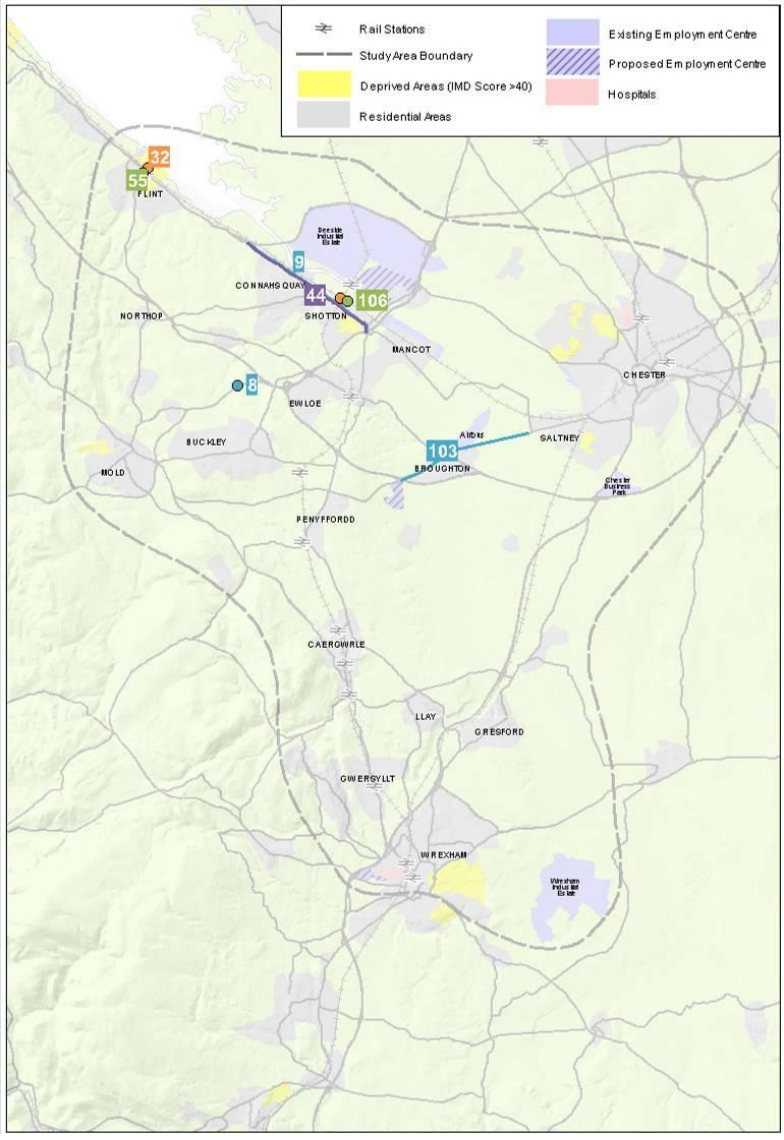
This package contains a series of options designed to reduce the level of car demand and improve the level of accessibility within the Flint/Mold – Chester corridor by enhancing or marketing existing transport network facilities both highway and non-highway based.

The primary positive economic responses are generated through the improved resilience of the highway network, specifically tackling congestion within the B5129 Connah's Quay area, A5104 Broughton to Saltney corridor and the Alltami signals along the A483 Mold to Deeside corridor.

The net economic impact of this complete package is likely to increase the level of economic activity and productivity within the Flint/Mold-Chester corridor, through the provision highway measures which alleviate key congestion and through the provision of multi modal accessibility. Economic responses are likely to be constrained to option specific locations such as Broughton, due to remaining existing strategic transit problems within the broader transport network.

Annex D contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

Figure 5.6: Package 2: Making Best Use – Flint / Mold-Chester



Option Map Key:

	32. Cycle parking improvements
44	B5129 Bus Priority
	55. Improved rail station accessibility
106	Improved connection between rail and bus services at Shotton station
8	Improvements to Alltami signals
9	Reduced congestion along B5129
103	Minor on-line improvements between Broughton and Saltnev

5.5.4 GVA Economic Impacts

This package is likely to produce a minor localised raise in GVA due to an increase in the level of productivity within certain scheme specific locations, such as the B5129 Connah's Quay corridor and Broughton. This is likely to generate a minor displacement of GVA towards the corridor locations from competing local locations.

Figure 5.7 on the following page represents the potential employment return for Package 2: Flint/Mold-Chester Corridor.

5.5.5 Employment Economic Impacts

This package is likely to create a low level of employment through the expansion of existing businesses within option specific locations, such as the retail centre within Broughton. The net employment response is likely to be restricted to the level of accessibility benefit provided by the measures within this package.

Similar to GVA there is a potential for a minor displacement employment towards the corridor from competing locations.

Figure 5.8 on the following page represents the potential employment return for Package 2: Flint/Mold-Chester Corridor.

5.5.6 Stimulated Investment and Contribution to Regional Development Plans

This package is likely to attract some additional investment as it supports the delivery of proposed development locations within Broughton and Deeside. However the majority of options within this package support the existing economy rather than encouraging it to expand.

This package contributes to the delivery of regional development plans as follows;

Cheshire West & Chester LDF - this package does not directly contribute to the delivery of the Cheshire West and Chester LDF.

Flintshire UDP – this package supports and contributes towards the delivery of the Flintshire UDP housing and employment allocations within the B5129 Connah's Quay corridor and Broughton, through improved highway resilience and local public transport accessibility and reliability. This package supports the extension to the Broughton Retail Park and Warren Hall Business Park.

Wrexham UDP - this package does not directly contribute to the delivery of the Wrexham UDP.

5.5.7 Summary

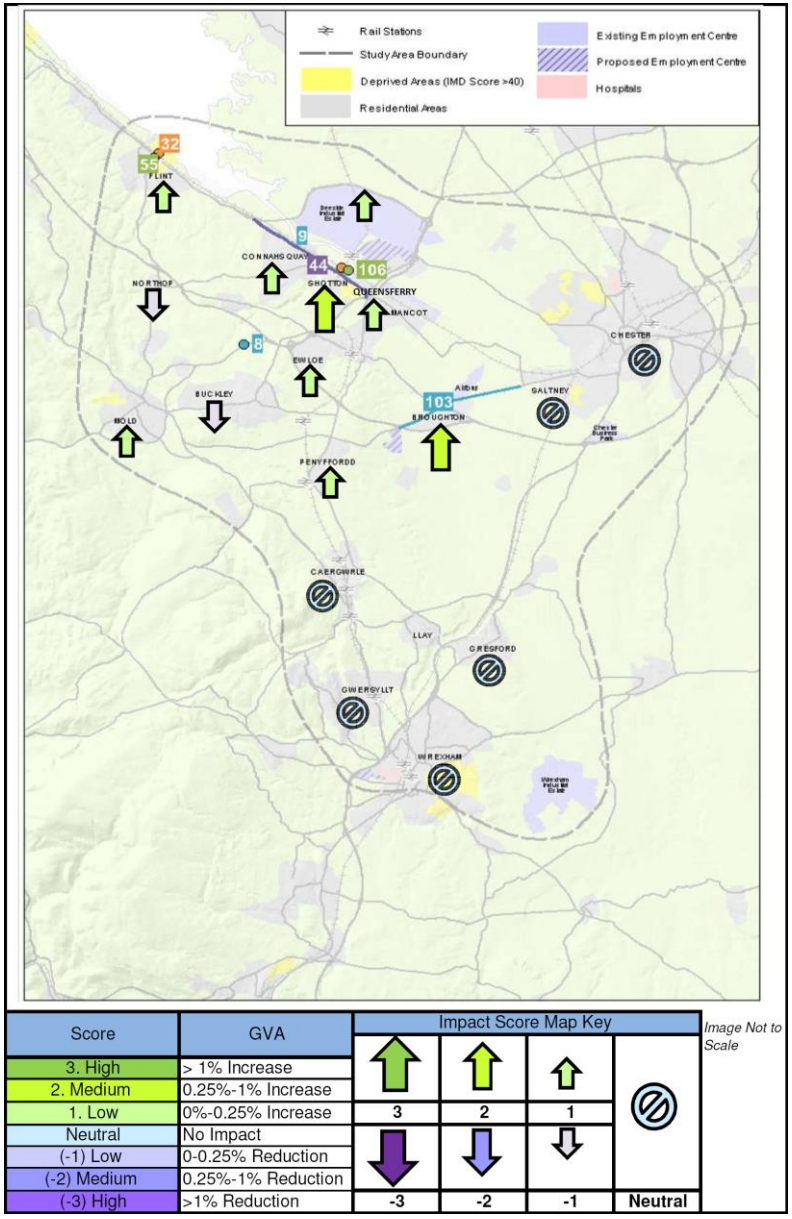
In summary this package is likely to generate a minor increase in the level of economic activity within the NEWABTS area, due to improved highway network efficiency and multi modal accessibility. However positive responses are likely to be restricted to specific option locations such as the B5129 Connah's Quay corridor and Broughton.

Table 5.8 below indicates that economic responses delivered through this package are likely to be minimal and restricted to the study area, primarily within scheme specific locations.

Table 5.8: Package 2: Flint/Mold-Chester Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Low	Low
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

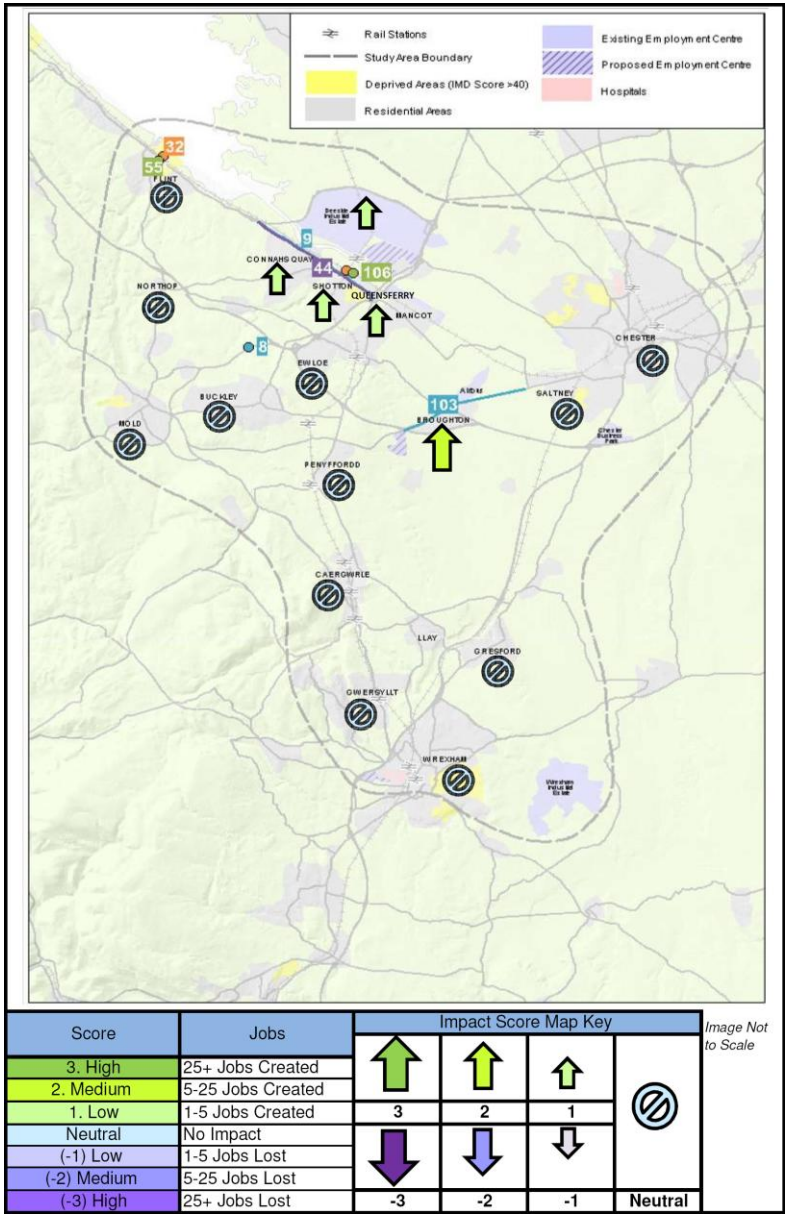
Figure 5.7: Package 2: Flint/Mold–Chester GVA Impacts



Score	GVA	Impact Score Map Key
3. High	> 1% Increase	3
2. Medium	0.25%-1% Increase	2
1. Low	0%-0.25% Increase	1
Neutral	No Impact	Neutral
(-1) Low	0-0.25% Reduction	-1
(-2) Medium	0.25%-1% Reduction	-2
(-3) High	>1% Reduction	-3

Image Not to Scale

Figure 5.8: Package 2: Flint/Mold-Chester Employment Impacts



Score	Jobs	Impact Score Map Key
3. High	25+ Jobs Created	3
2. Medium	5-25 Jobs Created	2
1. Low	1-5 Jobs Created	1
Neutral	No Impact	Neutral
(-1) Low	1-5 Jobs Lost	-1
(-2) Medium	5-25 Jobs Lost	-2
(-3) High	25+ Jobs Lost	-3

Image Not to Scale

Package 3: Capacity Enhancements – Flint / Mold-Chester Corridor

5.6 Package 3: Capacity Enhancements - Flint/Mold-Chester (via Deeside and Broughton)

This package contains a selection of options involving the provision of new infrastructure.

The elements within this package that can be identified as a location are shown in Figure 5.9 below

Table 5.9: Package 3: Capacity Enhancements – Flint/Mold-Chester

Theme	Name	Description	Ref
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.	39
	Mold to Saltney cycleway	A new walking and cycling link between Mold and Saltney with associated connections to key destinations along the route utilising a former railway alignment.	40
	Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities, and major employers.	41
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
Bus	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Estate and Chester	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	49
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
Rail	Rhyl-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester-Crewe shuttle). Requires new turnback facility at Rhyl.	67
	New station at Queensferry on the North Wales Main Line	New stations have been assessed as part of the NWRS study for Taith.	69
	New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.	70
	New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton	72
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	Improve road connections to Deeside Industrial Estate	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Estate.	13
	Improve road connections to the Broughton area	Identify a series of highway improvements which can improve the ease of accessing key traffic generators in the Broughton area.	14

5.6.1 Key Economic Responses

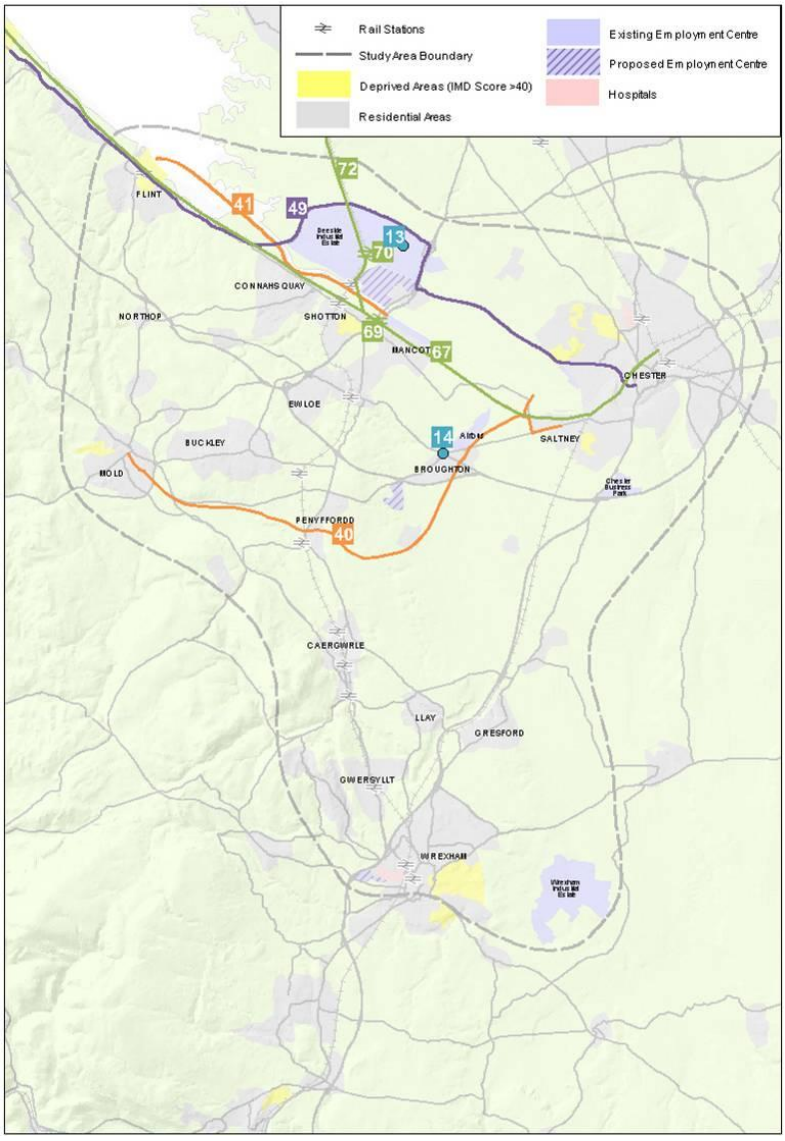
This package contains a series of options designed to improve the level of multi modal accessibility for both local and strategic trips within the Flint/Mold to Chester corridor, through the provision of new infrastructure both highway and non-highway based.

The key positive economic responses are delivered through the provision of commuter based rail services and specific highway infrastructure. However the components of these highway options are currently undefined.

The potential net economic impact of this package is an increase in the level of economic activity within the specific corridor, due to improved productivity generated through multi modal accessibility, primarily rail based.

Annex E contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

Figure 5.9: Package 3: Capacity Enhancements – Flint / Mold-Chester



Option Map Key:

40	Mold to Saltney cycleway
41	Dee Estuary Coastal Path
49	New cross Dee bus route
67	Rhyl-Chester local shuttle
69	New rail station at Queensferry
70	New rail station at Deeside Park
72	New rail service between Borderland line and Chester
13	Improved road connections to the Deeside Industrial Estate
14	Improved road connections to the Broughton area

5.6.2 Employment Economic Impacts

The measures within this package potentially generate an increase in GVA within the existing economically active corridor between Flint/Mold and Chester, due to improved productivity, delivered through the provision of multi modal infrastructure, primarily rail and highway based. These positive economic responses are likely to be focussed within the Deeside area.

The overall package is likely to generate a minor displacement of GVA towards the corridor from competing locations, however this corridor represents the primary economic link within the NEWABTS area, therefore displacement responses are likely to be limited.

Figure 5.10 on the following page represents the potential GVA return for Package 3: Flint/Mold-Chester Corridor.

5.6.3 Employment Economic Impacts

This package facilitates and encourages employment growth within the corridor through the expansion of existing businesses and the attraction of additional investment. However the scale of this response is likely to be restricted to the level of accessibility benefit provided by the options within the package. Certain options within this package such as new rail stations lead to direct job creation.

Similar to GVA, employment responses are likely to be limited by the primary economic nature of the corridor.

Figure 5.11 on the following page represents the potential employment return for Package 3: Flint/Mold-Chester Corridor.

5.6.4 Stimulated Investment and Contribution to Regional Development Plans

This package facilitates the expansion of existing businesses within the corridor and contributes towards the delivery of proposed developments within Broughton and Deeside Industrial Estate. In addition the package potentially attracts additional investment through improvements in local labour market accessibility.

This package contributes to the delivery of regional development plans as follows;

Cheshire West & Chester LDF – this package partially supports the delivery of Cheshire West and Chester LDF allocations through the provision of enhanced public transport services, primarily rail based.

Flintshire UDP – this package directly contributes to the delivery of the Flintshire UDP land use allocations through the provision of multi modal infrastructure within the Deeside Development Zone. This addresses the accessibility issues within the area for sustainable modes, in line with UDP policies. Proposed rail stations within Deeside Park and Queensferry directly align with the UDP policies. This package directly contributes towards the delivery of the Broughton Retail Park extension and Warren Hall Business Park development.

Wrexham UDP - this package does not directly contribute to the delivery of the Wrexham UDP.

5.6.5 Summary

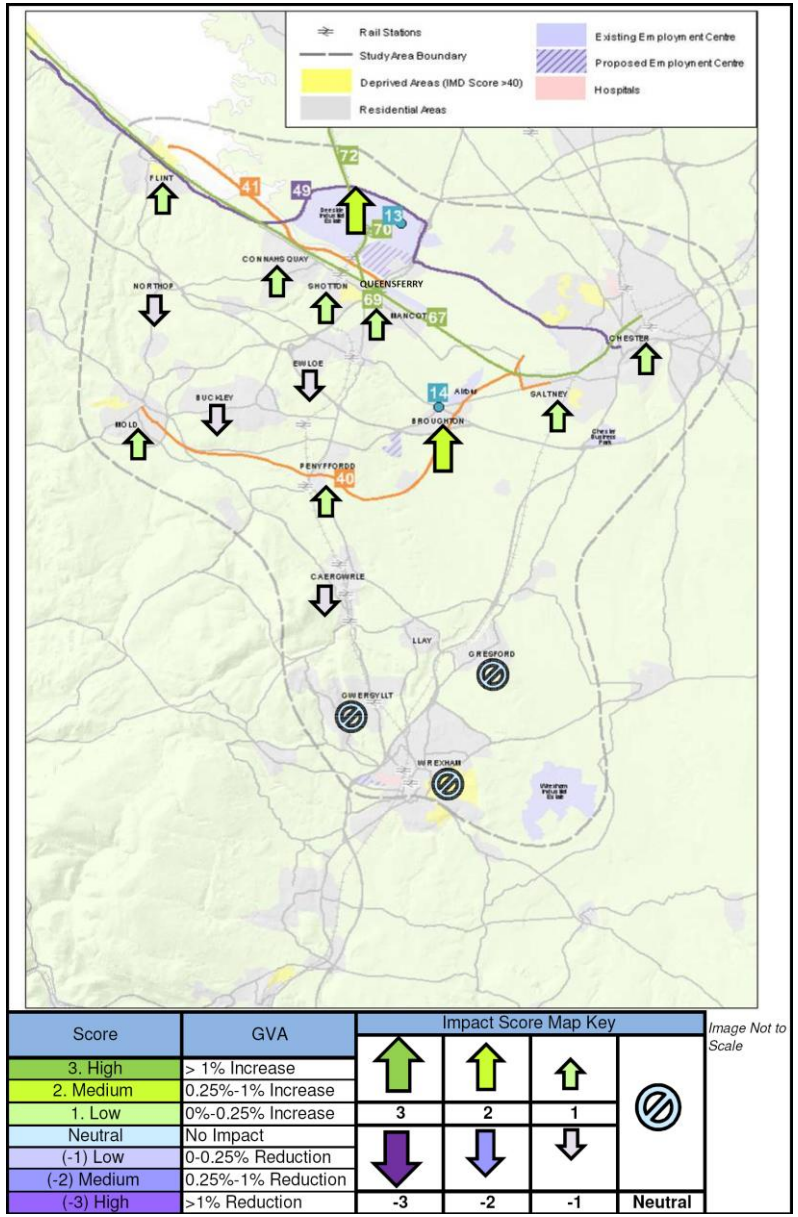
In summary this package is likely to generate a significant increase in the level of economic activity and productivity within the corridor and study area, to the benefit of both the local and national economies.

Table 5.10 below indicates that the positive economic responses are likely to be experienced within the NEWABTS area and throughout the broader economy of Wales. This is likely to be reflected in an increase in GVA, employment levels and lead to the attraction of additional investment, primarily within the A55/A494 corridor, Deeside Industrial Estates and Broughton.

Table 5.10: Package 3: Flint/Mold-Chester Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	Medium	Medium
Wales	Low	Low	Low
Great Britain	Neutral	Neutral	Neutral

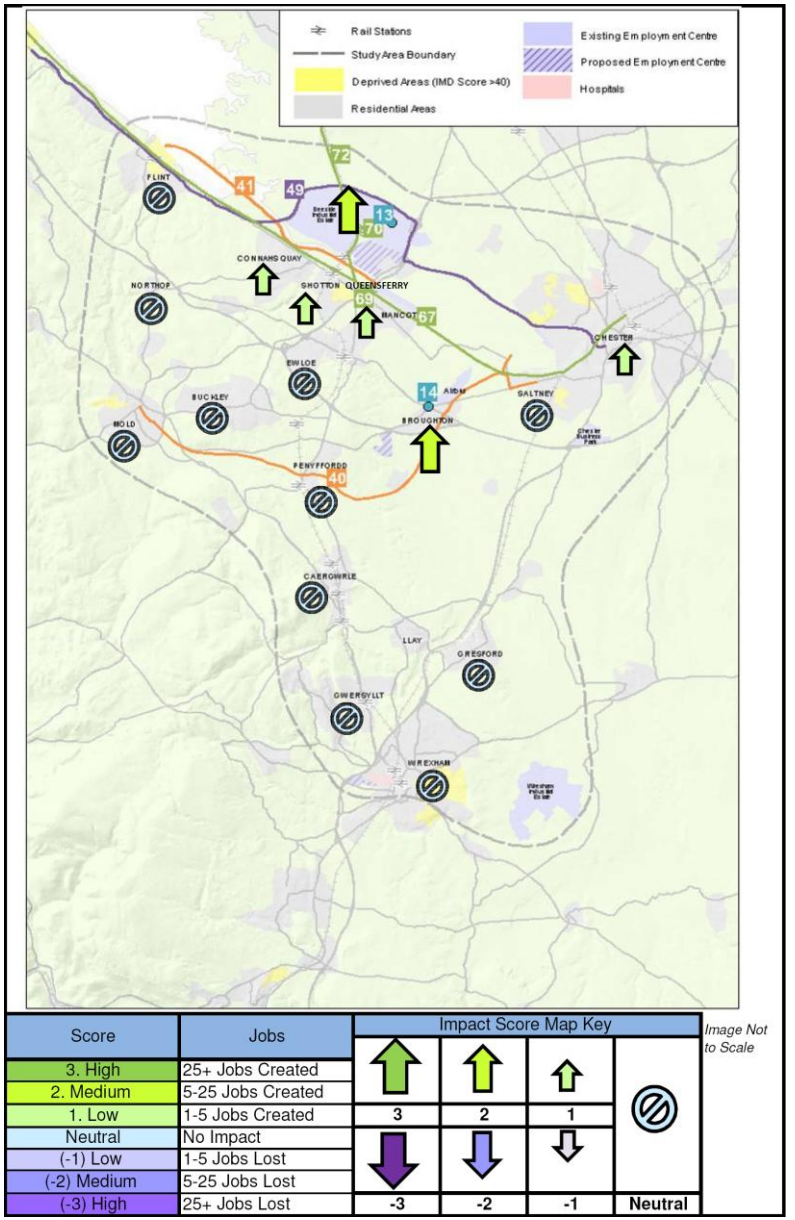
Figure 5.10: Package 3: Flint/Mold-Chester GVA Impacts



Score	GVA	Impact Score Map Key
3. High	> 1% Increase	3
2. Medium	0.25%-1% Increase	2
1. Low	0%-0.25% Increase	1
Neutral	No Impact	Neutral
(-1) Low	0-0.25% Reduction	-1
(-2) Medium	0.25%-1% Reduction	-2
(-3) High	>1% Reduction	-3

Image Not to Scale

Figure 5.11: Package 3: Flint/Mold-Chester Employment Impacts



Score	Jobs	Impact Score Map Key
3. High	25+ Jobs Created	3
2. Medium	5-25 Jobs Created	2
1. Low	1-5 Jobs Created	1
Neutral	No Impact	Neutral
(-1) Low	1-5 Jobs Lost	-1
(-2) Medium	5-25 Jobs Lost	-2
(-3) High	25+ Jobs Lost	-3

Image Not to Scale

Package 4: Making Best Use – Wrexham–Deeside (via Mold / Buckley)

5.7 Package 4: Making Best Use – Wrexham-Deeside

Transport corridor between Wrexham and Deeside, via Mold and Buckley.

This package consists of options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

The elements within this package that can be identified as a location are shown in Figure 5.12 below.

Table 5.11: Package 4: Making Best Use – Wrexham-Deeside

Theme	Option Name	Option Description	Ref
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS area where improvements can be made.	55
	Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments.	106
Highway	Consider a signage strategy for traffic travelling between the A55 and Wrexham	Look into options for improving the signage of traffic travelling between the A55 and Wrexham.	4
	Make better use of A541 / A550 route between the A55 and Wrexham	A series of minor improvements to the A541/A550 route addressing pinch-points along this route to improve the overall capacity of this route.	6
	Overcome pinch points in the Hope/Caergwrle area	A series of minor improvements to address the pinch-point that occurs in the Hope/Caergwrle area.	7
	Improvements on the A541 between Mold and Wrexham	Identify a series of highway measures which can improve the safety and route consistency of the A541 between Mold and Wrexham.	16

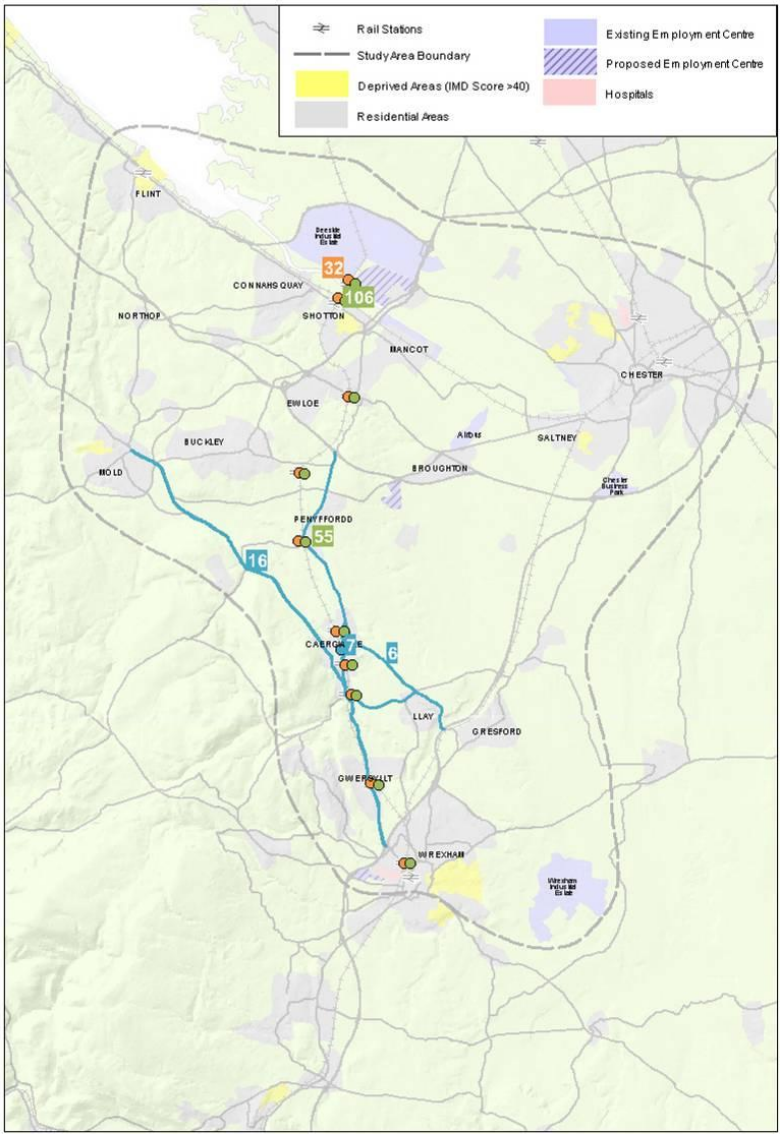
5.7.1 Key Economic Responses

This package contains a series of options which are designed to improve the level of accessibility for both strategic and local trips/traffic within the Wrexham-Deeside corridor, by enhancing or marketing existing transport facilities. The primary economic responses are delivered through the improved resilience and reliability of the A541/A550 highway network.

The net impact of this package is likely to be an increase in the level of economic activity within the corridor, specifically between corridor labour market locations and employment centres of Wrexham and the Deeside Industrial Estate.

Annex F contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

Figure 5.12: Package 4: Making Best Use – Wrexham-Deeside



Option Map Key:

	32. Cycle parking improvements
	55. Improved rail station accessibility
106	Improved connection between rail and bus services at Shotton station
6	A541/A550 route between A55 and Wrexham
7	Hope/Caergwrle highway pinch points
16	A541 Improvements between Mold and Wrexham

5.7.2 GVA Economic Impacts

This package is likely to produce a localised increase in GVA, due to improved productivity within the Wrexham to Deeside corridor, generated by multi modal accessibility measures. Key productivity benefits are delivered though the improvements in highway reliability and resilience between Wrexham, Ewloe and Mold.

However the scale of the any positive economic response is likely to be restricted by the remaining congestion within the strategic transit network i.e. A55/A494. The overall package is likely to lead to an increase in economic activity between Wrexham and commuter villages of Gwersyllt and Caergwrle.

This complete package is likely to generate a minor displacement of GVA towards the corridor locations from competing local locations.

Figure 5.13 on the following page represents the potential GVA return for Package 4: Wrexham-Deeside Corridor.

5.7.3 Employment Economic Impacts

This package is likely to lead to potential job creation within the Wrexham-Deeside corridor, due to the expansion of existing businesses and potential attraction of additional investment, within Wrexham and Deeside. However the scale of any inward investment is likely to be restricted by the broader strategic transit problems.

Similar to GVA, there is a potential for a minor displacement employment towards the corridor from competing locations.

Figure 5.14 on the following page represents the potential employment return for Package 4: Wrexham-Deeside Corridor.

5.7.4 Stimulated Investment and Contribution to Regional Development Plans

This package is likely to attract some additional investment as it supports the delivery of proposed development allocations within Wrexham and Deeside. However the majority of the options within this package support the existing economy rather than encouraging it to expand.

Cheshire West & Chester LDF - this package does not directly contribute towards the delivery of the Cheshire West and Chester LDF.

Flintshire UDP – this package provides a minor contribution towards the delivery of UDP allocations within Flintshire through provision of improved labour market accessibility within Shotton.

Wrexham UDP – this package supports the delivery of Wrexham UDP allocations within the Wrexham to Deeside corridor through the provision of improved accessibility, in line with UDP policies.

5.7.5 Summary

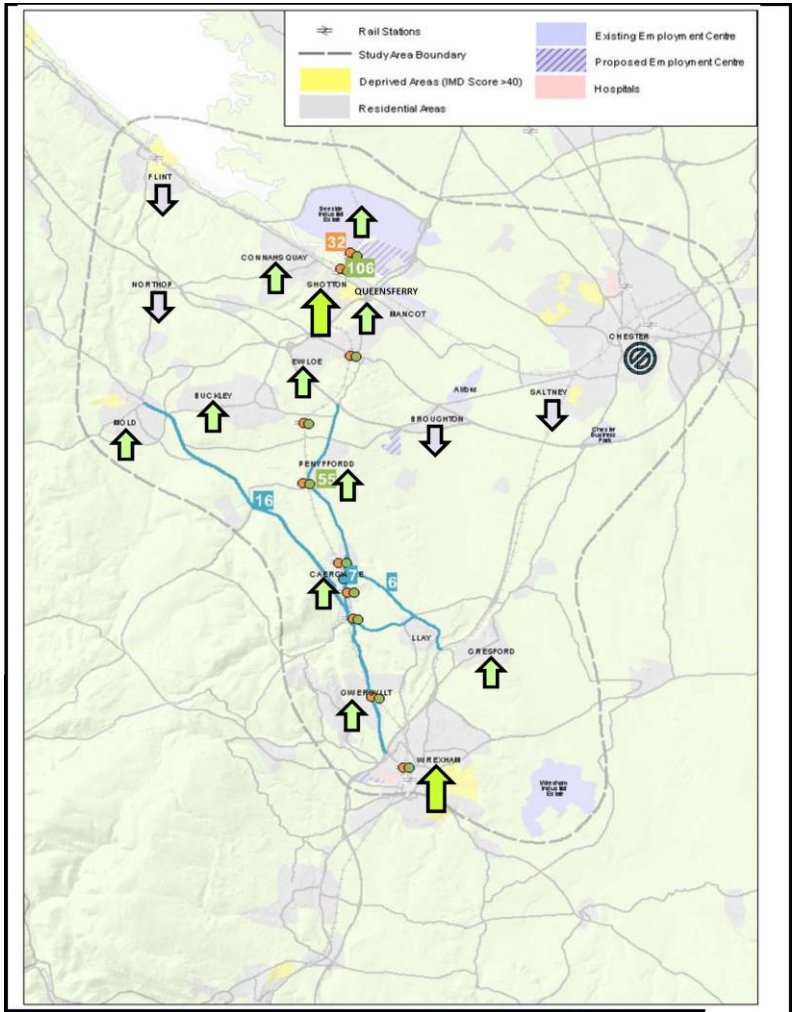
In summary this package provides transport accessibility benefits within the Wrexham to Deeside corridor, through measures that maximise the capability of the existing transport network, by addressing key constraining factors such as highway pinch points. However the scale of any positive response is likely to be restricted by the remaining transit problems within the broader highway network i.e. A55/A494 strategic trunk road.

Table 5.12 below indicates that the package has the potential to generate a low level economic response across all economic indicators both locally and nationally. However the scale of this response is dependent on the level of accessibility benefit provided by this package.

Table 5.12: Package 4: Wrexham-Deeside Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Low	Low
Wales	Low	Low	Low
Great Britain	Neutral	Neutral	Neutral

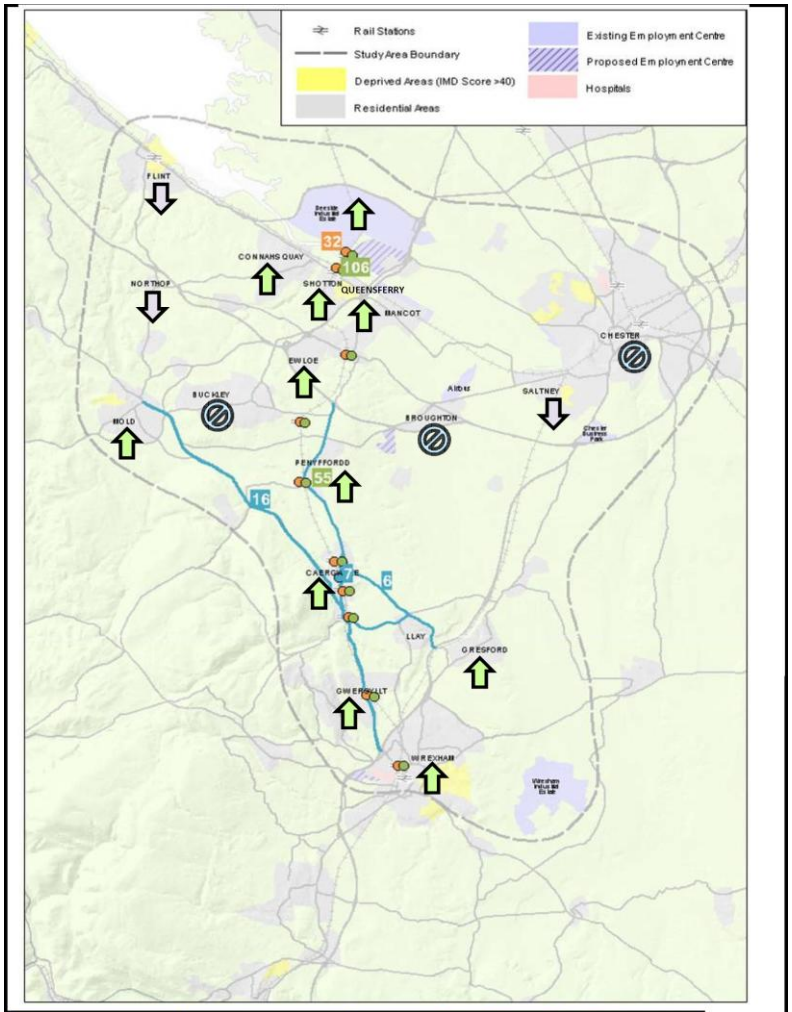
Figure 5.13: Package 4: Wrexham-Deeside GVA Impacts



Score	GVA	Impact Score Map Key
3. High	> 1% Increase	3
2. Medium	0.25%-1% Increase	2
1. Low	0%-0.25% Increase	1
Neutral	No Impact	Neutral
(-1) Low	0-0.25% Reduction	-1
(-2) Medium	0.25%-1% Reduction	-2
(-3) High	>1% Reduction	-3

Image Not to Scale

Figure 5.14: Package 4: Wrexham-Deeside Employment Impacts



Score	Jobs	Impact Score Map Key
3. High	25+ Jobs Created	3
2. Medium	5-25 Jobs Created	2
1. Low	1-5 Jobs Created	1
Neutral	No Impact	Neutral
(-1) Low	1-5 Jobs Lost	-1
(-2) Medium	5-25 Jobs Lost	-2
(-3) High	25+ Jobs Lost	-3

Image Not to Scale

Package 5: Capacity Enhancements – Wrexham–Deeside (via Mold / Buckley)

5.8 Package 5: Capacity Enhancements – Wrexham-Deeside

This package consists of options involving the provision of new infrastructure.

The elements within this package that can be identified as a location are shown in Figure 5.15 below.

Table 5.13: Package 5: Capacity Enhancements – Wrexham-Deeside

Theme	Option Name	Option Description	Ref
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
	Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside	104
Bus	Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxibuses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.	47
	New cross Dee bus route between Mold and Ellesmere Port	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	50
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	Doubling of service frequency between Wrexham and Bidston (with potential extension into Birkenhead)	56
	Increase parking provision at stations along the Wrexham - Bidston line (e.g. Penyffordd) to promote park and ride.	Additional parking provision at key stations along the Wrexham – Bidston line to encourage park and ride.	59
	New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.	70
	New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton	72
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	Improve road connections to Deeside Industrial Estate	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Estate.	13
	New road bridge between Connah's Quay and Deeside Park	A new local road bridge connecting the B5129 at Connah's Quay with Deeside Park to reduce pressure on the existing crossing points.	23
Freight	Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.	84

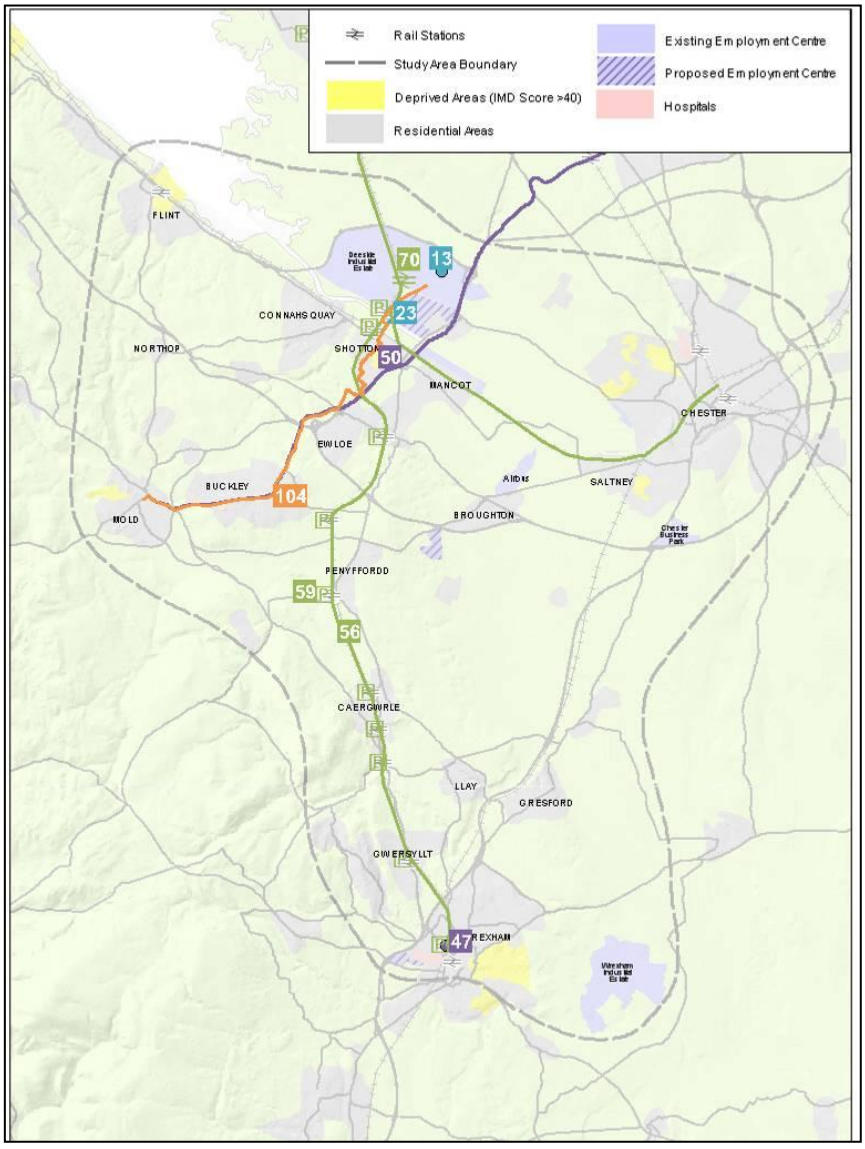
5.8.1 Key Economic Responses

This package contains a series of options designed to improve the level of multi modal accessibility within the Wrexham to Deeside corridor, through the provision of new public transport and highway infrastructure. However, based on the options included within this package the majority of the positive economic responses will be restricted to the Deeside area, due to improvements in accessibility with local labour market locations, such as the A55/A494 corridor.

In principle the complete package is likely to generate a significant increase in the level economic activity and productivity within the study area through the provision of multi modal accessibility to the Deeside Industrial Estate, primarily rail, such as the new rail station at Deeside Park. However the measures within this package fail to alleviate the primary constraints within the highway network, such as the A55/A494 trunk road, therefore the scale of economic responses are likely to be heavily restricted.

Annex G contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

Figure 5.15: Package 5: Capacity Enhancements – Wrexham-Deeside



Option Map Key:

104	Mold-Deeside cycle route
47	Wrexham General Station multi modal hub
50	New cross Dee bus route Mold to Ellesmere Port
56	Borderlands Line service frequency increase
59	Increased parking provision at stations along the Wrexham – Bidston line
70	New rail station at Deeside Park
13	Improved road connections to Deeside Industrial Estate
23	New Road Bridge between Connah's Quay and Deeside Park

5.8.2 GVA Economic Impacts

This package potentially leads to an increase in productivity levels within the Wrexham to Deeside corridor, which is reflected as an increase in GVA, primarily within the A55/A494 corridor, due to improved accessibility with the Deeside Industrial Estate.

This package is likely to lead to a minor displacement GVA towards the corridor from competing locations, both within the study area and broader locations i.e. Northern England and Wales.

Figure 5.16 on the following page represents the potential GVA return for Package 5: Wrexham-Deeside Corridor.

5.8.3 Employment Economic Impacts

This package facilitates and encourages employment growth through the expansion of existing businesses and the attraction of additional investment within the corridor, primarily within the Deeside Industrial Estate. Certain public transport options lead to direct job creation i.e. new rail stations.

Similar to GVA, there is the potential for a minor displacement of employment towards the corridor from competing locations.

Figure 5.17 on the following page represents the potential employment return for Package 5: Wrexham-Deeside Corridor.

5.8.4 Stimulated Investment and Contribution to Regional Development Plans

This package facilities and supports the expansion of existing business within the Wrexham to Deeside corridor, primarily within the Deeside Industrial Estate and potentially attracts additional investment through improvements in multi modal accessibility and highway capacity/resilience within the Deeside Development Zone.

This package contributes to the delivery of regional development plans as follows;

Cheshire West & Chester LDF – this package does not directly contribute to the delivery of the Cheshire West and Chester LDF, however the package does provide improved rail connections to the Deeside area through the new rail service between the Borderlands and Chester lines.

Flintshire UDP – this package directly support the delivery of the land use allocations within the Flintshire UDP, through the provision of new multi modal infrastructure, connecting the key labour market locations within the A55/A494 corridor. This package provides the necessary connections with the key employment centre of the Deeside Industrial Estate/Development Zone, in line with transport policies within the Flintshire UDP.

Wrexham UDP – this package contributes to the delivery of the Wrexham UDP allocations within Wrexham town, through the provision of a multi modal transport hub at the Wrexham General Station. Additionally, this package contributes to delivering allocations within the corridor villages, such as Gwersyllt, through improved rail services.

5.8.5 Summary

In summary this package improves the level of accessibility for all users along the Wrexham to Deeside corridor by providing multi modal connections through new infrastructure, primarily public transport options. This package essentially increases the level of economic activity within the corridor by improving accessibility to the Deeside Industrial Estate. However, positive economic responses are likely to be heavily restricted, as this package fails to address key highway network constraints.

In order to assess the impact of the highway options within this package, further details are required regarding the measures within Option 13 improved road connections with the Deeside Industrial Estate and the economic feasibility of a new River Dee Road Bridge (Option 23).

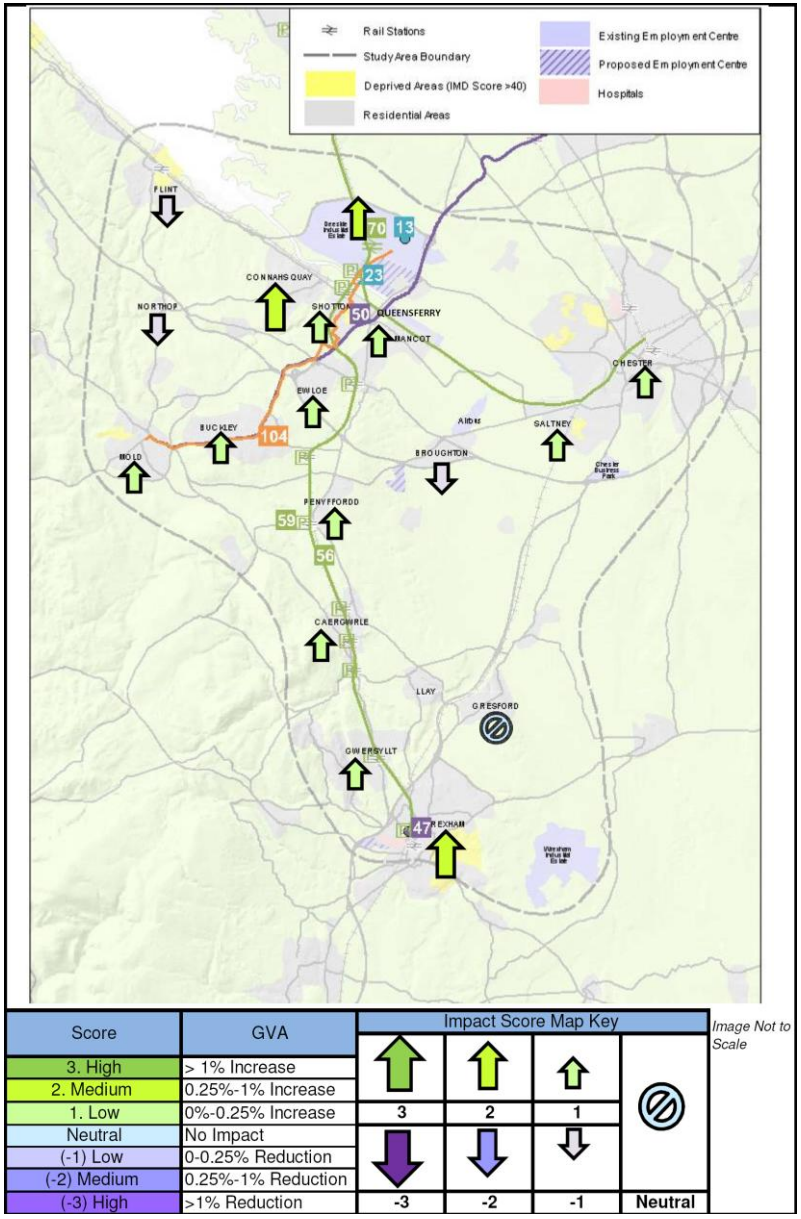
In addition further detailed assessment is required to understand the complete economic impact of this package as additional indirect benefits are likely to be determined, through mode shift and decongestion.

Table 5.14 below indicates that this package will benefit the study area economy, principally within the Deeside area, due to the options included, which support of the expansion of existing businesses, facilitate additional investment and improve accessibility for local labour market catchments, such as the A55/A494 corridor locations, including Connah's Quay and Shotton.

Table 5.14: Package 5: Wrexham-Deeside Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	Medium	Medium
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

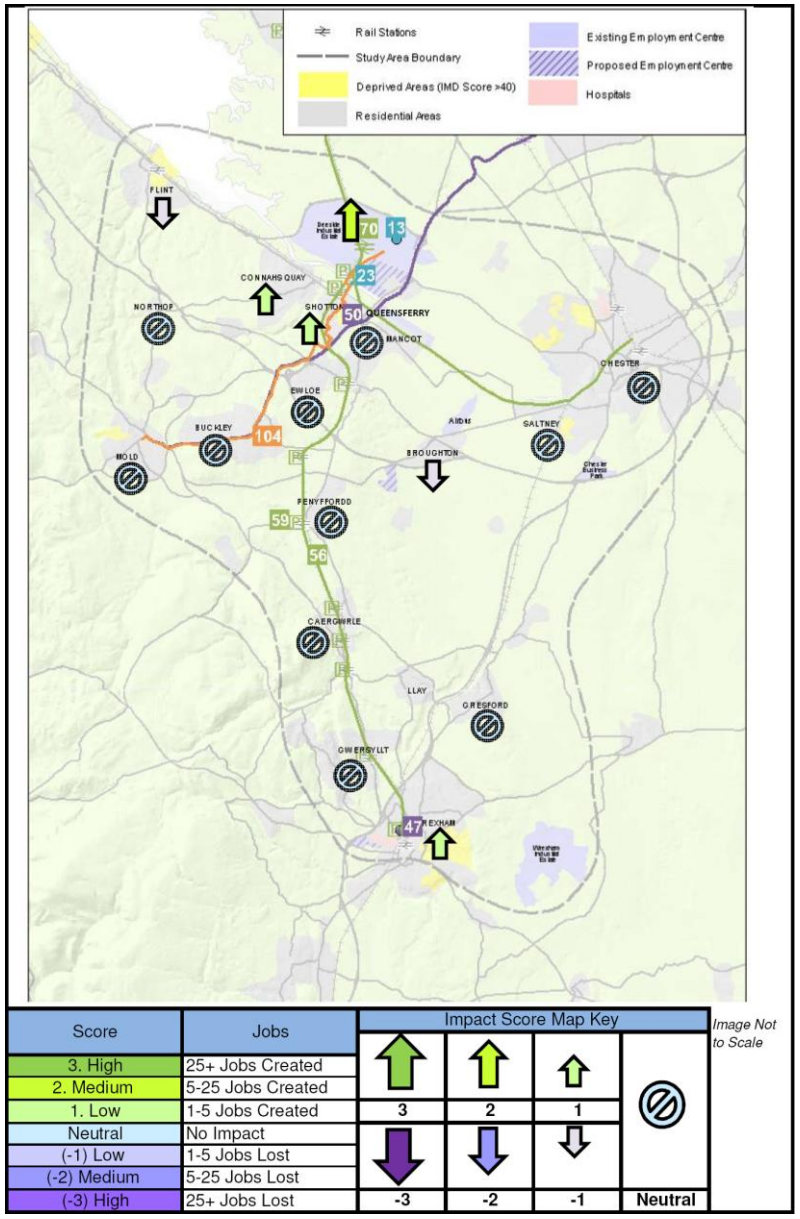
Figure 5.16: Package 5: Wrexham-Deeside GVA Impacts



Score	GVA	Impact Score Map Key
3. High	> 1% Increase	3
2. Medium	0.25%-1% Increase	2
1. Low	0%-0.25% Increase	1
Neutral	No Impact	Neutral
(-1) Low	0-0.25% Reduction	-1
(-2) Medium	0.25%-1% Reduction	-2
(-3) High	>1% Reduction	-3

Image Not to Scale

Figure 5.17: Package 5: Wrexham-Deeside Employment Impacts



Score	Jobs	Impact Score Map Key
3. High	25+ Jobs Created	3
2. Medium	5-25 Jobs Created	2
1. Low	1-5 Jobs Created	1
Neutral	No Impact	Neutral
(-1) Low	1-5 Jobs Lost	-1
(-2) Medium	5-25 Jobs Lost	-2
(-3) High	25+ Jobs Lost	-3

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Package 6: Making Best Use – Chester-Wrexham

5.9 Package 6: Making Best Use – Chester-Wrexham

Transport corridor between Chester and Wrexham.

Options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

The elements within this package that can be identified as a location are shown in Figure 5.18 below.

Table 5.15: Package 6: Making Best Use – Chester-Wrexham

Theme	Option Name	Option Description	Ref
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Bus priority at the A483/B5445 junction to avoid traffic congestion	Provide bus priority measures at the junction of the A483. Capacity Enhancements/B5445 to allow buses to avoid traffic congestion at this location and improve service reliability.	43
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS area where improvements can be made.	55

5.9.1 Key Economic Responses

This package contains a series of options designed to reduce the level of car demand within the Chester-Wrexham corridor by enhancing or marketing exiting facilities for sustainable modes, primarily public transport based.

In principle this complete package is likely to generate a minor increase in the level of economic activity within the corridor, due to improvements in local labour market accessibility to Chester and Wrexham, leading to a minor increase in productivity.

The net economic impact of this package is likely to be a minor increase in corridor specific GVA. Other economic responses are constrained by the level of accessibility provided by this package.

Annex H contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

5.9.2 GVA Economic Impacts

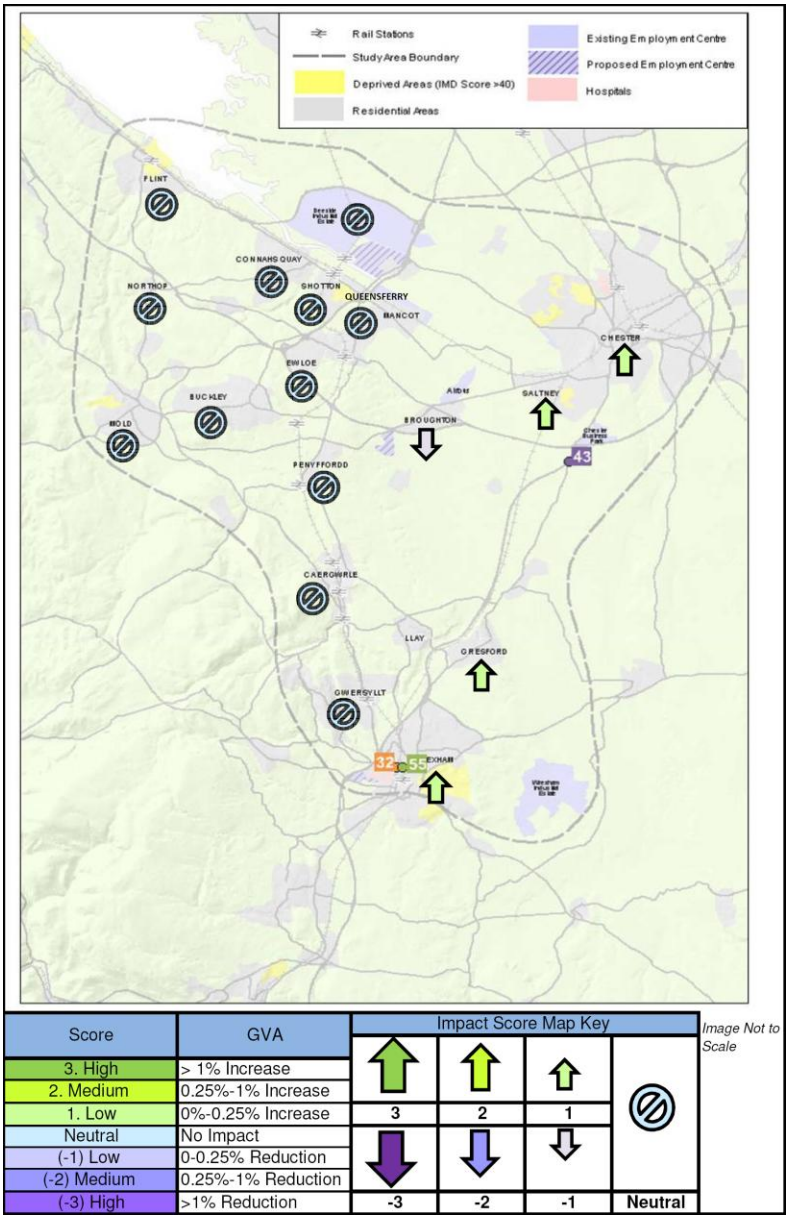
This package is likely to generate a potential minor localised increase in GVA within the Chester to Wrexham corridor, primarily within major locations of Chester and Wrexham, due to improved labour market accessibility.

These GVA increases are interlinked with improvements in public transport reliability, reflected as an increase in rail and bus passenger utilisation leading to increased interaction with local amenities.

Enhancing the Chester to Wrexham corridor is likely to result in the minor displacement of GVA towards corridor locations, however based on the options within this packages, there response are likely to be minimal.

Figure 5.18 represents the potential GVA return for Package 6: Chester-Wrexham Corridor.

Figure 5.18: Package 6: Chester-Wrexham GVA Impacts



Score	GVA	Impact Score Map Key
3. High	> 1% Increase	3
2. Medium	0.25%-1% Increase	2
1. Low	0%-0.25% Increase	1
Neutral	No Impact	Neutral
(-1) Low	0-0.25% Reduction	-1
(-2) Medium	0.25%-1% Reduction	-2
(-3) High	>1% Reduction	-3

Image Not to Scale

Option Map Key:

32	Cycling parking at public transport interchanges
43	A483/B5445 Junction Bus Priority
55	Improved non-car station accessibility

5.9.3 Employment Economic Impacts

Measures within this package are unlikely to generate an employment response.

5.9.4 Stimulated Investment and Contribution to Regional Development Plans

Measures within this package align with the regional development policies. However they are unlikely to assist in delivering the land use allocations, as stated within Cheshire West & Chester and Wrexham development plans.

5.9.5 Summary

In summary this package provides a minor improvement in the level of public transport accessibility within the Wrexham to Chester corridor, through measures that make best use of existing services and facilities.

Table 5.16 below indicates that the package will provide a minor GVA within the NEWABTS area, restricted to specific locations along the Wrexham to Chester corridor. It is unlikely that this package will generate additional employment and investment responses.

Table 5.16: Package 6: Chester-Wrexham Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Neutral	Neutral
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

Package 7: Capacity Enhancements – Chester-Wrexham Corridor

5.10 Package 7: Capacity Enhancements – Chester-Wrexham

This package consists of options involving the provision of new infrastructure.

The elements within this package that can be identified as a location are shown in Figure 5.19 below.

Table 5.17: Package 7: Capacity Enhancements – Chester-Wrexham

Theme	Option Name	Option Description	Ref
Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.	39
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
Bus	Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxibuses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.	47
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
Rail	Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury)	Hourly shuttle service to be operated alongside existing services to give a basic half-hourly service pattern between Wrexham and Chester.	64
	New station at Rossett on the Wrexham to Chester line	New stations have been assessed as part of the NWRS study for Taith.	71
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.	17
	Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.	18

5.10.1 Key Economic Responses

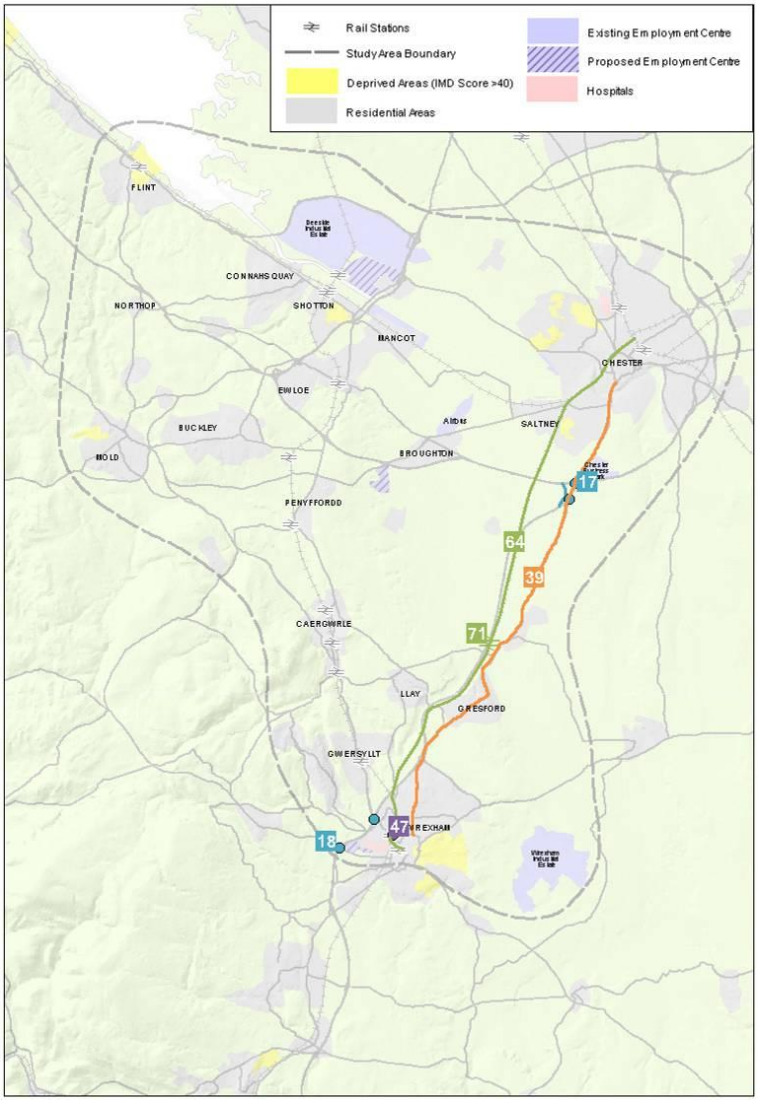
This package contains a series of options designed to improve the level of multi modal accessibility within the Wrexham and Chester corridor, through the provision of public transport infrastructure and specific highway improvements at key congestion locations within either end of the A483 trunk road.

Alleviating these key A483 trunk road constraints improves the resilience and reliability of the corridor, to the benefit of both strategic and local traffic. Additional localised accessibility benefits are likely to be experienced within the corridor locations, through the improved rail services and facilities.

The net economic impact of this package is a positive increase in all economic factors within the specific corridor, through the provision of improved multi modal accessibility between labour market locations and employment centres. The additional highway capacity encourages existing corridor businesses to expand and facilitates additional development.

Annex I contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

Figure 5.19: Package 7: Capacity Enhancements – Chester-Wrexham



Option Map Key:

39	National Cycle Route 5 Link
47	Wrexham multi modal transport hub
64	Shuttle service Wrexham to Chester
71	New rail station at Rossett
17	A483/A55 Junction improvement
18	Key A483 junction improvements

5.10.2 GVA Economic Impacts

Providing improved multi modal accessibility within the Chester to Wrexham corridor, though the provision of new public transport and highway infrastructure, is likely to generate a substantial increase in the level of productivity within the corridor, primarily focused within Wrexham and Chester.

This potential increase in productivity will be experienced both by strategic and local highway users, which should be reflected in an increase in GVA throughout the corridor. Wrexham is likely to experience an increase in the level of economic activity with South Wales, due to the reliability benefits provided by the A483 junction modifications.

The scale of transport benefits delivered by this package is likely to increase the competitive status of the A483 corridor, leading to the potential displacement of GVA towards this enhanced corridor.

Figure 5.20 represents the potential GVA return for Package 7: Chester-Wrexham Corridor.

5.10.3 Employment Economic Impacts

Employment responses to providing improved multi modal accessibility within the Chester to Wrexham corridor are likely to be similar to the GVA impacts. This corridor is likely to experience a broader increase in employment levels due to improved

productivity, leading to the expansion of existing businesses within the corridor and the potential attract of additional investment. Employment responses are likely to be focused within Chester and Wrexham.

The level of employment displacement within the study area is dependent on the scale of employment growth and attraction of investment within the Chester to Wrexham corridor, in comparison to competing locations.

Figure 5.21 represents the potential employment return for Package 7: Chester-Wrexham Corridor.

5.10.4 Stimulated Investment and Contribution to Regional Development Plans

This package facilities and supports the expansion of existing business within the corridor such as the Chester Business Park and potentially attracts additional investment through improved multi modal accessibility and highway capacity/resilience.

This package contributes to the delivery of regional development plans as follows;

Cheshire West & Chester LDF – this package contributes towards the delivery of development growth within the Chester and Cheshire West through the provision of multi modal accessibility within the corridor and provision of key highway infrastructure at the A483/A55 junction. However, the scale of support is restricted by the Cheshire West and Chester LDF core strategy, which focuses on improving connections and growth within Chester and Cheshire West locations e.g. Ellesmere Port.

Flintshire UDP – this package does not contribute to the delivery of the Flintshire UDP allocations.

Wrexham UDP- this package contributes towards the delivery of the Wrexham UDP allocations, through the provision of multi modal accessibility within the corridor, specifically within Wrexham town. Key highway infrastructure improvements along the A483 improve accessibility into Wales and Northern England, increasing the development viability status of Wrexham Town and the Wrexham Industrial Estate. However, the attraction of investment to the Wrexham Industrial Estate is likely to be restrained by the local accessibility problems. Within the corridor the package supports the delivery of housing and employment allocations within Gresford and Llay.

5.10.5 Summary

In summary this package improves the level of accessibility for all users along the Wrexham to Chester corridor by providing multi modal connections through new infrastructure, including public transport and key highway mitigation. This package essentially enhances the economic linkage between Wrexham and Chester.

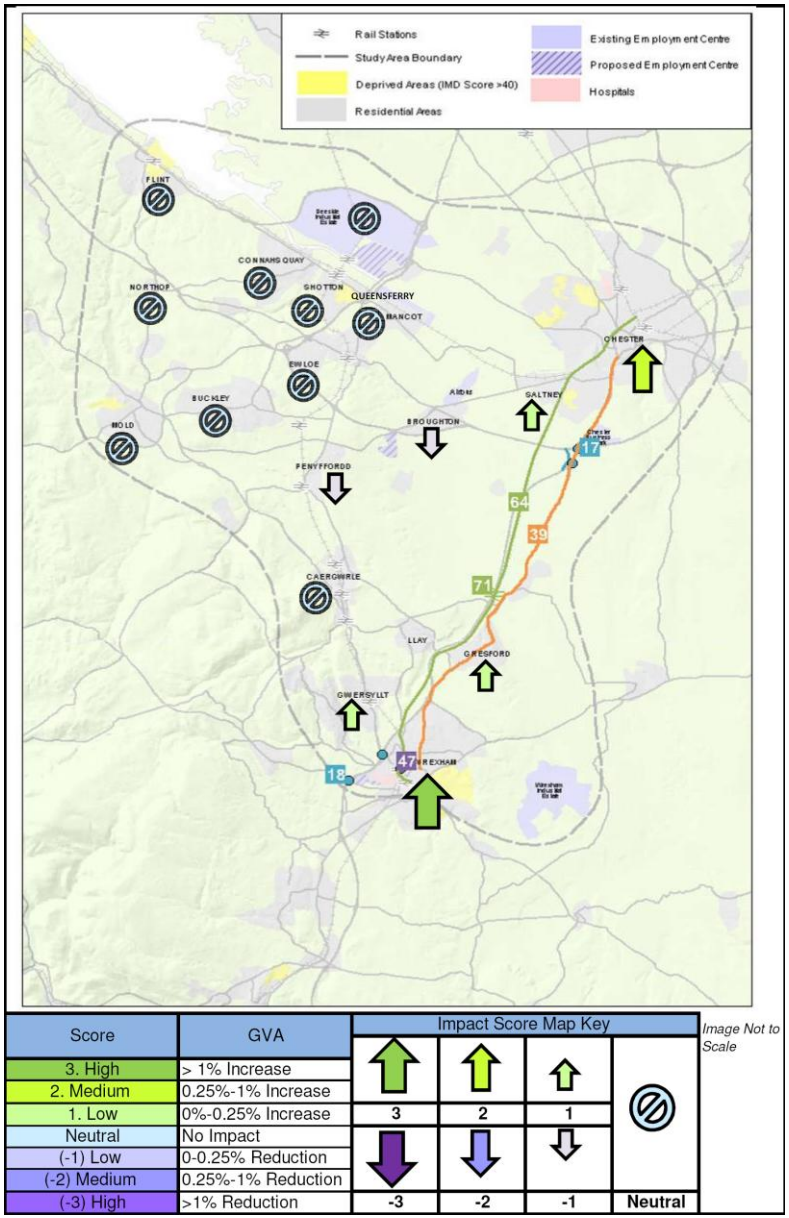
Further detailed assessment is required to understand the complete economic impact of this package as additional indirect benefits are likely to be determined through mode shift and decongestion.

Table 5.18 below indicates that the package will benefit both the local study area economy, primarily within the Wrexham to Chester corridor, and the economy of Wales through improved connections to Wrexham and Chester.

Table 5.18: Package 7: Chester-Wrexham Spatial Economic Impact Summary

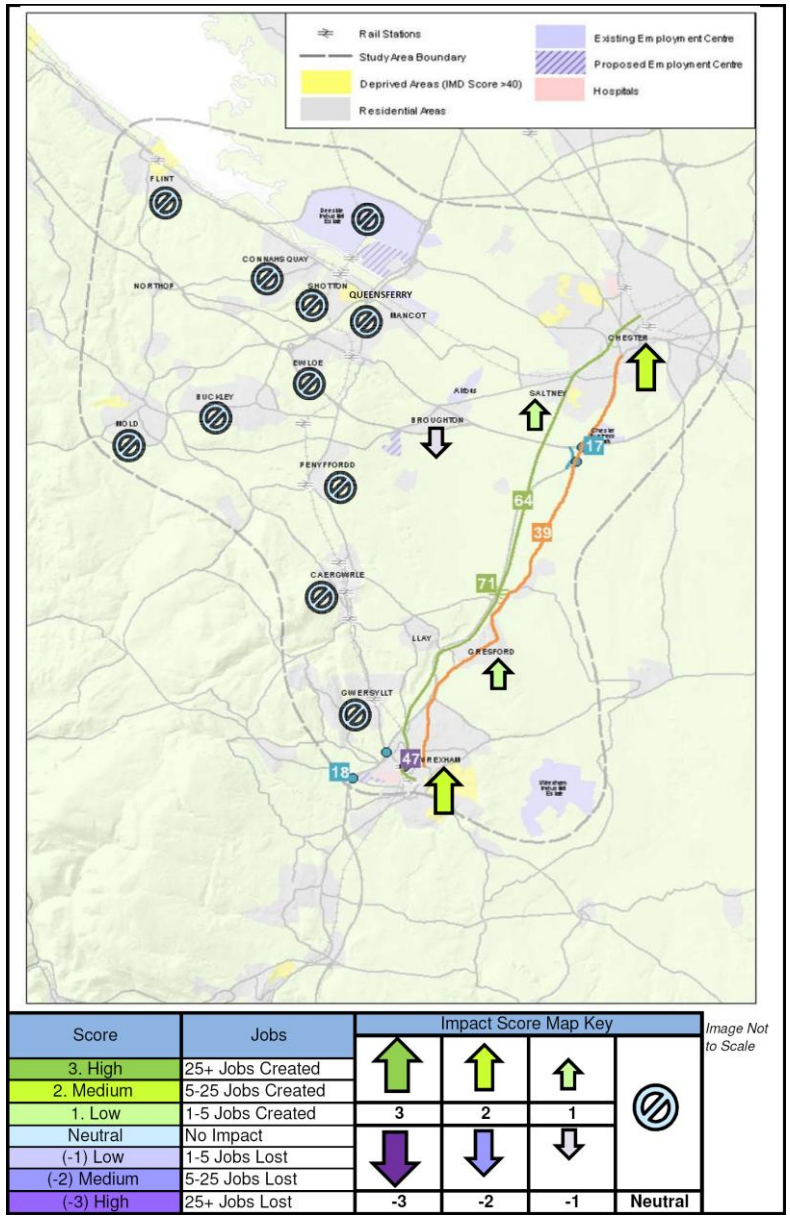
Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	Medium	Medium
Wales	Low	Low	Low
Great Britain	Neutral	Neutral	Neutral

Figure 5.20: Package 7: Chester-Wrexham GVA Impacts



Score	GVA	Impact Score Map Key				Image Not to Scale
3. High	> 1% Increase					
2. Medium	0.25%-1% Increase					
1. Low	0%-0.25% Increase	3	2	1		
Neutral	No Impact					
(-1) Low	0-0.25% Reduction					
(-2) Medium	0.25%-1% Reduction					
(-3) High	>1% Reduction	-3	-2	-1	Neutral	

Figure 5.21: Package 7: Chester-Wrexham Employment Impacts



Score	Jobs	Impact Score Map Key				Image Not to Scale
3. High	25+ Jobs Created					
2. Medium	5-25 Jobs Created					
1. Low	1-5 Jobs Created	3	2	1		
Neutral	No Impact					
(-1) Low	1-5 Jobs Lost					
(-2) Medium	5-25 Jobs Lost					
(-3) High	25+ Jobs Lost	-3	-2	-1	Neutral	

Package 8: Making Best Use – Strategic Trips

5.11 Package 8: Making Best Use – Corridor Strategic Trips

5.11.1 Scheme Options

Transport corridor for strategic trips; this includes the trunk road network through the study area.

This package consists of options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost.

The elements within this package that can be identified as a location are shown in Figure 5.2 below.

Table 5.3: **Package 8: Making Best Use – Strategic Trips**

Theme	Name	Description	Ref
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	32
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	34
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	35
	Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	36
Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	42
	Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	45
	Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with Mersey Travel ticketing. Could include amendment to fares for different zones.	46
	Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	101
Rail	Extension of Llandudno-Manchester service to Manchester Airport.	Existing hourly service extended to Manchester airport. These services have a long layover time at Piccadilly.	53
	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS area where improvements can be made.	55
Freight	Publicise the whereabouts and services from possible Port Rail & Inland Rail Terminals	The infrastructure in place for intermodal distribution from local ports is not being utilised to its full potential.	77
	Suspension of non essential maintenance at peak periods	Maintenance programs can cause pinch points on the network, even during quieter periods as seen around the tunnels at Penmaenmawr.	82
Highway	Reduce the number of slip roads on the strategic highway network. Reduce local distributer road access.	Reduce local access roads onto the strategic road network to improve the safety of these roads and reduce their use by local traffic.	1
	Consider a signage strategy for traffic travelling to/from the Midlands	Look into options for improving the signage of traffic travelling from the study area towards the midlands.	2
	Consider a signage strategy for traffic travelling to/from North England	Look into options for improving the signage of traffic travelling from the study area towards North England.	3
	Variable Messaging Signs	Variable messaging signs on the A55/A494/A483 strategic routes to allow reduced speed limits and re-routing of traffic as a result of incidents.	102

5.11.2 Key Economic Responses

This package contains a series of options designed to benefit strategic trips within the study area through demand management measures. These are intended to reduce and control car demand and traffic movements. Primary economic responses are likely to be delivered through, improved highway network resilience and the quality of rail connections between Llandudno to Manchester Airport. Further detailed analysis is required to determine the demand for the improved rail service.

The net economic impact of this package is likely to be a minimal increase GVA within the study area, primarily within transport network modification locations.

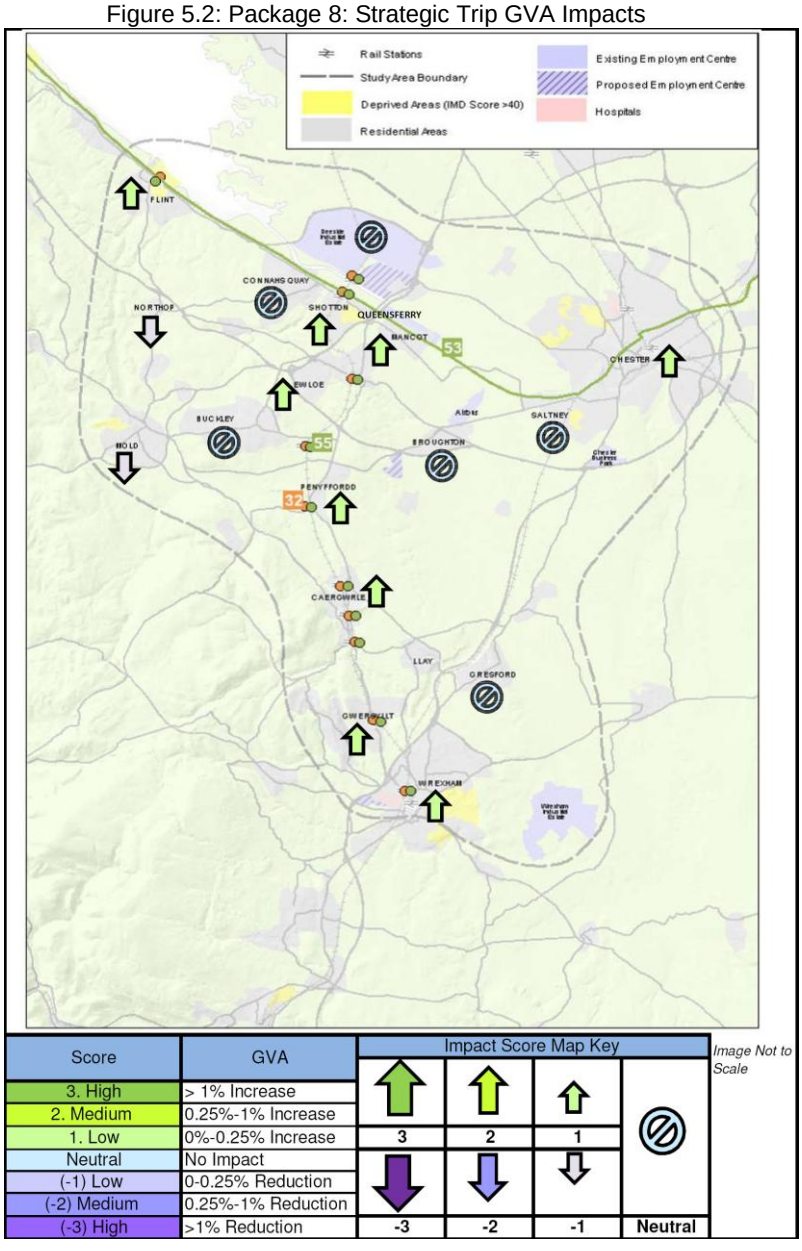
Annex B contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

5.11.3 GVA Economic Impacts

The potential minor localised increase in GVA generated by this package is due to an increase rail station passenger utilisation and increased interaction with local amenities.

Figure 5.2 represents the potential GVA income return for Package 8: Strategic Trips.

Figure 5.2: Package 8: Strategic Trip GVA Impacts



5.11.4 Employment Economic Impacts

The measures within this package are unlikely to result in the creation of large scale job opportunities. However there is the potential for the expansion of existing businesses within the study area due to improved productivity through the provision of a more reliable highway network.

Additional seasonal tourism based job opportunities maybe created by the improved connections to Llandudno from Manchester Airport.

5.11.5 Stimulated Investment and Contribution to Regional Development Plans

Measures within this package align with regional development policies. However in isolation they can only deliver a small fraction of the total land use allocation or attract additional investment.

5.11.6 Summary

In summary this package provides options which enhance or market existing facilities throughout the study area, primarily rail station accessibility for non-car modes. Based on the measures within this package the overall economic responses are likely to be minimal, however certain options such as the improved service to Llandudno have the potential to generate a positive response in GVA and jobs. The economic responses generated though highway management measures are likely to be restricted to the level of reliability benefit provided.

Table 5.4 below represents the potential spatial economic impacts of Package 8: Strategic Trips. As demonstrated in the above, this package is likely to result in a minor positive economic impact both locally and nationally.

Table 5.4: Package 8: Strategic Trips- Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Low	Neutral
Wales	Low	Low	Neutral
Great Britain	Neutral	Neutral	Neutral

Package 9: Capacity Enhancements – Strategic Trips

5.11.7 Scheme Options

This package consists of options involving the provision of new infrastructure

The elements within this package that can be identified as a location are shown in Figure 5.3 below.

Table 5.5: Package 9: Capacity Enhancements – Strategic Trips

Theme	Option Name	Option Description	Ref
Walking and Cycling	Provide walking and cycling crossing facilities on trunk roads and associated junctions	Identify demands for walking and cycling crossing facilities along the key roads in the study area and provide suitable crossing facilities.	33
	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	37
	Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.	39
	Mold to Saltney cycleway	A new walking and cycling link between Mold and Saltney with connections to key destinations along the route utilising a former railway alignment.	40
	Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities and major employers.	41
	Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside	104
	New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	100
	Provide a cycle link between Deeside and Neston	Utilise existing informal route to form a continuous walking and cycling link between Neston and Deeside Park	107
Bus	Taith Express coach services	Express coach services operating between Holyhead and Manchester Airport with stops in the study area.	51
	Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	52
	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Estate and Chester	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	49
	Improved cross Dee bus route between Mold and Ellesmere Port	Connecting key employment locations. Improve the existing 111 service so that it operates twice per hour and is supported with highway infrastructure and traffic management improvements to improve punctuality.	50
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	Doubling of service frequency (to 2 tph) between Wrexham and Bidston (with potential extension into Birkenhead).	56
	Fast Llandudno-Manchester Airport service	Removal of intermediate stops between Chester & Manchester (except Warrington). New hourly stopping service between Manchester & Chester.	61
	Extension of London-Chester services to Bangor/Holyhead	This creates an hourly service between N Wales and London.	66
	Rhyl-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester-Crewe shuttle). Requires new turnback facility at Rhyl.	67
Freight	Freight Consolidation Centres including one at Deeside	There may be an economic case for establishing whether opening “open user” distribution centres for example at strategic points in England e.g. near Wakefield on the M62 and near Manchester on the M60 might reduce the number of vehicles that have to make a journey to Deeside.	74
	Truckstops	Lack of truck parking facilities across North Wales, sites at both ends of the A55 would be ideal in reducing the number of illegally parked vehicles overnight in lay-bys and levels of vehicle crime.	83
	Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.	84
	Rail electrification	Electric freight trains can accelerate quicker and depending on the locomotive have the potential to pull a heavier train than a diesel.	87

	Open Access Rail Terminal	Lack of rail freight on the NWCL resulting from poor handling infrastructure despite apparent interest from industry particularly for continental services to and from Ireland	105
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	94
	Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	95
Highway	Apply managed motorway concepts to key trunk roads	Whilst not having full hard shoulders, ITS technology could be deployed on key routes such as the A55/A494 to vary speed limits according to traffic levels determined through traffic loops and CCTV.	5
	Provide hard shoulders on dual carriageway trunk roads	Hard shoulders would improve the resilience of these routes to incidents and maintenance events and improve safety.	99
	Enhance the A548 route between Flint and the A550	A series of highway improvements on the links and junctions on the A548 between Flint and the A550 to the east of Deeside Industrial Estate to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.	10
	A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.	17
	Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.	18
	New road connecting the A55 and A548	A new road connecting the A55 at Northop and the A548 at Kersterton to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.	21
	A55 Ewloe to Northop Improvements	Widening of the highway between Ewloe and Northop – the scale of such improvements is yet to be determined.	24
	Ewloe Interchange Improvements	Identify a higher capacity design for the A55/A494 Ewloe Interchange which reduces the congestion problems and improved the safety issues currently experienced at this location.	25
	A494 Ewloe to Drome Corner Improvements	Widening of the highway between Ewloe and Drome Corner – the scale of such improvements is yet to be determined.	26
	Improve the capacity of the A494 river Dee crossing	Widening of the existing A494 crossing of the River Dee to improve the capacity and safety of this link.	27

5.11.8 Key Economic Responses

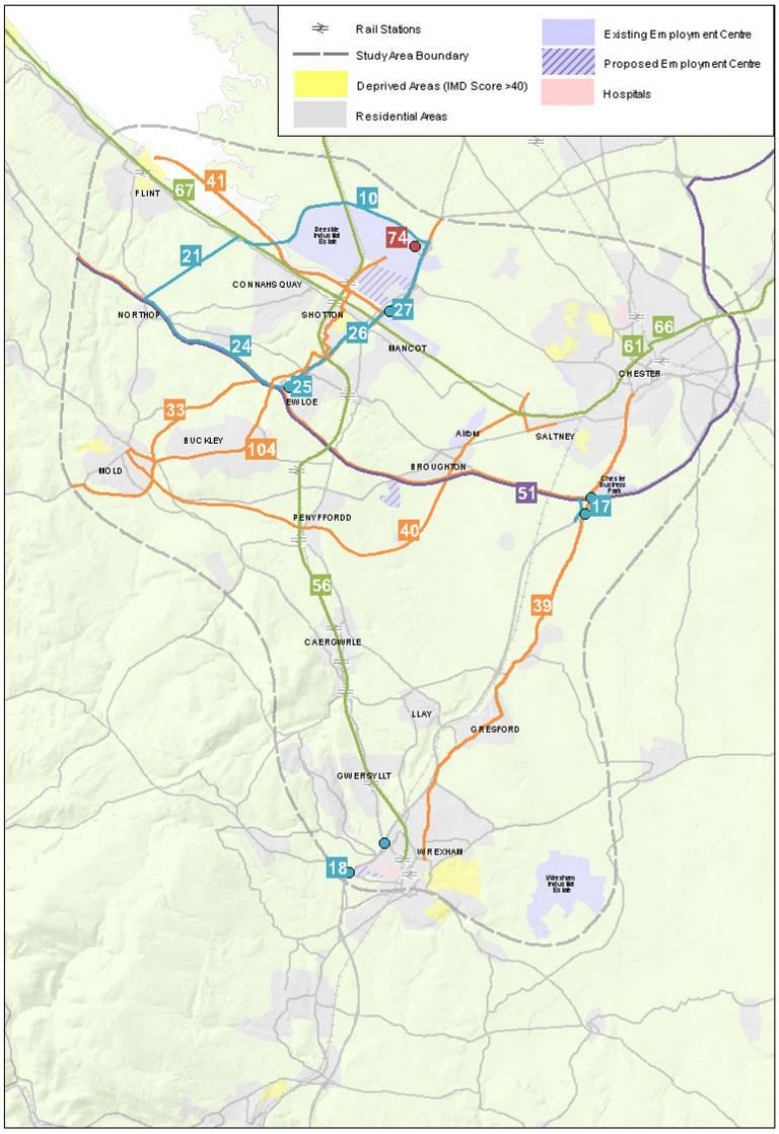
This package contains a series of options designed to improve the level of multi modal accessibility for both strategic and local trips within the study area through the provision of new infrastructure.

The majority of positive economic responses are delivered by the highway infrastructure improvements to the trunk road network within the Deeside area (A55, A494, A458 and A550). These measures alleviate key highway congestion and pinch points, to the benefit of the economy. In addition the highway improvements facilitate and encourage the expansion of existing businesses and attract additional investment into the Deeside Industrial Estate/Development Zone.

The net economic impact of this package will potentially increase in the level of economic activity and productivity within the study area and broader economy, through the provision highway measures which alleviate key strategic network congestion and through the provision of multi modal accessibility. This is likely to result in an increase in GVA and employment levels within the study area primarily within the Deeside Industrial Estate, due to improved local labour market accessibility.

Annex C contains further information regarding the economic impacts of each of the above options, based on the principles of *Additionality* and *Displacement.*

Figure 5.3: Package 9: Capacity Enhancements –Strategic Trips



Option Map Key:

33	Corridor crossing facility improvements
39	Link to National cycle route 5
40	Mold to Saltney cycleway
41	Dee Estuary Coastal Path
104	Mold-Deeside cycle route
51	Taith Express coach services
56	Borderlands Line service enhancement
61	Fast Llandudno-Manchester Airport service
66	London-Chester service extension
67	Rhyl-Chester local shuttle
74	Deeside Freight Consolidation Centre
10	A458-A550 Flint route enhancement
17	A483/A55 junction improvements
18	A483 key junction improvements
21	New road connection A55/A548
24	A55 Ewloe to Northop improvements
25	Ewloe Interchange improvements
26	A494 Ewloe to Drome Corner improvements
27	A494 River Dee capacity improvements
	Key highway junction improvements

5.11.9 GVA Economic Impacts

This transport package contains a selection of measures designed to alleviate the key economic constraining factors within the transport network, primarily highway based. The overall package improves the level of labour market accessibility through the provision of necessary multi modal infrastructure and services.

Based on the measures within this package, both strategic and local trips/traffic are likely to experience productivity benefits, generating a broad increase in GVA throughout the NEWABTS area. However the focus of the economic benefits will be experienced within the A55/A494 corridor due to improved access to the Deeside Industrial Estate.

Additional productivity benefits are likely to be generated within Wrexham and Chester through specific highway congestion targeted measures.

This package is likely to lead to the minor displacement of GVA towards the NEWABTS area from broader competing locations i.e. Northern England and Wales.

Figure 5.4: at the end of this subsection represents the potential employment return for Package 9: Capacity Enhancements GVA Impacts

5.11.10 Employment Economic Impacts

This package contains measures which improve the reliability and capacity of the highway network within the NEWABTS area, leading to an increase in the level of productivity for existing businesses and improves overall labour market accessibility through the provision of multi modal infrastructure and services.

This package is likely to generate a substantial increase in the level of employment throughout the NEWABTS area, as the package facilitates and encourages employment growth through the expansion of existing businesses, the delivery of proposed developments and the attraction of additional investment. Employment growth is likely to be experienced within the Deeside Industrial Estate, potentially creating 4,500 to 5,500 new jobs in accordance with Flintshire UDP allocations.

Similar to GVA, this package is likely to lead to a minor displacement of employment towards the NEWABTS area from broader competing locations due to the diversion of investment and employment opportunities.

Figure 5.5: at the end of this subsection represents the potential employment return for Package 9: Capacity Enhancements-Employment Impacts

5.11.11 Stimulated Investment and Contribution to Regional Development Plans

This package facilities and supports the expansion of existing business throughout the NEWABTS area and within the broader economy. This potentially leads to the attraction of additional investment due to the provision of highway capacity/resilience measures and multi modal labour market accessibility.

This package contributes to the delivery of regional development plans as follows;

Cheshire West & Chester LDF – this package provides a minor contribution to the delivery of the Cheshire West and Chester LDF allocations within Chester though the provision of rail service enhancements which facilitates development growth.

Flintshire UDP – this package principally facilitates and supports the delivery of the Flintshire UDP housing and employment allocation within the A55/A494 corridor, in line with sustainable travel and highway alignment policies within the UDP. However option 21 provides a new road connection within the west of the study area which contradicts with UDP policies, therefore modifications are required to this package in order to align with the UDP.

The key contribution of this package is the support in delivering the employment allocations within the Deeside Industrial Estate/ Development Zone, potentially creating 4,500 to 5,500 new jobs.

Wrexham UDP - this package provides a minor contribution to the delivery of the Wrexham UDP allocations though the provision of rail service enhancements within the Wrexham to Deeside corridor. Key highway infrastructure improvements along the A483 improve accessibility into Wales and Northern England, increasing the development viability status of Wrexham Town and the Wrexham Industrial Estate. However, the attraction of investment to the Wrexham Industrial Estate is likely to be restrained by the local accessibility problems. Within the corridor the package supports the delivery of housing and employment allocations within Gresford and Llay.

5.11.12 Summary

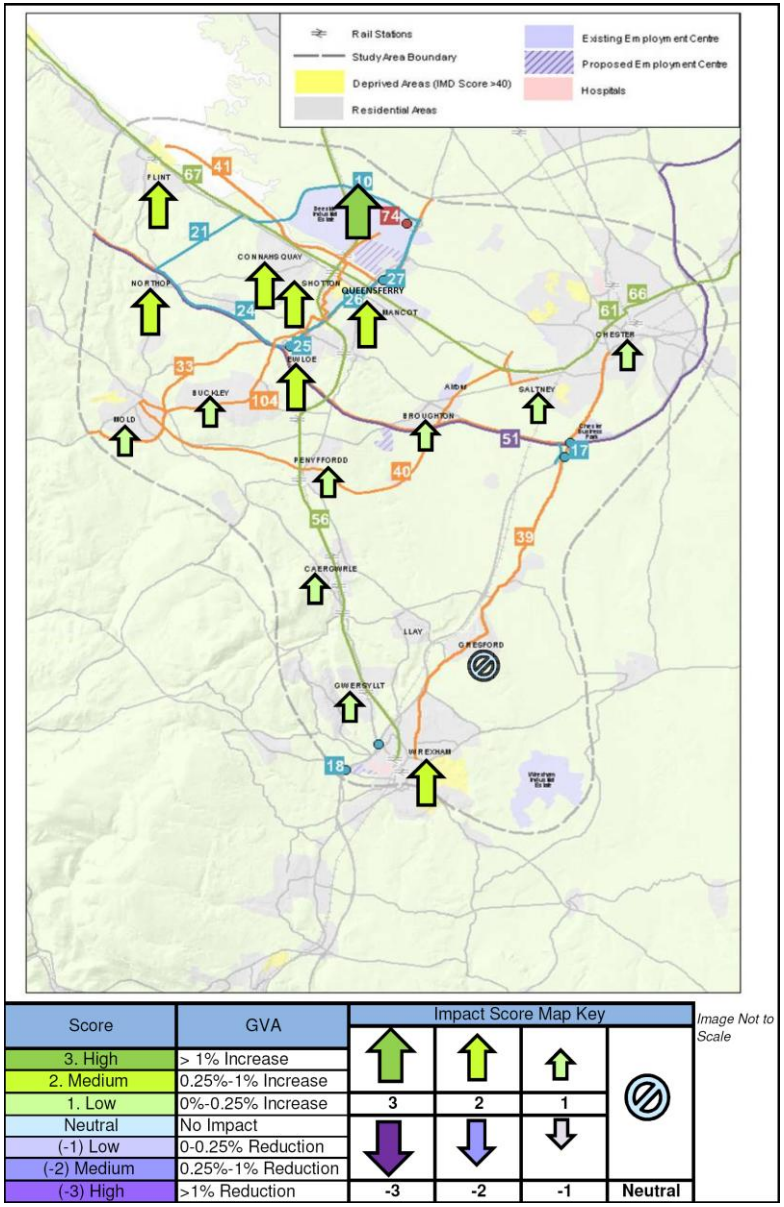
In summary this package is likely to generate a substantial increase in the level of economic activity and productivity within the study area and broader economy by addressing specific transportation constraints and providing multi modal accessibility.

Table 5.6 below indicates that the positive economic responses are likely to be experienced within the NEWABTS area and throughout the broader economy of Wales. This is likely to be reflected in an increase in GVA, employment levels and lead to the attraction of additional investment, primarily within the A55/A494 corridor and Deeside Industrial Estates.

Table 5.6: Package 9: Capacity Enhancements- Strategic Trips - Spatial Economic Impact Summary

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	High	Medium
Wales	Medium	Medium	Medium
Great Britain	Neutral	Neutral	Neutral

Figure 5.20: Package 9: Capacity Enhancements GVA Impacts

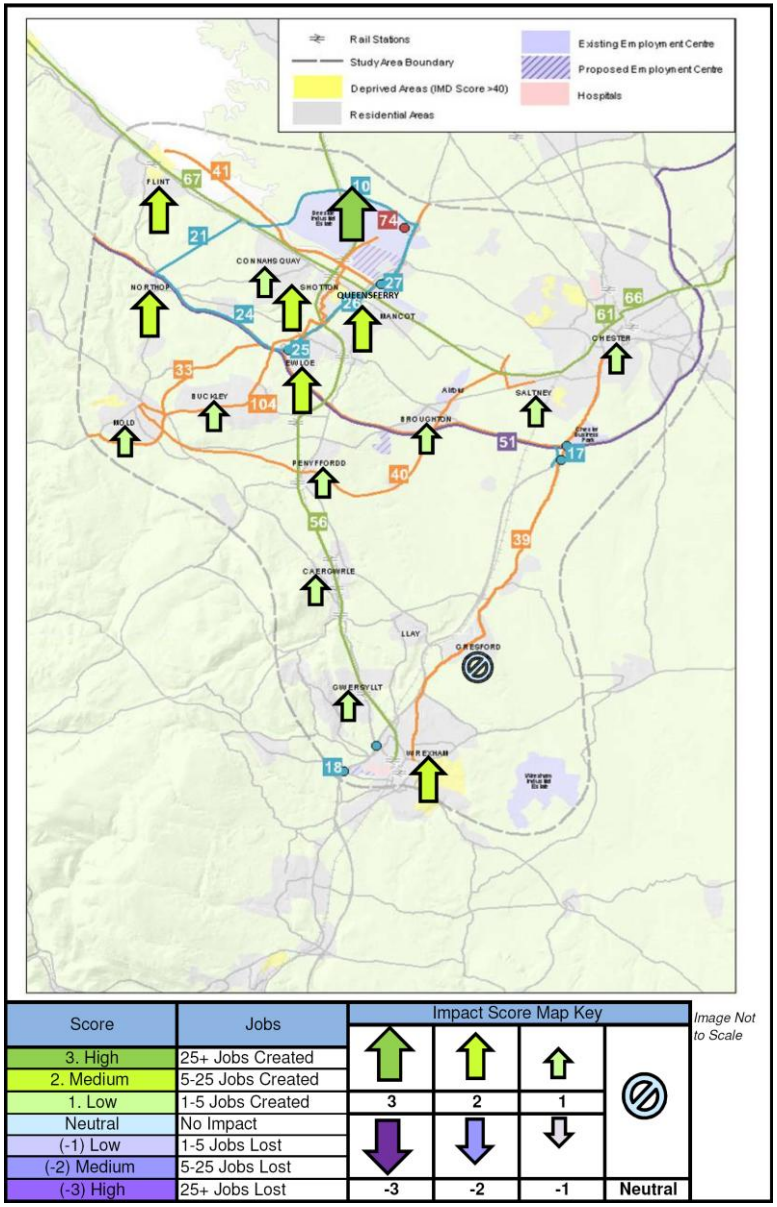


Score	GVA
3. High	> 1% Increase
2. Medium	0.25%-1% Increase
1. Low	0%-0.25% Increase
Neutral	No Impact
(-1) Low	0-0.25% Reduction
(-2) Medium	0.25%-1% Reduction
(-3) High	>1% Reduction

Impact Score Map Key: 3 | 2 | 1 | Neutral | -3 | -2 | -1

Image Not to Scale

Figure 5.21: Package 9: Capacity Enhancements- Employment Impacts



Score	Jobs
3. High	25+ Jobs Created
2. Medium	5-25 Jobs Created
1. Low	1-5 Jobs Created
Neutral	No Impact
(-1) Low	1-5 Jobs Lost
(-2) Medium	5-25 Jobs Lost
(-3) High	25+ Jobs Lost

Impact Score Map Key: 3 | 2 | 1 | Neutral | -3 | -2 | -1

Image Not to Scale

EALI Package Assessment Summary

5.12 Assessment Summary

Table 5.19 below provides a summary of the outcome of the EALI assessment for the NEWABTS area transport options packages.

Table 5.19: EALI Assessment Summary

Option Package	Economic Impact Response Summary	Aligns with Development Policy
Package 1: Area Wide Demand Management	Limited localised economic response.	YES
Package 2: Flint/Mold-Chester	Potential localised economic response within Flintshire, due to improved multi modal accessibility, primarily within the B5129 corridor between Connah's Quay and Queensferry. Additional localised benefits are related highway improvements to the Alltami signals and along the A5104 between Saltney and Broughton.	YES
Package 3: Flint/Mold-Chester	Potential substantial economic response, through the provision of multi modal infrastructure, which addresses employment accessibility issues within the economically active corridor, such as the Deeside Park rail station. In order to undertaken a full package assessment further details are required regarding the improved road connections with the Deeside Industrial Estate and Broughton.	YES
Package 4: Wrexham-Deeside	Potential localised economic response primarily due to improved highway resilience and public transport facilities/accessibility within the Wrexham to Deeside corridor for local users, in line with regional development policies. This package encourages economic activity between the Wrexham corridor and the Deeside Industrial Estate, however economic responses maybe restricted by the competition from the existing Wrexham Industrial Estate.	YES
Package 5: Wrexham-Deeside	Potential substantial economic response within the Wrexham to Deeside corridor, due to the provision of multi modal infrastructure, which addresses employment accessibility issues within the corridor, such as the Deeside Park rail station and rail service enhancements. Based on the options within the package the economic responses are likely to be primarily centralised within the Deeside area. In order to undertaken a full package assessment further details are required regarding the improved road connections with the Deeside Industrial Estate and demand for rail services. The feasibility of a new road bridge over the River Dee requires a further detailed economic assessment.	Partially
Package 6: Wrexham-Chester	Potential minor economic response within the Wrexham and Chester corridor, due to improved public transport facilities and reliability. Further detailed analysis is required to determine the demand for these facilities.	YES
Package 7: Wrexham-Chester	Potential substantial economic response within the Wrexham to Chester corridor, due to improved multi modal accessibility for local and strategic trips. Key economic responses are generated through congestion targeted highway infrastructure improvements and rail service	YES

	enhancements.	
Package 8: Strategic Trips	Potential localised economic response, primarily due to improved public transport accessibility and facilities within the Wrexham to Deeside corridor for local users, in line with the policies outlined within the regional development plans. However the scale of this response is likely to be restricted to the level of achievable public transport service provision and passenger increase.	YES
Package 9: Strategic Trips	Potential substantial economic response throughout the study area for local and strategic traffic, primarily due to enhanced multi modal accessibility to the Deeside Industrial Estate from the A55/A494 corridor and broader study area. The specified highway modifications within the package alleviate key congestion locations, however certain options such as the new road connecting the A55-A548 conflicts with Flintshire UDP policy. Therefore modifications to this package are required to align with regional development polices.	Partially

5.13 Conclusion

Based on the outcome of this EALI analysis, it is recommended that a transport strategy is developed for the NEWABTS area, which provides a balanced approach between catering for strategic traffic and facilitating the exiting and expanding local economy. Primary economic responses are delivered through capacity enhancements via the provision of new multi modal infrastructure, rather than measures intended to enhance or market existing facilities through making best use.

In order to deliver the maximum level of economic response via a transport strategy, the primary consideration is the connections with the Deeside Industrial Estate and strategic road network of the A55/A494/A550 and A458 within Flintshire, as demonstrated within the Package 9: Strategic Trips assessment.

Corridor specific packages have demonstrated the potential to generate positive economic responses. However based on the NEWABTS area transport network and the economic dependencies of Flintshire, Wrexham and Cheshire, options which improve accessibility and facilitate growth within Flintshire and the Deeside Development Zone are likely to generate the maximum economic return to the NEWABTS area. The Cheshire and Wrexham economies are primarily independent of the NEWABTS area transport network, as they maintain their own internal and external economic linkages with broader economic markets and employment centres. However, the congestion targeted highway modifications along the A483 corridor are likely to improve the economic performance of the Cheshire and Wrexham corridor. This will potentially result in an increase in the level economic interaction between Chester City, Wrexham Town and the Wrexham Industrial Estate.

It is recommended that the transport strategy primarily consists of multi-modal infrastructure measures within ‘Package 9: Strategic Trips’, in line with sustainable development polices as outlined within the Flintshire UDP. Key economic responses are generated by the provision of congestion targeted highway infrastructure improvements within the strategic road network of the A55/A494/A548/A550. These measures alleviate strategic transport constraints and facilitate development growth within the primary employment location of the Deeside Development Zone, potentially equating to the creation of 4,500 to 5,500 new jobs.

Following the delivery of the employment allocations within the Deeside Development Zone, it is recommended that the transport strategy includes options which provide corridor based accessibility improvements to this location. Principally through the provision of sustainable modal infrastructure and service improvements within the identified corridors, in order to provide viable alternative to the private car, such as;

- Flint/Mold-Chester corridor – New Deeside Park and Queensferry rail stations.
- Wrexham-Deeside corridor – New rail service between Borderlands line and Chester.

Further detailed analysis is required to evaluate the net economic impact and feasibility of a transport strategy for the NEWABTS area, in the with the standard option appraisal process, which includes consideration capital costs, benefit to cost ratios, environmental impacts, implementation, financing etc..

With regard to impacts at the North Wales level, for the majority of packages the effects are likely to be minimal, some of the making best use and sustainable transport measure packages may impact on general quality of life and health of the residential population. This would have a very small effect on productivity and hence GVA but it is likely that these impacts will be extremely small and completely masked by wider economic trends.

The strategic packages have a greater effect on the level of productivity and scale of new investment; removing infrastructure restrictions resulting in productivity benefits at a larger scale (though it is likely that these will also be impossible to distinguish at a high level). There is a danger that within the study area, the impact of transport improvements will be to simply move businesses around – this is not in itself an issue at the North Wales level. Provided that investment funding and planning policies are able to facilitate the development of sites in the study area then the North Wales economy should benefit from new businesses attracted to the area, however it is worth considering that this investment may simply be transferring from elsewhere e.g. South Wales or North West England.

5.14 Study Limitations

This study has been carried out as a desk based exercise only, using information currently available. The transport option economic analysis is primarily based on the principle of changing the level of accessibility within the NEWABTS area, using professional judgement and evidence information where available. Therefore this analysis is likely to be subjective and open to interpretation. Further detailed analysis is required within the Stage 2 assessment to the net economic impacts delivered though a specified transport strategy within the NEWABTS area.

Annexes

Annex A – Package 1: Managing Demand EALI Assessment

Option Assessment : **Package 1 (Managing Demand) - Area wide package - Applies to all corridors**

Ref	Theme	Name	Description	Economic Impact	Economic Impact: Additionality GVA	Economic Impact: Additionality Jobs	Economic Impact: Displacement GVA	Economic Impact: Displacement Jobs	Economic Impact: Net Impact GVA	Economic Impact: Net Impact Jobs	Investment
29	Walking and Cycling	Funds for businesses to invest in walking and cycling facilities	Provide grant funding which businesses in the study area can bid for to use on walking and cycling facilities.	The adoption of walking and cycling as mode of travel is likely to reduce travel costs and improve the overall physical health of employees. The result could be an increase in productivity and disposable income.	Minimal localised GVA increase through improved productivity and increased disposable income.	No Impact	No Impact	No Impact	Minimal localised GVA increase through improved productivity.	No Impact	No Impact
30		Encourage employers to increase cycling within its work force	Provide support to employers to help encourage walking and cycling to work.	The adoption of cycling as mode of travel is likely to reduce travel costs and improve the overall physical health of employees. The result could be an increase in productivity and disposable income.	Minimal localised GVA increase through improved productivity and increased disposable income.	No Impact	No Impact	No Impact	Minimal localised GVA increase through improved productivity.	No Impact	No Impact
31		Develop a local publicity campaign to promote walking and cycling	Coordinated local publicity campaign to increase awareness of the benefits of walking and cycling and current facilities and support that is available.	The adoption of walking and cycling through a publicity campaign is dependent on the facilities being marketed. Based on the existing facilities and current mode share it is unlikely that a local publicity campaign will generate an economic response.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
75	Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	The traditional way of moving a large proportion of goods is by lorry. Many companies are not even aware of a possible alternative to this and there is an opportunity for TAITH to work with industry in an awareness campaign.	No substantial economic impacts, as any efficiency savings will be shown as increases in operator profits, rather than an economic return in jobs or GVA.	No Identifiable Impacts						
78		Freight Exchange	There are a number of internet based freight exchanges but the membership of these by hauliers is still relatively low. This could be enhanced through an independent awareness campaign.	No substantial economic impacts, as any efficiency savings will be shown as increases in operator profits, rather than an economic return in jobs or GVA.	No Identifiable Impacts						
88	Other	Ensure that future developments mitigate and adverse impacts on the transport network	This would be a policy stance whereby the agencies in the study area who consider development control insure that future developments mitigate the adverse impacts on the transport network that they are anticipated to cause.	Option is designed to reinforce the enforcement of current development practice guidance. This protect the transport network from the adverse impacts associated with development. This option is unlikely to result in a economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
90		Improve linkages between economic development plans and transportation plans	Ensuring that economic development plans and transport plans are written in a coordinated manor so that they do not cause in intended consequences for each other.	Option is designed to encourage collaborative thinking between development and transportation plans, in line with common objectives. A principle transport objective is to protect the strategic road network. This option is unlikely to result in a economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
93	Demand Management	Promoting car clubs and car sharing	Providing financial and other forms of support to help groups with the development of car clubs and car sharing schemes in the study area.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact	No Impact	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact
96		Workplace Travel Planning	Work with employers at key employment centres in the study area to reduce car travel and promote alternative modes.	The uptake of alternative modes is likely to be restrictive to the locations targeted. By definition a travel plan encourages economic interaction with local amenities such as shops, however this dependent on the level of participation.	Minimal location specific GVA increase, due to increased interaction with local amenities. However, responses are restricted to the travel plan locations.	No Impact	No Impact	No Impact	Minimal localised GVA increases.	No Impact	No Impact
97		Parking management strategy	Devise a parking management strategy to reduce demand for car travel during peak periods and incentivise travel by alternative means.	The impact of a parking management strategy is dependent on the measures and scale of the initiative. The economic responses to this are likely to be limited if not negligible.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
PACKAGE IMPACT				**This package contains a series of measures designed to reduce car demand by encouraging the adoption of sustainable modes. By definition sustainable modes provide more opportunity for interaction with local amenities and communities, potentially resulting in a minor increase in localised economic activity.**	**Minimal localised GVA increase, depending on level and location of initiatives.**	**No Impact**	**No Impact**	**No Impact**	**Minimal localised GVA increase, depending on level and local of initiatives.**	**No Impact**	**No Impact**

Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton					0	0
Buckley					0	0
Caergwrle					0	0
Chester					0	0
Connah's Quay					0	0
Deeside					0	0
Ewloe					0	0
Flint					0	0
Gresford					0	0
Gwersyllt					0	0
Mold					0	0
Northop					0	0
Penyffordd					0	0
Queensferry					0	0
Saltney					0	0
Shotton					0	0
Wrexham					0	0
Wales					0	0
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Neutral	Neutral	Neutral
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

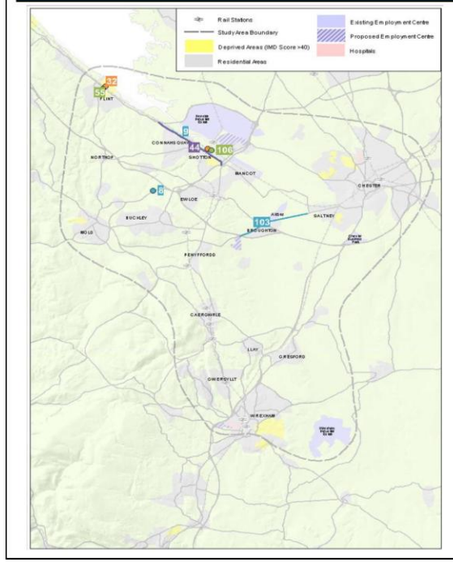
Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

Annex B – Package 2: Making Better Use – Flint / Mold-Chester Corridor EALI Assessment

Option Assessment : **Package 2: Making Best Use - Flint / Mold-Chester**

					Economic Impact						
					Additionality		Displacement		Net Impact		
Ref	Theme	Name	Description	Economic Impact	GVA	Jobs	GVA	Jobs	GVA	Jobs	Investment
32	Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
34		Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
35		Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	The adoption of cycling and walking as mode of travel is likely to reduce travel costs and improve the overall physical health of employees and the general public. The result could be an increase in productivity and disposable income.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction	No Impact	No Impact
36		Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	The prioritising and publicising cycling and walking routes between key locations within the study area will encourage interaction with the local community and amenities, generating a minor increase in localised GVA.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction	No Impact	No Impact
42	Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	Option provides improved journey time reliability for bus based travel only. Economic impacts are likely to be minimal or even offset by the reduced highway performance for other users.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
44		Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry.	Provide bus priority measures along the B5129 to allow buses to avoid traffic congestion when travelling through the Connah's Quay/Shotton area and improve service reliability.	Option provides improved journey time reliability for bus based travel only. Economic impacts are likely to be minimal or even offset by the reduced highway performance for other users.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
45		Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	Option provides improved accessibility for travel by public transport by addressing the boundary of interchanging. In principle improving the services and facilities is likely to result in an increase in public transport patronage., particularly over longer distances. However, the scale of benefit is dependent of the uptake as public transport of a mode of travel. This option is unlikely to result in a significant economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
46		Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with Mersey Travel ticketing. Could include amendment to fares for different zones.	Option encourages the uptake of public transport as a primary mode of travel, through improved ticketing, however this is not likely to be reflected in an economic impact.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
101		Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	The introduction of (RTI) measures at key bus stops is intended to overcome the perceived knowledge boundaries to using public transport. The outcome is a likely increase in public transport passengers based on an improved perception of bus journey time reliability. This option is unlikely to result in a economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
55	Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact	No Impact	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact
106		Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments.	Improving the facilities, connections and general accessibility in Shotton, is likely to generate a minor positive economic impact, due to increased passenger utilisation and corresponding station staffing levels.	Minor localised GVA increase, due to increased passenger utilisation and interaction with local amenities.	Potential new jobs created at Shotton station to deliver and operate the new facilities.	No Impact	No Impact	Minor Shotton area specific GVA increases due to improved passenger station utilisation.	Potential localised job creation due to enhanced Shotton station facilities.	No Impact
8	Highway	Improvements to Alltami Signals	Improve the traffic signal arrangements at Alltami to reduce delays at this location.	Mitigating the key constraining influence of the Alltami traffic signals improves the reliability and resilience of the corridor to the benefit of both local and strategic traffic. This is likely to generate a positive impact on productivity reflected in a increase in GVA.	Minor localised GVA increase within local area (Mold and Ewole) due to improved highway journey time reliability. Potential additional strategic traffic productivity benefit.	No Impact	No Impact	No Impact	Minor increase in local (Mold and Ewole) and strategic areas.	No Impact	No Impact
9		Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay	Identify a series of minor on-line highway improvements which can reduce the congestion problems currently experienced along the B5129 between Connah's Quay and Queensferry.	Reducing the impact of key congestion within Connah's Quay and Queensferry is likely to generate an increase in local and strategic productivity.	Minor localised GVA increases (Connah's Quay and Queensferry) due to improved network efficiency.	Potential expansion of existing business within Connah's Quay and Queensferry due to improved accessibility.	Potential displacement of GVA towards Connah's Quay and Queensferry from broader areas such as Flint.	Potential minor displacement of employment towards employers within the A55/A494 corridor.	Increase in local and strategic areas	Potential local job creation	Option primarily facilitates existing business demand rather than attracting additional investment.
103		Minor on-line improvements between Broughton and Saltney	Identify a series of highway measures which improve safety and relieve pinchpoints on the A5104	Option improves the reliability of the A5104 between Broughton and Saltney tackling current accessibility problems to the economic benefit of the local area, including key employer Airbus and the supports the delivery of the proposed employment centre south of Broughton. This option is likely to generate a positive economic response in local GVA and lead potential job creation.	Minor localised GVA increases due to improved network efficiency and accessibility for key locations between Broughton and Saltney.	Potential job creation due to the expansion of key employment centres within corridor e.g. Airbus and support of proposed employment centre south of Broughton.	No Impact	No Impact	Minor localised corridor specific GVA increases	Potential corridor based job creation	Options primarily the facilities the existing business within the corridor including key employment centre of Airbus. There is potential for additional investment as the option supports the delivery of the proposed employment centre south of Broughton.
PACKAGE IMPACT				**This package contains a series of options designed to reduce the level of car demand within the Flint/Mold-Chester corridor by enhancing or marketing existing transport facilities. The primary economic responses are driven by the improved resilience of the highway network and improved public transport accessibility and facilities. Further detailed analysis is required to determine to true scale of the economic responses to this package. In principle the complete package is likely to increase the level of economic activity within the corridor and broader study area.**	**Minor localised GVA increases relating to public transport station improvements and service enhancements.**	**Potential job creation due to expansion of existing businesses and attraction of additional investment.**	**Minor broad displacement of GVA towards the corridor from competing locations and corridors.**	**Minor broad displacement of employment towards the corridor from competing locations and corridors.**	**Minor localised GVA increases relating to public transport station improvements and service enhancements.**	**This package provides opportunity for potential job creation within the corridor including rail station facilities and additional developments.**	**This package is likely to attract some additional investment as it supports the delivery of proposed development within the study area. However the majority the options within this package primarily support the existing economy rather than expand it.**



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton	2	2			2	2
Buckley			-1		-1	0
Caergwrle					0	0
Chester					0	0
Connah's Quay	1	1			1	1
Deeside	1	1			1	1
Ewloe	1				1	0
Flint	1				1	0
Gresford					0	0
Gwersyllt					0	0
Mold	1				1	0
Northop			-1		-1	0
Penyffordd	1				1	0
Queensferry	1	1			1	1
Saltney					0	0
Shotton	1	1			1	1
Wrexham					0	0
Wales					0	0
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Low	Low
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

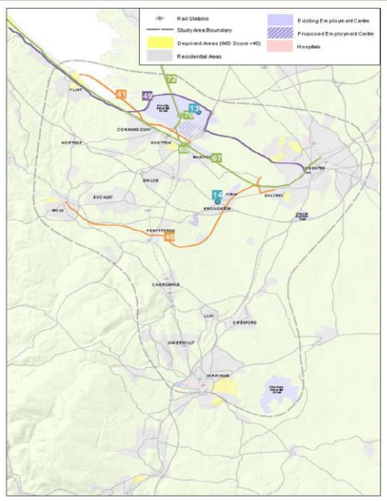
Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

Annex C – Package 3: Capacity Enhancements – Flint / Mold-Chester Corridor EALI Assessment

Option Assessment : **Package 3: Capacity Enhancements - Flint / Mold-Chester**

					Economic Impact						
					Additionality		Displacement		Net Impact		Investment
Ref	Theme	Name	Description	Economic Impact	GVA	Jobs	GVA	Jobs	GVA	Jobs	
37	Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	Improving the provision of crossing facilities in line with demand, is likely to result in a significant reduction in travel distance and time for employees, whose journey involves crossing the strategic network on foot or cycle. This could result in an increase in productivity, however additional crossing facilities may lead to extra delay on the strategic network, therefore a balanced approach is required to consider all users.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction. Localised benefits are unlikely to generate a displacement effect.	No Impact	No Impact
39		Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.	Providing a link to the National route 5 cycleway is likely to generate a minor economic response, due to increased community interaction, user health benefits and attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
40		Mold to Saltney cycle way	A new walking and cycling link between Mold and Saltney with associated connections to key destinations along the route utilising a former railway alignment.	Providing a direct cycle route between Mold-Saltney is likely to generate a minor economic response, due to increased community interaction, user health benefits and potential attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
41		Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities, and major employers.	Providing a Dee Coastal Path is likely to generate a minor economic response, due to increased community interaction, user health benefits including employees and attraction of tourism.	Minor localised GVA increase due to employee health benefits, improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
100		New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	Providing new walking and cycle route which link key community locations is likely to generate a minor economic response, due to increased community interaction, user health benefits including employees and attraction of tourism.	Minor localised GVA increase due to improved employee productivity and local community interaction.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
49	Bus	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Estate and Chester	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	Option provides improved accessibility within the study area between key labour market locations and employment centres. Generally this option is likely to generate an increase in the level of economic activity between service locations, improving employment rates, employee productivity and increasing level of community interaction.	Minor localised GVA increase due to improved labour market accessibility, employee productivity and increased local community interaction.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
52		Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	Improving the level of accessibility between key employment sites from rail stations, generates a positive economic response, due to the provision of direct access to employment centres from broader labour locations.	Minor localised GVA increase due to improved employee productivity and local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
67	Rail	Rhyl-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester-Crewe shuttle). Requires new turnback facility at Rhyl.	Further detailed analysis is required regarding the demand for this service to inform the economic assessment. In principle the option increases the economic interaction between Chester and the intermediate stopping locations to Rhyl.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
69		New station at Queensferry on the North Wales Main Line	New stations have been assessed as part of the NWRS study for Taith.	Further detailed information is required to complete an assessment of this option, which is currently unavailable. In principle providing a new station at Queensferry on the North Wales Main Line generates a new location for economic activity, focused around the new station, due to improved labour market accessibility. The station itself generates potential employment through staffing and general associated amenities. Additional inward investment may also be attracted to land surrounding the station. Overall economic impact is positive for the Queensferry area and the study area as a whole.	Potential creation of a new economic activity centre focus around the proposed station, potentially resulting in a significant increase in GVA within Queensferry	Initial employment impact is the creation of job to service the proposed station and amenities. Further employment could be generated through inward investment.	Improved accessibility into the Queensferry area and the possible creation of a new economic centre is likely to result in the displacement of GVA from competing areas into the Queensferry	The creation of jobs relating to the station operation is unlikely to result in a displacement response. However, a significant displacement impact maybe attributed to the attraction of investment as somewhere else losses out.	Net impact of providing a new station in Queensferry is positive, as it creates a new economic centre within the area. A displacement response is likely, although it is unlikely this is sufficient enough to offset the benefits.	The new station directly generates employment and attracts potential additional investment. Regardless of the impact of displacement, the net employment impact is likely to be positive.	Option provides improved accessibility to a specific location the study area, potentially attracting additional investment to land surrounding the proposed station.
70		New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.	Further detailed information is required to complete an assessment for this option, which is currently unavailable. In principle providing a new station within the Deeside Industrial Estate provides direct access to a key employment locations and proposed employment centres, therefore a significant economic response is likely. The option potentially enhances existing employee productivity and attracts/supports additional investment.	Potential provision of a new rail station within Deeside Industrial Estate results in a increase in localised GVA due to increased accessibility.	Primary employment impact is the creation of new jobs to service the proposed station and amenities. Further employment could be generated through inward investment to the Deeside Industrial Estate, such as the proposed employment centre.	The Deeside Industrial Estate represents the primary source of GVA within the study area, therefore potential productivity displacement impacts generated by the option are likely to be limited.	The Deeside Industrial Estate represents the primary employment location within the study area, therefore impact of employment displacement is likely to be limited.	Potential increase in local GVA based on improved accessibility and correlated employee productivity. It is unlikely the will be offset by displacement.	Potential creation of new jobs to service the proposed station. Additional new jobs maybe created through inward investment into the Deeside Industrial Estate.	Option provides improved accessibility to a specific location the study area, potentially attracting additional investment to land surrounding the proposed station.
72		New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton	Providing a new rail service providing direct access to Chester from Borderlands Line service, is likely to result in substantial increase in the travel economic activity between the Borderlands catchment and Chester.	Potential increase in GVA along the service corridor due to improved productivity and services operations.	Potential job creation through service operations, corridor based business expansion and additional investment.	Potential strategic and localised displacement of GVA towards corridor enhanced locations.	Potential strategic and local displacement of investment and employment towards service accessible locations.	Potential increase in local and strategic GVA based on improved accessibility, which is unlikely to be offset by displacement.	Potential net increase in employment due to new jobs and the attraction of additional investment which is unlikely to be offset by displacement.	Option provides improved accessibility between key labour market locations and employment centres, potential leading to the attraction of additional investment.
94	Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact	No Impact	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact
95		Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	A P&R facility directly generates new jobs, as these are required for its operation i.e. bus services and facility staff. This generates a positive impact for the local economy. However the scale of broader economic responses are dependent on the uptake of P&R as a option of travel. The location of the P&R site in relation to key employment centres such as the Deeside Industrial Estate, will limit the impact of this initiative.	Primary GVA increases restricted to potential P&R employee specific locations	Jobs directly created to operate and service the proposed P&R site.	No Impact	No Impact	No Impact	No Impact	No Impact
13	Highway	Improve road connections to Deeside Industrial Estate	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Estate.	Improved highway accessibility into the key employment centre of the Deeside Industrial Estate is likely to generate a positive economic impact as it directly addresses a key restriction to economic activity within the study area and supports delivery of the proposed employment centre.	Potential increase in local GVA due to improved accessibility to Deeside Industrial Estate	Growth in jobs in Deeside Estate and surrounding Labour Market catchment	Reduced investment and spend in competing locations	Reduced performance in completive locations within area	Specific localised benefits in GVA	Specific localised job creation.	Potential stimulated investment into Deeside Industrial Estate and Proposed Employment Centre
14		Improve road connections to the Broughton area	Identify a series of highway improvements which can improve the ease of accessing key traffic generators in the Broughton area.	Improved highway accessibility into the key employment centre of the Broughton is likely to generate a positive economic impact as it directly addresses a key restriction to economic activity within the study area and supports delivery of the proposed employment centre.	Potential increase in local GVA within Broughton and surrounding commuter catchment due to improved accessibility.	Potential job creation due to improved business productivity and the attraction of investment.	Reduced investment and spend in competing locations	Reduced performance in completive locations within area	Specific localised benefits in GVA	Specific localised job creation.	Potential stimulated investment into Broughton and Proposed Employment Centre.
PACKAGE IMPACT			**This package contains a series of options designed to improve the level of accessibility for both strategic and local trips within a specific study area corridor through the provision of new infrastructure within the specific corridor. The majority of the positive economic responses are delivered by the provision of improved rail service and facilities and highway infrastructure, in principle the complete package is likely to generate a substantial increase in the level of economic activity and productivity within the study area, with a minor increase broader economy activity through improved multi-modal accessibility.**	This package potentially leads to an increase in GVA levels within the study area corridor, due to improved local accessibility within the high volume corridor between Flint and Mold. This economic response is primarily focused on the Deeside area. Certain public transport options lead to direct job creation i.e. new rail stations.	This package facilitates and encourages employment growth through the expansion of existing businesses and the attraction of additional investment within the specific corridor.	This package potentially leads to the minor displacement of GVA towards this corridor form competing corridors within study area and broader competing i.e. Northern England and Wales.	This package potentially leads to the minor displacement of employment towards this corridor form competing corridors within study area and broader locations i.e. Northern England and Wales.	This package has an overall net positive economic impact on GVA levels within the specific corridor and broader study area, due to improved accessibility locally.	This package has an overall net positive economic impact on employment levels within corridor and study area, due to improved local accessibility which is likely to stimulate economic activity and additional investment.	This package facilitates and supports the expansion of existing businesses, the delivery of proposed developments (Broughton and Deeside employment centres) and attracts additional investment by improving primarily local accessibility.



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton	2	2			2	2
Buckley			-1		-1	0
Caergwrle			-1		-1	0
Chester	1	1			1	1
Connah's Quay	1	1			1	1
Deeside	2	2			2	2
Ewloe			-1		-1	0
Flint	1				1	0
Gresford					0	0
Gwernaffil					0	0
Mold	1				1	0
Northop			-1		-1	0
Penyffordd	1				1	0
Queensferry	1				1	0
Saltney	1				1	0
Shotton	1				1	0
Wrexham					0	0
Wales	1	1			1	1
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	Medium	Medium
Wales	Low	Low	Low
Great Britain	Neutral	Neutral	Neutral

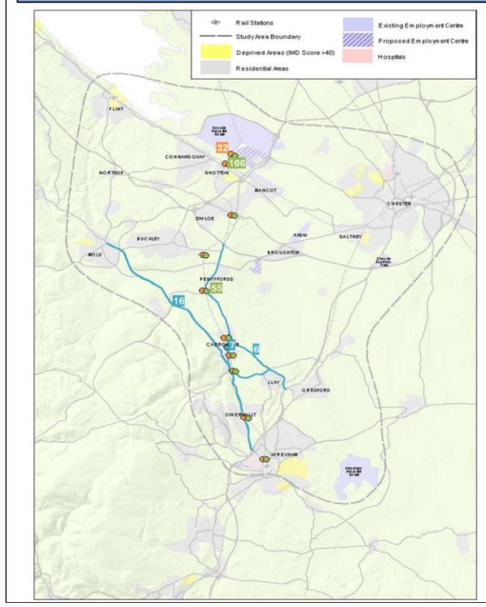
Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	> 1% Reduction	25+ Jobs Lost

Annex D – Package 4: Making Best Use – Wrexham–Deeside (via Mold / Buckley) EALI Assessment

Option Assessment : **Package 4: Making Best Use - Wrexham-Deeside**

					Economic Impact						
					Additionality		Displacement		Net Impact		Investment
Ref	Theme	Name	Description	Economic Impact	GVA	Jobs	GVA	Jobs	GVA	Jobs	
32	Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
34		Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
35		Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	The adoption of cycling and walking as mode of travel is likely to reduce travel costs and improve the overall physical health of employees and the general public. The result could be an increase in productivity and disposable income.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction	No Impact	No Impact
36		Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	The prioritising and publicising cycling and walking routes between key locations within the study area will encourage interaction with the local community and amenities, generating a minor increase in localised GVA.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction	No Impact	No Impact
42	Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	Option provides improved journey time reliability for bus based travel only. Economic impacts are likely to be minimal or even offset by the reduced highway performance for other users.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
45		Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	Option provides improved accessibility for travel by public transport by addressing the boundary of interchanging. In principle improving the services and facilities is likely to result in an increase in public transport patronage,, particularly over longer distances. However, the scale of benefit is dependent of the uptake as public transport of a mode of travel. This option is unlikely to result in a significant economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
46		Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with Mersey Travel ticketing. Could include amendment to fares for different zones.	Option encourages the uptake of public transport as a primary mode of travel, through improved ticketing, however this is not likely to be reflected in an economic impact.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
101		Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	The introduction of (RTI) measures at key bus stops is intended to overcome the perceived knowledge boundaries to using public transport. The outcome is a likely increase in public transport passengers based on an improved perception of bus journey time reliability. This option is unlikely to result in a economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
55	Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact	No Impact	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact
106		Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments.	Improving the facilities, connections and general accessibility in Shotton, is likely to generate a minor positive economic impact, due to increased passenger utilisation and corresponding station staffing levels.	Minor localised GVA increase, due to increased passenger utilisation and interaction with local amenities.	Potential new jobs created at Shotton station to deliver and operate the new facilities.	No Impact	No Impact	Minor Shotton area specific GVA increases due to improved passenger station utilisation.	Potential localised job creation due to enhanced Shotton station facilities.	No Impact
4	Highway	Consider a signage strategy for traffic travelling between the A55 and Wrexham	Look into options for improving the signage of traffic travelling between the A55 and Wrexham.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
6		Make better use of A541 / A550 route between the A55 and Wrexham	A series of minor improvements to the A541/A550 route addressing pinch-points along this route to improve the overall capacity of this route.	Improving the reliability and resilience of the A541/A550 route between Wrexham and the A55 is likely to result in a increase in productivity for both local and strategic traffic. The option improves the status of the route as a strategic route in context of competing A483. This option is likely to result in an increase in economic activity between Wrexham and A55 locations, generating an increase in GVA and employment.	Potential increase in GVA within the corridor due to improved economic interaction and productivity between A55 locations and Wrexham. Benefits can be maximised by delivering this option as part of a A541/A550 package.	Potential minor job creation within the local corridor due improved accessibility and business performance throughout the corridor. Additional investment can also be accommodated within the corridor.	Corridor becomes more competitive with it counterparts, therefore there is the potential for displacement of GVA towards the improved corridor locations.	Similar to GVA there is a potential for displacement of employment towards the improved corridor, however the scale of this response is dependent on the level of accessibility benefits	Net impact is likely to be an increase overall GVA locally and strategically, as negative impacts are unlikely to offset the positive.	Net employment impact is likely to be neutral as localised job creation is likely to be offset by local displacement responses .	This option has the potential to attract additional investment as it improves the competitiveness of the area for inward investment in relation to its counterparts.
7		Overcome pinch points in the Hope/Caergwrle area	A series of minor improvements to address the pinch-point that occurs in the Hope/Caergwrle area.	Improving the reliability and resilience of the A541/A550 route between Wrexham and the A55 through the key constraints with the Hope/Caergwrle area is likely to result in a increase in productivity for both local and strategic traffic. The option improves the status of the route as a strategic route in context of competing A483. This option is likely to result in an increase in economic activity between Wrexham and A55 locations, generating an minor increase in GVA.	Potential localised increase in GVA within the corridor due to improved economic interaction and productivity between A55 locations and Wrexham, however broader transit problems remain. Benefits can be maximised by delivering this option as part of a A541/A550 package.	Potential minor job creation within the local corridor due improved accessibility and business performance.	Corridor becomes more competitive with it counterparts, therefore there is the potential minor displacement of GVA towards the improved corridor locations.	Similar to GVA there is a potential a minor displacement of employment towards the improved corridor, however the scale of this response is dependent on the level of accessibility benefits	Net impact is likely to be an increase overall GVA locally and strategically, as negative impacts are unlikely to offset the positive.	Net employment impact is likely to be neutral as localised job creation is likely to be offset by local displacement responses .	This option improves the competiveness of the area for inward investment in relation to its counterparts by tackling specific highway constraints. Investment is likely to be restricted to the level of additional capacity provided.
16		Improvements on the A541 between Mold and Wrexham	Identify a series of highway measures which can improve the safety and route consistency of the A541 between Mold and Wrexham.	Improving the reliability and resilience of the A541 route between Wrexham and the Mold is likely to increase the level of economic activity between these locations, to the benefit of both local corridor and strategic areas. This option is likely to generate a minor increase in GVA and employment.	Potential localised increase in GVA within the corridor due to improved economic interaction and productivity between Wrexham and Mold.	Potential minor job creation within the local corridor due improved accessibility and business performance.	Corridor becomes more competitive with it counterparts, therefore there is the potential minor displacement of GVA towards the improved corridor locations., however there is limited alternative route choice within the corridor.	Similar to GVA there is a potential a minor displacement of employment towards the improved corridor, however the scale of this response is dependent on the level of accessibility benefits	Net impact is likely to be an increase overall GVA locally and strategically, as negative impacts are unlikely to offset the positive.	Net employment impact is likely to be neutral as localised job creation is likely to be offset by local displacement responses .	This option improves the competiveness of the area for inward investment in relation to its counterparts by tackling specific highway constraints. Investment is likely to be restricted to the level of additional capacity provided.
PACKAGE IMPACT				**This package contains a series of options designed to reduce the level of car demand within the Wrexham-Deeside corridor by enhancing or marketing existing transport facilities. The primary economic responses are driven by the improved resilience of the highway network and improved public transport accessibility and facilities. Further detailed analysis is required to determine to true scale of the economic responses to this package. In principle the complete package is likely to increase the level of economic activity within the corridor and broader study area.**	**Minor localised GVA increases relating to public transport station improvements and service enhancements.**	**Potential job creation due to expansion of existing businesses and attraction of additional investment.**	**Minor broad displacement of GVA towards the corridor from competing locations and corridors.**	**Minor broad displacement of employment towards the corridor from competing locations and corridors.**	**Minor localised GVA increases relating to public transport station improvements and service enhancements.**	**This package provides opportunity for potential job creation within the corridor including rail station facilities and additional developments.**	**This package is likely to attract some additional investment as it supports the delivery of proposed development within the study area. However the majority the options within this package primarily support the existing economy rather than expand it.**



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton			-1		-1	0
Buckley	1				1	0
Caergwrle	1	1			1	1
Chester					0	0
Connah's Quay	1	1			1	1
Deeside	1	1			1	1
Ewloe	1	1			1	1
Flint			-1	-1	-1	-1
Gresford	1				1	0
Gwersyllt	1				1	0
Mold	1	1			1	1
Northop			-1	-1	-1	-1
Penyffordd	1	1			1	1
Queensferry	1				1	0
Saltney			-1		-1	0
Shotton	2	1			2	1
Wrexham	2	1			2	1
Wales	1	1			1	1
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Low	Low
Wales	Low	Low	Low
Great Britain	Neutral	Neutral	Neutral

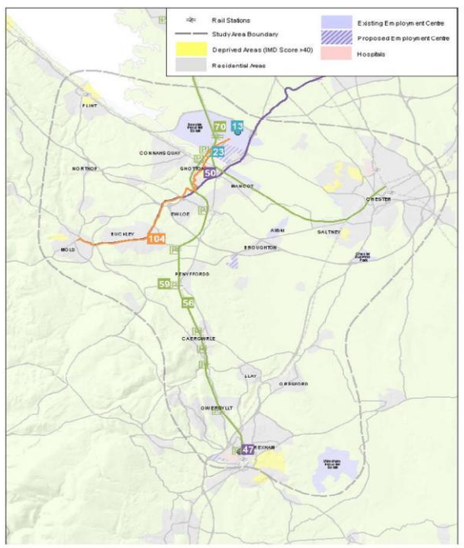
Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

Annex E – Package 5: Capacity Enhancements – Wrexham–Deeside (via Mold / Buckley) EALI Assessment

Option Assessment : **Package 5: Capacity Enhancements - Wrexham-Deeside**

					Economic Impact						
					Additionality		Displacement		Net Impact		Investment
Ref	Theme	Name	Description	Economic Impact	GVA	Jobs	GVA	Jobs	GVA	Jobs	
37	Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	Providing designated connecting routes between specific locations such and local communities and public transport interchanges, encourages user economic interaction with local amenities to benefit of the local economy. At a micro economic level, positive responses are restricted to the enhanced route corridors.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction and safety benefits.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction and safety benefits. Localised benefits are unlikely to generate a	No Impact	No Impact
100		New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	Providing new walking and cycle route which link key community locations is likely to generate a minor economic response, due to increased community interaction, user health benefits including employees and attraction of tourism.	Minor localised GVA increase due to improved employee productivity and local community interaction.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
104		Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside	Providing a direct cycle route between Mold-Deeside is likely to generate a minor economic response, due to increased community interaction, user health benefits and potential attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
47	Bus	Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxi buses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.	Proving a multi-modal hub within Wrexham is likely to generate a minor localised economic response, due to the increased volume of passenger utilisation and level of local community interaction.	Minor localised GVA increase due to improved employee productivity and local community interaction and enhanced facilities.	Potential direct job creation to operate improved facilities.	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
50		New cross Dee bus route between Mold and Ellesmere Port	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.	Option provides improved accessibility and service frequency between key location labour market and employment locations within the study area, covering all sectors. The overall economic impact is likely to be an increase in the level of economic activity	Minor increase in localised GVA through increased productivity at key locations linked by the new service.	No Impact	No Impact	No Impact	Minor increase in localised GVA which is unlikely to be offset by the influence of displacement.	No Impact	No Impact
52		Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	Improving the level of accessibility between key employment sites from rail stations, generates a positive economic response, due to the provision of direct access to employment centres from broader labour locations.	Minor localised GVA increase due to improved employee productivity and local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
56	Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	Doubling of service frequency between Wrexham and Bidston (with potential extension into Birkenhead)	This option provides improved accessibility along the Borderlands Line by increasing the level of service. This is likely to generate an increase in the volume of patronage and level of economic activity between connected locations. Further detailed information is required to undertake a complete of this option, including the passenger demand for connecting to Birkenhead. In principle the overall economic impact is likely to be positive for the corridor and broader catchment.	Minor localised GVA increase due to improved employee productivity and local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
59		Increase parking provision at stations along the Wrexham - Bidston line (e.g. Penyffordd) to promote park and ride.	Additional parking provision at key stations along the Wrexham – Bidston line to encourage park and ride.	This option provides improved rail station accessibility by increasing the volume car parking. The intention is to encourage the adoption of rail based park and ride as an alternative to travelling by private car. Generally this option improves level of accessibility to rail travel and generates a potential localised decongestion benefit. The net economic impact is a likely increase in the level of economic activity between connected locations.	Minor localised GVA increase due to improved accessibility, employee productivity and increased local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
70		New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.	Further detailed information is required to complete an assessment for this option, which is currently unavailable. In principle providing a new station within the Deeside Industrial Estate provides direct access to a key employment locations and proposed employment centres, therefore a significant economic response is likely. The option potentially enhances existing employee productivity and attracts/supports additional investment.	Potential provision of a new rail station within Deeside Industrial Estate results in a increase in localised GVA due to increased accessibility.	Primary employment impact is the creation of new jobs to service the proposed station and amenities. Further employment could be generated through inward investment to the Deeside Industrial Estate, such as the proposed employment centre.	The Deeside Industrial Estate represents the primary source of GVA within the study area, therefore potential productivity displacement impacts generated by the option are likely to be limited.	The Deeside Industrial Estate represents the primary employment location within the study area, therefore impact of employment displacement is likely to be limited.	Potential increase in local GVA based on improved accessibility and correlated employee productivity. It is unlikely the will be offset by displacement.	Potential creation of new jobs to service the proposed station. Additional new jobs maybe created through inward investment into the Deeside Industrial Estate.	Option provides improved accessibility to a specific location the study area, potentially attracting additional investment to land surrounding the proposed station.
72		New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton	Providing a new rail service providing direct access to Chester from Borderlands Line service, is likely to result in substantial increase in the level economic activity between the Borderlands catchment and Chester.	Potential increase in GVA along the service corridor due to improved productivity and services operations.	Potential job creation through service operations, corridor based business expansion and additional investment.	Potential strategic and localised displacement of GVA towards corridor enhanced locations.	Potential strategic and local displacement of investment and employment towards service accessible locations.	Potential increase in local and strategic GVA based on improved accessibility, which is unlikely to be offset by displacement.	Potential net increase in employment due to new jobs and the attraction of additional investment which is unlikely to be offset by displacement.	Option provides improved accessibility between key labour market locations and employment centres, potential leading to the attraction of additional investment.
94	Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact	No Impact	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact
95		Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	A P&R facility directly generates new jobs, as these are required for its operation i.e. bus services and facility staff. This generates a positive impact for the local economy. However the scale of broader economic responses are dependent on the uptake of P&R as a option of travel. The location of the P&R site in relation to key employment centres such as the Deeside Industrial Estate, will limit the impact of this initiative.	Primary GVA increases restricted to potential P&R employee specific locations	Jobs directly created to operate and service the proposed P&R site.	No Impact	No Impact	No Impact	No Impact	No Impact
13	Highway	Improve road connections to Deeside Industrial Estate	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Estate.	Improved highway accessibility into the key employment centre of the Deeside Industrial Estate is likely to generate a positive economic impact as it directly addresses a key restriction to economic activity within the study area and supports delivery of the proposed employment centre.	Potential increase in local GVA due to improved accessibility to Deeside Industrial Estate	Growth in jobs in Deeside Estate and surrounding Labour Market catchment	Reduced investment and spend in competing locations	Reduced performance in completive locations within area	Specific localised benefits in GVA	Specific localised job creation.	Potential stimulated investment into Deeside Industrial Estate and Proposed Employment Centre
23		New road bridge between Connah's Quay and Deeside Park	A new local road bridge connecting the B5129 at Connah's Quay with Deeside Park to reduce pressure on the existing crossing points.	New link provides direct access to Deeside Industrial Park from key Labour Catchments.	Minor increase in local area GVA due to increased accessibility to Deeside Industrial Estate	Growth in jobs in Deeside Estate and surround Labour Market catchment	Reduced investment and spend in competing locations	Reduced performance in completive locations within area	Specific localised benefits in GVA	Specific localised job creation.	Potential stimulated investment into Deeside Industrial Estate and Proposed Employment Centre
84	Freight	Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.	No substantial economic locational impact	**No Identifiable Impacts**						
PACKAGE IMPACT				**This package contains a series of options designed to improve the level of accessibility for both strategic and local trips within a specific study area corridor through the provision of new infrastructure within the specific corridor. The majority of the positive economic responses are delivered by the provision of improved rail service and facilities and highway infrastructure, In principle the complete package is likely to generate a substantial increase in the level of economic activity and productivity within the study area, through improved multi-modal accessibility.**	This package potentially leads to an increase in GVA levels within the study area corridor, due to improved local accessibility within the high volume corridor between Wrexham and Deeside. This economic response is primarily focused on the Deeside area.	This package facilitates and encourages employment growth through the expansion of existing businesses and the attraction of additional investment within the corridor. Certain public transport option lead to direct job creation i.e. new rail stations.	This package potentially leads to the minor displacement of GVA towards this corridor form competing corridors within study area and broader competing i.e. Northern England and Wales.	This package potentially leads to the minor displacement of employment towards this corridor form competing corridors within study area and broader locations i.e. Northern England and Wales.	This package has an overall net positive economic impact on GVA levels within the specific corridor and broader study area, due to improved accessibility locally.	This package has an overall net positive economic impact on employment levels within corridor and study area, due to improved local accessibility which is likely to stimulate economic activity and additional investment.	This package facilitates and supports the expansion of existing businesses, the delivery of proposed developments (Deeside employment centres) and attracts additional investment by improving primarily local accessibility.



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton			-1	-1	-1	-1
Buckley	1				1	0
Caergwrle	1				1	0
Chester	1				1	0
Connah's Quay	2	1			2	1
Deeside	2	2			2	2
Ewloe	1				1	0
Flint			-1	-1	-1	-1
Gresford					0	0
Gwersyllt	1				1	0
Mold	1				1	0
Northop			-1		-1	0
Penyffordd	1				1	0
Queensferry	1				1	0
Saltney	1				1	0
Shotton	1	1			1	1
Wrexham	2	1			2	1
Wales					0	0
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	Medium	Medium
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

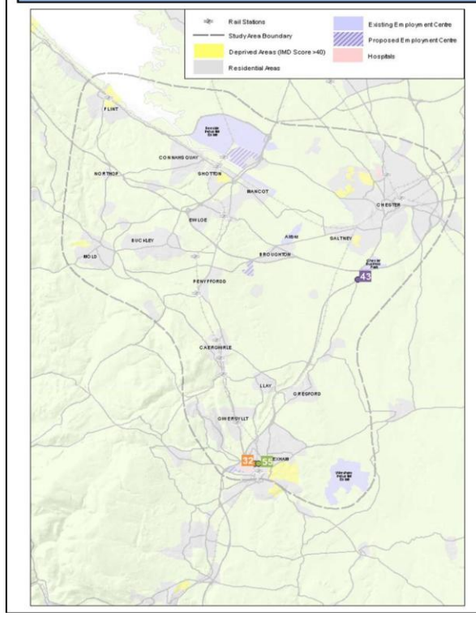
Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

Annex F – Package 6: Making Best Use – Chester-Wrexham EALI Assessment

Option Assessment : **Package 6: Making Best Use - Chester-Wrexham**

Ref	Theme	Name	Description	Economic Impact	Economic Impact						Investment
					Additionality		Displacement		Net Impact		
					GVA	Jobs	GVA	Jobs	GVA	Jobs	
32	Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
34		Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
35		Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	The adoption of cycling and walking as mode of travel is likely to reduce travel costs and improve the overall physical health of employees and the general public. The result could be an increase in productivity and disposable income.	Minimal localised GVA increase, due to improved employee heath and consequential productivity, increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity, increases can also be attributed to the increase local community interaction	No Impact	No Impact
36		Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	The prioritising and publicising cycling and walking routes between key locations within the study area will encourage interaction with the local community and amenities, generating a minor increase in localised GVA.	Minimal localised GVA increase, due to improved employee heath and consequential productivity, increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity, increases can also be attributed to the increase local community interaction	No Impact	No Impact
42	Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.	Option provides improved journey time reliability for bus based travel only. Economic impacts are likely to be minimal or even offset by the reduced highway performance for other users.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
43		Bus priority at the A483/B5445 junction to avoid traffic congestion	Provide bus priority measures at the junction of the A483. Capacity Enhancements/B5445 to allow buses to avoid traffic congestion at this location and improve service reliability.	Option provides improved journey time reliability for bus based along the A483 avoiding a key recognised congestion location. Based on the principled of bus priority, the economic impacts of this option are likely to be minimal or even offset by the reduced highway performance for other users.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
45		Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	Option provides improved accessibility for travel by public transport by addressing the boundary of interchanging. In principle improving the services and facilities is likely to result in an increase in public transport patronage., particularly over longer distances. However, the scale of benefit is dependent of the uptake as public transport of a mode of travel. This option is unlikely to result in a significant economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
46		Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.	Option encourages the uptake of public transport as a primary mode of travel, through improved ticketing, however this is not likely to be reflected in an economic impact.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
101		Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	The introduction of (RTI) measures at key bus stops is intended to overcome the perceived knowledge boundaries to using public transport. The outcome is a likely increase in public transport passengers based on an improved perception of bus journey time reliability. This option is unlikely to result in a economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
55	Rail	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact	No Impact	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact
PACKAGE IMPACT				**This package contains a series of options designed to reduce the level of car demand within the Chester-Wrexham corridor by enhancing or marketing existing transport facilities. The primary economic responses are driven by the improved public transport accessibility and facilities. Further detailed analysis is required to determine to true scale of the economic responses to this package. In principle the complete package is likely to generate a minor increase the level of economic activity within the specific corridor.**	**Minor localised GVA increases relating to public transport station improvements and service enhancements.**	No Impact	No Impact	No Impact	**Minor localised GVA increases relating to public transport station improvements and service enhancements.**	No Impact	No Impact



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton			-1		-1	0
Buckley					0	0
Caergwrle					0	0
Chester	1				1	0
Connah's Quay					0	0
Deeside					0	0
Ewloe					0	0
Flint					0	0
Gresford	1				1	0
Gwersyllt					0	0
Mold					0	0
Northop					0	0
Penyffordd					0	0
Queensferry					0	0
Saltney	1				1	0
Shotton					0	0
Wrexham	1				1	0
Wales					0	0
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Neutral	Neutral
Wales	Neutral	Neutral	Neutral
Great Britain	Neutral	Neutral	Neutral

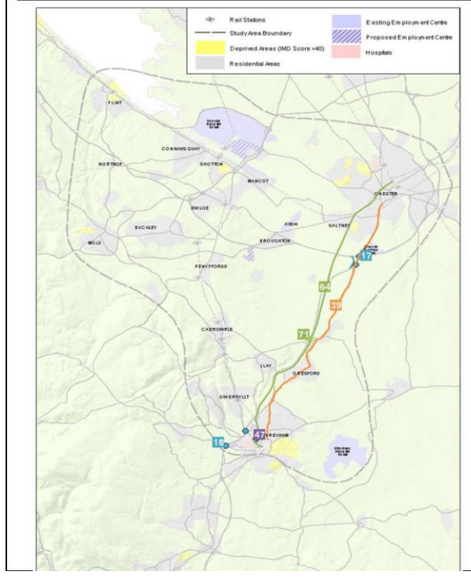
Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

Annex G – Package 7: Capacity Enhancements – Chester-Wrexham EALI Assessment

Option Assessment : **Package 7: Capacity Enhancements - Chester-Wrexham**

Ref	Theme	Name	Description	Economic Impact	Economic Impact: Additionality GVA	Economic Impact: Additionality Jobs	Economic Impact: Displacement GVA	Economic Impact: Displacement Jobs	Economic Impact: Net Impact GVA	Economic Impact: Net Impact Jobs	Investment
37	Walking and Cycling	Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	Providing designated connecting routes between specific locations such and local communities and public transport interchanges, encourages user economic interaction with local amenities to benefit of the local economy. At a micro economic level, positive responses are restricted to the enhanced route corridors.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction and safety benefits.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction and safety benefits. Localised benefits are unlikely to generate a displacement ef	No Impact	No Impact
39		Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.	Providing a link to the National route 5 cycleway is likely to generate a minor economic response, due to increased community interaction, user health benefits and attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
100		New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	Providing new walking and cycle route which link key community locations is likely to generate a minor economic response, due to increased community interaction, user health benefits including employees and attraction of tourism.	Minor localised GVA increase due to improved employee productivity and local community interaction.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
47	Bus	Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxibuses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.	Proving a multi-modal hub within Wrexham is likely to generate a minor localised economic response, due to the increased volume of passenger utilisation and level of local community interaction.	Minor localised GVA increase due to improved local community interaction and enhanced facilities.	Potential direct job creation to operate improved facilities.	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
52		Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	Improving the level of accessibility between key employment sites from rail stations, generates a positive economic response, due to the provision of direct access to employment centres from broader labour locations.	Minor localised GVA increase due to improved employee productivity and local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
64	Rail	Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury)	Hourly shuttle service to be operated alongside existing services to give a basic half-hourly service pattern between Wrexham and Chester.	This option provides improved accessibility between Chester and Wrexham by increasing the level of service. This is likely to generate an increase in the volume of patronage and level of economic activity between connected locations. Further detailed information is required to undertake a complete assessment of this option, including the passenger demand for connecting to Shrewsbury. In principle the overall economic impact is likely to be positive for the corridor and broader catchment.	Minor localised GVA increase due to improved employee productivity and local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
71		New station at Rossett on the Wrexham to Chester line	New stations have been assessed as part of the NWRS study for Taith.	Further detailed information is required to complete an assessment of this option, which is currently unavailable. In principle providing a new station at Rossett on the Wrexham to Chester Line generates a new location for economic activity, focused around the new station, due to improved labour market accessibility. The station itself generates potential employment through staffing and general associated amenities. Additional inward investment may also be attracted to land surrounding the station. Overall economic impact is positive for the Rossett area and the study area as a whole.	Potential creation of a new economic activity centre focus around the proposed station, potentially resulting in a significant increase in GVA within Rossett	Initial employment impact is the creation of job to service the proposed station and amenities. Further employment could be generated through inward investment.	Improved accessibility into the Rossett area and the possible creation of a new economic centre is likely to result in the displacement of GVA from competing areas into the Rossett	The creation of jobs relating to the station operation is unlikely to result in a displacement response. However, a significant displacement impact maybe attributed to the attraction of investment as somewhere else losses out.	Net impact of providing a new station in Rossett is positive, as it creates a new economic centre within the area. A displacement response is likely, although it is unlikely this is sufficient enough to offset the benefits.	The new station directly generates employment and attracts potential additional investment. Regardless of the impact of displacement, the net employment impact is likely to be positive.	Option provides improved accessibility to a specific location the study area, potentially attracting additional investment to land surrounding the proposed station.
94	Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact	No Impact	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact
95		Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	A P&R facility directly generates new jobs, as these are required for its operation i.e. bus services and facility staff. This generates a positive impact for the local economy. However the scale of broader economic responses are dependent on the uptake of P&R as a option of travel. The location of the P&R site in relation to key employment centres such as the Deeside Industrial Estate, will limit the impact of this initiative.	Primary GVA increases restricted to potential P&R employee specific locations	Jobs directly created to operate and service the proposed P&R site.	No Impact	No Impact	No Impact	No Impact	No Impact
17	Highway	A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.	Option alleviates key congestion along the primary southern route into Chester to the benefit of both the A483 and A55, improving the level of accessibility and journey time reliability between Wrexham and Chester. The overall net impact is a potential increase in corridor GVA and employment, focused in key locations such as Chester, Wrexham and employment centre Chester Business Park.	Potential increase in GVA within corridor locations.	Potential job creation through increased economic performance of corridor location and improved interaction between Wrexham, Chester and Chester Business Park.	Potential minor displacement of GVA into the corridor from broader competitive areas.	Potential minor displacement of employment towards the enhanced corridor and key Chester Business Park location	Potential net increase in corridor and strategic GVA.	Potential overall job creation due to improved existing economic activity and the attraction of additional investment.	This option alleviates congestion related to a key development area within Cheshire. In principal the option enables the area to facilitate additional investment such as the expansion of the Chester Business Park.
18		Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.	Option alleviates key congestion along A483 which is the primary access into Wrexham from the south Wales. Primary economic impact is a potential increase in economic activity between Wrexham and Wales, resulting in an increase in GVA and potential job creation.	Potential increase in GVA due to improved connection between Wrexham and south/central Wales.	Potential job creation through increased accessibility to broader economic markets.	No Impact	No Impact	Potential net increase in local and strategic GVA.	Potential net increase in local employment levels.	No Impact
PACKAGE IMPACT				**This package contains a series of options designed to improve the level of accessibility for both strategic and local trips within a specific study area corridor through the provision of new infrastructure between Wrexham and Chester. The majority of the positive economic responses are delivered by the provision of specific highway infrastructure and improved rail services. In principle the complete package is likely to generate a substantial increase in the level of economic activity and productivity within the corridor, through improved multi-modal accessibility.**	This package potentially leads to an increase in GVA levels within the study area corridor, due to improved local accessibility within the high volume corridor between Wrexham and Chester. This economic response is primarily focused on the key locations of Wrexham and Chester.	This package facilitates and encourages employment growth through the expansion of existing businesses and the attraction of additional investment within the corridor. Certain public transport option lead to direct job creation i.e. new rail stations.	This package potentially leads to the minor displacement of GVA towards this corridor form competing corridors within study area and broader competing i.e. Northern/Central England and Wales.	This package potentially leads to the minor displacement of employment towards this corridor form competing corridors within study area and broader locations i.e. Northern/Central England and Wales.	This package has an overall net positive economic impact on GVA levels within the specific corridor and broader study area, due to improved local accessibility.	This package has an overall net positive economic impact on employment levels within corridor and study area, due to improved local accessibility which is likely to stimulate economic activity and additional investment.	This package facilitates and supports the expansion of existing businesses (Chester Business Park) and attracts additional investment by improving corridor accessibility and capacity.



Locational Impacts	Additionality GVA	Additionality Jobs	Displacement GVA	Displacement Jobs	Net Impact GVA	Net Impact Jobs
Location						
Broughton			-1	-1	-1	-1
Buckley					0	0
Caergwrle					0	0
Chester	2	2			2	2
Connah's Quay					0	0
Deeside					0	0
Ewloe					0	0
Flint					0	0
Gresford	1	1			1	1
Gwersyllt	1			-1	0	-1
Mold					0	0
Northop					0	0
Penyffordd			-1		-1	0
Queensferry					0	0
Saltney	1	1			1	1
Shotton					0	0
Wrexham	3	2			3	2
Wales	1	1			1	1
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	Medium	Medium
Wales	Low	Low	Low
Great Britain	Neutral	Neutral	Neutral

Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

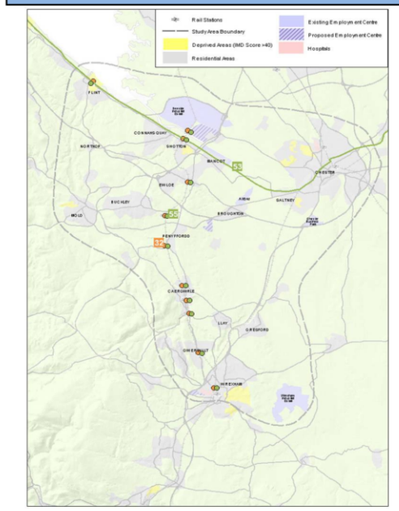
Annex H – Package 8: Making Best Use – Strategic Trips EALI Assessment

Option Assessment : **Package 8: Making Best Use - Strategic Trips**

					Economic Impact						
					Additionality		Displacement		Net Impact		
Ref	Theme	Name	Description	Economic Impact	GVA	Jobs	GVA	Jobs	GVA	Jobs	Investment
32	Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
34		Integrate cycling with other passenger transport services, for example use of buses with cycle	A range of measures to encourage interchange between bicycle and public transport.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
35		Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.	The adoption of cycling and walking as mode of travel is likely to reduce travel costs and improve the overall physical health of employees and the general public. The result could be an increase in productivity and disposable income.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction	No Impact	No Impact
36		Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.	The prioritising and publicising cycling and walking routes between key locations within the study area will encourage interaction with the local community and amenities, generating a minor increase in localised GVA.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increase local community interaction	No Impact	No Impact
42	Bus	Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junction to allow buses to avoid traffic congestion and improve service reliability.	Option provides improved journey time reliability for bus based travel only. Economic impacts are likely to be minimal or even offset by the reduced highway performance for other users.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
45		Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.	Option provides improved accessibility for travel by public transport by addressing the boundary of interchanging. In principle improving the services and facilities is likely to result in an increase in public transport patronage., particularly over longer distances. However, the scale of benefit is dependent of the uptake as public transport of a mode of travel. This option is unlikely to result in a significant economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
46		Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with Mersey Travel ticketing. Could include amendment to fares for difference zones.	Option encourages the uptake of public transport as a primary mode of travel, through improved ticketing, however this is not likely to be reflected in an economic impact.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
101		Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.	The introduction of (RTI) measures at key bus stops is intended to overcome the perceived knowledge boundaries to using public transport. The outcome is a likely increase in public transport passengers based on an improved perception of bus journey time reliability. This option is unlikely to result in a economic return in jobs or GVA.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
53	Rail	Extension of Llandudno-Manchester service to Manchester Airport.	Existing hourly service extended to Manchester airport. These services have a long layover time at Piccadilly.	Providing a direct service between Manchester Airport and the Llandudno, which is key tourism destination within North Wales, is likely to result in an increase in tourism based activity. Simplify the connections between the locations, improves accessibility and opens up broader markets. Further analysis is required to determine the level of demand for this service provision. In principle the option provides a potential positive economic impact from a tourism based perspective.	Minor localised (seasonal) GVA increases based on an increase in the volume of tourists originating from broader markets such as foreign visitors.	Potential creation of new seasonal jobs to service tourist demand. However, current tourism based employment and economy for North Wales is fragile.	No Impact	No Impact	Minor localised (seasonal) GVA increases due to increased tourism.	Potential creation of new seasonal jobs to service tourist demand. However, current tourism based employment and economy for North Wales is fragile.	No Impact
55		Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact	No Impact	Minor localised station specific GVA increase, due to increased passenger utilisation and interaction with local amenities.	No Impact	No Impact
77	Freight	Publicise the whereabouts and services from Possible Port Rail & Inland Rail Terminals	The infrastructure in place for intermodal distribution from local ports is not being utilised to its full potential.	No substantial economic locational impact	No Identifiable Impacts						
82		Suspension of non essential maintenance at peak periods	Maintenance programs can cause pinch points on the network, even during quieter periods as seen around the tunnels at Penmaenmawr.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	No Identifiable Impacts						

Option Assessment : **Package 8: Making Best Use - Strategic Trips contd...**

Ref	Theme	Name	Description	Economic Impact	Economic Impact						Investment
					Additionality		Displacement		Net Impact		
					GVA	Jobs	GVA	Jobs	GVA	Jobs	
1	Highway	Reduce the number of slip roads on the strategic highway network. Reduce local distributor road access.	Reduce local access roads onto the strategic road network to improve the safety of these roads and reduce their use by local traffic.	Controlling and restricting the access points to the strategic road network, allows the performance of the strategic network to be protected, at the expense of local access. Strategic traffic and site specific locations will economically benefit from this option, whilst others loss out.	Increased strategic GVA through improved productivity and journey time reliability.	Potential expansion of existing business and employment growth within the corridor due to improved accessibility at specific locations.	Controlling/restricting access to the strategic network from local areas may result in the displacement of GVA other more accessible locations within the corridor.	Controlling/restricting access to the strategic network from local areas may result in the displacement of employers (small businesses) to other more accessible locations.	Net GVA impact is likely to be neutral, as positives are balanced by the negatives.	Net employment impact is likely to be neutral, as positives are balanced by the negatives.	Option primarily facilitates existing business demand rather than attracting additional investment.
2		Consider a signage strategy for traffic travelling to/from the Midlands	Look into options for improving the signage of traffic travelling from the study area towards the Midlands.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
3		Consider a signage strategy for traffic travelling to/from North England	Look into options for improving the signage of traffic travelling from the study area towards North England.	No substantial economic locational impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
102		Variable Messaging Signs	Variable messaging signs on the A55/A494/A483 strategic routes to allow reduced speed limits and re-routing of traffic as a result of incidents.	This options allows the operation of the highway network to be controlled, therefore enhancing the overall performance. The result is an increase in highway efficiency and reliability, which generates an economic increase in productivity.	Increase in local and strategic GVA through improved productivity and journey time reliability.	Potential expansion of existing businesses and employment growth within the corridor due to improved accessibility to economic markets.	Potential minor displacement of GVA towards A55/A494 corridor locations.	Potential minor displacement of employment towards employers within the A55/A494 corridor.	Increase in local and strategic areas	Potential local job creation	Option primarily facilitates existing business demand rather than attracting additional investment.
PACKAGE IMPACT				**This package contains a series of options designed to reduce the level of car demand by enhancing or marketing existing facilities. The primary economic responses are driven by the improved resilience of the highway network and the quality of connection between Llandudno to Manchester Airport. Further detailed analysis is required to determine to true scale of the economic impact of this package. In principle the complete package is likely to increase the level of economic activity within the study area and broader economy.**	**Minor localised GVA increases relating to public transport station improvements and service enhancements. Minor benefits are likely to be experienced at both locally and at Wales level.**	**Potential job creation due to expansion within existing businesses and the tourism sector.**	**No Impact**	**No Impact**	**Minor localised GVA increases relating to public transport station improvements and service enhancements. Minor benefits are likely to be experienced at both locally and at Wales level.**	**Package provides the opportunity for potential creation of localised jobs and seasonal tourism based employment.**	**This package is unlikely to attract additional investment, as the options within the package support the existing economy rather than expand it.**



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton					0	0
Buckley					0	0
Caergwrle	1				1	0
Chester	1				1	0
Connah's Quay					0	0
Deeside					0	0
Ewloe	1				1	0
Flint	1				1	0
Gresford					0	0
Gwersyllt	1				1	0
Mold			-1		-1	0
Northop			-1		-1	0
Penyffordd	1				1	0
Queensferry	1				1	0
Saltney					0	0
Shotton	1				1	0
Wrexham	1				1	0
Wales	1	1			1	1
England					0	0
Scotland					0	0

Impact Summary Table

Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Low	Low	Neutral
Wales	Low	Low	Neutral
Great Britain	Neutral	Neutral	Neutral

Assessment Scores

Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	> 1% Reduction	25+ Jobs Lost

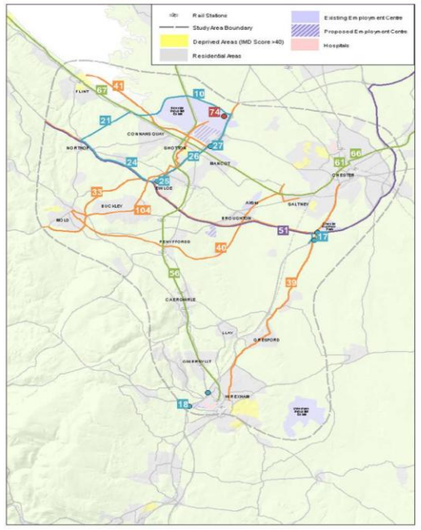
Annex I – Package 9: Capacity Enhancements – Strategic Trips EALI Assessment

Option Assessment : **Package 9: Capacity Enhancements - Strategic Trips**

Ref	Theme	Name	Description	Economic Impact	Economic Impact						Investment
					Additionality		Displacement		Net Impact		
					GVA	Jobs	GVA	Jobs	GVA	Jobs	
33	Walking and Cycling	Provide walking and cycling crossing facilities on trunk roads and associated junctions	Identify demands for walking and cycling crossing facilities along the key roads in the study area and provide suitable crossing facilities.	Improving the provision of crossing facilities in line with demand, is likely to result in a significant reduction in travel distance and time for employees, whose journey involves crossing the strategic network on foot or cycle. This could result in an increase in productivity, however additional crossing facilities may lead to extra delay on the strategic network, therefore a balanced approach is required to consider all users.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction. Localised benefits are unlikely to generate a displacement effect.	No Impact	No Impact
37		Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.	Providing designated connecting routes between specific locations such and local communities and public transport interchanges, encourages user economic interaction with local amenities to benefit of the local economy. At a micro economic level, positive responses are restricted to the enhanced route corridors.	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction and safety benefits.	No Impact	No Impact	No Impact	Minimal localised GVA increase, due to improved employee heath and consequential productivity. Increases can also be attributed to the increased local community interaction and safety benefits. Localised benefits are unlikely to generate a displacement ef	No Impact	No Impact
39		Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.	Providing a link to the National route 5 cycleway is likely to generate a minor economic response, due to increased community interaction, user health benefits and attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
40		Mold to Saltney cycle way	A new walking and cycling link between Mold and Saltney with connections to key destinations along the route utilising a former railway alignment.	Providing a direct cycle route between Mold-Saltney is likely to generate a minor economic response, due to increased community interaction, user health benefits and potential attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
41		Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities and major employers.	Providing a Dee Coastal Path is likely to generate a minor economic response, due to increased community interaction, user health benefits including employees and attraction of tourism.	Minor localised GVA increase due to employee health benefits, improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
104		Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside	Providing a direct cycle route between Mold-Deeside is likely to generate a minor economic response, due to increased community interaction, user health benefits and potential attraction of tourism.	Minor localised GVA increase due to improved local community interaction and potential additional tourism expenditure.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
100		New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.	Providing new walking and cycle route which link key community locations is likely to generate a minor economic response, due to increased community interaction, user health benefits including employees and attraction of tourism.	Minor localised GVA increase due to improved employee productivity and local community interaction.	No Impact	No Impact	No Impact	Minor localised GVA increase	No Impact	No Impact
51	Bus	Taith Express coach services	Express coach services operating between Holyhead and Manchester Airport with stops in the study area.	Further detail information and analysis is required to consider the economic case for this option. In principle the economic responses are likely to be limited.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
52		Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.	Improving the level of accessibility between key employment sites from rail stations, generates a positive economic response, due to the provision of direct access to employment centres from broader labour locations.	Minor localised GVA increase due to improved employee productivity and local community interaction.	Potential job generation though improved connectivity between labour market locations and employment centres .	No Impact	No Impact	Minor localised GVA increase	Minor localised job creation	No Impact
56	Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	Doubling of service frequency (to 2 tph) between Wrexham and Bidston (with potential extension into Birkenhead).	In principle the economic locational impacts related to this option are likely to be limited. Further information is required for a detailed analysis, including existing service demand and requirement for connection to Birkenhead.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
61		Fast Llandudno-Manchester Airport service	Removal of intermediate stops between Chester & Manchester (except Warrington). New hourly stopping service between Manchester & Chester.	In principle the economic locational impacts related to this option are likely to be limited, as the locations are already connected by existing services. Further detailed information is required regarding the demand for this service.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
66		Extension of London-Chester services to Bangor/Holyhead	This creates an hourly service between N W ales and London.	Providing an enhanced connection between Bangor/Holyhead to broader location such as Chester and primarily London, is likely to increase the level of economic activity between these locations, specifically tourism sector based activity. Further detailed analysis is required to understand the scale of this response, in principle to impact is positive.	Minimal increase in GVA, primarily related to an increase in tourism based activity between locations.	Potential minor tourism (seasonal) based job creation, however impact is likely to be limited.	No Impact	No Impact	Potential minor increase in GVA relating to increased tourism based activity.	Potential minor tourism (seasonal) based job creation.	No Impact
67		Rhiy-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester Crewe shuttle). Requires new trunback facility at Rhyl.	Further detailed analysis is required regarding the demand for this service to inform the economic assessment. In principle the option increases the economic interaction between Chester and the intermediate stopping locations to Rhyl.	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
74	Freight	Freight Consolidation Centres including one at Deeside	There may be an economic case for establishing whether opening "open user" distribution centres for example at strategic points in England e.g. near Wakefield on the M62 and near Manchester on the M60 might reduce the number of vehicles that have to make a journey to Deeside.	Further detailed economic analysis is required to determine the economic benefits of providing an "open user" distribution centre within this location. In principle the option provides a new facility which directly generates jobs, however these maybe offset by a corresponding reduction individual operator staff, therefore net impact of likely to be neutral.	Neutral Economic Impact						
83		Truckstops	Lack of truck parking facilities across North Wales, sites at both ends of the A55 would be ideal in reducing the number of illegally parked vehicles overnight in lay-bys and levels of vehicle crime.	Reduction in Freight based vehicle crime will result in an increase in operator profits, rather than an economic return in jobs or GVA increases.	No Identifiable Impacts						
84		Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.	Crawler lanes enhance the resilience of the highway network by reducing the delay impact of slow moving vehicles such as HGV's. The option provides a reliability journey time benefit, however benefit cannot be quantified as a locational impact as GVA or Jobs.	No Identifiable Impacts						
87		Rail electrification	Electric freight trains can accelerate quicker and depending on the locomotive have the potential to pull a heavier train than a diesel.	Reduction in Freight operator costs are likely to result in an increase in operator profits, rather than an economic return in jobs or GVA increases. Further benefits through decongestion cannot be assessed at this stage of the assessment.	No Identifiable Impacts						
105		Open Access Rail Terminal	Lack of rail freight on the NWCL resulting from poor handling infrastructure despite apparent interest from industry particularly for continental services to and from Ireland	Further detailed economic analysis is required to determine the economic benefits of providing an "open access rail terminal" within the study area. In principle the option provides a new facility which directly generates jobs, however these maybe offset by a corresponding reduction individual freight operator staff. Broader economic benefits could attributed to decongestion or increased operator profits, however at this stage, these benefits cannot indentified as a locational impact as GVA or Jobs.	No Identifiable Impacts						
94	Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	Option is likely to result in a reduction in journey to work travel costs, which leads to a potential increase in the level of employee disposable income to the benefit of the local economy. However the impact will be restricted to specific initiative locations and level of participation. Broader economic benefits through decongestion are likely to be negligible.	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact	No Impact	Minimal localised GVA increases. Option impacts are locational dependent.	No Impact	No Impact
95		Park and Ride scheme	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.	A P&R facility directly generates new jobs, as these are required for its operation i.e. bus services and facility staff. This generates a positive impact for the local economy. However the scale of broader economic responses are dependent on the uptake of P&R as a option of travel. The location of the P&R site in relation to key employment centres such as the Deeside Industrial Estate, will limit the impact of this initiative.	Primary GVA increases restricted to potential P&R employee specific locations	Jobs directly created to operate and service the proposed P&R site.	No Impact	No Impact	No Impact	No Impact	No Impact

Option Assessment : **Package 9: Capacity Enhancements - Strategic Trips contd...**

Ref	Theme	Name	Description	Economic Impact	Economic Impact: Additionality GVA	Economic Impact: Additionality Jobs	Economic Impact: Displacement GVA	Economic Impact: Displacement Jobs	Economic Impact: Net Impact GVA	Economic Impact: Net Impact Jobs	Investment
5	Highway	Apply managed motorway concepts to key trunk roads	Whilst not having full hard shoulders, ITS technology could be deployed on key routes such as the A55/A494 to vary speed limits according to traffic levels determined through traffic loops and CCTV.	Option improves the reliability of the highway network by applying an intelligent demand control mechanisms, resulting in improved journey time reliability and economic productivity.	Potential increase in GVA due to journey time reliability and productivity benefits.	No Impact	No Impact	No Impact	Potential net increase in GVA.	No Impact	No Impact
99		Provide hard shoulders on dual carriageway trunk roads	Hard shoulders would improve the resilience of these routes to incidents and maintenance events and improve safety.	The provision of hard shoulders is designed improve the resilience of the highway network to the negative influence of temporary constraints. Mitigating these constraints is unlikely to generate an economic response.	**No Identifiable Impacts**						
10		Enhance the A548 route between Flint and the A550	A series of highway improvements on the links and junctions on the A548 between Flint and the A550 to the east of Deeside Industrial Estate to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.	Scheme encourages the adoption of the A458 as strategic route and provides improved accessibility between Flint and the broader economic locations. The result is likely to be an increase in the level of economic activity and productivity within the corridor.	Minor localised GVA increases within the western end of the study area due to improved accessibility.	Potential minor job creation through increased accessibility to Deeside Industrial Estate and broader employment catchment.	Minor GVA increase in the west are likely to offset be reductions in the east.	Potential job creation in the west is likely result in reduction in the east.	Net impact on GVA values are likely to be neutral as the gains in the west are offset by the loss in east.	Net impact on employment volumes are likely to be neutral as the gains in the west are offset by the loss in the east.	Scheme encourages the adoption of the A548 as a strategic route, therefore there is the potential to attract additional investment.
17		A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.	Option alleviates key congestion along the primary southern route into Chester to the benefit of both the A483 and A55, improving the level of accessibility and journey time reliability between Wrexham and Chester. The overall net impact is a potential increase in corridor GVA and employment, focused in key locations such as Chester, Wrexham and employment centre Chester Business Park.	Potential increase in GVA within corridor locations.	Potential job creation through increased economic performance of corridor location and improved interaction between Wrexham, Chester and Chester Business Park.	Potential minor displacement of GVA into the corridor from broader competitive areas.	Potential minor displacement of employment towards the enhanced corridor and key Chester Business Park location	Potential net increase in corridor and strategic GVA.	Potential overall job creation due to improved existing economic activity and the attraction of additional investment.	This option alleviates congestion related to a key development area within Cheshire. In principal the option enables the area to facilitate additional investment such as the expansion of the Chester Business Park.
18		Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.	Option alleviates key congestion along A483 which is the primary access into Wrexham from the south Wales. Primary economic impact is a potential increase in economic activity between Wrexham and Wales, resulting in an increase in GVA and potential job creation.	Potential increase in GVA due to improved connection between Wrexham and south/central Wales.	Potential job creation through increased accessibility to broader economic markets.	No Impact	No Impact	Potential net increase in local and strategic GVA,	Potential net increase in local employment levels.	No Impact
21		New road connecting the A55 and A548	A new road connecting the A55 at Northop and the A548 at Kersterton to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.	Providing a new strategic connection with the A55 which bypasses key congestion hotspots is likely to increase the economic performance of the local area and benefit strategic traffic. In addition investment maybe attracted to the newly accessible land.	Minor localised GVA increases within the western end of the study area due to improved accessibility.	Potential minor job creation through the provision of a new strategic link and development corridor.	Minor GVA increase in the west are likely to offset be reductions in the east.	Potential job creation in the west is likely result in reduction in the east.	Net impact on GVA values are likely to be neutral as the gains in the west are offset by the loss in east.	Net impact on employment volumes are likely to be neutral as the gains in the west are offset by the loss in the east.	Potential attraction of additional investment into the newly accessible land with scheme corridor. However broader strategic transit issues remain.
24		A55 Ewloe to Northop Improvements	Widening of the highway between Ewloe and Northop – the scale of such improvements is yet to be determined.	The option enhances the capacity, performance and reliability of a key section of the strategic A55, to the benefit specific locations of Ewloe to Northop, whilst benefiting general strategic traffic. However the complete level of journey time improvement for strategic traffic is dependent on the delivery of other enhancements along the broader SRN. This Option is likely to improve existing economic productivity, as well as attracting additional investment.	Option is likely to result in an increase in GVA through improved productivity within the corridor and broader economy. However the scale of this response is dependent on the delivery of the package of highway measures rather than isolated infrastructure.	Option when delivered as a package facilitates and encourages employment growth within the corridor as well as attracting additional investment. In isolation employment responses are constrained.	Potential minor displacement of GVA from broader areas to corridor specific locations.	Employment growth and investment is likely to be attracted to improved strategic corridor, leading minor displacement of jobs from the broader locations.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in GVA within the study area and broader economy. In isolation the option provides limited impacts.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in jobs within the study area. In isolation the option provides limited impacts.	Option mitigates existing congestion along a specific corridor, resulting in the potential attraction of additional investment.
25		Ewloe Interchange Improvements	Identify a higher capacity design for the A55/A494 Ewloe Interchange which reduces the congestion problems and improved the safety issues currently experienced at this location.	The option is designed to alleviate a key congestion point within the strategic network which currently constrains the performance of the local and strategic economy. The option is likely to improve the existing area economic productivity, although the level of economic response is dependent of the level improvement. Impacts are dependent on the package approach rather than isolated infrastructure enhancements.	Option is likely to result in an increase in GVA through improved productivity within the corridor and broader economy. However the scale of this response is dependent on the delivery of the package of highway measures rather than isolated infrastructure.	Option when delivered as a package facilitates and encourages employment growth within the corridor as well as attracting additional investment. In isolation employment responses are constrained.	Potential minor displacement of GVA from broader areas to corridor specific locations.	Employment growth and investment is likely to be attracted to improved strategic corridor, leading minor displacement of jobs from the broader locations.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in GVA within the study area and broader economy. In isolation the option provides limited impacts.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in jobs within the study area. In isolation the option provides limited impacts.	Option mitigates existing congestion at a specific location, however the attraction of investment is dependent of the level of improvement.
26		A494 Ewloe to Drome Corner Improvements	Widening of the highway between Ewloe and Drome Corner – the scale of such improvements is yet to be determined.	Increasing the highway capacity of the A494 between Ewloe to Drome Corner, improves the resilience of the highway network to variations in highway demand and enables the corridor to accommodate additional traffic to the benefit of local and strategic traffic. Improved journey time reliability and additional capacity is likely to result in a positive economic impact in GVA and employment.	Option is likely to result in an increase in GVA through improved productivity within the corridor and broader economy. However the scale of this response is dependent on the delivery of the package of highway measures rather than isolated infrastructure.	Option when delivered as a package facilitates and encourages employment growth within the corridor as well as attracting additional investment. In isolation employment responses are constrained.	Potential minor displacement of GVA from broader areas to corridor specific locations.	Employment growth and investment is likely to be attracted to improved strategic corridor, leading minor displacement of jobs from the broader locations.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in GVA within the study area and broader economy. In isolation the option provides limited impacts.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in jobs within the study area. In isolation the option provides limited impacts.	Option mitigates existing congestion at a specific location, however the attraction of investment is dependent of the level of improvement.
27		Improve the capacity of the A494 river Dee crossing	Widening of the existing A494 crossing of the River Dee to improve the capacity and safety of this link.	The option alleviates a key constraints within highway network, the A494 River Dee crossing, primarily benefiting strategic traffic. This option is likely to significantly improve existing economic productivity of the area, as well as attracting additional investment. Impacts are dependent on a package approach rather than isolated infrastructure enhancements.	Option is likely to result in an increase in GVA through improved productivity within the corridor and broader economy. However the scale of this response is dependent on the delivery of the package of highway measures rather than isolated infrastructure.	Option when delivered as a package facilitates and encourages employment growth within the corridor as well as attracting additional investment. In isolation employment responses are constrained.	Potential minor displacement of GVA from broader areas to corridor specific locations.	Employment growth and investment is likely to be attracted to improved strategic corridor, leading minor displacement of jobs from the broader locations.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in GVA within the study area and broader economy. In isolation the option provides limited impacts.	The option when delivered as part of the complete highway measure package is likely to result in a net increase in jobs within the study area. In isolation the option provides limited impacts.	Option alleviates congestion problems associated with a key development location of the Deeside Industrial Estate and proposed employment centre, therefore option is likely to directly attract investment.
PACKAGE IMPACT			**This package contains a series of options designed to improve the level of accessibility for both strategic and local trips within the study area through the provision of new infrastructure. The majority of the positive economic responses are driven by the highway improvements, particularly those within the Deeside area (A55/A494/A548/A550). In principle the complete package is likely to generate a substantial increase in the level of economic activity and productivity within the study area and broader economy by tackling specific constraining factors and providing multi-modal accessibility.**	This package potentially leads to an increase in GVA levels within the study area and broader economy, due to improved accessibility both locally and strategically. This economic response is primarily focused on the A55/A494 corridor and Deeside area.	This package facilitates and encourages employment growth through the expansion of existing businesses and the attraction of additional investment.	This package potentially leads to the minor displacement of GVA towards the study area from broader competing locations i.e. Northern England and Wales.	This package potentially minor displacement of employment towards the study area from broader competing locations i.e. Northern England and Wales.	This package has an overall net positive economic impact on GVA levels within the study area and broader national economy, due to improved accessibility both locally and strategically.	This package has an overall net positive economic impact on employment levels within the study area and broader national economy, due to improved accessibility both locally and strategically which is likely to stimulate economic activity and additional investment.	This package facilitates and supports the expansion of existing businesses, the delivery of proposed developments and attracts additional investment by improving strategic and local accessibility.



Locational Impacts	Additionality		Displacement		Net Impact	
Location	GVA	Jobs	GVA	Jobs	GVA	Jobs
Broughton	1				1	0
Buckley	1				1	0
Caergwrle	1				1	0
Chester	1	1			1	1
Connah's Quay	1	1			1	1
Deeside	3	3			3	3
Ewloe	2	2			2	2
Flint	2	2			2	2
Gresford					0	0
Gwersyllt	1				1	0
Mold	1				1	0
Northop	2	2			2	2
Penyffordd	1				1	0
Queensferry	2	2			2	2
Saltney	1				1	0
Shotton	2	2			2	2
Wrexham	2	1			2	1
Wales					0	0
England					0	0
Scotland					0	0

Impact Summary Table

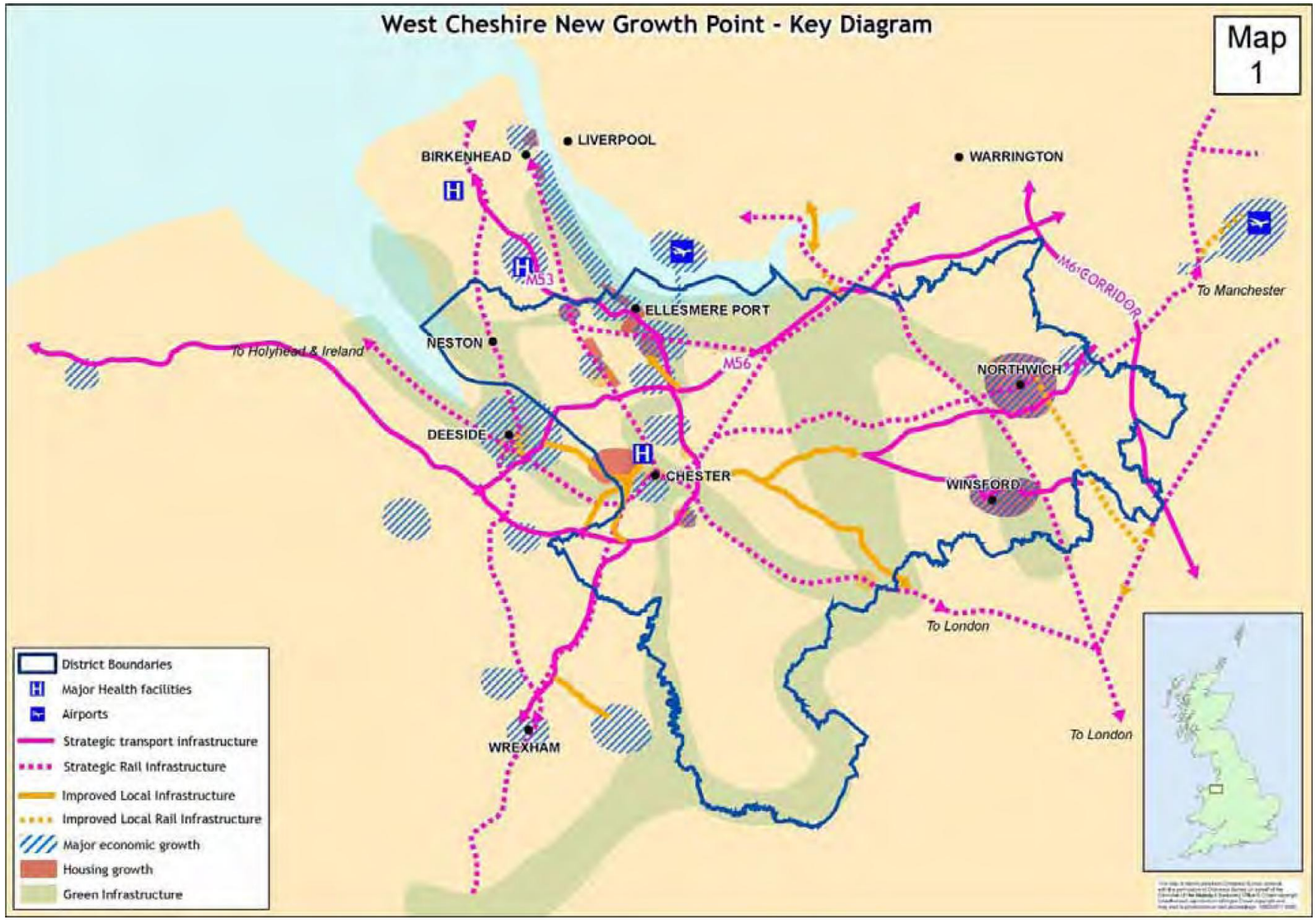
Location	Income Impacts GVA	Job Creation	Inward Investment Opportunity
Study Area	Medium	High	Medium
Wales	Medium	Medium	Medium
Great Britain	Neutral	Neutral	Neutral

Assessment Scores

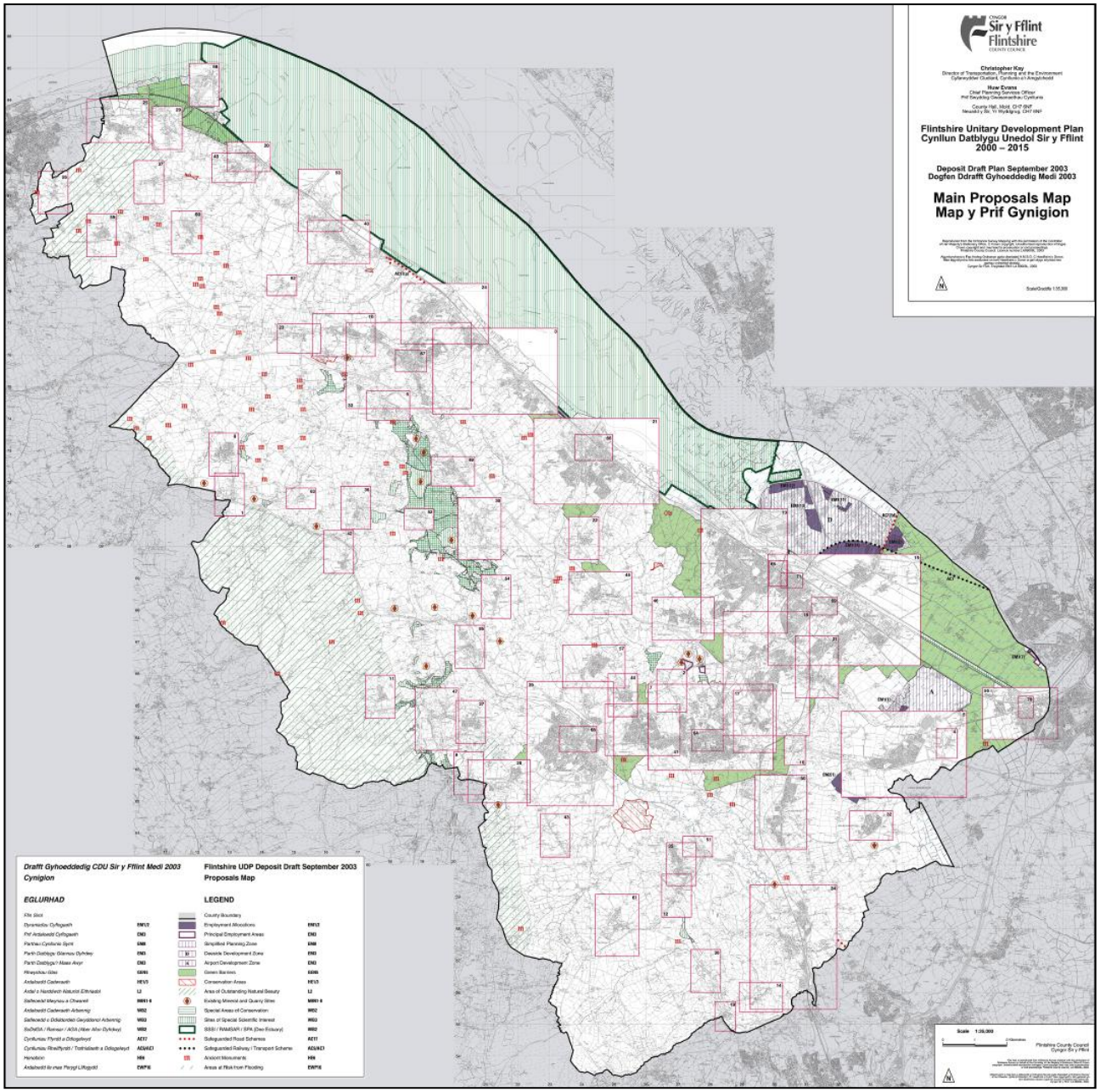
Score	GVA	Jobs
3. High	> 1% Increase	25+ Jobs Created
2. Medium	0.25%-1% Increase	5-25 Jobs Created
1. Low	0%-0.25% Increase	1-5 Jobs Created
Neutral	No Impact	No Impact
(-1) Low	0-0.25% Reduction	1-5 Jobs Lost
(-2) Medium	0.25%-1% Reduction	5-25 Jobs Lost
(-3) High	>1% Reduction	25+ Jobs Lost

Annex J.1 – West Cheshire LDF New Growth Points

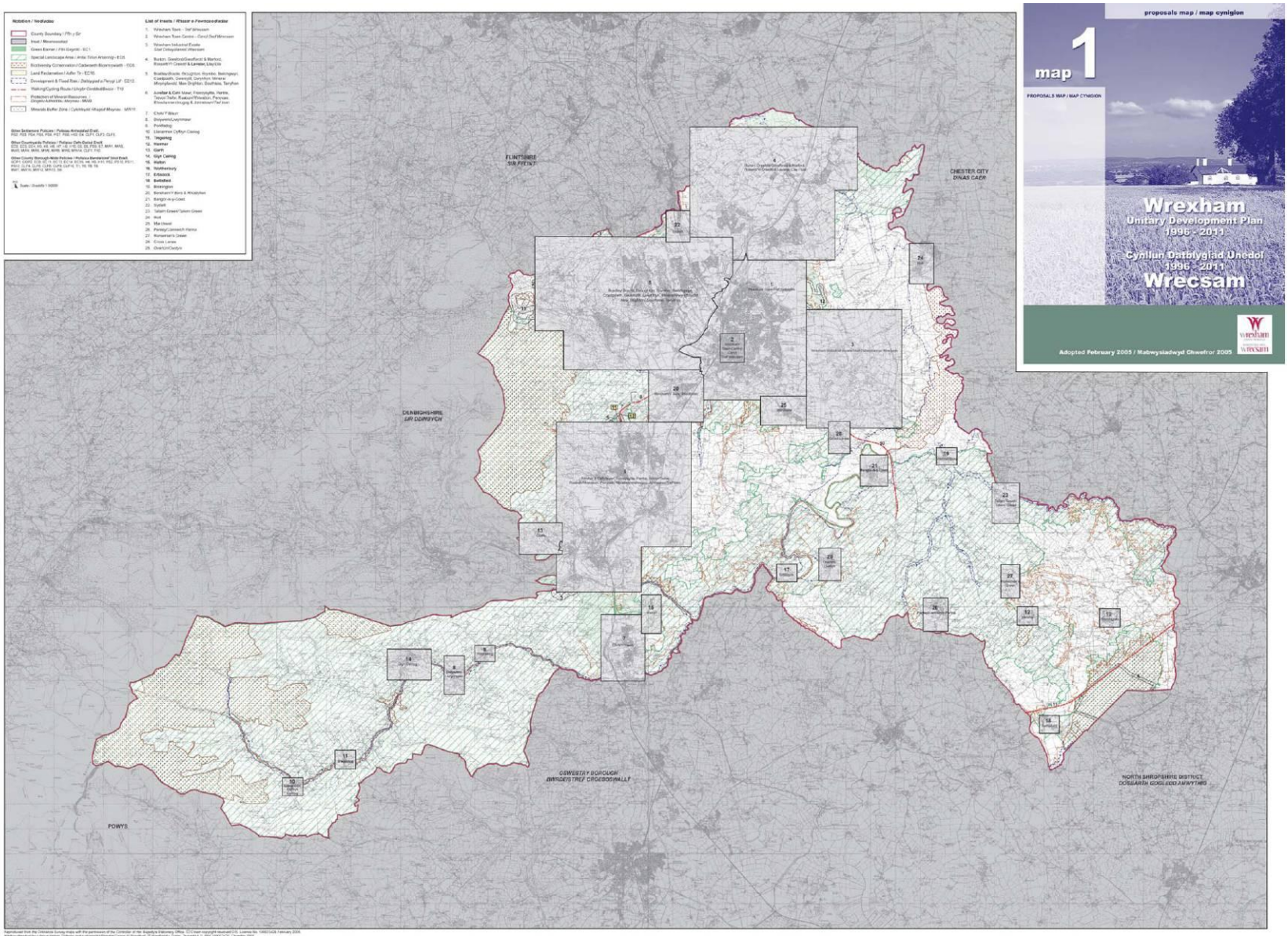
Annex J – Regional Development Plan Information



Annex J.2 – Flintshire UDP Main Proposals Map 2000-2015



Annex J.3 – Wrexham UDP Main Proposals Map 1996-2011



Annex J.4 - Flintshire UDP Employment Allocations for B1, B2 & B8 2000-2015

Ref no.	Settlements/ Location	Site	Area (ha)	Comments
1	Broughton	Chester Aerospace Park	15.5	Retain allocation. WDA redevelopment of a brownfield site
2	Broughton	Manor Lane/Hawarden Park Extension	20.7	**New allocation** to the south of existing industrial park to cater for aerospace sector spin-offs and enable improved access
3	Buckley	Catherall's Ind. Est.	1.2	Brownfield site extension to existing estate
4	Buckley	Mount Pleasant Road (north)	2.0	Reduction to original allocation
5	Buckley	Land North of Buckley Station	0.6	Retain as allocation
6	Buckley	Drury New Road	1.4	**New allocation** to reflect vacant land to the north of access road to former Optec factory
7	'Chester'	Chester West Employment Park	1.3	Retain as allocation.
8	Connahs Quay	Former Power Station	12.8	Retain allocation but omit from the Deeside Development Zone
9	Connahs Quay	Dock Road Ind. Est.	4.3	Retain existing small allocation and extend to include the former playing field as **new allocation**
10	Connahs Quay	Crumps Yard, Dock Road	4.0	**New allocation** to bring brownfield site back into use
11	Deeside	Deeside Industrial Park, Phase II	11.6	Retain balance as allocation
12	Deeside	Land to North of Shotton Paper	24.0	Retain as allocation. But not generally available
13	Deeside	Land to East of Shotton Paper	32.0	Retain as allocation. But 10ha. not generally available
14	Deeside	Land to North West of Garden City	138.2	Retain and extend existing allocation. Needs major infrastructure. Development Brief required
15	Flint	Adjacent Paper Mill, Oakenholt	4.1	**New allocation**, but only for the expansion of the Paper Mill
16	Greenfield	Greenfield Business Park, Phase I	1.3	Retain allocation, but land not generally available
17	Greenfield	Greenfield Business Park, Phase II	6.1	Retain allocations. But 5.0 ha. not generally available
18	Greenfield	Greenfield Business Park, Phase III	7.6	Retain allocations. But 4.0 ha. not generally available
19	Greenfield	Greenfield Business Park (III) Extension	6.6	Retain allocation as extension to Business Park
20	Mold	Broncoed Ind. Est.	1.1	Retain allocation
21	Mold	Mold Business Park	5.3	Retain allocations. Restrict to B1 & high quality B2 uses
22	Mostyn	Adjacent Mostyn Docks	4.5	Retain as allocation
23	Queensferry	Expressway Business Park	0.7	Retain as allocation
24	Queensferry	Chester Road East	9.9	Retain as allocation
25	Rhydymwyn	Antelope Ind. Est.	1.1	Retain as allocation
26	Saltney	River Lane	2.2	Retain as allocation
27	Sandycroft	Prince William Avenue	4.8	Retain as allocation
28	Shotton	Rowley's Drive	1.8	Retain as allocation. All committed - no land generally available. B1, B2 (low impact) & B8 uses
	Total		**326.7**	**Existing allocations rolled forward - 292.2 ha.**
				New site allocations - 34.5 ha.
				Land not generally available - 50.2 ha.

Annex J.5 – Wrexham UDP Housing Allocations 2001-2011

Housing Allocations

Policy H1 Sufficient land will be allocated for housing development between 2001 and 2011 as follows:-

URBAN VILLAGES

Ref. Number	Location	Area (ha)	Units
1.	Acrefair: Llangollen Road	2.40	60
2.	Broughton : Former Gatewen Colliery Site	8.57	214
3.	Broughton: Southsea Road/New Road	3.28	77
4.	Chirk : Lodgevale Park	0.70	18
5.	Gwersyllt: Bottom Road	1.33	33
6.	Llay : Llay Road	1.31	31
7.	Penycae: Afoneitha Road	0.53	12
8.	Pentre Broughton : High Street	0.70	18
9.	Rhos : High Street/Hall Street	0.25	9
10.	Rhostyllen : Wrexham Road	7.57	160
11.	Ruabon : Station Road	1.17	23
12.	Ruabon: New Hall Road	3.50	80
13.	Tanyfron: Bryn Gwenfro	2.33	56
14.	Trevor: Former Brickworks, Llangollen Road	1.40	40
	Urban Villages Sub Total	**35.04**	**831**

WREXHAM TOWN

Ref. Number	Location	Area(ha)	Units
15.	Rhosrobin: Pontrobin Farm	1.22	36
16.	Bridge Street/Cambrian Yard	4.73	260
17.	Former Brewery, Central Road	2.80	100
18.	Former Depot, Crescent Road	0.54	13
19.	Salop Road / Greenbank Road	1.06	30
20.	Stansty Road/Garden Road	2.05	60
21.	Ruthin Road	11.00	327
22.	Watery Road	1.23	37
	Wrexham Town Sub Total	**24.63**	**863**

RURAL VILLAGES

Ref. Number	Location	Area (ha)	Units
23.	Bronington : Former Garden Centre, New Hall Lane	0.63	12
24.	Dolywern : Adjacent to Y Wern	0.30	5
25.	Gresford : Bryn y Groes	2.87	43
26.	Holt : Wrexham Road	0.67	12
27.	Lavister : Waterways Garden Centre	0.94	12
28.	Minera : Adjacent to Eversley Court	0.25	6
29.	Penley : Polish Hospital	4.05	66
	Rural Villages Sub Total	**9.71**	**156**
	TOTAL	**69.38**	**1850**

Annex J.6 – Wrexham UDP Employment Allocations for B1, B2 & B8 2000-2015

Policy E1 Sufficient land will be allocated for employment development between 2001 and 2011 at:-

WREXHAM INDUSTRIAL ESTATE

Ref. Number	Location	Area (ha.)
1.	Abbey Road	1.4
2.	Abenbury Way	1.7
3.	Ash Road South (i)	2.6
4.	Ash Road South (ii)	7.3
5.	Ash Road South (iii)	0.8
6.	Bryn Cottages	3.6
7.	Bryn Road	9.5
8.	Clywedog Road North	1.9
9.	Clywedog Road East	2.2
10.	Clywedog Road South (i)	3.3
11.	Clywedog Road South (ii)	5.0
12.	Clywedog Road South (iii)	6.5
13.	Coed Aben Road	2.6
14.	Dunster Road	1.5
15.	Maelor, Bedwell Road	2.9
16.	Redwither (i)	2.1
17.	Redwither (ii)	0.9
18.	Redwither (iii)	2.1
19.	Redwither (iv)	0.9
20.	Redwither (v)	3.3
21.	Ridley Wood Road	3.3
	Wrexham Industrial Estate Sub Total	**65.4**

OTHER SITES

Ref. Number	Location	Area (ha.)
22.	Acrefair: Wynnstay Industrial Estate	1.4
23.	Gresford: Industrial Estate	1.1
24.	Johnstown: Vauxhall Industrial Estate	2.5
25.	Llay: Industrial Estate (i)	3.3
26.	Llay: Industrial Estate (ii)	2.9
27.	Llay: Industrial Estate (iii)	0.4
28.	Llay: Industrial Estate (iv)	1.4
29.	Llay: Industrial Estate (v)	1.2
30.	Llay: Industrial Estate (vi)	0.8
31.	Llay: Industrial Estate (vii)	7.5
32.	Rhosllannerchrugog: Coppi Industrial Estate, Hall Lane	0.4
33.	Rhostyllen : Croesfoel Industrial Estate	1.3
34.	Rhosymedre: Plas Kynaston	0.6
35.	Wrexham: Pandy Industrial Estate	1.1
36.	Wrexham: Queensway Industrial Estate	0.5
37.	Wrexham: Rhosddu Industrial Estate	1.7
38.	Wrexham: Technology Park	5.3
39.	Wrexham: Ruthin Road Development Area	15.2
	Other Sites Sub Total	**48.6**
	TOTAL	**114.0**

NEWABTS Stage 1 Appendix C Environmental Report



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NEWABTS Stage 1 Appendix C - Environmental Report

Rev No	Comments	Checked by	Approved by	Date
1	DRAFT Report	Jane Knowles	Sarah Edwards	10-01-2011
2	Final Report	Jane Knowles	Sarah Edwards	31-05-2012

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1 Introduction

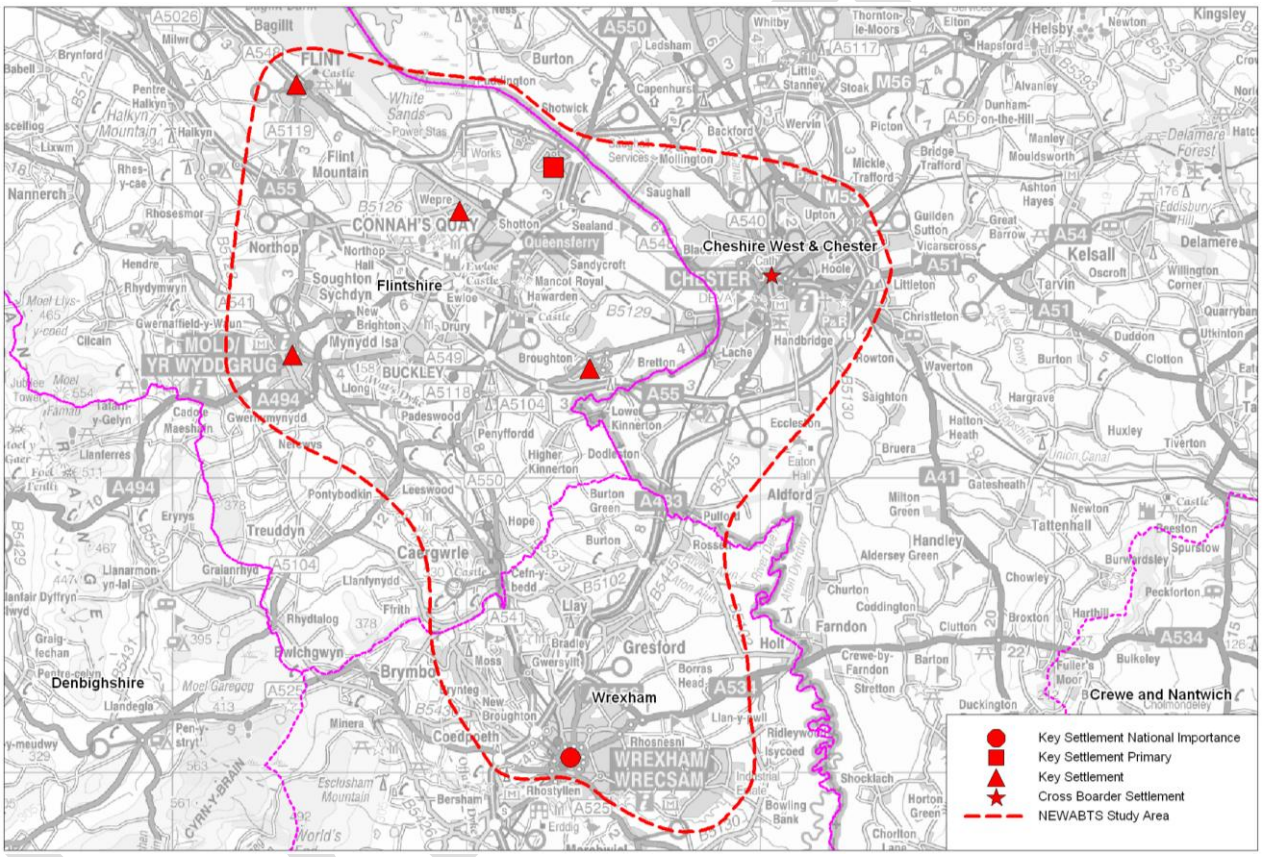
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2 Introduction

1.1 Study Overview

AECOM has been commissioned by the Welsh Government and the Taith Consortium to progress a Welsh Transport Appraisal Guidance (WelTAG) study to consider transport issues and options within the North East Wales Area Based Transport Study (NEWABTS) consistent with the aims and commitments set out in the National Transport Plan (NTP) (March 2010). The study area is shown in Figure 1.1 below and encompasses three local authorities (the eastern part of Flintshire, north and eastern part of Wrexham and the west of Cheshire West and Chester).

Figure 1.1: Study Area



1.2 Objective of this Report

This document is the WelTAG Stage 1 Environmental Report which sets the context in terms of environment impacts from the proposed transport "packages", highlights key issues and presents mitigation measures.

WelTAG has been developed by the Welsh Government with the intention that it is applied to all transport strategies, plans and schemes being promoted or requiring funding from the Welsh Government.

A Stage 1 appraisal *"is always required (for strategies and schemes) and is intended to screen and test options (already developed and pre-tested in a previous planning stage) against both the Transport Planning Objectives (TPO) and the Welsh impact areas. Appraisal against TPOs ensures that the proposal does address the problems identified. It is also essential to appraise using the Welsh impact areas, because a proposal that performs poorly against Welsh impact areas is unlikely to gain support from the Welsh Government.'*

1.3 Transport Problems and Transport Objectives

In July 2010, stakeholder consultation was carried out to identify the main transportation problems within the NEWABTS area. The issues were categorised into the main transport links within the study area. For each of these routes the issues were categorised into highway, walking and cycling, bus, rail and freight topics. The transport planning objectives for the NEWABTS are as follows:

- To improve transport connections for businesses within the study area to key economic centres and employment sites
- To improve access between employment sites and workforce catchment areas
- To reduce carbon emissions from transport in the study area
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts
- To improve the actual and perceived safety and personal security of all transport users in the study area
- To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight.
- To reduce social deprivation through improved access to jobs and other key services
- To maintain and make more efficient use of the existing transport infrastructure in the study area
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

1.4 WelTAG Planning Stage Environmental Review

An initial environmental data collection exercise was undertaken as part of the WelTAG Planning Stage and forms part of the environmental baseline information used throughout this report, against which any changes can be measured or predicted.

The findings are presented below:

- There are a large number of International and European designated sites within and adjacent to the study area. These include Dee Estuary / Aber Dyfrdwy Special Area of Conservation, Special Protection Area (SPA) and Ramsar, the River Dee and Bala Lake / Afon Dyfrdwy.SAC, Deeside and Buckley Newt Sites SAC and Midland Meres and Mosses Phase 2 Ramsar. A large number of these are water dependant sites. Any transport infrastructure developments within the study area as a consequence of this study will need to consider hydrological links and the effect on routine runoff on these sites. In addition a number of interest features (*Luronium natas* and Old Sessile oak wood with *Ilex* and *Blechnum*) are currently exceeding critical loads for nitrogen deposition. Therefore the study should look at options to reduce transport derived nutrient nitrogen and acid deposition.

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- There is a varied landscape character within the study area from undulating hills in the west and south to the coastal and estuarine flats of the River Dee and its estuary in the north and east. The Alyn River valley and its tributaries are a key characteristic of the undulating landscape in the west of the study area. This valley is surrounded by agricultural land that exhibits small irregular filed patterns and interspersed with numerous pockets of woodland. In the north and east of the study area either side of River Dee the landscape is flat and dominated by the industrial processes that have built up along the banks of the river and its estuary. The areas of industry are in amongst agricultural fields separated by regular linear field boundaries that also act as land drainage. In the south of the study area to the north and east of Wrexham a significant area is designated as a Local Landscape Area (LLA). This designated area is generally associated with the River Alyn and River Dee corridors.
- There is a legacy of historical contamination across the majority of the study area as a result of the legacy mining industries within the region and other industries that developed around Deeside, in particular along the banks of the River Dee. These include brickworks, steelworks, paintworks etc. Whilst not directly related to transport infrastructure the development of any new infrastructure will have to take the location of potential areas of contaminated ground into account in terms of exposing potential environmental risks and the associated cost of remediation. In particular a number of these sites lie adjacent to the existing road network as transport infrastructure generally developed around the existing industry in the area therefore this is particularly important in the context of any future road widening schemes.
- One of the major rivers within the study area, the River Alyn is classified as currently being of poor ecological status from Mold to its confluence with the River Dee. This river is crossed and flows adjacent to a number of strategic roads within the study area and it is likely that it receives a high proportion of road drainage from these. Therefore any schemes proposed as a consequence of the study should consider the implementation of additional treatment measures to outfalls to this watercourse.
- There are a number of strategic roads that dissect the study area, in particular the A55, A494 and the A483. These roads and particularly the A55 and the A494 take large volumes of traffic both local and passing, including large volumes of tourist traffic both at the weekends and during holiday periods. As a consequence there is a significant amount of transport related noise adjacent to these roads. Whilst the A55 takes the largest volume of traffic and the 55-59dB noise levels from this road cover a wide corridor there are few receptors within the rural sections. However, where the road passes through Queensferry there are a number of receptors adjacent to the road including a school which falls within the 65-69dB band. In addition there is a significant noise corridor along the A483 through Wrexham, in particular around the A541 junction which becomes congested at peak times.
- There is a large amount of heavy industry within the study area this is mainly concentrated around the Deeside Industrial Park and along the banks of the River Dee between Flint and Chester. This industry is vital for employment within the area, however as a result Flintshire is the 3rd highest CO_2 emitter of the 22 Welsh Counties. In addition in terms of transport related air pollution Flint is the 5th highest CO_2 emitter of the Welsh counties. It is likely that this is attributed to the presence of the A55/A494 that takes large volumes of traffic between northwest England and Wales as well commuter and local traffic. Whilst it is acknowledged that this study will not address the impact of holiday traffic that use this section of the road to reach north Wales and the port of Holyhead the study should look at ways of increasing the modal shift in local and commuter journeys.

1.5 Strategic Transport Proposals

The proposed transport strategy aims to look at the transport links between main settlements in the study area, access to areas outside the study area and transport issues which impact on trips through the study area.

Packages of options have been created through dividing the options considered at the Planning Stage based upon the level of intervention (managing demand, making best use of capacity enhancements) as well as the corridor affected.

The following corridors are considered within the study area (see Figure 1.2):

- Strategic Trips: This corridor comprises the trunk road network through the study area.
- Flint/Mold-Chester (via Deeside/Broughton): Combined transport corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

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- Wrexham-Deeside (via Mold/Buckley): Transport corridor between Wrexham and Deeside, via Mold and Buckley.
- Chester-Wrexham: Transport corridor between Chester and Wrexham

Figure 1.2: Transport Corridors within NEWABTS



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There are nine transport packages being proposed, each of which is made up of individual options/interventions (see Table 1.1)

Table 1.1: Proposed Transport Packages

Level	Level Description	Package	Corridor
Managing Demand	Reduce the demand for travel	1	Managing Demand
Making Best Use	More efficient use of existing transport facilities and infrastructure with minimal cost	2	Flint/Mold - Chester
		4	Wrexham - Deeside
		6	Chester - Wrexham
		8	Strategic Trips
Capacity Improvements	Provision of new infrastructure along the main corridors	3	Flint/Mold - Chester
		5	Wrexham - Deeside
		7	Chester - Wrexham
		9	Strategic Trips

1.5.1 Package 1 Managing Demand

This package consists of a number of measures targeting demand management, walking and cycling, freight and other transport issues.

Measures to manage demand include the promotion of car clubs and car sharing, establish workplace travel planning and to devise parking management strategies.

Walking and cycling measures comprise providing funds for businesses to invest in walking and cycling facilities, encourage employers to increase cycling within its work force, as well as developing a local publicity campaign to promote walking and cycling.

Additionally, it is proposed to promote the use of rail freight and internet based freight exchanges.

Finally, this package also proposes measures to ensure that future developments mitigate any adverse impacts of the transport network, and to improve linkages between economic development plans and transportation plans.

1.5.2 Package 2 Making Best Use: Flint/Mold-Chester

There are a number of proposed measures aimed at making more efficient use of the existing transport facilities and infrastructure along the combined corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions (e.g. along the B5129 through the Connah's Quay/Shotton area), improve the integration of rail and bus services, establish integrated area ticketing and provide real time information at bus stops.

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With regards to rail transport, improvements in the accessibility of a number of stations are proposed and in the connectivity between rail and bus services at Shotton stations.

Highway transport measures include improvements of the traffic signal arrangements at Alltami, as well as some minor on-line highway improvements to reduce congestion along the B5129 between Connah's Quay and Queensferry, and on the A5104 between Broughton and Saltney.

1.5.3 Package 3 Capacity Enhancements: Flint/Mold-Chester

There are a number of proposed measures involving the provision of new infrastructure along the combined corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

Walking and cycling is promoted by providing safe walking and cycling routes from local communities to public transport interchanges and new walking and cycling links to key employment sites. This package proposes the provision of a number of new cycling and walking links including those from Chester to Denbigh and Wrexham from Mold to Saltney, and along the Dee Coast (Dee Coastal Path in Flintshire).

In terms of bus transport, this package includes the provision of a new cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester, and new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to incorporate a Rhyl to Chester local shuttle service (with possible extension to Crewe), and new stations at Queensferry on the North Wales Main Line and at Deeside Industrial Park on the Borderlands line. A new rail service between Borderlands Line and Chester is also proposed as part of this package.

In addition, demand management is proposed to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include a series of road improvements to improve the ease of accessing the Deeside Industrial Park and in the Broughton area.

1.5.4 Package 4 Making Best Use: Wrexham-Deeside (via Mold/Buckley)

There are a number of proposed options aimed at making more efficient use of the existing transport facilities and infrastructure along the corridor between Wrexham and Deeside, via Mold and Buckley.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions, improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, improvements in the accessibility of a number of stations and in the connectivity between rail and bus services at Shotton stations.

Finally, four measures are proposed for the existing road network. These include considering a signage strategy for traffic travelling between the A55 and Wrexham, together with a series of minor improvements to the A541/A550 route between the A55 and Wrexham, in the Hope/Caergwrle area and on the A541 between Mold and Wrexham.

1.5.5 Package 5 Capacity Enhancements Wrexham-Deeside (via Mold/Buckley)

The proposed measures involving the provision of new infrastructure along the corridor between Wrexham and Deeside, via Mold and Buckley, are presented below.

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Walking and cycling is promoted by providing safe walking and cycling routes from local communities to public transport interchanges, new walking and cycling links to key employment sites and a new cycling route between Mold and Deeside.

In terms of bus transport, this package proposes the creation of a multi-modal hub at Wrexham General Station and the provision of a new cross Dee bus route between Mold and Ellesmere Port, as well as new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to increase the service frequency on the Borderlands Line (from hourly to half-hourly). Furthermore, additional parking provision at key stations along the Wrexham-Bidston Line, a new station at Deeside Industrial Park on the Borderlands Line and a new rail service between Borderlands Line and Chester are measures proposed as part of this package.

In addition, demand management is proposed to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include a series of improvements to improve the ease of accessing the Deeside Industrial Park and the construction of a new road bridge between Connah's Quay and Deeside Industrial Park.

Proposed freight measures consist of the construction of crawler lanes on key trunk roads and other single carriageways roads.

1.5.6 Package 6 Making Best Use: Chester-Wrexham

There are a number of proposed measures aimed at making more efficient use of the existing transport facilities and infrastructure along the corridor between Chester and Wrexham.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions (e.g. A483/B5445 junction), improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, improvements in the accessibility of a number of stations are proposed.

1.5.7 Package 7: Capacity Enhancement: Chester-Wrexham

There are a number of proposed measures involving the provision of new infrastructure along the corridor between Chester and Wrexham.

Walking and cycling is promoted by providing safe walking and cycling routes from local communities to public transport interchanges, a new cycling and walking link connected to the existing National Cycle Route 5 from Chester to Denbigh and Wrexham, together with new walking and cycling links to key employment sites.

In terms of bus transport, this package includes the creation of a multi-modal hub at Wrexham General Station and the provision of new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to provide a shuttle service between Chester and Wrexham (with possible extension to Shrewsbury) and the construction of a new station at Rossett on the Wrexham to Chester line.

In addition, demand management is proposed to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include improvements at the A483/A55 junction and to the key junctions along the A483.

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1.5.8 Package 8 Making best use Strategic Trips

There are a number of proposed interventions aimed at making more efficient use of the existing transport facilities and infrastructure along the trunk roads in the study area.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions, improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, it is proposed an extension of Llandudno-Manchester service to Manchester Airport and improvements in the accessibility of a number of stations.

Freight measures consist of publicising the whereabouts and services from possible rail and inland rail terminals so they can be used to their full potential and suspending non essential maintenance programs at peak periods.

In terms of measures in the existing road network, it is proposed to reduce local access roads onto the strategic road network. The accesses to be closed include the A55 Westbound / Pinfold Lane – J33a (Eastbound access will be retained), A494 Northbound / Old Aston Hill, A494 Northbound / Plough Lane (southbound access will be retained) and A494 Southbound / Clay Hill Lane. Additionally, it is also proposed to consider a signage strategy for traffic travelling to/from the Midlands and to/from North England and to incorporate variable messaging signs.

1.5.9 Package 9 Capacity Enhancements Strategic Trips

There are a number of proposed measures involving the provision of new infrastructure along the trunk roads in the study area.

Walking and cycling is promoted by providing walking and cycling crossing facilities on trunk roads and associated junctions, safe walking and cycling routes from local communities to public transport interchanges, and new walking and cycling links to key employment sites. This package proposes the provision of a number of new cycling and walking links including those from Chester to Denbigh and Wrexham, from Mold to Saltney, along the Dee Coast, and between Mold and Deeside.

In terms of bus transport, this package includes the provision of express coach services operation between Holyhead and Manchester Airport with stops in the study area and new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to double the service frequency between Wrexham and Bidston. Additionally, a fast service between Llandudno and Manchester Airport is proposed, as well as the extension of London-Chester services to Bangor/Holyhead and the provision of a Rhyl-Chester (with possible extension to Crewe) local shuttle service.

Proposed freight actions consist of measures such as the provision of freight consolidation centres including one at Deeside, truck parking facilities and an open access rail freight terminal. It is also proposed the construction of crawler lanes on key trunk roads and other single carriageways roads and the replacement of diesel freight trains by electric ones.

In addition, demand management is intended to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include applying managed motorway concepts (e.g. ITS technology could be deployed on key routes to vary speed limits according to traffic levels determined through traffic loops and CCTV), providing hard shoulders on dual carriageway trunk roads and enhancing the A548 route between Flint and the A550.

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Additional highway improvements comprise those to the A483/A55 junction and other key junctions on the A483 and the Ewloe Interchange. This package includes the widening of the A55 between Ewloe and Northop, the A494 between Ewloe and Drome Corner and the A494 River Dee crossing. A new road is also part of the proposed Package 9, connecting the A55 and the A548.

1.6 Report Structure

This report covers the WelTAG Stage 1 Environmental Report, which is the qualitative/quantitative assessment of packages in accordance with WelTAG guidance. The report structure is as follows:

- **Section 1: Introduction** - A brief description of the project background and the packages to be assessed.
- **Section 2: Noise** - An assessment of the potential impacts on the surrounding communities from traffic noise and vibration.
- **Section 3: Local Air Quality** - An assessment of the potential effects from the packages on air quality in the vicinity of the packages.
- **Section 4: Greenhouse Gas Emissions** - An assessment of the potential positive and negative effects from the packages on greenhouse gas emissions.
- **Section 5: Landscape and Townscape** - An assessment of the impacts to the landscape and visual amenity for the packages.
- **Section 6: Biodiversity** - An assessment of the potential negative and positive impacts on the local ecology and statutory designated sites in the vicinity of the packages.
- **Section 7: Heritage** - An assessment of the impacts on the archaeology and cultural heritage in the vicinity of the packages.
- **Section 8: Soils** - This section describes the existing baseline geological and land contamination issues within the study area and identifies potential constraints for each package.
- **Section 9: Water Environment** - An assessment of the packages in terms of potential effects on the water environment (surface water quality, groundwater and flood risk).
- **Section 10: Conclusions** - This section summarises the findings of the specialist sections, highlighting key issues and a preferred package.

The appendices and figures are located at the end of the document and have been numbered according to the referring section, unless figures have been included within the report.

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2 Noise

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3 Noise

3.1 Introduction

This section deals with the assessment of the noise impacts from the nine transport packages divided into three distinct levels:

- Managing Demand: options which aim to reduce the demand for travel.
- Making Best Use: options which seek to make more efficient use of the existing transport facilities.
- Capacity Enhancement: options involving the provision of new infrastructure.

Details of the various packages under consideration within each level are described in Section 1.5, Section 1 of this report.

The content of this section includes the methodology adopted to assess noise impacts followed by a brief overview of the relevant legislation and policies relevant to this assessment. The potential effects of these proposed packages are then presented and the residual effects and cumulative impacts discussed.

Although certain options within the proposed packages relate to railways, the impact of these proposals on changes in railway noise exposure is not significant. This report only deals with impacts relating to estimated changes in road traffic noise as a consequence of the proposed options within each of the above packages.

3.2 Methodology

The Welsh Transport Planning and Appraisal Guidance (WelTAG 2008), states that *"For Stage 1 (both strategies and schemes), a qualitative assessment of the potential noise impacts may be sufficient, highlighting the key issues, expected impacts and geographic locations most affected."*

The Stage 1 assessment presented in this Section has been prepared in accordance with WelTAG. The results of the assessment of the impact significance is summarised using a seven –point scale, as follows:

- Large beneficial ;
- Moderate beneficial;
- Slight beneficial ;
- Neutral ;
- Slight adverse ;
- Moderate adverse ; and
- Large adverse .

3.3 Policies and their implications

3.3.1 Local Planning Policy

The Wrexham Unitary Development Plan[1] contains the following policy which is relevant to this assessment:

"*Policy GDP1 - All new development should … ensure the safety and amenity of the public and safeguard the environment from the adverse effects … and associated noise, odour or vibration arising from the development.*."

Wrexham County Borough Local Transport Plan 2011-2006[2] states:

[1] Wrexham County Borough Council, Adopted Unitary Development Plan, 2005.

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'Policy ES1 To monitor and seek to minimise the amount of land, air, water and noise pollution.'

The following policies and supporting text are contained within the Flintshire County Council Unitary Development Plan[3] (UDP)

"*AC15 Traffic Management - Proposals for integrated traffic management schemes will be permitted where they will … enhance the safety and environmental quality of towns and villages.*

The implementation of traffic management measures can improve the quality of life for local people as well as enhancing the quality and attractiveness of the County for visitors and investors. The more efficient utilisation of the existing road network can deliver cost-effective environmental improvements without the need for the construction of new routes.

AC16 Road Improvements / New Roads Design -… Such schemes should be routed and designed so as to …not unacceptably harm residential amenity."

In the first instance, existing highway problems should be addressed through traffic calming or traffic management schemes. Where this is not practicable, consideration may be given to road improvements or new roads provided that the scheme brings about improved highway safety and environmental conditions and better accessibility in the locality.

Once the principle of either a road improvement or new road scheme is established, careful attention will need to be given to routing and design so that environmental impacts are minimised or negated through mitigation measures."

The Flintshire Transport Plan 2001-2006 [4] contains the following policy:

ENV 4 'To reduce noise levels in areas where it is significantly affected by road noise'

The Chester District Local Plan[5] contains the following saved policy which is relevant to this assessment:

"Policy ENV 59

Any development proposal with the potential to pollute or be affected by pollution will be allowed providing … it will not cause a significant increase in the ambient noise level of the area."

The Cheshire's Local Transport Plan 2006-2011 contains the following policy:[6]

6, Protect and enhance the built, natural and historical environment. Reduce the impact of traffic on the wider environment… reducing traffic noise and pollution.'

3.4 Baseline

At this stage of the assessment process baseline surveys are not required as the assessment is based on a qualitative assessment. However, should one or more of the packages progress such that more a detailed assessment is required, then a baseline survey would be necessary.

3.5 Potential Effects

A qualitative assessment of the various packages has been carried out and the results are as follows.

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[2] Wrexham County Borough Council Local Transport Plan, 2001-2006

[3] Flintshire County Council, The Flintshire Unitary Development Plan, Deposit Draft Plan September 2003.

[4] Flintshire Transport Plan 2001-2006

[5] Chester City Council, Chester District Local Plan, 2006.

[6] Cheshire's Local Transport Plan 2006 - 2011

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3.5.1 Package 1: Managing Demand – Area wide package – Applies to all corridors

The aim of this measure is to reduce demand for travel. Measures to reduce car usage and improved freight logistics will tend to reduce traffic volume and therefore reduce noise. However, it is anticipated that any reduction will only achieve, at, most a slight beneficial impact at those sites affected. The most likely outcome is that these benefits will not be widespread and therefore an overall assessment of the impact is neutral.

3.5.2 Package 2: Making Best Use – Flint / Mold-Chester

Most of the non-highway options will have little impact on noise.

Reduced congestion along B5129 may have a slight adverse impact on noise due to associated increase in speeds at certain times of the day. There are possible slight overall beneficial impacts at those sites where traffic is attracted away to routes where through-put has improved. Overall assessment is neutral.

3.5.3 Package 3: Capacity Enhancement – Flint / Mold-Chester

Generally, non-highway options will have little influence on noise. There may be some adverse impacts from local traffic relating to new rail stations at Queensferry and Deeside Industrial Park but these are generally situated in industrial areas.

Possible slight adverse and beneficial impacts due to changes in road traffic as a result of improved road connections in the Broughton area. Overall assessment is neutral

3.5.4 Package 4: Making Best Use – Wrexham – Deeside

Non-highway options will have little impact on noise.

Generally the highway measures may provide slight adverse and beneficial impacts depending on changes in traffic flows as traffic is attracted to less congested routes / improved routes, whilst reduced congestion may increase in noise as speeds increase. However, overall assessment is neutral.

3.5.5 Package 5: Capacity Enhancements – Wrexham – Deeside

Non-highway options including some increases in rail service will have negligible increase in noise.

There is a possibility for a slight adverse noise impact alongside improved crawler lanes due to increase in overall traffic speed. Slight adverse and beneficial impacts due to changes in traffic as a result of improved road connections including new bridge would be expected. Overall assessment is neutral.

3.5.6 Package 6: Making Best Use – Chester – Wrexham

Options will have negligible influence on noise levels, overall assessment is neutral.

3.5.7 Package 7: Capacity Enhancements – Chester – Wrexham

Non-highway options including some increases in rail service will have negligible increase in noise. New railway station at Rossett has an adverse impact due to increase in local traffic.

Highway options including increasing capacity on A483 and improving congestion is likely to have a slight adverse impact with regard to noise. However, traffic on other roads may decrease and provide slight beneficial impacts. Overall assessment is neutral.

3.5.8 Package 8: Making Best Use – Strategic Trips

These packages designed to make better use of the existing transport facilities and infrastructure with minimal cost will generally have a small influence on noise impacts. Encouraging people away from their cars by promoting cycling/walking/bus promotions may have benefits in term of noise impacts but are likely to be imperceptible.

Improving rail services and the shifting of freight from road to rail or from road to ship leading to reduced traffic volume will have some beneficial effects but only if traffic volumes reduce by at least 20%, and therefore again any benefits are likely to be imperceptible.

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In general, both slight adverse and beneficial impacts due to re-routing of traffic from reducing number of slip roads. Some slight to moderate beneficial impacts along the A55/A494/A483 due to variable speed limits allowing reduced speed limits – the significance of impact is dependent on the overall speed reduction. The overall assessment is put at slight beneficial impact.

3.5.9 Package 9: Capacity Enhancement – Strategic Trips

Non-highway options including some increases in rail service will have negligible increase in noise.

Highway options will have influence on noise levels at certain locations. Traffic management along trunk roads are likely to have slight beneficial benefits. However, moderate adverse impacts would be expected from new road connecting A55 to A548. Overall the assessment is slight adverse.

3.6 Potential Mitigation Measures

At this stage the extent of any proposed mitigation measures is not known. Mitigation measures such as acoustics barriers and low-noise surfaces can be put in place where necessary.

3.7 Residual Effects

More detailed assessment would be necessary for any residual effects to be assessed.

3.8 Cumulative Impacts

The effects of each of the proposed packages will need to be considered in combination with other schemes and developments which may affect traffic flows.

No details have been provided about any other schemes in the area, therefore the cumulative impacts have not been assessed. As packages are progressed cumulative impacts within the packages and with other developments will need to be assessed

3.9 Conclusion

The conclusions drawn from a Stage 1 assessment of the various packages are as follows:

- The overall assessment for packages 1, Package 2, 4, 6, 3, 5 and 7 is neutral.
- The overall assessment for packages 8 is slight beneficial.
- The overall assessment for packages 9 is slight adverse.

The above assessments and significance of impacts have been carried out by balancing the adverse and beneficial impacts within each of the packages taking into account both the level and the area of the impacts. A more detailed assessment would need to be carried out to refine these assessments, in particular, package 9 which indicated a slight adverse impact.

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3.10 References

Welsh Transport Planning and Appraisal Guidance (WelTAG)

Wrexham County Borough Council, Adopted Unitary Development Plan, 2005

Wrexham County Borough Council Local Transport Plan, 2001-2006

Flintshire County Council, The Flintshire Unitary Development Plan, Deposit Draft Plan September 2003.

Flintshire Transport Plan 2001-2006

Chester City Council, Chester District Local Plan, 2006.

Cheshire's Local Transport Plan 2006 - 2011

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4 Local Air Quality

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5 Local Air Quality

5.1 Introduction

This section of the report considers the potential impact on local air quality of each of the packages proposed within the NEWABTS. Given the large number of options considered within NEWABTS, the potential impact of each package on traffic flows on the local road network has not been quantified; meaning a quantitative assessment of the change in emissions associated with each package has not been possible. A qualitative assessment has therefore been made of the potential for the options within each package to impact on local air quality.

The packages which have been considered within this section are described in detail within Section 1.5 of this report.

5.2 Methodology

The Welsh Transport Planning and Appraisal Guidance (WelTAG 2008)[7], states that *"Stage 1 will normally not require more than the estimations of exhaust emissions, applying average emissions rates … to the number of vehicle-km estimated to be removed from or added to the network".* However, the guidance goes on to state, *"Clearly, this is only possible if a previous mechanism (e.g. transport model) has been applied to estimate the number of trips. Otherwise, even a qualitative approach may be justifiable in some cases".*

As traffic data are not currently available for a quantitative, emissions based assessment of the packages described above, a qualitative assessment has been made of the potential for each package to impact on local air quality. This assessment has been based on the likely effect of each package on traffic volumes and congestion, with reference to baseline conditions and the number of sensitive receptors likely to be affected.

The results of the assessment have been summarised using a seven–point scale, as follows:

- Large beneficial;
- Moderate beneficial;
- Slight beneficial;
- Neutral;
- Slight adverse;
- Moderate adverse; and
- Large adverse.

5.3 Policies and their implications

5.3.1 Local Air Quality Management

The provisions of Part IV of the Environment Act 1995 establish a national framework for air quality management, which requires all local authorities in England, Scotland and Wales to conduct local air quality reviews. Section 82(1) of the Act requires these reviews to include an assessment of the current air quality in the area and the predicted air quality in future years. Should the reviews indicate that the objectives prescribed in the UK Air Quality Strategy and the Air Quality (Wales) Regulations[8,9] will not be met (or in England, the Air Quality (England) Regulations[10,11]), the local authority is

[7] Welsh Transport Planning and Appraisal Guidance (WelTAG), Section 7.5 Local Air Quality.
[8] The Air Quality (Wales) Regulations 2000 (SI 2000/1940), as amended.
[9] Air Quality (Amendment) (Wales) Regulations 2002, (SI 3182).
[10] Defra, The Air Quality (England) Regulations, 2000 (SI 2000/928).
[11] Defra, The Air Quality (England) (Amendment) Regulations, 2002 (SI 2002/3043).

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required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level to ensure that air quality in the area improves. This process is known as 'local air quality management' (LAQM).

5.3.2 UK Air Quality Strategy

The UK Air Quality Strategy (AQS) identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality issues, with the exception of ozone, which is instead considered to be a regional problem. The Air Quality Regulations set objectives for the eight pollutants that are associated with local air quality. These objectives aim to reduce the health impacts of the pollutants to negligible levels.

5.3.3 European Air Quality Directives

The Air Quality Framework Directive (96/62/EC) on ambient air quality assessment and management defines the policy framework for 12 air pollutants known to have a harmful effect on human health and the environment. The limit values for the specific pollutants are set through a series of Daughter Directives. These limit values have been incorporated into the Air Quality Standards (Wales) Regulations 2010[12] (and Air Quality Standards Regulations 2010[13] in England) and are mandatory. Failure to achieve the limit values will result in infraction proceedings being taken against the UK by the EU.

5.3.4 Air Quality Objectives and Limit Values

The air quality objectives and limit values currently applying to the UK can therefore be split into two groups. Each has a different legal status and is therefore handled differently within the framework of UK air quality policy. These are:

- UK air quality objectives set down in regulations for the purposes of local air quality management; and
- EU limits values transcribed into UK legislation for which compliance is mandatory.

The UK air quality objectives and EU limit values for nitrogen dioxide (NO_2) and particulate matter less than 10 µm in diameter (PM_{10}) are those considered of most relevance to this study. These are:

- An annual mean NO_2 concentration of 40 µg/m^3 to be achieved by 2005 and 2010 for the objective and limit value respectively;
- An hourly mean NO_2 concentration of 200 µg/m^3, to be exceeded no more than 18 times per year, to be achieved by 2005 and 2010 for the objective and limit value respectively;
- An annual mean PM_{10} concentration of 40 µg/m^3 for to be achieved by 2004 and 2005 for the objective and limit value respectively; and
- A daily mean PM_{10} concentration of 50 µg/m^3, to be exceeded no more than 35 days in a year, to be achieved by 2004 and 2005 for the objective and limit value respectively.

5.3.5 National Planning Policy

Planning Policy Wales[14] states the following with regard to development control and air quality:

"*The potential for pollution affecting the use of land will be a material consideration in deciding whether to grant planning permission. Material considerations in determining applications for potentially polluting development are likely to include … the risk and impact of potential pollution from the development, insofar as this might have an effect on the use of other land and the surrounding environment (the environmental regulatory regime may well have an interest in these issues, particularly if the development would impact on an Air Quality Management Area or a SAC).*"

In England, Planning Policy Statement 23 (PPS 23): Planning and Pollution Control[15] advises that:

[12] The Air Quality Standards (Wales) Regulations 2010 No. 1433 (W. 126).
[13] The Air Quality Standards Regulations 2010 SI 2010 No.1001.
[14] Welsh Government, Planning Policy Wales, Section 13 Minimising and Managing Environmental Risks and Pollution, July 2010.
[15] ODPM (2004), Planning Policy Statement 23 (PPS 23): Planning and Pollution Control.

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- *any consideration of the quality of land, air or water and potential impacts arising from development, possibly leading to impacts on health, is capable of being a material planning consideration, in so far as it arises or may arise from or may affect any land use;*
- *the planning system plays a key role in determining the location of development which may give rise to pollution, either directly or indirectly, and in ensuring that other uses and developments are not, as far as possible, affected by major existing or potential sources of pollution; and*
- *where pollution issues are likely to arise, intending developers should hold informal pre-application discussions with the Local Planning Authority, the relevant pollution control authority and/or the environmental health departments of local authorities, and other authorities and stakeholders with a legitimate interest.*

5.3.6 Local Planning Policy

The Wrexham Unitary Development Plan[16] contains the following policy which is relevant to this assessment:

"*Policy GDP1 - All new development should … ensure the safety and amenity of the public and safeguard the environment from the adverse effects of pollution of water, land or air.*"

The following policies and supporting text are contained within the Flintshire County Council Unitary Development Plan[17] (UDP)

"AC15 Traffic Management - Proposals for integrated traffic management schemes will be permitted where they will … enhance the safety and environmental quality of towns and villages.

The implementation of traffic management measures can improve the quality of life for local people as well as enhancing the quality and attractiveness of the County for visitors and investors. The more efficient utilisation of the existing road network can deliver cost-effective environmental improvements without the need for the construction of new routes.

AC16 Road Improvements / New Roads Design - Road improvement schemes or new roads will only be considered where traffic calming or traffic management schemes are not practicable and must result in … improved environmental conditions. … Such schemes should be routed and designed so as to …not harm air or water quality."

In the first instance, existing highway problems should be addressed through traffic calming or traffic management schemes. Where this is not practicable, consideration may be given to road improvements or new roads provided that the scheme brings about improved highway safety and environmental conditions and better accessibility in the locality.

Once the principle of either a road improvement or new road scheme is established, careful attention will need to be given to routing and design so that environmental impacts are minimised or negated through mitigation measures"

The Chester District Local Plan[18] contains the following saved policy which is relevant to this assessment:

"Policy ENV 59

Any development proposal with the potential to pollute or be affected by pollution will be allowed providing … it will not significantly increase air pollution."

5.4 Baseline

5.4.1 Study Area

The study area for this assessment is shown in Figure 1.1 and covers areas within three local authorities; the eastern part of Flintshire, the north and eastern part of Wrexham and the west of Cheshire West and Chester. In order to establish baseline conditions, reports produced by the local authorities described above as part of the Review and Assessment process have been reviewed.

[16] Wrexham County Borough Council, Adopted Unitary Development Plan, 2005.
[17] Flintshire County Council, The Flintshire Unitary Development Plan, Deposit Draft Plan September 2003.
[18] Chester City Council, Chester District Local Plan, 2006.

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5.4.2 Existing Conditions – Flintshire County

Flintshire County Council has completed all of the compulsory Air Quality Review and Assessment reporting requirements to date. There are currently no Air Quality Management Areas (AQMAs) within the County. The 2006 Updating and Screening Assessment (USA)[19] concluded that NO_2 and PM_{10} are the key pollutants of concern in Flintshire and identified two areas for investigation through Detailed Assessment[20] as monitoring results indicated pollutant concentrations close to the relevant air quality objectives at residential properties near to the A5119 / A494 in Mold. Interim Air Quality Progress Reports and the 2009 USA[21] reported similar conclusions. A continuous monitoring site was commissioned at the site in 2008 and a Detailed Assessment for NO_2 and PM_{10} produced which showed that the air quality objectives for NO_2 and PM_{10} around the junction were not being exceeded and so there was no requirement for an AQMA to be declared.

Air quality monitoring is carried out at a number of locations within Flintshire. Continuous monitoring of NO_2 and PM_{10} is undertaken at two locations. Continuous monitoring of NO_2 and PM_{10} at the A5119 Sychdyn/New Brighton site was carried out between November 2008 and November 2009 to inform a Detailed Assessment. The reported mean pollutant concentrations for this period indicate that the relevant air quality objectives for NO_2 and PM_{10} were not exceeded, as shown in Table 3.1. The monitoring site at Mold was commissioned in December 2009 and at present there is no ratified data available. The site is affiliated to the Automatic Urban and Rural Network (AURN) and monitors NO_2 and ozone.

Table 3.1: Continuous Monitoring Results for NO2 and PM10 – Flintshire

Site	Location (X, Y)	Type	Pollutant	Mean Concentration (µg/m3)	No. of Hours NO2 > 200 µg/m3	No. of Days PM10 > 50 µg/m3
Junction A5119 Sychdyn / New Brighton	324374, 365011	Roadside	NO_2	33.0	0	
			PM_{10}	21.6		11

Note: The continuous monitoring site was operational from 5/11/2008 to 5/11/2009. Data capture for both pollutants was greater than 99%.

In addition to continuous monitoring, Flintshire County Council operates a network of NO_2 diffusion tube sites covering more than 50 locations. The results for 2008 and 2009 at roadside locations in the study area are shown in Table 3.2. The only site to exceed the annual mean objective for NO_2 in 2008 or 2009 was Aston Mead, Aston, where an annual mean concentration of 55µg/m^3 was measured in 2009. This site is 1m from the kerbside of the A494 at Aston Hill. However, it should be noted that this site was relocated in April 2009 from the façade of a nearby residential property to its current position after the residential property was demolished. At present, there are no properties close to this new tube location as the Aston Mead and Lower Aston Hall properties that were very close to this carriageway were demolished in 2009. Consequently, this site is no longer at a location of relevant exposure.

Monitored annual mean NO_2 concentrations at all other sites are well below the national air quality objective. Further details of the monitoring undertaken within Flintshire can be found in the Council's Review and Assessment Reports[22].

Table 3.2: NO_2 Diffusion Tube Monitoring Results at Roadside Locations in Flintshire County

Site	Grid Reference		Annual Mean NO_2 Concentration (µg/m^3)	
	X	Y	2008	2009
Aston Mead, Aston	330626	367184	38	**55**
Chester Road West, Shotton	330594	368924	30	30
Wrexham Road, Mold	323801	363854	25	30

[19] Flintshire County Council. Updating and Screening Assessment of Air Quality (2006).
[20] Flintshire County Council. Detailed Air Quality Assessment for fine particulates (PM_{10}) and nitrogen dioxide (2010).
[21] Flintshire County Council. Updating and Screening Assessment of Air Quality (2009).
[22] Flintshire County Council Local Air Quality Review and Assessment Documents: Available upon request from Flintshire County Council.

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Site	Grid Reference		Annual Mean NO_2 Concentration ($\mu g/m^3$)	
	X	Y	2008	2009
Glynne Way, Hawarden	331646	365742	34	35
Main Road, Broughton	333569	363511	29	31
Belvedere Close, Queensferry	331658	368032	30	32
High Street, Caergwrle	330423	357566	31	29
Chester Road, Pentre, Deeside	332226	367725	29	33
Mill Lane, Buckley	327848	364150	26	29
Northop Road, Flint Mountain	323864	370368	25	29
Station Road, Queensferry	331807	368271	28	25
Riverside Park, Garden City	333049	369054	23	23
High Street, Saltney	338284	365033	21	24
Chester Road Sandycroft	332670	367380	21	25
Coleshill Street Flint	324201	372989	22	23
Flint Town Council Buildings	324461	373141	24	25
Mold Road Buckley	327457	364018	18	19
Alltami Nr. Mold	326802	365671	17	20
Kelsterton Road C Quay	327183	371239	15	17
Wrexham Road Hope	330978	358683	18	17
Croes Atti School Flint	324954	372673	14	16
Kingsley Road Garden City	332549	369135	14	17
Mold Road Connah's Quay	326814	368782	12	15
Kelsterton Road C' Quay	328032	370647	13	17
Golftyn Lane C' Quay -2	327983	369423	14	12
Kelsterton Road C' Quay	328032	370647	12	12
Golftyn Lane C' Quay -2	327983	369423	11	10
A5118 Padeswood	328346	362413	11	14

Note: Exceedences of the annual average NO2 objective (40 $\mu g/m^3$) are shown in bold.

5.4.3 Existing Conditions – Wrexham County Borough

Wrexham County Borough Council has completed all of the compulsory Air Quality Review and Assessment reporting requirements to date. There are currently no Air Quality Management Areas (AQMAs) within the County Borough.

The first stage of review and assessment was carried out in 1999 / 2000 and made the following recommendation:

"*This report has identified two pollutants, particulates (PM_{10}) and Nitrogen dioxide (NO_2), which may not meet the Air Quality standards adopted by the Government. It is therefore necessary to carry out a Stage 2 review and assessment.*"

The second stage of review and assessment concluded that the *"exceedence of the PM_{10} and the NO_2 objective from road sources is unlikely at any relevant location."* However, the stage two review and assessment also commented that there was insufficient monitoring data to be confident that the Air Quality Objectives would not be breached for PM_{10} and Sulphur Dioxide (SO_2). Hence Wrexham County Borough Council proceeded to the third stage of review and assessment, which made the following conclusion:

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"*The Stage 3 Assessment has indicated elevated particulate emissions from local domestic coal burning in the village of Llay. The results of the investigation indicate that the air quality standard and objective for particulate emissions in Llay may be exceeded. The Public Protection Service of Wrexham County Borough Council will recommend the declaration of an Air Quality Management Area for Llay. This will include the production of a Stage 4 Report and the implementation of an Air Quality Action Plan during 2002.*"

An Air Quality Action Plan was implemented in 2003, which introduced a gas supply into the village of Llay. This had the effect of lowering the PM_{10} levels in the village and bringing them within the national guideline levels. This removed the need to declare an Air Quality Management Area in Llay.

The 2004 Updating and Screening Assessment (USA), 2005 Progress Report, 2006 USA, 2007 Progress Report, 2008 Progress Report and 2009 USA have all since concluded that the national air quality objectives are likely to be met within the County Borough.

Continuous monitoring of NO_2 and PM_{10} is undertaken at two locations in Wrexham, Victoria Road and Isycoed. The results for the Victoria Road site in recent years are presented in Table 3.3 as this is a roadside location. The results for the Isycoed site are not presented as this site primarily monitors industrial emissions, and so are not relevant to this study. The results in Table 3.3 indicate that concentrations of NO_2 and PM_{10} in recent years were well below the relevant national air quality objectives.

Table 3.3: Continuous Monitoring Results for NO_2 and PM_{10} – Wrexham

Site	Location (X, Y)	Type	Pollutant	Annual Mean Concentration (µg/m^3)			No. of Days PM10 > 50 µg/m^3		
				2007	2008	2009	2007	2008	2009
Victoria Road	349900, 332900	Roadside	NO_2	19.6	20.3	21.3			
			PM_{10}	19.6	20.3	15.2	22	15	4

Note: There were no occasions where the monitored hourly mean NO2 concentration exceeded 200 µg/m^3 at this site.

In addition to continuous monitoring, Wrexham County Borough Council operates a network of NO_2 diffusion tubes at 22 locations. The results in recent years at roadside locations in the study area are shown in Table 3.4. The results in Table 3.4 indicate that annual average NO_2 concentrations are generally well below the national air quality objective in Wrexham.

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Table 3.4: NO_2 Diffusion Tube Monitoring Results at Roadside Locations in Wrexham County Borough

Site	Grid Reference		Annual Mean NO2 Concentration (µg/m^3)		
	X	Y	2007	2008	2009
Grosvenor Road, Wrexham	350600	333200	24.1	33.7	35.2
Hugmore Lane, Wrexham Industrial Estate	351800	337700	19.6	20.9	20.7
Mold Rd, Wrexham	351000	332600	18.7	24.1	24.9
Holt Rd, Wrexham	350700	334100	26.8	23.2	23.1
The Sycamores, Chester Road	353222	333887	30.3	29.8	30.5
Rhostyllen Roundabout, Wrexham (A483)	348170	330950	37.3	28.6	28.5
Bus Station, Wrexham	350590	333350	31.5	34.4	35.8
Smithfield Road	333981	350171			21.4

5.4.4 Existing Conditions – Cheshire West and Chester

Cheshire West and Chester Council was formed on the 1st April 2009 and comprises the old Chester City, Ellesmere Port and Neston, and Vale Royal District Councils.

Currently in Cheshire West and Chester there are two Air Quality Management Areas (AQMAs). Air Quality Management Area No 1 (Whitby Road / Station Road) was designated in 2005 by Ellesmere Port and Neston Council because of a risk of exceeding the annual mean objective for nitrogen dioxide (NO_2) due to road traffic. A Further Assessment carried out by Ellesmere Port and Neston in 2007 verified the designation of the AQMA. It should be noted that this AQMA is outside of the study area for this assessment.

The second AQMA, which is within the study area for this assessment, was designated in March 2008 by Chester City Council because of an exceedence of the annual mean NO_2 objective due to road traffic in the Boughton area of the city. The AQMA covers the Boughton Gyratory to the west of the city centre and is situated at the convergence of the A51 Tarvin Road and the A5155 Christleton Road (see Figure 10.1).

Continuous monitoring for NO_2 in the Boughton AQMA commenced in February 2010 and as such ratified annual mean concentrations are not currently available. The remaining continuous monitoring sites are located outside of the study area for this assessment and so the results from these sites have not been presented within this report.

In addition to continuous monitoring, Cheshire West and Chester Council operates a network of NO_2 diffusion tubes at over 50 locations. The results in recent years at roadside locations in the study area are shown in Table 3.5, which indicate that annual average NO_2 concentrations exceeded the national air quality objective at several locations within Chester.

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Table 3.5: NO_2 Diffusion Tube Monitoring Results at Roadside Locations in Cheshire West and Cheshire

Site	Grid Reference		Annual Mean NO2 Concentration ($\mu g/m^3$)		
	X	Y	2007	2008	2009
Parkgate Road, Chester	340313	367014			**47.5**
Dee Hills Park	341245	366476	30.5	33.0	38.0
105 Boughton	341633	366510			35.6
Edgeley, Boughton	341658	366487			36.7
Specialized, Bikes Boughton	341819	366475			**46.4**
Christleton Road (11)	341915	366427	**50.8**	**45.6**	**50.0**
Tarvin Road (6)	341926	366446			**64.3**
Tarvin Road (25)	341963	366457	36.7	30.3	38.3
The Mount, Boughton	341925	366383			21.0
St Giles, Boughton	341951	366396	32.9	33.7	**42.0**
Christleton Road (36)	342000	366374			**64.2**
Christleton Road (75)	342056	366354			34.5
Ingham Close, Boughton	342068	366332	**49.4**	**41.2**	**42.0**
Pram shop, Christleton Road	342114	366325			31.8
Tarvin Road (44)	342085	366446			**52.6**
Fairholme Place, Tarvin Road	342247	366496			32.0
Tarvin Road (67)	342250	366515			35.4
Tarvin Road (97)	342353	366532			36.7
A41, Christleton (old glasshouse)	343285	365844			**42.7**

Note: Exceedences of the annual average NO2 objective (40 $\mu g/m^3$) are shown in bold.

5.5 Potential Effects

As previously discussed, a qualitative assessment has been made of the potential impacts of each package on local air quality.

5.5.1 Package 1

The aim of Package 1 is to reduce the demand for travel over the study area as a whole using the following options:

- encouraging walking and cycling;
- shifting freight from road to rail and promoting freight exchange;
- ensuring the impact of future development is mitigated through planning controls and that coordinated economic development and transportation plans are developed; and
- promoting car clubs and car sharing, workplace travel planning and parking management strategies.

Should the options above lead to a reduction in travel demand and hence a reduction in traffic volumes on roads within the study area, this is likely to have a slight beneficial impact on local air quality. Although beneficial overall, this impact is unlikely to be of significance at the majority of sensitive receptors, should these options lead to a sizeable reduction in traffic volumes within certain areas, such as the Chester AQMA, they have the potential to be of significant benefit.

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5.5.2 Package 2

Package 2 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the combined transport corridor between Flint / Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in traffic volumes. However, the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are of the highest emissions standard possible in order to maximise any air quality benefits, particularly should these vehicles operate within the Chester AQMA. Furthermore, a greater number of older, more polluting buses could have an adverse effect on local air quality, particularly under urban driving conditions. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.

Improved station accessibility is unlikely to have a significant impact on local air quality unless it significantly reduces congestion outside the station.

Those options aimed at improving Highway traffic flows have the potential to have a slight beneficial impact on local air quality should they lead to a reduction in congestion and therefore reduced emissions.

5.5.3 Package 3

Package 3 involves the provision of new infrastructure to the combined transport corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in overall traffic volumes within the study area.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality should they lead to a reduction the volume of traffic entering urban areas. However, there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.

The Highway options within Package 3 have the potential to have an adverse impact on local air quality should they lead to a major increase in traffic volumes or changes in road alignment. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment.

5.5.4 Package 4

Package 4 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the combined transport corridor between Wrexham and Deeside, via Mold and Buckley.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are of the highest emissions standard possible in order to maximise any air quality benefits. Furthermore, a greater number of older, more polluting buses could have an adverse effect on local air quality, particularly under urban driving conditions. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.

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Improved station accessibility and a service frequency increase on the Borderlands Line, are unlikely to have a significant impact on local air quality unless it significantly reduces congestion outside the station.

Those options aimed at improving Highway traffic flows have the potential to have a slight beneficial impact on local air quality should they lead to a reduction in congestion and therefore reduced emissions.

5.5.5 Package 5

Package 5 involves the provision of new infrastructure to the combined transport corridor between Wrexham and Deeside, via Mold and Buckley.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in overall road traffic volumes within the study area.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality should they lead to a reduction the volume of traffic entering urban areas, however there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.

The Highway options within Package 5 have the potential to have an adverse impact on local air quality should they lead to a significant increase in traffic volumes or changes in road alignment. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment.

5.5.6 Package 7

Package 7 involves the provision of new infrastructure to the combined transport corridor between Chester and Wrexham.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in overall road traffic volumes within the study area.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality should they lead to a reduction the volume of traffic entering urban areas, however there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.

The Highway options within Package 7 have the potential to have an adverse impact on local air quality should they lead to a significant increase in traffic volumes changes in road alignment. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment.

5.5.7 Package 6

Package 6 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the combined transport corridor between Chester and Wrexham.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are of the highest emissions standard possible in order to maximise any air quality benefits, particularly should these vehicles operate within the Chester AQMA. Furthermore, a greater number of older, more polluting buses could have an adverse effect on local air quality, particularly under urban driving conditions. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.

Improved station accessibility is unlikely to have a significant impact on local air quality unless it significantly reduces congestion outside the station.

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Package 8

Package 8 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the transport corridor for strategic trips, including the trunk road network through the study area.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be imperceptible in terms of pollutant concentrations.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on local air quality should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are of the highest emissions standard possible in order to maximise any air quality benefits, particularly should these vehicles operate within the Chester AQMA. Furthermore, a greater number of older, more polluting buses could have an adverse effect on local air quality, particularly under urban driving conditions. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to adverse air quality impacts.

Should options aimed at improving rail services lead to a reduction in traffic volumes on roads within the study area, this is likely to have a slight beneficial impact on local air quality.

Shifting freight from road to rail or from road to ship has the potential to have a slight beneficial impact on local air quality. However, there could also be localised adverse air quality impacts should greater volumes of traffic, in particular HGVs, be attracted to depot or terminal locations.

Those options aimed at improving highway traffic flows such as suspending non-essential maintenance works, signage strategies and variable message signs have the potential to have a slight beneficial impact on local air quality should they lead to a reduction in congestion and therefore reduced emissions. However, whilst reducing the number of slip roads on the strategic highway network would reduce their use by local traffic and potentially lead to slight beneficial impacts, the ‘diversion’ of this traffic could have adverse air quality impacts elsewhere, which would be particularly significant should this traffic be diverted into more heavily populated areas.

5.5.8 Package 9

Package 9 involves the provision of new infrastructure to the transport corridor for strategic trips, including the trunk road network through the study area.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on local air quality should they lead to a reduction in overall traffic volumes within the study area.

Shifting freight from road to rail and freight consolidation centres have the potential to have slight beneficial impacts on local air quality, should they lead to a reduction in the overall number of HGV kms travelled. However, there could also be localised adverse air quality impacts as greater volumes of traffic, in particular HGVs, will be attracted to depot locations and consolidation centres.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on local air quality should they lead to a reduction the volume of traffic entering urban areas. However, there could also be localised adverse air quality impacts as greater volumes of traffic will be attracted to the car parks associated with the schemes.

The Highway options within Package 9 have the potential to have an adverse impact on local air quality should they lead to a significant increase in traffic volumes or a reduction in the distance between road traffic and sensitive receptors as a result of road widening or realignment. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment. Variable speed limits also have the potential to effect local air quality, albeit to a lesser extent, should they lead to a reduction in average vehicle speeds which can lead to increased emissions.

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5.6 Potential Mitigation Measures

Historically, it has proven extremely difficult to improve areas of poor air quality associated with road transport emissions. It is therefore extremely important that any transport options which are implemented should be designed with due regard to areas of poor air quality e.g. Chester AQMA.

The benefits associated with reducing car usage by encouraging bus use should be maximised by utilising buses with the highest emissions standard possible. Likewise freight consolidation centres could use Low Emission Vehicles to transport goods to locations in areas with poor air quality.

The locations of park and ride schemes and rail and freight depots should be carefully chosen to minimise any localised air quality impacts which may result.

Should changes in road alignment be proposed, it is important to ensure, where practicable, that the distance between road traffic and sensitive receptors is not significantly reduced. Where the opportunity presents itself, the distance between road traffic and sensitive receptors with poor air quality should be increased in order to improve local air quality at these receptors.

5.7 Residual Effects

Further, more detailed assessment is required in order to determine the residual effects of the proposed packages on local air quality to be assessed.

5.8 Cumulative Impacts

The effects of each of the proposed packages will need to be considered in combination with other schemes and developments which may affect traffic flows. This has not been possible at this stage given that the traffic impacts associated with cumulative effects have the potential to be extensive and complex and have not yet been predicted. Cumulative effects will therefore be considered at a later stage once the packages are progressed and traffic modelling is undertaken.

5.9 Conclusion

The results of this assessment are summarised below.

- Package 1 is likely to have a neutral effect. Slight beneficial impacts may occur, although these are unlikely to be significant in terms of pollutant concentrations.
- All remaining packages are considered to have, on balance, a slight beneficial impact in terms of local air quality, however adverse impacts may be experienced at some locations should traffic flows increase in certain areas.
- Further, more detailed assessment is required in order to determine the effects of each of the proposed packages on local air quality over the road network as a whole and to determine the location and extent of any associated adverse impacts.

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6 Greenhouse Gas Emissions

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7 Greenhouse Gas Emissions

7.1 Introduction

This section of the report considers the potential impact on greenhouse gas emissions of each of the packages proposed within the NEWABTS. Given the large number of options considered within NEWABTS, the potential impact of each package on traffic flows on the local road network has not been quantified; meaning a quantitative assessment of the change in emissions associated with each package has not been possible. A qualitative assessment has therefore been made of the potential for the options within each package to impact on greenhouse gas emissions.

The option packages which have been considered within this section are described in detail within Section 1.5 of this report.

7.2 Methodology

As traffic data are not currently available for a quantitative, emissions based assessment of the packages described above, a qualitative assessment has been made of the potential for each package to impact on local air quality. This assessment has been based on the likely effect of each package on traffic volumes and congestion, with reference to baseline conditions and the number of sensitive receptors likely to be affected.

The results of the assessment have been summarised using a seven–point scale, as follows:

- Large beneficial;
- Moderate beneficial;
- Slight beneficial;
- Neutral;
- Slight adverse;
- Moderate adverse; and
- Large adverse.

7.3 Policies and their implications

The Climate Change Act 2008 set a clear and credible long term framework for the UK to reduce its greenhouse gas (GHG) emissions including:

- a legal requirement to reduce emissions by at least 80% below 1990 levels by 2050 and by at least 34% in the period 2018-2022;
- compliance with a system of five-year carbon budgets, set up to 15 years in advance, to deliver the emissions reductions required to achieve the 2020 and 2050 targets; and
- the setting up of a Committee on Climate Change (CCC) to advise Government on the level of the carbon budgets and how they might be met and report annually on progress.

The first three carbon budgets, covering the period 2008 to 2022, were announced at Budget 2009 and set in law in May 2009 following their approval by Parliament. These budgets require a 22% reduction in emissions below 1990 levels in 2008-2012, a 28% reduction in 2013-2017 and a 34% reduction in 2018-2022.

The Welsh Government has set out to achieve annual carbon reduction-equivalent emissions reductions of 3 per cent per year by 2011 in areas of devolved competence, which include land use planning[23].

[23] One Wales: A Progressive Agenda for the Government of Wales, Welsh Government, 2007.

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7.4 Baseline

7.4.1 Study Area

The study area for this assessment is shown in Figure 1.1 and covers areas within three local authorities; the eastern part of Flintshire, the north and eastern part of Wrexham and the west of Cheshire West and Chester.

7.4.2 Existing Conditions

Estimates of CO_2 emissions from all sources between 2005 and 2008 for Flintshire, Wrexham and Cheshire West and Chester are shown in Table 4.1 below. Emissions from road transport are shown in brackets. Emissions estimates for Wales and the whole of UK are also provided for completeness (Table 4.2). These data are sourced from the Department of Energy & Climate Change (DECC) website[24].

Table 4.1: Total CO2 Emission Estimates for Flintshire, Wrexham and Cheshire West and Chester

Year	CO_2 Emissions in ktonnes		
	Flintshire	Wrexham	Cheshire West & Chester
2005	2,265 (422)	1,487 (239)	5,642 (1,010)
2006	2,660 (421)	1,521 (238)	5,625 (1,003)
2007	2,574 (425)	1,439 (237)	5,738 (1,008)
2008	2,418 (407)	1,419 (229)	5,903 (985)

Table 4.2: Total CO_2 Emission Estimates for Wales, England and the UK

Year	CO_2 Emissions (ktonnes)		
	Wales	England	UK
2005	33,233	431,896	528,163
2006	33,563	430,166	526,190
2007	33,407	422,483	518,038
2008	32,413	413,963	506,526

From Tables 4.1 and 4.2 it can be seen that Flintshire accounted for between 6.8% and 7.9% of Wales' CO_2 emissions between 2005 and 2008, and between 0.4 and 0.5% of UK emissions. Road transport accounted for between 15.8% and 18.6% of the total CO_2 emissions within Flintshire between 2005 and 2008.

Wrexham accounted for between 4.3% and 4.5% of Wales' CO_2 emissions between 2005 and 2008, and approximately 0.3% of UK emissions. Road transport accounted for between 15.6% and 16.4% of the total CO_2 emissions within Wrexham between 2005 and 2008.

Cheshire West and Chester accounted for between 1.3% and 1.4% of England's CO_2 emissions between 2005 and 2008, and between 1.1% and 1.2% of UK emissions. Road transport accounted for between 16.7% and 17.9% of the total CO_2 emissions within Cheshire West and Chester between 2005 and 2008.

7.5 Potential Effects

As previously discussed, a qualitative assessment has been made of the potential impacts of each package on greenhouse gas emissions.

[24] DECC, Local and Regional CO_2 Emissions Estimates for 2005 – 2008, produced by AEA (AEAT/ENV/R/2848) Updated September 2010. http://www.decc.gov.uk/en/content/cms/statistics/climate_change/climate_change.aspx

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7.5.1 Package 1

The aim of Package 1 is to reduce the demand for travel over the study area as a whole using the following options:

- encouraging walking and cycling;
- shifting freight from road to rail and promoting freight exchange;
- ensuring the impact of future development is mitigated through planning controls and that coordinated economic development and transportation plans are developed; and
- promoting car clubs and car sharing, workplace travel planning and parking management strategies.

Should the options above lead to a reduction in travel demand and hence a reduction in traffic volumes on roads within the study area, this is likely to have a slight beneficial impact on greenhouse gas emissions.

7.5.2 Package 2

Package 2 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the combined transport corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be relatively small.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are low carbon emitters in order to maximise any emissions benefits. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to an increase in greenhouse gas emissions.

Improved station accessibility is unlikely to have a significant impact on greenhouse gas emissions.

Those options aimed at improving Highway traffic flows have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in congestion.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are low carbon emitters in order to maximise any emissions reduction. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to an increase in greenhouse gas emissions.

Improved station accessibility is unlikely to have a significant impact on greenhouse gas emissions.

Those options aimed at improving Highway traffic flows have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in congestion and therefore reduced emissions.

7.5.3 Package 3

Package 3 involves the provision of new infrastructure to the combined transport corridor between Flint / Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Park or Buckley and Broughton.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in overall traffic volumes within the study area.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in overall vehicle km travelled.

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The Highway options within Package 3 have the potential to have an adverse impact on greenhouse gas emissions should they lead to a significant increase in traffic volumes. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment.

7.5.4 Package 4

Package 4 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the combined transport corridor between Wrexham and Deeside, via Mold and Buckley.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be relatively small.

7.5.5 Package 5

Package 5 involves the provision of new infrastructure to the combined transport corridor between Wrexham and Deeside, via Mold and Buckley.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in overall road traffic volumes within the study area.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in overall vehicle km travelled.

The Highway options within Package 5 have the potential to have an adverse impact on greenhouse gas emissions should they lead to a significant increase in traffic volumes. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment.

7.5.6 Package 6

Package 6 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the combined transport corridor between Chester and Wrexham.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be relatively small.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are low carbon emitters in order to maximise any reduction in greenhouse gas emissions. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to an increase in greenhouse gas emissions.

Improved station accessibility is unlikely to have a significant impact on greenhouse gas emissions.

7.5.7 Package 7

Package 7 involves the provision of new infrastructure to the combined transport corridor between Chester and Wrexham.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in overall road traffic volumes within the study area.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in overall vehicle km travelled.

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The Highway options within Package 7 have the potential to have an adverse impact on greenhouse gas emissions should they lead to a significant increase in traffic volumes. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment.

7.5.8 Package 8

Package 8 seeks to make more efficient use of existing transport facilities and infrastructure with minimal cost in relation to the transport corridor for strategic trips, including the trunk road network through the study area.

Options aimed at encouraging walking and cycling are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in traffic volumes, however the magnitude of such impacts are likely to be relatively small.

Options aimed at encouraging bus patronage have the potential to have a slight beneficial impact on greenhouse gas emissions should this lead to a reduction in overall traffic volumes. However, should passenger car numbers decrease and bus numbers increase, it is important that theses buses are low carbon emitters in order to maximise any greenhouse gas benefits. The effect of bus priority options such as signal priority should also be carefully considered to ensure that this does not lead to increased congestion for other vehicles, or at other locations, and hence lead to an increase in greenhouse gas emissions.

Should options aimed at improving rail services lead to a reduction in traffic volumes on roads within the study area, this is likely to have a slight beneficial impact on greenhouse gas emissions.

Shifting freight from road to rail or from road to ship has the potential to have a slight beneficial impact on greenhouse gas emissions.

Those options aimed at improving Highway traffic flows such as suspending non-essential maintenance works, signage strategies and variable message signs have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in congestion.

7.5.9 Package 9

Package 9 involves the provision of new infrastructure to the transport corridor for strategic trips, including the trunk road network through the study area.

Options aimed at encouraging walking and cycling and rail and bus patronage are considered likely to have a slight beneficial effect on greenhouse gas emissions should they lead to a reduction in overall traffic volumes within the study area.

Shifting freight from road to rail and freight consolidation centres have the potential to have slight beneficial impacts on an increase in greenhouse gas emissions, should they lead to a reduction in the overall number of Heavy Goods Vehicles (HGV) km travelled.

Park and Car Share and Park and Ride Schemes also have the potential to have a slight beneficial impact on greenhouse gas emissions should they lead to a reduction in overall vehicle km travelled.

The Highway options within Package 9 have the potential to have an adverse impact on greenhouse gas emissions should they lead to a significant increase in traffic volumes. The potential magnitude and significance of these impacts will need to be considered as part of a more detailed assessment. Variable speed limits also have the potential to effect greenhouse gas emissions, albeit to a lesser extent.

7.6 Potential Mitigation Measures

Mitigation measures have not been considered at this stage.

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7.7 Residual Effects

Further, more detailed assessment is required in order to determine the residual effects of the proposed packages on greenhouse gas emissions to be assessed.

7.8 Cumulative Impacts

The effects of each of the proposed packages will need to be considered in combination with other schemes and developments which may affect traffic flows. This has not been possible at this stage given that the traffic impacts associated with cumulative effects have the potential to be extensive and complex and have not yet been predicted. Cumulative effects will therefore be considered at a later stage once the packages are progressed and traffic modelling is undertaken.

7.9 Conclusion

The results of this assessment are summarised below.

- Package 1 is likely to have a neutral effect. Slight beneficial impacts may occur, although these are unlikely to be significant in terms of pollutant concentrations.
- All remaining packages are considered to have, on balance, a slight beneficial impact in terms of greenhouse gas emissions, however adverse impacts may be experienced at some locations should traffic flows increase in certain areas.
- Further, more detailed assessment is required in order to determine the effects of each of the proposed packages on greenhouse gas emissions over the road network as a whole and to determine the location and extent of any associated adverse impacts.

7.10 References

The Climate Change Act 2008

One Wales: A Progressive Agenda for the Government of Wales, Welsh Government, 2007.

DECC, Local and Regional CO2 Emissions Estimates for 2005 – 2008, produced by AEA (AEAT/ENV/R/2848) Updated September 2010. http://www.decc.gov.uk/en/content/cms/statistics/climate_change/climate_change.aspx

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8 Landscape and Townscape

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9 Landscape and Townscape

9.1 Introduction

This section will summarise the high level assessment of landscape and townscape undertaken at WelTAG Stage 1, to determine the potential effects of the nine options proposed as part of the NEWABTS. In undertaking this assessment, a combination of desk based study and high level site survey have been undertaken to broadly determine the landscape/townscape constraints associated with the study area and the potential for significant effects upon the landscape/townscape resource. The assessment is intended to provide the basis for further study and to guide future proposals.

The study area, shown on Figure 10.1, comprises an extensive, trans-border area stretching from Chester in the north east, to Wrexham in the south, and Mold and Flint to the west and north-west. The area incorporates a number of key transport corridors including a numerous highway routes, regional rail links and strategic footpath/cycle links, as well as sections of the River Dee and Dee Estuary.

Within the study area nine 'packages' have been identified. The packages under consideration are summarised in Section 1 and relate to three levels of proposal: 1, Managing Demand; 2, Making Best Use; and, 3, Capacity Enhancements. Within these levels, the packages are split into transport corridors.

Each package is considered as part of the landscape/townscape assessment which is set out in the section below.

9.2 Methodology

The landscape/townscape assessment has been undertaken by a Chartered Landscape Architect in accordance with the Welsh Transport Planning and Appraisal Guidance (WelTAG 2008) for Stage 1, and with reference to DMRB 11 section 3, and the Guidelines for Landscape and Visual Impact Assessment produced by The Landscape Institute (LI) and Institute of Environmental Management & Assessment (IEMA), 2nd Edition (Spon 2002).

In accordance with the WelTAG Stage 1 assessment requirements (section 7.7), a landscape/townscape assessment has been undertaken to determine the potential effects of the options/proposals in relation to features designated for their international, national or local importance within the natural and/or urban environment. Consideration has also been given to potential effects upon visual amenity, in broad terms, within this context.

The assessment has involved a review of published documentation, including:

- Relevant planning policy including Development Plans, Structure Plans etc.
- Ordnance Survey mapping;
- Aerial photography.

The review of published documentation has been combined with high level site survey to confirm the findings of the desk study and identify specific landscape/townscape constraints within the study area in relation to the proposals under consideration where appropriate.

9.2.1 Landscape/Townscape Appraisal Criteria

The proposed options are described in terms of their potential effects on the landscape/ townscape context within the study area. Impact on landscape/townscape has been assessed using the 7 point scale of impact shown in Table 5.1, below to accord with guidance set out in WelTAG Table E3.1.

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Table 5.1: Criteria for Assessment of Potential Landscape/Townscape Impact

Scale	Example
Large (Positive) Benefit	Very few proposals will merit this score.
Moderate (Positive) Benefit	Proposals enhance landscape/townscape because they: - fit in very well; - have potential to restore characteristic features; - enable a sense of place and scale; - enable a sense of quality; and - further government objectives.
Slight (Positive) Benefit	The proposals: - • fit in well; - • incorporate mitigation; - • enable a sense of place and scale maintain or enhance existing character outside protected areas; and - • avoid conflict with government policies.
No effect or neutral effect	The proposals: - complement the landscape/townscape; - incorporate mitigation; - avoid being visually intrusive and don't affect tranquillity; - maintain existing landscape/townscape character outside protected areas; and - avoid conflict with Government policies.
Slight Adverse Effect	The proposals: - do not quite fit the landscape/ townscape; - impact on certain views; - cannot be completely mitigated; - affect an area of recognised landscape/ townscape quality; and - conflict with local authority policies.
Moderate Adverse Effect	The proposals: - are out of scale with the landscape/ townscape; - are visually intrusive; - cannot be fully mitigated; - will have an adverse impact on a landscape/townscape of recognised quality; and - conflict with local and national policies.
Large Adverse Effect	Proposals are: - at complete variance with the landscape/townscape; - highly visual and intrusive; - damaging to characteristic features; - elements of change in very high quality or highly vulnerable landscapes/townscapes; - not capable of being mitigated for; and - not reconcilable with Government policy.

In scoring and assessing the potential impact of each of the individual proposal options on the receiving landscape, the principal of assuming a neutral impact has been applied to certain options within all packages in certain instances as follows.

For there to be a landscape impact, a measureable effect involving physical change must be implicit within the proposal to single or multiple identifiable features within the receiving landscape. Where this is not anticipated to be the case there would be no change to the landscape resource. An example of this would be certain proposals making better use of existing transit infrastructure more effectively as there would be no physical change to the receiving environment (though where an extreme intensification of route use by traffic would be identifiable on the basis of available information, this would not be case).

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Alternatively, a known physical impact could be classified as neutral where a measureable effect involving physical change is implicit within the proposal but it is justifiable to assume this would not undermine the intrinsic quality of any features or the wider landscape which it would affect, due to the type and small scale of the development. An example of this could be a new public footpath within a protected area, where it is legitimate to assume that such a proposal would only be deemed appropriate if the scale and design of the proposal reflected the sensitivity of its setting.

9.2.2 Effects on views

The landscape/townscape assessment has involved consideration of the extent to which the proposals would affect visual amenity, at a broad, study area wide level. Assessment is based on the information gathered through desk study and site survey, and analysis of the proposed options. A more detailed assessment of impacts to specific receptors will be considered in greater detail at the next stage of assessment.

9.2.3 Potential, Temporary Construction Impacts

Construction impacts may be associated with a number of the options under consideration and will need to be assessed once preferred options are developed further and detailed information becomes available. At this stage, temporary construction effects have not been considered for any of the options due to the strategic, high level nature of the study and insufficient level of information available to make any meaningful evaluation.

9.3 Policies and their implications

Environmental planning constraints are illustrated on Figure 10.1.

9.3.1 International/National Planning Context

There are no international or nationally important landscape designations within the study area. The Clwyddian Range AONB is the closest nationally designated landscape, and is located outside the study area, approximately 1km the west of Mold.

There are a number of nationally designated sites within the study area which form part of the cultural landscape context. These include:

- A large number of Listed Buildings scattered throughout the area, often located close to key transport corridors and particular focused within the settlements of Chester, Hawarden, Mold and Wrexham;
- A small number of Scheduled Monuments scattered throughout the area, including those within or in proximity to settlements at Chester, Caergwrle, Hawarden, Dodleston, Wrexham, Mold and Flint; and
- A small number of Registered Historic Parks and Gardens primarily focussed in the west of the study area, overlooking the River Alyn, but also including extensive parkland associated with Eaton Hall south of Chester.

A full list of cultural heritage features can be found in Annex 7.1.

There are a number of areas of Ancient Woodland within the study area. Planning Policy Statement 9 (PPS 9) recognises the importance of these areas and makes provision for their protection through land use planning. Ancient Woodland is of key ecological importance in terms of habitat, but also forms a key feature within the character of the historic landscape, often including historically important landscape elements as well. Adverse effects to ancient woodland should be avoided if at all possible, but where impacts are unavoidable, appropriate mitigation should be considered as part of any proposed development.

A greenbelt designation covers much of the land around Chester to the north, east and south. Although Greenbelt is a land use planning based designation, it is also relevant to the physical landscape as an aim of the green belt is to retain a sense of openness. However, the fundamental aim of the Greenbelt is to prevent urban sprawl and as such there is a presumption against development.

9.3.2 Local Planning Policy

At a local level, the study area is covered by the following planning authorities in both Wales and England:

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- Flintshire County Council and Wrexham County Borough Council (Wales)
- Chester West and Chester District Council (England)

A broad review of both adopted and emerging policy relevant to the study area has been undertaken as part of this assessment. The following summarises landscape related policies which are considered as part of this high level assessment.

An Area of Special County Value (ASCV) is designated to the south of Chester covering the Eaton Estate and Dee Valley. This area has been designated to conserve the special character of the parkland and Dee valley landscape. Development proposals within this area would need to show that they would not directly or indirectly damage, or contribute to, the erosion of features for which the ASCV has been designated.

There are a number of Conservation Areas designated throughout the study area, focussed within key urban centres in Chester and Wrexham, within settlements at Mold, Flint, Ewloe, Northop, Saughall and Caergwrle, and within a number of smaller rural settlements between Chester and Wrexham. Planning policy dictates that development within Conservation Areas would need to preserve and/or enhance the character of those areas, and their setting, as well as giving consideration to views into and out of those areas.

In addition to designated sites/areas, local planning policy covering the study area also includes general policies intended to protect and enhance the character of the rural landscape as a resource, in its own right; they would be considerations in any proposed development leading to changes to the landscape resource. Policies of this type apply within all authority areas and are intended to conserve and enhance features which help to create local landscape character.

In addition to landscape specific designations and policies, there are a number of areas designated as Green Barrier in proximity to settlements within both Flintshire County and Wrexham County Borough. Green Barriers provide a potential, local level constraint to development within the study area, as the aims of the designation are similar to those of Greenbelt, the difference being that they are not a permanent, national level, statutory designation. Permitted development within Green Barriers includes appropriate uses for which a rural location is essential and which would not affect the openness of the Green Barrier.

9.4 Baseline

9.4.1 Existing Conditions

The landscape of the study area and its immediate setting can be broadly characterised into three zones with some intermediate areas within these. These are:

- The Dee Estuary corridor and Chester. This consists of the Dee Estuary and associated flat, lowland landscape as far inland as Chester;
- The hill landscapes of the Welsh border area to the east of the study area; and
- The Anglo-Welsh border area between Chester and Wrexham. This consists of the gently undulating farmland landscapes of the Dee Valley south of Chester, West Cheshire and lowland farmland areas east and north of Wrexham.

Due to the large scale of the landscape, all areas enjoy a high degree of intervisibility and there are extensive views into and across Cheshire, Merseyside and Lancashire from the elevated Welsh hills along the western side of the study area including the Clwydian Range. The Clwydian Range and its foothills enclose views to the west, and provide a sense of place to the lowland landscapes of the western side of the study area.

Dee Estuary Corridor to Chester

Although the area has a long history of an industrial presence, the character of current industrial sites/zones, towns of Connah's Quay, Flint and the smaller settlements of the area are, at the wider landscape level, influenced by the wider

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semi-rural landscape setting. Flint also has a significant historic heritage as a border town, complete with medieval castle.

In the north eastern part of the study area the flat, canalised section of the Dee corridor broadens into the marsh dominated estuarial section of the river. This section of the Dee is an area of extensive land reclamation over a long period and from west of Flint to immediately west of Chester the river is canalised giving it a somewhat sterile character. The Dee corridor's flat lowland landscape surrounding this contains dispersed, large scale areas of industrial activity and transport infrastructure, which form significant elements within it. Whilst these are large in scale, these developments only dominate their immediate setting at a very local level and are counter balanced by an open, lowland agricultural setting much of which is formed of reclaimed land from the Dee flood plain consisting of large, rectangular fields (most notably at Deeside Industrial Park, Broughton and other Industrial and Business Parks particularly along the Dee corridor around Flint and Connah's Quay).

The Dee estuary forms a broad expansive landscape; there are views across and along the estuary in the direction of Wirral and West Cheshire to the east and to the foothills and high points of the Clywdian Range to the west. The Dee estuary is unusual in that comparatively little water occupies so large basin.

The Anglo-Welsh border area between Chester and Wrexham

This area comprises Chester, the Dee River corridor south of Chester, and adjoining pastoral lowlands around the border area as far south as Wrexham. South of Chester, the Dee runs through a rich pastoral landscape, as far as the eastern side of Wrexham which encompasses the areas both sides of the A483. The area is characterised by a gently undulating landscape with varied, degrees of tree cover and pockets of woodland, and small villages some with a degree of suburbanisation. The areas sense of place is enhanced by views of the Clwydian Range perceived as a continuous ridge of to the west and the hills of West Cheshire to the east.

Chester is one of the most important historic towns in the north of England and its virtually complete city walls contain a townscape heritage of international significance. The south western edge of Chester forms the interface with the canalised section of the Dee and reclaimed land associated with it. This area also contains a large scale retail park and Sealand Industrial Area. Chester also sits at the western edge of the belt of towns and cities of North West England to the east and is only separated from the Merseyside conurbation by a relatively narrow belt of greenbelt land.

Hill Landscapes of North East Wales Border

Immediately west of the lowland Dee landscape of west Cheshire and the border area, the landscape is characterised by hill scenery, varying from gentle undulations to steeper slopes, which spread throughout the eastern side of the study area. The Clywdian Range rises as an elevated ridge across north east Wales with high points at Moel Famau (475m) due west of the northern end of the study area and Ruabon Mountain (490m) east of Wrexham, both immediately west of the study area. Elevated, undulating land between the Dee corridor and the Clywdian Range from the foothills of the Clywdian Range and this area contains a number of scenic river valleys draining the area, notably the River Alyn and contains many pockets of Ancient Woodland. Much of the landscape, although undesignated, is of high quality.

Many tracts of the landscape within this area were formerly blighted by traditional extractive industries and these have been comprehensively restored over many decades, though the overall character was, and remains, overwhelmingly rural. The main towns are Wrexham and Mold, along with Harwarden and other small settlements, contain significant historic centres and extensive townscape and landscape assets rooting them intimately to their wider landscapes. There are also large scale business and industrial parks associated with Wrexham. The industrial base of the other settlements is relatively modest in scale and is not a significant characteristic of the landscape setting.

9.5 Potential Effects

As outlined in Section 1, there are nine 'packages' under consideration as part of this study. The various packages comprise a series of 'options' or proposals which have been assessed in terms of potential effects to the landscape/townscape resource, at a strategic level. Each package is considered below, with reference to specific options where appropriate.

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9.5.1 Package 1

Package 1 relates to the entire study area and comprise options outlining a series of strategic proposals which seek to reduce the demand for travel on highways including promoting car clubs, funds for business to invest in sustainable transport facilities and promotion of use of rail in freight. Although it is recognised that a reduction in traffic has potential for indirect landscape benefits in the longer term, effects are not quantifiable in landscape terms and as such have not been assessed. Package 1 does not include any options which propose a physical change to the landscape/townscape resource and as such no direct impacts to landscape/townscape are anticipated within the study area; the scale of impact would be Neutral.

Overall package 1 could have a potentially **Neutral** effect.

9.5.2 Package 2

Package 2 relates to the Flint/Mold – Chester corridor and comprises a number of options which set out specific proposals seeking to make more efficient use of existing transport facilities and infrastructure with minimal cost. The majority of options proposed are not relevant to the landscape/townscape assessment as they either:

- comprise purely operational improvements to existing bus and rail services, such as timetable adjustments, integrated area ticketing (travelcards), improvements to traffic signals and real time passenger information; or
- are unquantifiable in landscape/townscape terms due to the type or scale of the proposal, such as improvements in security measures for bicycles at transport interchanges, priority signalling for buses at junctions, signal improvements, and additional signage for walkers and cyclists.

Although it is recognised that a number of options would be beneficial in terms of improved accessibility and permeability for non-motorised users in urban areas, the changes proposed would not have a significant direct, physical effect upon landscape or townscape as a resource, due to the small scale of the change. All operational or unquantifiable options would have a Neutral impact on landscape/townscape accordingly.

Two options have potential for adverse effects upon the landscape/townscape. Options 9 and 103 propose minor online highway improvements to the B5129 within Connah's Quay and Queensferry and A5104 between Broughton and Saltney respectively. Depending upon the level of change and location of specific proposals, this could have a detrimental effect upon the setting of listed buildings situated within Connah's Quay, Shotton and Queensferry and those situated adjacent to the A5104. However, due to the location of Listed Buildings within existing road corridors, the scale of potential impacts is likely to be limited to Slight Adverse.

Overall package 2 could have a potentially **Slight Adverse** effect due to the installation impact of minor road improvements on the setting of Listed Buildings located within existing road corridors.

9.5.3 Package 3

Package 3 relates to the Flint/Mold – Chester corridor and comprises a number of options which set out specific proposals to enhance capacity by providing new infrastructure. A number of proposals will have a Neutral impact on landscape/townscape for one or more of the following reasons:

- A number of options comprise purely operational improvements to bus and rail services, such as new bus routes to link rail stations with employment sites, changes to service frequency;
- A number of options are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal, such as improvements to allow safe walking/cycling from local communities to public transport interchanges, car share schemes; and/or
- Proposals have not been developed sufficiently at this stage to meaningfully assess potential effects, such as park and ride schemes or provision of new walking/cycle link, connected to National Cycle Route 5, to improve links between Chester, Denbigh and Wrexham.

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There are a number of proposals which would have some direct, physical effects on the landscape/townscape resource and as such have been considered in more detail. Assessment is set out below under themes applied to the various options.

Walking and Cycling

Two options include proposals for new walkways/cycleways which have potential to provide strategic level enhancement in terms of recreation as well as increased accessibility, connectivity and permeability for non-motorised users (41 and 40). The options proposed utilise a dismantled railway between Mold and Saltney and provide an extension along the southern side of the River Dee, linking Queensferry with Flint.

Options proposed to enhance/create walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource (except in very exceptional circumstances), particularly where new routes utilise former transport links e.g. the dismantled railway. The scale of potential effects to landscape and townscape would be Slight or Moderate Beneficial due to the enhancement in terms of recreation, connectivity and permeability.

Rail

Three of the options proposed could have potential effects on landscape/townscape (69, 70 and 72). Proposals comprise two new railway stations located at Queensferry and Deeside Industrial Park, and a new 'curve' at Shotton to allow for a new service between the Borderlands and Chester.

The development of a new station at Deeside Industrial Park could be easily accommodated within the wider context of the large scale industrial and commercial, built setting, without significantly affecting the character of the landscape/townscape. The new station would likely be small in scale, relative to the surrounding built environment.

A new station in Queensferry could also be successfully accommodated within the context of the urban edge of the settlement. The station would likely be located in close proximity to the intersection of the existing line and the A494 which form relatively substantial, urbanising elements in the local townscape. The character of the townscape in this area is primarily light industrial in nature and includes a large scale sewerage works. Within this setting a new station could be accommodated without significant detriment to landscape/townscape character. However, the area also includes a limited amount of residential housing and as such, there is potential for the new station to have a detrimental effect in terms visual amenity, within a localised area.

A new curve at Shotton has the potential to have a limited, localised but detrimental effect on the semi-rural character of the Deeside landscape, on the north side of the railway line, particularly in the short term. It could require the removal of existing sports pitches which would also have an adverse effect on recreation value of the Deeside landscape in this area.

Although no designated features would be affected by any of the rail proposals, there is potential for the new curve at Shotton and New Station at Queensferry to have a Slight Adverse impact.

Highway

Two options (13 and 14) propose a series of highway improvements to improve access to both Deeside and Broughton Industrial areas. At present, details of the improvements have not been developed to a sufficient level to allow for any detailed level of assessment. However, the industrial character of both Deeside Industrial Park and Broughton should be capable of accommodating minor highway improvements without detriment to the wider landscape setting or designated features, of which there are few in close proximity. Larger scale proposals, particularly if located at Broughton, would need to consider direct and indirect affects upon the setting of listed buildings and the wider landscape setting which includes designated sites in Hawarden.

Overall package 3 could have a potentially **Slight Adverse** effect due to the loss of recreational land and detrimental effect on river side character caused by requirement for a new rail 'curve' at Shotton.

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9.5.4 Package 4

Package 4 relates to the Wrexham - Deeside corridor and comprises a number of options which set out specific proposals seeking to make more efficient use of existing transport facilities and infrastructure with minimal cost. The majority of options proposed are not relevant to the landscape/townscape assessment as they either:

- comprise purely operational improvements to existing bus and rail services, such as timetable adjustments, integrated area ticketing (travelcards), and real time passenger information; or
- are unquantifiable in landscape/townscape terms due to the type or scale of the proposal, such as improvements in security measures for bicycles at transport interchanges, priority signalling for buses at junctions, and additional signage for walkers and cyclists.

Although it is recognised that a number of options would be beneficial in terms of improved accessibility and permeability for non-motorised users in urban areas, the changes proposed would not have a significant direct, physical effect upon landscape or townscape as a resource, due to the small scale of the change. All operational or unquantifiable options would have a Neutral impact on landscape/townscape accordingly.

A small number of options propose minor highway improvements (options 6, 7 and 16) and have potential for adverse impacts upon the landscape/townscape. Minor highway improvements include: addressing pinch points on A541/A550 between Junction 35 on A55 (North of Pennyfford) and Junction 5 on A483 (Wrexham); a series of improvements to overcome pinch points in the Hope/Caergwrle area; and, safety/route consistency enhancements to A541 between Mold and Wrexham. There are a number of constraints within the areas affected by the proposals including numerous Listed Buildings within existing road corridors (A541, A550, B5373 and B5102), a Conservation Area and two Scheduled Monuments at Caergwrle. The proposals also pass through an area designated at a local level for landscape value between Wrexham and Caergwrle. Depending upon the level of change proposed and location of specific proposals, there is potential for there to be detrimental effects upon the setting of designated cultural landscape features (Listed Buildings, Scheduled Monuments, Conservation Areas). There is also potential for the proposals to have a detrimental effect on the local landscape, particularly where proposals would be located within the designated area. However, potential impacts would be limited to Slight Adverse due to the small scale of online improvements and reduced sensitivity of landscape/townscape features, as existing road corridors already have an influence on the landscape setting.

Whilst it is envisaged that potential impacts would be limited due to the small scale of online improvements and reduced sensitivity, it should be noted that in combination, proposals have the potential for more significant effects where multiple proposals are located within a limited/localised area. In combination, there is potential for a Moderate Adverse effect, before mitigation.

Overall package 4 could have a potentially **Moderate Adverse** effect due to the combined effect of minor highway improvements within a limited area of primarily rural landscape.

9.5.5 Package 5

Package 4 relates to the Wrexham - Deeside corridor and comprises a number of options which set out specific proposals to enhance capacity by providing new infrastructure. A number of proposals will have a Neutral impact on landscape/townscape for one or more of the following reasons:

- A number of options comprise purely operational improvements to bus or rail services, such as new bus routes to link rail stations with employment sites and increases in service frequency;
- A number of options are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal, such as improvements to allow safe walking/cycling from local communities to public transport interchanges and car share schemes; and or
- Proposals have not been developed sufficiently at this stage to meaningfully assess potential effects, such as park and ride schemes.

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There are a number of proposals which would have some direct, physical effects on the landscape/townscape resource and as such have been considered in more detail. Assessment is set out below under themes applied to the various options.

Walking and Cycling

The package includes proposals for a new walkway/cycleway (option 104), located within existing transport corridors/links between Mold and Deeside, which has potential to provide strategic level enhancement in terms of recreation as well as increased accessibility, connectivity and permeability for non-motorised users.

Proposals to enhance walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource (except in very exceptional circumstances), particularly where new routes are proposed within existing highway corridors. The scale of potential effects to landscape and townscape would be Slight or Moderate Beneficial due to the enhancement in terms of recreation, connectivity and permeability.

Bus

The package includes an option to create a multimodal hub at Wrexham Station (option 47) which could include bus stop and terminus facilities, parking and drop off/pick up areas. Wrexham General Station is a Grade II Listed Building, and a section of Wat's Dyke (SAM) lies immediately south of the station. Due to the proximity of the proposals, the options have potential to detrimentally affect sensitive townscape features and their setting which, due to their inherent sensitivity, could lead to a Large – Moderate Adverse effect if specific design proposals do not reflect the sensitivity of the setting.

Rail

Option 70 proposes a new railway station at Deeside Industrial Park which could be easily accommodated within the wider context of the large scale industrial and commercial, built setting, without significantly affecting the character of the landscape/townscape. The new station would likely be small in scale, relative to the surrounding built environment.

Provision of additional car parking at key railway stations on the Wrexham – Bidston line has potential to adversely affect landscape/townscape, the extent to which would depend heavily upon the scale of the parking proposed and the precise location (option 59). In the absence of detailed proposals, it is assumed that the design of such schemes could be undertaken to avoid significant adverse effects upon the setting of Listed Buildings in the vicinity of stations, and design would be undertaken to reflect the sensitive location of stations where located within a Conservation Area (Wrexham and Caergwrle). A detailed landscape and visual assessment would be required once the design of proposals has been developed. If additional car parking is proposed at Wrexham General Station there could be a combined adverse effect with proposals to develop the station as a multi-modal hub (option 47).

Highways

A new road bridge across the Dee is proposed to the east of the existing rail bridge between Shotton and Deeside Industrial Park (option 23). The existing rail bridge is Listed and the design of the new bridge would need to ensure that it would not affect the setting of it. Assuming that the design of the proposed bridge would be appropriate, it would be in keeping with the semi-industrial character of the river corridor in this location and would not have a significant impact on landscape character or visual amenity.

The package also includes proposals for a series of highway improvements to improve access to Deeside Industrial Park (option 13). At present, details of the improvements have not been developed to a sufficient level to allow for any detailed level of assessment. However, the industrial character of Deeside Industrial Park should be capable of accommodating minor highway improvements without detriment to the wider landscape setting or designated features, of which there are few in close proximity. If larger scale proposals are required, direct and indirect effects upon the setting of listed buildings and the wider landscape setting would need to be considered in detail.

Freight

Construction of crawler lanes at inclines on key trunk roads and other single carriageway A-roads (option 84) has potential for significant adverse effects as works could detrimentally affect the setting of numerous designated features

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which lie adjacent to the highway network, if road widening were required. In the absence of detailed proposals it is difficult to predict the significance of the effect, but there could be potential for Large- Moderate Adverse effects to the landscape resource, particularly in the short term if additional lanes would require the removal of existing screen planting within the highway corridor which would open up views of the road.

Overall package 5 could have a potentially **Large – Moderate Adverse** effect due to the effects of new crawler lanes, which would be likely to have a highly intrusive effect on visual amenity and landscape character due to loss of existing roadside planting, and the development of a multimodal hub at Wrexham General Station.

9.5.6 Package 6

Package 6 relates to the Chester - Wrexham corridor and comprises a number of options which set out specific proposals seeking to make more efficient use of existing transport facilities and infrastructure with minimal cost. The majority of options proposed are not relevant to the landscape/townscape assessment as they either:

- comprise purely operational improvements to existing bus services, such as timetable adjustments, integrated area ticketing (travelcards), and real time passenger information; or
- are unquantifiable in landscape/townscape terms due to the type or scale of the proposal, such as improvements in security measures for bicycles at transport interchanges, priority signalling and capacity enhancements for buses at junctions, and additional signage for walkers and cyclists.

Although it is recognised that a number of options would be beneficial in terms of improved accessibility and permeability for non-motorised users in urban areas, the changes proposed would not have a significant direct, physical effect upon landscape or townscape as a resource, due to the small scale of the change. All operational or unquantifiable options would have a Neutral impact on landscape/townscape accordingly.

The package also includes proposals to improve non-car access at Wrexham General Station. The station building is Listed and as such it is assumed that any proposals in this area would be designed to reflect the sensitivity of the setting. Due to the type of proposal, it is considered likely that the proposals could be accommodated within this setting with detriment to the Listed Building.

Bus priority measures proposed at the junction between the A55 and A483 (option 43) would have little effect on the landscape resource due to the scale of proposal, which it is assumed could be accommodated within the existing highway.

Overall, package 6 could have potentially **Neutral** effect.

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9.5.7 Package 7

Package 7 relates the Chester - Wrexham corridor and comprises a number of options which set out specific proposals to enhance capacity by providing new infrastructure. A number of proposals will have a Neutral impact on landscape/townscape for one or more of the following reasons:

- A number of options comprise purely operational improvements to bus or rail services, such as new bus routes to link rail stations with employment sites and/or changes in service frequency;
- A number of options are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal, such as improvements to allow safe walking/cycling from local communities to public transport interchanges and car share schemes;
- Proposals have not been developed sufficiently at this stage to meaningfully assess potential effects, such as park and ride schemes.

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There are a number of proposals which would have some direct, physical effects on the landscape/townscape resource and as such have been considered in more detail. Assessment is set out below under themes applied to the various options.

Walking and Cycling

The package includes proposals for a new walkway/cycleway, located entirely within existing highway corridors between Wrexham and Chester, which has potential to provide strategic level enhancement in terms of recreation as well as increased accessibility, connectivity and permeability for non-motorised users.

Options proposed to enhance walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource (except in very exceptional circumstances), particularly where new routes are proposed within existing highway corridors. The scale of potential effects to landscape and townscape would be Slight or Moderate Beneficial due to the enhancement in terms of recreation, connectivity and permeability.

Bus

The package includes an option to create a multimodal hub at Wrexham Station (option 47) which could include bus stop and terminus facilities, parking and drop off/pick up areas. Wrexham General Station is a Grade II Listed Building, and a section of Wat's Dyke (SAM) lies immediately south of the station. Due to the proximity of the proposals, the options have potential to detrimentally affect sensitive townscape features and their setting which, due to their inherent sensitivity, could lead to a Large – Moderate Adverse effect if specific design proposals do not reflect the sensitivity of the setting.

Rail

A new station is proposed on the western edge of Rosset. It is assumed that the scale of development would be in keeping with the adjacent settlement and as such could be accommodated without significant detriment to the wider landscape setting. Visual amenity from adjacent properties would need to be considered as part of a more detailed assessment at the next stage.

Highways

The package includes two highway improvement proposals comprising options 17 and 18:

- Improvements to two key junctions on A483 west of Wrexham; and
- Improvements to two existing junctions on the A483 south west of Chester Business Park.

The improvements to junctions west of Wrexham are located within the immediate context of a Local Landscape Area and a small number of Listed Buildings. There is potential for the proposals to have a detrimental effect on the character of the landscape in this area, though the scale of impact would be dependent upon the magnitude of the change proposed. The setting of the southernmost junction (J4) is of greater sensitivity, and the change proposed could give rise to a Moderate Adverse effect without mitigation.

Improvements to two junctions south of Chester Business Park are located within an area of agricultural landscape and adjacent to a Local Landscape Area, partly designated protect the setting of adjacent historic parkland. There are also two Listed Buildings in proximity of the junctions, to the west. Proposals in this area would need to take account of the sensitive setting as there is potential for there to be a significant detrimental effect on landscape character. The scale of the potential impact would depend upon the scale of the proposed improvement works, and extensive mitigation may be required. There is potential for a Moderate Adverse effect without mitigation.

Overall package 7 could have a potentially **Large – Moderate Adverse** effect due to the development of a multimodal hub at Wrexham General Station and junction improvements in proximity to sensitive landscape areas/features.

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9.5.8 Package 8

Package 8 relates to the entire study area and comprises a number of options which set out specific proposals seeking to make more efficient use of existing transport facilities and infrastructure with minimal cost. The majority of options proposed are not relevant to the landscape/townscape assessment as they either:

- Comprise purely operational improvements to existing bus, rail and freight services, such as extensions or increases in frequency of rail services, integrated area ticketing (travelcards), and suspension of non essential maintenance at peak times; or
- Are unquantifiable in landscape/townscape terms due to the type or scale of the proposal, such as improvements in security measures for bicycles at transport interchanges, priority signalling for buses at junctions, and additional signage for walkers and cyclists.

All operational or unquantifiable options would have a **neutral** impact on landscape/townscape accordingly. However, it should be noted that some of these proposals should be assessed in landscape/townscape terms once the schemes have been developed in more detailed.

Option 102 (installation of VMS on A55/A494/A483) has potential to detrimentally affect the setting of a number of Listed Buildings, a small number of Scheduled Monuments and, in the case of the A483, a Local Landscape Area, if the proposals are located in close proximity to these protected features/areas. Although proposals could be located close to Conservation Areas in Manford and Gresford, the A483 is separated from settlements by the railway line and as such, no significant effects are anticipated. In the absence of detailed proposals, it is assumed that the potential impact could be Slight Adverse due to impacts to the setting of designated features/areas, limited only by the low sensitivity of the immediate setting, which is already affected by proximity to existing road corridors.

Option 1 (reduce the number of slip roads onto the strategic highway network) would not have any significant effects on the landscape/townscape resource.

Overall package 8 could have a potentially **Slight Adverse** effect due to the potential impact of VMS on the settings of Listed Buildings, SAMs and a Local Landscape Area.

9.5.9 Package 9

Package 9 relates to the entire study area and comprises a number of options which set out specific proposals to enhance capacity by providing new infrastructure. The majority of proposals will have a Neutral impact on landscape/townscape for one or more of the following reasons:

- A number of options comprise purely operational improvements to bus, rail or freight services, such as new bus routes to link rail stations with employment sites, increases in service frequency, removal of stops on services between major hubs, timetable changes, and rail electrification;
- A number of options are unquantifiable in landscape/townscape terms at this stage due to the type or scale of the proposal, such as improvements to allow safe walking/cycling from local communities to public transport interchanges, open user distribution centres outside of the study area, car share schemes;
- Proposals have not been developed sufficiently at this stage to meaningfully assess potential effects, such as park and ride schemes.

There are a number of proposals which would have some direct, physical effects on the landscape/townscape resource and as such have been considered in more detail. Assessment is set out below under themes applied to the various options.

Walking and Cycling

A number of options include proposals for new walkways/cycleways which have potential to provide strategic level enhancement in terms of recreation as well as increased accessibility, connectivity and permeability for non-motorised users. The options proposed are located within existing highway corridors (between Mold and Saltney, Mold and Deeside, and Wrexham and Chester), utilise a dismantled railway between Wrexham and Chester, and an extension to

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existing rights of way, through an industrialised area, along the southern side of the River Dee. There are also proposals to enhance existing rights of way where they cross existing trunk roads and associated junctions, to provide suitable crossing facilities.

Options proposed to enhance walking and cycling routes are unlikely to be of sufficient scale to have a significant, detrimental physical effect on the landscape/townscape resource (except in very exceptional circumstances), particularly where new routes are proposed within existing highway corridors or utilise former transport links e.g. the dismantled railway. The scale of potential effects to landscape and townscape would be Slight or Moderate Beneficial due to the enhancement in terms of recreation, connectivity and permeability.

Freight

The options for improvements to freight include proposed truck parking facilities at both ends of the A55 and a new open access rail terminal (options 83 and 105) both of which, depending upon the scale and location of the proposals, could potentially have significant adverse effect on the character of the landscape/townscape. A high degree of inter-visibility within these areas means that visual impacts could also be potentially significant. That withstanding, it would be equally possible to locate sites of the type proposed within areas of lower sensitivity and as such, potential effects would be less significant.

Construction of crawler lanes at inclines on key trunk roads and other single carriageway A-roads (option 84) has potential for significant adverse effects as works could detrimentally affect the setting of numerous designated features which lie adjacent to the highway network, if road widening were required. In the absence of detailed proposals it is difficult to predict the significance of the effect, but there could be potential for Moderate-Large Adverse effects to the landscape resource, particularly in the short term if additional lanes would require the removal of existing screen planting within the highway corridor which would open up views of the road.

Highway

There are numerous highway improvements proposed which could potentially affect the landscape/townscape resource to varying degrees depending upon the scale of change and sensitivity of receiving environment.

Option 5 is the only proposal which purely comprises improvements within the existing highway (the installation of ITS on the A55/A494) which has potential for Neutral - Slight Adverse effects, depending upon the scale and location of specific proposals.

A number of options (99, 10, 17, 18, 24, 25, 26 and 27) include proposals for improvements to existing highway infrastructure including:

- Provision of hard shoulders on dual carriageway trunk roads throughout the study area;
- Enhancements to A548 between Flint and A550, east of Deeside Industrial Park;
- Improvements to two existing junctions on the A483 south west of Chester Business park;
- Improvements to two key junctions on A483 west of Wrexham;
- Improvements to Ewloe interchange between the A55 and A494;
- Widening of the A55 between Ewloe and Northrop (scale to be determined);
- Widening of the A494 between Ewloe and Drome Corner (scale to be determined); and
- Widening of the A494 Dee River crossing.

In isolation, individual proposals have potential to adversely affect the setting of designated features such as Listed Buildings and Scheduled Monuments where they are located in proximity to existing road corridors. Depending upon the scale of the proposals, effects would likely be limited to Slight or Moderate Adverse as major highways already have a significant influence on the setting. However, the combined effect of multiple proposals within a localised area could increase the magnitude of change and therefore the scale of the adverse effect. The options proposed also have potential to significantly affect visual amenity where schemes are located in proximity to residential areas within Ewloe,

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Queensferry, Shotton, Northrop, Flint and Northrop Hall, particularly where existing roadside screen planting and/or earth mounding would need to be removed to make way for road widening. Impacts of this type would likely be short term in nature as planting and mounding could be replaced in the medium to long term. There is potential, particularly in the short term, for the combined effect to be Large Adverse without mitigation.

The most significant change is proposed in option 21, which comprises a new link road between the A55 at Northrop and the A548, between Flint and Connah's Quay. The road is proposed within an area of undulating, and gradually sloping, rural landscape, west of Connah's Quay and would almost certainly require the removal of existing landscape features such as hedgerows and mature trees. In addition, the scheme may require the removal of areas of Ancient Woodland, a potentially unmitigatable impact, as well as broader effects on features which combine to define the rural character of the landscape resource i.e. Listed Buildings, landform, field boundaries and tranquillity. The road would be located within an area designated as Green Barrier (Greenbelt) and would have an urbanising influence on the rural character of the area. There is potential for the scheme to be a highly visible new feature in views from Connah's Quay and the wider landscape north of the Dee Estuary. The routing of the scheme would be crucial to the level of impact as the potential effect on landscape character and visual amenity could be Large Adverse.

Overall package 9 could have a potentially **Large Adverse** effect due to potential impacts of option 21 upon the rural landscape and an area of Ancient Woodland, as well as the combined effect of numerous highway improvements which would be likely to have a highly intrusive effect on visual amenity and landscape character due to loss of existing roadside planting

9.6 Potential Mitigation Measures

There are a number of mitigation measures that could be proposed to avoid and/or reduce potential landscape/townscape and visual effects identified. The type of mitigation measures proposed would vary in accordance with the scale of individual proposals and sensitivity of the specific landscape setting, on a scheme by scheme basis. At a broad scale, the following measures could be considered for mitigation of all schemes where potential adverse effects have been identified.

- Where new development or extensions to existing infrastructure are proposed i.e. new highways, park and ride sites, large scale junction improvements, new railway stations and highway widening, they should be carefully routed/located to avoid direct impacts on areas of designated landscape/townscape such as Ancient Woodland, Local Landscape Areas, Listed Buildings, Conservations Areas, registered Parks and Gardens; and
- where possible, the routing/siting of proposed development could be undertaken to avoid direct impacts upon other existing features that contribute to the character of the landscape/townscape, such as woodland, mature trees (including those covered by a Tree Protection Order), historic field boundaries, existing screen planting.

Where effects cannot be fully mitigated through routing and siting design, specific landscape mitigation proposals could be developed alongside overall scheme design, to reduce effects upon landscape/townscape character and key visual receptors. Mitigation measures could include:

- Mass native tree and shrub planting to replace significant vegetation removed including that located within existing road corridors or that with a screening function in proximity to key visual receptors;
- A combination of ground modelling and mass native tree and shrub planting to help integrate development within rural areas or to provide screening where located in proximity to sensitive visual receptors in both rural and urban areas;
- Use of appropriate or vernacular materials in design of new development, particularly in areas of designated landscape or townscape quality/value to complement/enhance the setting, e.g. use of local stone where development is situated within or in close proximity to Conservation Areas or within setting of Listed Buildings;
- Considered micro-siting of new development to avoid the requirement for new, urbanising structures within rural areas e.g. designing out the need for retaining structures as part of road widening or installation of ITS/VMS;
- Landscape enhancement and/or restoration measures to compensate for the loss of important landscape features e.g. historic hedgerow restoration to mitigate loss of existing hedgerows;

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- Proposed planting and use of appropriate materials where development is in close proximity to designated areas e.g. Road widening or installations within highway in close proximity to Listed Buildings or Local Landscape Areas.

Table 5.2 outlines typically appropriate mitigation measures with reference to specific options, where potentially significant effects (moderate or large) have been identified.

Table 5.2: Proposed Mitigation Measures

Option Reference	Description	Typical Mitigation Measures Proposed
Option 17 (Packages 9 and 7)	Junction Improvements including new link between A55 and A483	- Avoid direct impacts to Listed Buildings at Rough Hill, and enhance setting of Listed Buildings through additional mass planting and earth mounding as appropriate; - Mass planting to integrate junction into wider landscape setting, to replace vegetation removed and provide screening for nearby residential properties; - Avoid significant development on east side of A483 as designated as Local Landscape Area.
Option 18 (Packages 9 and 7)	Junction Improvements west of Wrexham	- Locate any large scale junction improvements within existing developed footprint as far as possible; - Mass planting to junction to replace vegetation removed within the highway help integrate and screen the improved junction from the rural landscape setting, particularly to the south east of junction 4 where there is a Local Landscape Area.
Option 21 (Package 9)	New road connecting A55 and A548	- Sensitive routing and alignment design to avoid removal of Ancient Woodland or direct impacts to Listed Buildings and their setting as these features are irreplaceable; - Carefully considered horizontal and vertical alignment to minimise requirements for large scale highway features and urbanising elements (i.e. grade separated junctions, bridges, large retaining features) within the rural landscape setting; - Proposed woodland planting where required to screen views and to help integrate the road into the rural landscape setting and the setting of Listed Buildings; - Designed to incorporate curved road alignment to reduce effects on views along line of road; - Replacement planting where required to replace loss of hedgerows and or tree groups.
Options 24, 25 26 and 99 (Package 9)	A55/A494 widening and provision of hard shoulders on dual carriageways	- Combination of earth mounding and proposed planting within and adjacent to the road corridor to replace existing vegetation removed to make way for the widening, and to provide enhancement though screening where the widened road would be in close proximity to residential edge of Ewloe, Shotton, Queensferry, Northrop, Northrop Hall.
Option 47 (Packages 5 and 7)	Multimodal hub at Wrexham Station	- Ensure all proposals are designed to conserve the historic setting of Wrexham General Station (Listed Building) and Wat's Dyke through appropriate use of materials and sensitive siting of new infrastructure.
Option 84 (Packages 9 and 5)	Crawler lanes on key trunk roads and single carriageway A-roads	- Combination of earth mounding and proposed planting within and adjacent to the road corridor to replace existing vegetation removed to make way for the widening, and to provide enhancement though screening where the widened road would be in close proximity to residential areas or designated sites e.g. Listed Buildings.

In summary, the landscape/townscape setting of the majority of small scale proposals is not of particular sensitivity to a change of this scale, and as such only a low level of mitigation will be required to successfully integrate the schemes into their setting. Where significant potential effects (moderate or large) have been identified (Options 17, 18, 21, 24, 25, 26, 47 and 84) it is assumed that a greater level of mitigation can be incorporated into the scheme design. It is considered that large scale mass planting of the type required to mitigate the more substantial options would be possible and furthermore, could be successfully accommodated within the landscape due to the scale of the landscape itself.

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9.7 Residual Effects

Proposed mitigation measures outlined above will help to minimise potential significant effects and enhance the existing landscape/townscape character for all route options, in line with strategic policy. Taking potential mitigation measures into account, the significance of the effect on landscape/townscape could be reduced to **Slight Adverse** in the medium to long term, for packages 5 and 7. However, due to the potential scale of the cumulative effect of multiple highway improvements and the potential magnitude of change associated with the new road between the A458 and A55, the residual effect of package 9 could only be reduced to **Moderate Adverse** in the longer term.

Following mitigation, the effects of packages 8, 2, 3 and 4 could be reduced to from Slight adverse to **Neutral** in the short to medium term.

Mitigation would not be required for packages M1 and 6 and residual effects would be **Neutral**.

9.8 Cumulative Impacts

As part of this assessment, the cumulative or combined effect of multiple proposals or 'options' within specific 'packages' has been assessed as part of the study, and implications noted where appropriate. It is not intended that more than one package be taken forward from this study and as such there will be no cumulative effect of multiple 'packages' being implemented.

In addition, due to the scale of the study area it is considered that a detailed assessment of all other potential developments within the area would not be feasible or appropriate as part of an assessment at such a strategic level. Furthermore, it is highly unlikely that the assessment of effects made in this assessment (primarily concerning proposals located within existing transport corridors) would be significantly affected by other potential developments, due in part to the character of the existing landscape/townscape, which in general terms is capable of accommodating large scale change, and large scale landscape mitigation if required.

9.9 Conclusion

The packages proposed relate to one of the three levels of proposal: 1, Managing Demand; 2, Making Best Use; or, 3, Capacity Enhancements.

Package M1, relating to level 1: Managing Demand, will have no direct or physical effect on the character of the landscape/townscape resource or designated features within it and as such, would have no significant effect.

Those packages which relate to level 2: Making Best Use, mainly comprise minor improvements to existing infrastructure or operational enhancements which have little influence on the character of the landscape/townscape. Where options could affect the landscape/townscape resource or designated features, effects are generally deemed to be small scale and/or located in an appropriate context, and as such proposals can be successfully accommodated within the landscape setting with only low levels of mitigation required in most cases. Where more significant effects have been identified due to the cumulative effect of numerous schemes (package 4) more extensive mitigation and considered siting and design could help to reduce impacts over time.

The proposals relating to level 3: Capacity Enhancements, have the greatest potential for adverse effects as they comprise the most significant levels of change to landscape/townscape resource and designated features, particularly in the short to medium term, prior to establishment of planted mitigation. A number of the potential effects identified could be avoided through carefully considered siting and sensitive design in most cases, (e.g. use of appropriate materials and careful siting of new infrastructure for development of the multimodal hub within setting of Wrexham Station) which would reduce the need for additional, potentially substantial mitigation.

Short term effects would be greatest where packages propose new infrastructure/development (e.g. new highways, buildings or installations) or substantial improvements to existing transport corridors (e.g. road widening, large scale junction improvements). Schemes of this type can be highly intrusive, particularly where located in proximity to sensitive

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areas/features, and often require the removal of substantial areas of vegetation, including existing screen/mitigation planting previously planted within road corridors. Mitigation measures could reduce the significance of adverse effects over time which, due to the scale and character of the existing landscape setting, could be successfully accommodated as part of each individual scheme, if landscape issues are considered at an early stage of the design process.

9.10 References

The Welsh Government (June 2008) Welsh Transport Planning and Appraisal Guidance

Design Manual for Road and Bridges (DMRB) (2009) Volume 11 Section 3 Part 5 Landscape Effects (HD45/09) Welsh Government

Guidelines for Landscape and Visual Impact Assessment, 2nd Edition (Spoon 2002) The Landscape Institute and Institute of Environmental Management and Assessment,

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10 Biodiversity

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11 Biodiversity

11.1 Introduction

AECOM was commissioned by Welsh Government and Taith to undertake an initial high level ecological assessment of the nine proposed options for the NEWABTS. The assessment aims to provide an overall ecological assessment of the study area and identify potential ecological constraints, based on the methodology outlined within the WelTAG guidance. This report is based on the findings of a desk study and a high level site survey undertaken where access was permitted.

The overall study area is situated within Flintshire, Wrexham and Cheshire, and extends from Flint, Mold and Deeside Industrial Park in the north, to Wrexham and Wrexham Industrial Estate in the south, and Chester to the East. The scheme focus' on 'Making Best Use' and 'Capacity Enhancements' Packages for 4 main corridors of Strategic Trips, Flint/Mold – Chester (via Deeside/Broughton), Wrexham – Deeside (Via Mold/Buckley), and Chester – Wrexham. There is also an Area Wide package that focuses on "Managing Demand".

The area wide package considers the trunk road network through the area, including the A55/A494 corridor, the A548/A550 corridor, and the A483. Although somewhat focused on the highway corridor, the study area also includes key transport corridors comprising major rail links and strategic footpath/cycle links, as well as a section of the River Dee and estuary.

This section discusses the environmental constraints and potential environmental impacts of the proposed nine transport options on the biodiversity of the area. It presents the potential environmental baseline conditions and the likely assessment of significance for each of the scheme options, suggested mitigation measures and the likely residual impacts.

Unlike other sections within the study, it is difficult to determine significance of impacts following mitigation at this stage, as mitigation required for each designation/habitat/species must be tailored, and at this level it is impossible to identify detailed mitigation for this many options, without detailed design and even confirmed locations. Mitigation design must follow detailed surveys, which are only cost effective to conduct once the packages and options within have been reduced.

The options under consideration are described in detail in Section 1.5 in Section 1:

11.1.1 Objectives

The objectives of the survey were to complete an initial ecological assessment as prescribed under Stage 1 of WelTAG. Broadly the objectives of the biodiversity assessment are as follows:

- Describe sequentially the characteristic biodiversity features;
- Appraise environmental capital – using a set of indicators, this is done by assessing the importance of these characteristic features, why they are important, and their inter-relationships;
- Describe how proposals impact on biodiversity features, including effects on its distinctive quality and substantial local diversity; and
- Produce an overall assessment of the significance of the impact based on a seven-point scale.

11.1.2 Quality Assurance

This project has been undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our accreditation to the international standards BS EN ISO 9001:2000 and 14001:2004 and BS OHSAS 18001:2007. In addition our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors. All AECOM Ecologists are members of (at the appropriate level) the Institute of Ecology and Environmental Management (IEEM) and follow their code of professional conduct when undertaking ecological work.

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11.2 Methodology

11.2.1 Summary

The Stage 1 assessment presented in this Section has been prepared in accordance with Welsh Transport Planning and Appraisal Guidance (WelTAG 2008). It also takes into consideration the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 4 Ecology and Nature Conservation (Welsh Government).

11.2.2 Desk Study

The objectives of the desk study are to review the existing available information to identify the following:

- Internationally, nationally and locally designated sites within the study area; and
- Records of protected species within the study area;

Information relating to protected habitats was collated using the Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk). All internationally and nationally designated sites within the study area were identified.

At present, the study area is too large to purchase protected species records from local records centres. At this stage the cost would be too great and the volume of records too large to review. This would need to be done once the options have been reduced. This also applies to collation of some locally designated sites, such as county wildlife sites, as these can be numerous and would be spread over the whole study area.

Phase 1 Habitat Data was purchased from Cofnod - the Local Records Centre for North Wales, to give an indication of possible habitats present within inaccessible areas, however it does not cover the entire study area, and the age of this data is unknown and it cannot be guaranteed to provide a contemporary assessment of habitat types within the study area.

The National Biodiversity Network (NBN) (www.searchnbn.net) was searched for recent records of notable and protected species in the local area, as this site can be searched by 10 km grid square. The appropriate LBAP were also reviewed to identify any relevant information (for Flintshire, Wrexham and Cheshire).

11.2.3 Site Visits

An Extended Phase 1 Habitat Survey (Institute of Environmental Assessment, 1995) of the study area has not been undertaken at this stage, as the study area is too large, options not fully designed/mapped and appropriate access has not been obtained to walk the entire area.

An initial high level site visit and survey of the study area has been conducted to identify potential constraints where possible. This was conducted by Chris Sutton (IEEM Associate member) and Fran Tarry (IEEM Graduate member) on 4th and 18th November 2010. This involved a site walkover and preliminary assessment of key habitats, land use and ecological features from accessible locations. The main habitats present were noted, and an assessment was undertaken using aerial photographs and a general Phase 1 Habitat Survey undertaken by Countryside Council for Wales (CCW).

Due to access restrictions, the site visit was largely restricted to the main corridor of the scheme, including the A55, A494, A483 and the A548. Secondary, locally used roads were used to access land outside of the main corridor as much as possible.

Despite the described restrictions, the site visit was useful in giving an overview of key ecological features and potential issues associated with the scheme within the study area. During the site visit key habitats, land use and ecological features were noted where possible. Aerial photographs were used to fill in information on broad habitat types, where access was not available. The study area was also broadly assessed for its potential to support protected species. This was in order to identify potential ecological constraints and to guide recommendations for potential further survey requirements for these species.

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11.2.4 Limitations of Desk Study and Walkover Survey

Biological records can be received from a wide variety of sources and may or may not be comprehensive and accurate. At this stage it was not feasible to purchase data from a local records centre due to costs and the scale of records that would have been provided. This would need to be done once the options have been reduced. This also applies to collation of some locally designated sites, such as county wildlife sites, as these can be numerous and would be spread over the whole study area.

The lack of a Phase 1 Habitat Survey is not a limitation at this stage, as it is not yet feasible/cost effective due to the size of the study area, and the high level of option design. A brief site visit in available areas, purchase of existing Phase 1 habitat data (where available), and aerial photographs were used to fill in information on broad habitat types to give indications of habitats/species likely to be present. Overall, there are deemed to be no significant limitations to the desk study and Survey described in this report in fulfilling the objectives of the report until such time that the options can be fully designed.

11.2.5 Ecological Assessment

Habitats and species (i.e. ecological receptors) identified within the study area have been assigned ecological values using the standard scale that classifies ecological receptors within a defined geographic context as recommended by the Institute of Ecological and Environmental Management (IEEM 2006). The following frame of reference has been used:

- International importance
- UK importance
- National importance (England and Wales)
- Regional importance
- County
- District
- Parish
- Site level only (limited to the study area boundary)

11.2.6 Impact Assessment

The impact assessment has been made based on the scheme proposals identified in Section 1.5 and within the constraints placed by lack of detailed ecological surveys. Therefore, the assessment also includes an indication of the confidence level that the change will take place. The following terminology has been used:

- Certain: probability estimated to exceed 95%
- Likely: probability estimated to be 50-95%
- Unlikely: probability estimated to be 5-49%
- Extremely Unlikely: probability estimated to be less than 5%.

The overall significance of the impact has been assessed using the following the WelTAG seven point scale:

Table 6.1: Seven Point Scale for Significance

Scale	Definition
Large Beneficial	Significant beneficial effect
Moderate (Positive) Beneficial	Significant beneficial effect
Slight (Positive) Beneficial	Beneficial effect, but not significant

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No effect or Neutral effect	No effect
Slight Adverse Effect	Adverse effect, but not significant
Moderate Adverse Effect	Significant adverse effect
Large Adverse Effect	Significant adverse effect

An ecologically significant impact is defined as an impact on the integrity of a defined site or ecosystem and/ or the conservation status of habitats or species (IEEM, 2006).

11.3 Policies and their Implications

11.3.1 Legislative Context

There are several different acts of legislation and regulations which refer to the protection of wildlife. These are summarised in Annex 6.1. In particular, the legislation relating to possible protected species on site is outlined. This is a brief summary of the legislation and is not to be regarded as a definitive legal opinion. When dealing with individual cases, the client is advised to consult the full texts of the relevant legislation and obtain further legal advice.

11.3.2 Planning Policy

National Policies and Plans

National policy guidance in Wales on nature conservation is presented in *Technical Advice Note 5 Nature Conservation and Planning 2009* (TAN 5). The purpose of the guidance is to provide:

"…advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. This guidance note should be read in conjunction with Planning Policy Wales (1996).

To ensure that development plans are based on adequate information about geology, landform, habitats and species, nature conservation issues should be included in surveys of local authority areas. Nature conservation policies in development plans should indicate the criteria against which a development will be judged, having regard to the relative significance of international, national and local designations."

Likewise, National planning policy concerning the protection of biodiversity and geological conservation in England is set out in Planning Policy Statement 9 (PPS 9). One of the key objectives of PPS 9 is to ensure that adequate weight is given to biological and geological conservation issues when deciding on future land use and development. In addition, PPS9 stresses that every effort should be made to actively restore and enhance England's biodiversity and geology, by both conserving and improving the quality and extent of natural habitat, geological and geomorphological sites.

People, Places, Futures - The Wales Spatial Plan, Updated 2008

The Wales Spatial Plan (WSP) provides the overarching policy framework for the future spatial development of Wales. The Wales Spatial Plan identifies that the quality of our environment is a fundamental asset for its intrinsic value, and for our economy and quality of life. By safeguarding and enhancing both the natural and built environment we will attract people to and retain them within our communities and preserve the foundations for the future.

The Spatial Plan lists a number of actions that should be taken to promote a healthy and enjoyable environment in which to live and work, those relevant to the Scheme include:

- Providing safe and clean open spaces with more opportunities to enjoy wildlife.
- Managing waste, water and soils more sustainably.
- Protecting and enhancing the biodiversity of the Spatial Plan Area and managing the risks of the disconnection and isolation of habitats arising from changes in land use and climate.

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- Protecting and enhancing the quality of our rivers and bathing waters.
- Carefully managing development pressures to safeguard and enhance the Area's high quality landscape and countryside.
- Addressing river habitats which are important for wildlife and biodiversity.

The Spatial Plan identifies a number of aims for protecting and enhancing the environment, those relevant to the Scheme include:

- Develop a strategy to reduce each Spatial Plan Area's ecological footprint across the range of its activities, and set this out in the Area's delivery framework.
- Promote wildlife and biodiversity for intrinsic reasons and for people's enjoyment by increasing the quantity and quality of nature sites throughout all Spatial Plan Areas and particularly in urban areas.

Local Policies and Plans

Flintshire Unitary Development Plan (UDP)

Flintshire County Council is currently preparing their UDP, which sets out the county's land-use plan between 2000 and 2015. Once adopted, the plan will replace all structure and local plans that cover different regions within the county. The deposit draft plan (September 2003) is available to view online on the Flintshire County Council website (http://www.flintshire.gov.uk).

The overall focus of the UDP is sustainable development, with four key objectives, namely; social progress, protection of the environment, prudent use of natural resources and economic growth.

Environmental policies contained within the UDP promote the conservation and enhancement of biodiversity within Flintshire, to benefit both present and future generations of citizens. In addition to the protection of designated wildlife sites, policies within the plan also support protection of non designated features of ecological importance. Such features include wildlife corridors, trees and hedgerows. Policies within the UDP also reflect those within the Flintshire Biodiversity Action Plan (FBAP). Policies within the UDP are presented in Annex 6.2.

Wrexham UDP

Wrexham County Borough Council adopted its UDP in 2005, which superseded the previous Local Plan and Clwyd Structure Plan. In the future it will move towards a new Local Development Plan system (LDP). The Plan acknowledges that the local environment is one of the County Borough's greatest resources, being an essential consequent in residents' quality of life and in the successful development of local employment initiatives. Accordingly, policies seek to rectify damage done in the past, prevent further deterioration, and conserve and enhance those open space, biodiversity, landscape, and townscape elements which form an important part of the local heritage, its diversity and distinctiveness, and its residents' quality of life. See Annex 6.2 for relevant policies.

The implementation of the UDP will be monitored, including looking at the Environmental Protection/Enhancement Indicators which will take into account any *Biodiversity impact through net gains or losses to sites of nature conservation interest, woodlands, hedgerows and protected species*.

The Wrexham Local Development Plan (The 'LDP') will be a long-term land use and development strategy, focused on achieving sustainable development. It will be guided by the principles set out in the local community strategy Wrexham Refreshed[25]. The Plan will be adopted by the Council and will replace the UDP on a provisional date of September 2012.

Wrexham LANDMAP

Wrexham LANDMAP is part of an all-Wales initiative developed by the CCW and the Welsh Landscape Partnership Group. The study covers aspects of Earth Science, Biodiversity, Visual and Sensory, History & Archaeology and Culture,

[25] Wrexham Refreshed - A Vision for Wrexham County Borough 2004 – 2020. Wrexham County Borough Council.

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and evaluates them. This has allowed recognisable landscape character areas to be identified, and recommendations made to manage and enhance the rich varied landscape heritage in an appropriate way for the future.

Wrexham LANDMAP Supplementary Planning Guidance (SPG), adopted March 2007, provides a consolidated and simplified version of the Wrexham LANDMAP 2004, which it supersedes, in all but the evaluation scores for each aspect and background to the LANDMAP process.

The series of Local Planning Guidance Notes based on Wrexham LANDMAP (adopted November 2004), set out recommendations for each Landscape Character area.

Cheshire Local Plan

The Chester District Local Plan was adopted May 12th 2006. Policies within the plan were initially saved for a period of three years, from the date of adoption. A review has since taken place, following government guidelines and as a result all policies remain saved. Saved policies within the plan will be gradually superseded by the Local Development Framework for Cheshire West and Chester; however, this process may take some time.

Policies within the Local Plan that are concerned with conservation of the local environment are shown in Annex 6.2.

Biodiversity

Biodiversity encompasses the whole variety of life on earth. It includes the whole of the natural world from the commonplace to the critically endangered. However, the world is losing biodiversity at an ever-increasing rate as a result of human activity. In the UK, we have lost over 100 species during the last century. In 1992, the global community responded to biodiversity loss by publishing the Convention on Biological Diversity. This has been supported in the UK by the UK Biodiversity Action Plan (BAP) and subsequently by Local Biodiversity Action Plans (LBAPs), in this case the Wrexham, Flintshire and Cheshire LBAPs.

Although BAPs do not impose any legal responsibility in themselves, protection of biodiversity through legislation has been implemented by section 74(1) of the Countryside & Rights of Way (CRoW) Act, as amended by the Natural Environment and Rural Communities Act (NERC Act) 2006. This legislation places a duty on Ministers and Government Departments “to have regard” to the purpose of conserving biological diversity in accordance with the UN Convention on Biological Diversity 1992. In addition, Section 40 of the NERC Act 2006 extends to all public authorities (i.e. including planning authorities) the existing section 74 duty to “have regard to biodiversity as far as is consistent with the proper exercise of their functions”. Species or habitats of principal importance for the purpose of conserving biodiversity are published on a list which follows the UK BAP species and habitats list.

The UK BAP

The UK BAP, published in 1994, sets out this Country’s response to Article 6 of this Convention. There are currently 1150 Species Action Plans (SAP) and 65 Habitat Action Plans (HAP) that extend across the UK[26]. This follows the UK BAP; Report on the Species and Habitat Review 2007[27]. The production of separate Action Plans for priority species and habitats, setting out clear and measurable targets, was considered to be fundamental to the process.

Local conservation action, engagement in public awareness, education and developing partnerships are stated as being vital actions that form a major part of the work of LBAPs and form an essential complement to the UK action plans. LBAPs are often organised at the county or unitary authority level, although they also exist for national parks and for other administrative areas such as districts.

HAPs provide targeted actions aiming to improve and enhance wildlife and habitats. They are aimed at specific habitats considered to be at risk of damage and/or extinction. SAPs provide targeted actions that aim to improve and enhance wildlife and habitats. They are aimed at species considered to be at risk of decline and/or extinction.

[26] http://www.ukbap.org.uk/NewPriorityList.aspx

[27] UK Biodiversity Action Plan; Report on the Species and Habitat Review. BRIG (ed. Ant Maddock) 2007. http://www.ukbap.org.uk/library/BRIG/SHRW/SpeciesandHabitatReviewReport2007andAnnexes1-3

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Where species or habitats are included in the UK BAP, or are priority habitats in Wales, then this is stated within the section relevant to the species/habitat.

Wrexham, Cheshire and Flintshire LBAPs

Table 6.2 below comprises species listed within the Wrexham Biodiversity Framework as UK 'Priority' species/habitats, found within Wrexham County Borough.

In addition the species/habitats listed in Table 6.2, the Wrexham Biodiversity Framework also identifies a provisional list of species and habitats that are considered to be locally important or endangered. The list is extensive and can be viewed at:

Biodiversity Framework (Includes list of LBAP Species & Habitats).

http://www.wrexham.gov.uk/assets/pdfs/planning/framework_en.PDF

The Cheshire LBAP includes BAPs for 39 priority species and 21 priority habitats, which are considered to be of particular local importance (see Table 6.2)

The Flintshire LBAP includes BAPs for 4 species and 10 habitats that are considered to be of particular local importance (see Table 6.2).

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Table 6.2: Species and Habitats within Wrexham, Cheshire and Flintshire LBAPs

LBAP	Species	Habitats
Wrexham	- Water vole - Brown hare - European otter - Pipistrelle bat - Lesser horseshoe bat - Red squirrel - Skylark - Nightjar - Linnet - Reed bunting - Spotted flycatcher - Tree sparrow - Bullfinch - Black grouse - Song thrush - Grey partridge - GCN - Grey scalloped bar moth - Argent & sable moth - Slender green feather moss - Prickly sedge - Floating water plantain - Lesser silver diving beetle	- Upland oak woodland - Wet woodland - Upland mixed ash woodland - Lowland wood pasture and parkland - Blanket bog - Lowland raised mire - Ancient hedgerows - Cereal field margins - Upland heath - Lowland heath - Calcareous grassland - Lowland meadows - Lowland dry acid grassland - Floodplain grazing marsh - Fens - Purple moor-grass and rush pasture - Ponds (Welsh priority habitat)
The Cheshire Region	- Barn owl - Black necked grebe - Spotted flycatcher - Farmland Birds - GCN - Natterjack Toad - Adder - Slow worm - Atlantic grey seal - Bats - Brown hare - Dormouse - Harvest mouse - Otter - Polecat - Small cetaceans - Water vole - Bees & Wasps - Belted Beauty - Club-Tailed Dragonfly - Depressed River Mussel - Dingy Skipper - Downy Emerald - Lesser Silver Water Beetle - Mud Snail - Ringlet - Sandhill Rustic	- Ancient Hedgerows - Ancient Semi-Natural Broadleaved Woodland - Cereal Field Margins - Coastal & Floodplain Grazing Marsh - Coastal Sand Dune - Coastal Saltmarsh - Dry Stone Walls - Fens - Gardens & Allotments - Heathland - Lime Beds - Lowland Raised Bog - Lowland Wood, Parks & Pastures - Meres - Mudflats - Ponds - Reedbeds - Roadside Verges - Traditional Orchards - Unimproved Grassland - Waxcap Grassland

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	- Small Pearl-bordered Fritillary - Spotted Yellow/Black Leaf Beetle - Variable Damselfly - White Clawed Crayfish - White Letter Hairstreak - Black Poplar - Bluebell - Isle of Man Cabbage - Ivy-leaved Water-crowfoot - Mackay's Horsetail - River Water-crowfoot - Rock Sea-lavender	
Flintshire	- Barn owl - Native Black Poplar - Reptiles - Lesser Horseshoe Bat	Local Habitats - Boundary and linear features - Churchyards and cemeteries - Gardens and allotments - School grounds Priority Habitats - Lowland calcareous grassland - Lowland dry acid grassland - Lowland heathland - Upland calcareous grassland - Upland heathland - Upland oakwood

Red/Amber Lists

The Royal Society for the Protection of Birds (RSPB) Red List and Amber List Birds of Conservation Concern 2002-2007 – This list is compiled by leading government and non- government conservation organisations, following an assessment of the population status of 247 bird species regularly found in the UK. It places birds into one of three lists:

- Red List species are bird species that are globally threatened according to the International Union for the Conservation of Nature (IUCN) criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery.
- Amber List species are bird species with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.
- Green List species are those that fulfil none of the criteria. (RSPB Birds of Conservation Concern 2002-2007).

Although these lists offer no legal protection, they aim to guide conservation action for individual species.

11.4 Baseline

11.4.1 Study Area

Designated Sites

Six internationally and eleven nationally designated sites have been identified within the study area boundary. Details of these protected sites are given below.

International/European

Dee Estuary/Aber Afon Dyfrdwy SAC, Special Protection Area (SPA), Ramsar Site and Site of Special Scientific Interest (SSSI)

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This site comprises of sandflats and mudflats that are not covered by seawater at low tide and Atlantic Salt Meadows. These habitats support internationally important numbers of wintering and passage waterfowl populations.

River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC

This site is designated for watercourses of plain montain levels, Atlantic salmon (*Salmo salar*) and Floating water-plantain (*Luronium natans*).

Deeside and Buckley Newt Sites SAC

The site supports one of the largest populations of great crested newt (GCN) in Great Britain. The waterbodies within the site have been formed by the extraction of clay, sand and coal during the industrial revolution and some more recent creations for nature conservation. The sites are located either side of the A55 /A494 road junction on the coastal slopes that overlook the Dee Estuary.

Midland Meres and Mosses Phase 2 Ramsar

The Midland Meres and Mosses form a geologically discrete sites of lowland open water and peatland sites in the north-west Midlands of England. These sites have developed in Natural depressions in the glacial drift by receding ice sheets which formerly covered the Cheshire/Shropshire Plain.

There are 18 sites within the Shropshire / Cheshire Plain which include open water bodies (meres), and nutrient poor peat bogs (mosses) forming in some sites in the fringes of meres or completely infilling basins. Ina few cases the result is a floating quaking bog or schwingmoor.

National

Dee Estuary/Aber Afon Dyfrdwy Site of Special Scientific Interest (SSSI)

As above

Shotton Lagoons and Reedbeds SSSI

This site has been designated for its breeding population of common tern (*Sterna hirundo)* and the reedswamp which is characterised by *Phragmites australis.* The site contains the largest common tern colony in Wales.

Inner Marsh Farm and Dee Estuary SSSI

This site is notified for the ornithological interest as it supports, particularly its wintering bird populations. The site is located on the former estuarine flats which are reclaimed from the Dee Estuary in the late 19th century due to the construction of the Bidston to Wrexham railway.

The site consists of a complex of open water bodies which were excavated in the late 1980s and wetland habitat.

Connah's Quay Ponds and Woodland SSSI

This site is designated for its population of great crested newt (*Triturus cristatus*), its assemblage of widespread amphibian species and for its semi-natural broadleaved woodland. The water bodies within the site in total support one of the largest known breeding populations of the GCN in Britain.

Maes y Grug SSSI

This site is of special interest for its large population of the GCN *Triturus cristatus*. The water bodies within the site support one of the largest known populations in north east Wales. The mosaic of grasslands and shrubs that surround the water bodies form important foraging and over wintering areas of adult and juvenile amphibians.

Llay Bog SSSI

This site is a small peat bog in an ice hollow in the glacial drift deposits. The fringes contain species such as Marsh Cinquefoil (*Potentilla palustris)*, Marsh pennywort (*Hydrocotyle vulgaris)*, Marsh Violet (*Viola palustris)* and Soft Rush (*Juncus effuses)*. The central part of the site contain a lawn of Bog Moss (*Sphagnum spp*.) with (*Eriophorum*

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angustifolium) and Cotton Grasses (*E. Vaginatum)*, Cranberry (*Vaccinium oxycocus)*, Bottle Sedge (*Carex rostrata)*, Sundew (*Drosera rotundifolia)* and (*Calluna vulgaris)* and heaths (*Erica tetralix)*.

Gatewen Marsh SSSI

This site is one of only three examples in the former county of Clwyd of the "southern mesotrophic mires" wetland type. This type is more characteristic of the south-west Wales and, in North Wales, is largely restricted to Ynya Mon and Dwyfor. The closure of the former colliery that once occupied this site has been a major factor in creating suitable conditions for the development of wetland vegetation.

Marford Quarry SSSI

This site is a disused sand and gravel workings. A large diversity of lepidopteran species have been recorded including many notable species. The butterfly list is particularly diverse with around thirty individual species being recoded and is significant in a county context.

Vicarage Moss SSSI

This site is one of the best-developed examples of kettle hole complex in Wales comprising one very large and several smaller subsidiary kettle holes.

The kettle holes are representative of many developed through the Wrexham area in the sands and gravels of the famous 'Wrexham Delta Terrace' and this site is site of outstanding interest to the Quaternary geomorphologist and is the largest example of a basin mire in Clwyd.

River Dee SSSI

The River Dee is notified for its nationally important transition through a range of river types from the mesotrophic to eutrophic. It is also an important habitat for Atlantic salmon, club-tailed dragonfly (*Gomphus vulgatissimus*) and it is also a fluvial geomorphology site.

Buckley Claypits and Commons SSSI

This site is located near Mold in north-east Wales and has numerous ponds created by past mineral extraction and for watering stock, make ideal breeding habitat for amphibians. The surrounding mosaic of grassland, heath, and scrub is ideal for adults and juveniles to forage, shelter and hibernate.

Regional/Local

Two Local Nature Reserves, namely; 'Gathering Grands Woods' and Alyn Waters have been identified within the study area.

Habitats

Phase 1 Habitat data received from Cofnod identified a wide range of habitats within the study area, including some which were not identified during the initial restricted site visit. Such habitats included; semi-improved neutral grassland, swamp, dense continuous saltmarsh, intertidal shingle/cobbles and shingle above high tide mark.

Species

The desk study identified a range of protected species records within the overall study area. Records were obtained from the National Biodiversity Network website, as mentioned in section 6.2. Protected sites within the study area are also known to support protected species, such as GCN (*Triturus cristatus*), important bird species and otter (*Lutra lutra*). Details of protected species records identified during the desk study are discussed further in section 6.4.2.

11.4.2 Existing Conditions

Habitats

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General Study Area Description

The study area covers a large area of land in north eastern Flintshire and Wrexham in north Wales, and west Cheshire in England. There is a varied landscape character within the study area ranging from undulating hills and agricultural land in the west and south, coastal and heavily industrialised areas in the north and east that have built up along the banks of the River Dee and its estuary, and plains, both urban and rural in Cheshire. The study area comprises a range of different habitats, some of which are of both national and international importance. Habitats identified during the desk study and initial visit include improved grassland, scrub, arable, standing water, running water, ancient woodland, scattered trees, hedgerows, sand and mudflats.

With the exception of the urban and industrial areas, the main areas of study are dominated by improved pasture fields separated by species poor hedgerows. Scattered trees line some of the hedgerows, and lengths of semi-natural (sometimes ancient) woodland follow watercourses through the study area. The coastal strip includes saltmarsh and other estuarine habitats. There are important wildlife corridors in the study area, including the River Dee among other watercourses, several strips of woodland including Leadbrook Wood and Wepre Wood, and both used and disused railway lines. Habitats present include, neutral semi-improved grassland, marshy grassland, improved grassland, amenity grassland, arable, swamp, scrub, hedgerows, running water, standing water, semi natural broadleaved woodland, and scattered trees.

Watercourses

There are numerous rivers, streams and brooks within the study area, including, but not in entirety, the River Dee, River Alyn, River Cegidog, River Clywedog, River Terrig, Lead Brook, Wepre Brook, Northrop Brook, Kelsterston Brook, Pulford Brook, and Black Brook. There are also a number of smaller unnamed watercourses within the study area. These watercourses are likely to provide important wildlife habitats and corridors.

Scrub

There are areas of scrub scattered throughout the study area. Areas of scrub have the potential to support breeding birds, and substantial dense stands of scrub may also provide suitable habitat for badgers. Areas of scrub will frequent embankments of railway lines, edges of the woodland blocks and the coastal paths. Species are likely to include bramble (*Rubus fruticosus agg*), gorse (*Ulex spp*), buddleia (*Buddleja davidii.),* birch (*Betula spp*.), dogwood (*Thelycrania sanguine*), dog rose (*Rosa canina*) and hawthorn (*Crataegus monogyna*).

Woodland and Mature Trees

There are tracts of Ancient woodland throughout the study area including Leadbrook Wood, Oakenholt Wood, Broadoak and Wepre Wood and Top Y Fron Dingle. These woodlands have been designated SSSI's. Ewloe wood is also within the study area and is a designated SSSI. Further woods include Bretton Wood, Black Wood, Marford Wood and Hall Wood. All areas of woodland have high potential to support badger, breeding birds, roosting bats and dormice. Footpaths that run both through and along the woodland edges are likely to be used as commuting routes by bats and badgers. Woodland edges also provide suitable basking sites for reptiles. Large numbers of mature and semi-mature scattered trees were present throughout the study area. These trees have high potential to support breeding birds and roosting bats. It is unknown if any of the trees likely to be affected by the works are protected under Tree Protection Orders (TPOs).

Upland oak woodland , wet woodland and upland mixed ash woodland are Wrexham BAP habitats. Ancient Semi-Natural Broadleaved Woodland is identified as a Cheshire BAP habitat.

Hedgerows

There are numerous hedgerows throughout the study area often forming traditional field boundaries. Although no species rich hedgerows were noted within the study area, it is considered likely that they are present within the study area. Hedgerows are important landscape features and are important for a large number of species, some of which are protected. Other types of traditional field boundaries likely to be present within the study area include drystone walls and earth banks or cloddiau as they are known in Wales.

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Ancient hedgerows are identified as a Wrexham BAP habitat.

Grassland

The majority of grassland areas within the survey area are likely to consist of either improved agricultural pasture or amenity grassland, both of which have limited diversity in either structure or species. These open heavily grazed/used fields are of limited ecological value. However, they may be used protected species such as badgers or bats.

There are also likely to be patches of semi-improved grassland, unimproved grassland, and marshy grassland, all of which will have a higher diversity of species present.

Structures

There are both commercial and residential properties present throughout the study area. Whilst the majority of buildings are likely to be of negligible ecological value, it is considered highly likely that some of the buildings will provide suitable habitat for breeding birds and roosting/hibernating bats. In particular the scattered farm buildings with out-buildings. In addition, there are numerous bridges and tunnels that may also provide suitable habitat for some species.

Standing Water

There are numerous potential ponds within the study area. Ponds have the potential to support and provide important habitat for a number of protected species such as great crested newts and lesser silver water beetle. Some clusters of ponds within the study area have been designated for their large populations of GCN.

Ponds are identified as a Welsh priority habitat.

Swamp

Phase 1 data received from Cofnod shows areas of swamp located north of the River Dee. Such habitat may support protected species such as birds, invertebrates and reptiles.

Arable

Arable land is scattered throughout the study area. Whilst insensitively farmed arable land may be of limited ecological value, arable land where practices such as conservation headlands, beetlelbanks and traditional cropping rotations have been adopted can offer valuable habitat for birds, insects and small mammals. Winter stubble also provides seed food for birds in the form of spilt grain and seeds of weeds that germinated with the preceding crop.

Amenity

Amenity grassland was identified throughout the study area. This habitat is usually of limited ecological value.

Mud and sand flats and saltmarsh

These habitats are present on the Dee Estuary. Mud and sand flats support wintering and passage of internationally important waterfowl populations.

Intertidal shingle/cobbles and shingle above high tide mark

Phase 1 Habitat data received from Cofnod identify theses habitats adjacent to the River Dee, forming part of the Dee Estuary. Such habitats may support breeding birds and invertebrates.

Protected or Notable Species

Plant Species

Plant species could not be recorded during the initial restricted site survey. However, NBN has records for a number of welsh plant species of principal importance within the study area. Species include; Fragrant Orchid (*Gymnadenia conopsea*), Frog Orchid (*Coeloglossum viride*), Large-flowered Hemp-nettle (*Galeopsis speciosa*), Purple Ramping-fumitory (*Fumaria purpurea*), Yellow Bird's-nest (*Monotropa hypopitys*), Slender Hare's-ear (*Bupleurum tenuissimum*) and Deptford Pink (*Dianthus armeria*) (also a Schedule 8 plant species).

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Controlled Species

It is possible that there are controlled plant species present within the study area, including; Japanese knotweed (*Fallopia japonica*) Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*). Japanese knotweed is typically found on brownfield land and along watercourses, railways and highways. Giant hogweed can be found on brownfield land and adjacent to watercourses, whilst Himalayan balsam rapidly colonises river banks and areas of damp ground.

Invertebrates

NBN provides a number of records for Welsh invertebrate species of principal importance, within the 10 km OS grid squares SJ27, SJ26, SJ36, SJ37, SJ46 and SJ35. Species include; High Brown Fritillary (*Argynnis adippe*) Small Blue (*Cupido minimus*) Wall (*Lasiommata megera*) White-letter Hairstreak (*Satyrium w-album*) Blood-vein (*Timandra comae*) Broom Moth (*Melanchra pisi*) and Brown-spot Pinion (*Agrochola litura*). Habitats noted within the study area which may provide suitable habitat for invertebrates include; woodland edges, open water, wetland areas, watercourses, hedgerow and scrub.

Fish

NBN did not return any records for protected fish species within the study area. Protected species which have been recorded within the River Dee and Bala Lake SAC, (a site which partially falls within the study area), include; Atlantic salmon (*Salmo salar*), sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*) and bullhead (*Cottus gobio*).

The Dee Estuary and Swinchiard Brook are designated under the Shellfish Water Directive.

River Dee, River Alyn, River Clywedog and Cegidog River are designated Salmonid rivers under the Freshwater Fish Directive (FFD) (DEFRA website, 2010).

Amphibians

Ordnance Survey maps show that there are numerous ponds, streams and ditches scattered throughout the study area, particularly across the agricultural land, south and west of Shotton town, around Wrexham industrial estate, and Buckley. Larger waterbodies are also present north of the River Dee, south of the A548. Deeside and Buckley Newt Sites SAC lies within the study area, just south and west of Shotton town. This site supports one of the largest populations of GCN in Great Britain. In addition, NBN identified records (within the last ten years) for GCN (*Triturus cristatus*) across the study area, within the 10 km OS grid squares SJ27, SJ26, SJ36, SJ36, SJ37 and SJ46. It is therefore highly likely that great crested newts inhabit suitable ponds and terrestrial habitat across the study area. Suitable terrestrial refuge habitat noted during the site visit included; scrub, hedgerows and woodland. The A458, A494 and railway lines are likely to act as major barriers to amphibian dispersal.

GCN is included within the Cheshire and Wrexham BAPs.

Natterjack toads are known to be present within the wider area of the study site, although no records are known of within the study area. This species is included as a Cheshire BAP species.

Reptiles

NBN has records of adder (*Vipera berus*) common lizard (*Lacerta vivipara*), grass snake (*Natrix natrix*) and slow worm (*Anguis fragilis*) within the study area, with records for grass snake and common lizard dated within the last ten years. Reptiles prefer a mosaic of habitats, including sheltered areas for refuge and hibernation, adjacent to open areas for basking. Habitat features suitable for supporting reptile species which were noted during the initial site visit included; long grass, tussocky grass, scrub, woodland edges, railway embankments, track and path edges, hedgerows, bare ground patches, open water and dry stone walls. Other suitable features that may be present within the study area, which were not noted during the initial restricted site visit, may include; bog, sunny banks/slopes, brash piles, manure/compost heaps, rubble/rubbish and rock/scree.

Retiles species are included within the Flintshire BAP. Slow worm and adder feature within the Cheshire BAP.

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Breeding Birds

No species of conservation concern were noted during the initial site visit; however, it is likely that vegetation within the study area is used by breeding birds, including areas of scrub, woodland, hedgerow and scattered trees. Structures, such as buildings and road/rail bridges are also likely to be used by breeding birds. Numerous notable bird species have been recorded within the 10 km OS grid squares SJ62, SJ27, SJ36 and SJ37, including; barn owl (*Tyto alba*), common kingfisher (*Alcedo atthis*) and common quail (*Coturnix coturnix*) (NBN, 2010). A proportion of the Dee Estuary SPA falls within the study area. This site is known to support wintering and passage of internationally important waterfowl populations. Shotton Lagoons and Reedbeds SSSI also falls within the study area, adjacent to the A548, and supports the largest common tern (*Sterna hirundo*) colony in Wales.

Badger

NBN identified records for badger (*Meles meles)* with the study area. In addition, the Wepre Park website states that badger are present in and around Wepre, an area of ancient woodland north of the A55 and A494. A badger survey was not undertaken during the initial site visit, however, a dead badger was observed at the side of the A55. A number of habitat features suitable for supporting badger were noted across the study area, including; improved grassland and arable fields (suitable for foraging), woodland, scrub, hedgerows and railway embankments.

Bats

The NBN website identified a number of bat records across the study area. Species recorded within the 10 km OS Grid Squares SJ27, SJ26, SJ35, SJ36, SJ37 and SJ46 include; common pipistrelle, (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), lesser horseshoe (*Rhinolophus hipposideros*), brown long eared (*Plecotus auritus*), Daubentons (*Myotis daubentonii*), Natterer's (*Myotis nattereri*), noctule (*Nyctalus noctula*) and Whiskered/Brandt's Bat (*Myotis mystacinus/brandtii*).

A number of the commercial and residential properties within the study area have the potential to be used by roosting bats. Features include gaps between the wall and soffit and facia boards, gaps in brick work, pitched roofs and hanging tiles. These features are suitable for a number of bat species. There are numerous mature trees within the study area which have features which may suitable to support roosting bats. These features include broken limbs, peeling bark and dense ivy covered trucks and branches. Other features, such as quarries, and rail and road bridges/tunnels may also provide habitat for roosting bats.

Linear features within the study area, such as the railway line and hedgerows connecting wooded areas, may act as valuable bat commuter habitat, particularly areas which are unlit. It must be noted that although bats do tend to commute along linear features, they can also cover open ground. There are numerous suitable bat foraging habitats throughout the study area, including the water features, woodland edges, hedgerows and agricultural land.

Bat species are included within the Cheshire, Flintshire and Wrexham BAPs.

Dormice

NBN did not provide any records for dormice (*Muscardinus avellanarius*) within the study area. However, Flintshire county council have identified a number of known dormouse sites within the county and dormouse is identified as a Flintshire BAP species. It is possible that areas of woodland and well established hedgerows within the study area provide suitable habitat for dormice. In addition, mature trees with suitable hollow branches can provide suitable nesting sites, as well as abandoned bird nests/nest boxes (the Mammal Society, 2010).There are also known release sites in the wider area, including near Malpas, Cheshire.

Polecat

NBN provided records for polecat (*Mustela putorius*) within the study area, within the 10 km OS grid squares SJ27, SJ26, SJ35, SJ36 and SJ46. It must be noted, however, that none of the records were dated within the last ten years. Habitat features noted within the study area which may be suited to polecats include; woodland, coastal, agricultural land and riverbanks.

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Water vole

NBN provided water vole (*Arvicola amphibius*) records within the 10 km OS grid squares SJ26, SJ27, SJ36, SJ37 and SJ46. However, none of these records were dated within the last ten years. There are several watercourses within the study area, which could not be assessed during the initial site visit. Habitat features suitable for supporting water vole, which may be present within the study area, include; slow flowing, relatively deep watercourses, dense bank-side vegetation and easily penetrable earth or silt shored banks (Strachan & Moorhouse, 2006). Water voles are known to be present in Queensferry drain.

Water vole is identified Cheshire and Wrexham BAP species.

Otter

NBN provided otter (*Lutra lutra*) records which fall within the study area. In addition, otter have been recorded within the River Dee and Bala Lake SAC, which falls within the study area. There are a number of watercourses located within the study area, which may provide suitable habitat for otter. However, these could not be surveyed during the initial site visit. Otter are known to inhabit a range of waterbodies, including; ditches, streams, lakes and rivers and suitable habitat features include; dense bank-side vegetation, an abundance of fish, river debris and exposed tree roots.

Otter is identified as a Wrexham and Cheshire BAP species.

White Clawed Crayfish

NBN did not identify any records for white clawed crayfish (*Austropotamobius pallipes*) within the study area. However, it is possible that that watercourses within the study area offer habitat opportunities for this species. Suitable habitat features can include; Rocky bottoms, submerged logs, overhanging banks and tree roots.

White clawed crayfish is identified as a Cheshire BAP species.

11.4.3 Ecological Assessment Summary

The study area cannot current be fully assessed for its value for many of the notable species such as bats or otter as this will require additional specific survey work. However, a provisional assessment of value is provided.

Table 6.3: Ecological Assessment Summary

Habitat / Species	Ecological Valuation (IEEM, 2006)
Watercourses	International
Railway line supporting vegetated embankments	Local
Woodland	National
Scrub	Parish
Amenity grassland	Parish
Improved grassland	Parish
Buildings	Local
Hedgerow	Local
Standing open water	County
Arable	Local
Mud and sandflats	International
Saltmarsh	County
Fish	County
Invertebrates	Local
Amphibians	International
Birds	International
Otter	County
Water vole	County
White clawed crayfish	County
Bats	County
Dormouse	County
Badger	County
Reptiles	County

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11.5 Potential Effects

The potential impacts are assessed under the proposed nine packages of options outlined in section 1 and within the constraints placed by lack of detailed ecological survey at this stage, and a lack of details relating to the implementation of the options. Therefore, the assessment also includes an indication of the confidence level that the change will take place.

The impacts of Packages 8, 2, 4 and 6 on biodiversity are considered to be very similar, as are those for Packages 9, 3, 5 and 7. However the impacts from any Package 3 will be more severe than those for any Package 2.

11.5.1 Construction

Any of the proposed transport options which involve any construction activity (i.e. all options except Package 1), including installation of new signs such as VMS, may lead to impacts on the biodiversity of the study area. The more intrusive options such as creation of new roads, new bridges and widening of road and rail routes are likely to have the largest impacts on biodiversity. The majority of the measures to promote walking and cycling, bus, rail and freight transport and to manage car travel demand will not include any construction phase, and therefore no adverse impact on the biodiversity of the study area will occur for these options.

It is not possible to accurately assess all of the potential construction impacts of each package/option as they are not fully designed yet, and potential working methods are not known. However it is considered that the options could include construction impacts relating to habitat loss, displacement of species, a reduction in connectivity causing fragmentation of habitats, air pollution, noise pollution, light pollution, disturbance to species and potential construction run-off that impacts local water quality and associated species. During construction, more severe impacts could occur if appropriate good practice construction techniques and mitigation are not implemented.

The provision of a Dee Coastal Footpath, a new road bridge and modifications to the A494 over the Dee estuary, depending on their proximity to the Dee Estuary / Aber Dyfdwy has the potential to cause disturbance to over-wintering, passage and breeding birds all of which are qualifying features of the SPA designation. Construction works will also need to be timed appropriately so as to avoid significant effects on the qualifying features of the designated sites and protected species

11.5.2 Operation

It is predicted that the majority of measures to promote walking and cycling, bus, rail and freight transport and to manage car travel demand will not have any adverse impact on the biodiversity of the study area during the operation phase. The provision of a Dee Coastal Footpath, depending on its proximity to the Dee Estuary / Aber Dyfdwy has the potential to cause disturbance to over-wintering, passage and breeding birds all of which are qualifying features of the SPA designation. Any potential effects on the integrity or conservation value of the SPA would be subject to more detailed assessment as part of the Appropriate Assessment process. It is likely that detailed mitigation would have to be developed to ensure that there are no adverse effects on the SPA during operation.

The proposed transport options which include road interventions are the most likely options that could lead to the operation impacts. However, it is not possible to accurately assess all of the potential operation impacts of each option as they are not fully designed yet, it is considered that the provision of a new road bridge over the Dee estuary, depending on its proximity to the Dee Estuary / Aber Dyfdwy has the potential to cause disturbance to over-wintering, passage and breeding birds all of which are qualifying features of the SPA designation. Any potential effects on the integrity or conservation value of the SPA would be subject to more detailed assessment as part of the Appropriate Assessment process. It is likely that detailed mitigation would have to be developed to ensure that there are no adverse effects on the SPA during operation It is also considered that the options could include operation impacts relating to a reduction in connectivity causing fragmentation of habitats, a permanent barrier that animals may be killed trying to cross, air pollution, noise pollution, physical disturbance and light pollution causing disturbance and barriers to species, and potential run off from a road that impacts local water quality and associated species.

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11.5.3 Description of Options

NB – The confidence level applies to the options within the package where locations are known and can therefore be assessed, where options are not mapped and include some construction elements, the impacts are indeterminable as the works could for example be located within designated sites or just areas of hard standing. More accurate confidence levels can only be applied at a later stage when packages have been narrowed down and more details of options have been given.

Package 1 (Managing Demand) – Area Wide Package – Applies to all corridors			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites, Habitats, Species			
Designated Sites, Habitats, Species	This package gives a range of options to encourage the use of rail, car sharing, walking and cycling routes, and also to ensure that future developments mitigate impacts on the transport network. All of these will help to reduce traffic within the study area, thereby potentially having positive effects on the Designated Sites, Habitats, and Species in the study area through reduction in emissions, cleaner surface water runoff from the roads and reduction in potential wildlife/vehicle collisions, although these are not considered to be significant. Although work to create/improve walking and cycling facilities could potential have impacts, depending upon the extent and location of the route.	Likely	Neutral

Package 2 (Making Best Use) – Flint/Mold - Chester			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites: - River Dee and Bala Lake/Afon SAC - Dee Estuary SPA, SAC, Ramsar and SSSI - Inner Marsh Farm and Dee Estuary SSSI - Buckley Claypits and Commons SSSI - Deeside and Buckley Newt Sites SAC - Connah's Quay Ponds and Woodland SSSI - River Dee SSSI - Shotton Lagoons and Reedbeds SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Further sites are likely to be within 2 km of works, where options 35, 36, 42, and 45 have unknown locations of work.	Likely	Moderate Adverse
Habitats			
Watercourses/water features	- Options proposed within this package may involve minor construction adjacent to a number of watercourses, including the River Dee, Lead Brook and Wepre Brook. - The River Dee and Dee Estuary is afforded protection as a SAC, SPA, Ramsar and SSSI - Disturbance to watercourses/water features could affect	Unlikely	Slight Adverse

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Package 2 (Making Best Use) – Flint/Mold - Chester			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	protected species such as; water vole, otter, GCN and crayfish. - Construction run off has the potential to contaminate nearby watercourses/water features.		
Woodland and trees	- Should options within this package involve creation of new signage along cycleways, lighting of cycle parking etc, this could impact on edges of wooded area, and individual trees. - It is possible that the scheme will require the removal of some mature trees. - Woodland areas and trees have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.	Unlikely	Slight Adverse
Scrub	- Options within this package could require small areas of scrub removal, particularly adjacent to the highway corridor where improvements are made, or signage along cycleways. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Unlikely	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of small areas of hedgerow, particularly adjacent to the highway corridor of the B5129 (Option 103). - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN , reptiles, dormouse and breeding birds.	Unlikely	Slight Adverse
Grassland	- Options within this package could require the removal of some areas of amenity and improved grassland. - Amenity and improved grassland considered to be of low ecological value. However, can provide foraging habitat for protected species such as bats, badger and reptiles.	Unlikely	Neutral
Buildings	- Options within this package are unlikely to require the demolition of buildings. - Some building types may have the potential to support protected species; such as bats and breeding birds.	Unlikely	Neutral
Mud and sandflats	- Construction adjacent to the River Dee could potentially affect mud and sandflats which are present on the Dee Estuary. - .These habitats support breeding, wintering and passage birds of international importance	Unlikely	Slight Adverse
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Unlikely	Neutral
Fish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore fish species are unlikely to be adversely affected.	Unlikely	Slight Adverse

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Package 2 (Making Best Use) – Flint/Mold - Chester			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Amphibians	Any works within 500 m of a pond/ditch which supports GCN could impact on this species without mitigation. The study area is known for populations of GCN, including an SAC designated to protect them, and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence. There will be limited areas of suitable habitat disturbed within potential working areas as the majority will be small areas adjacent to/within barriers to GCN dispersal. This is most likely to occur in Option 103 where minor improvement to the B5104 may occur. GCN records are adjacent to this road.	Unlikely	Moderate Adverse
Reptiles	Soil disturbance and/or the removal of suitable vegetation such as dense scrub and sections of hedgerow could impact on reptiles if present. This may occur when installing signs along cycle routes.	Unlikely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures Any work within or adjacent to the River Dee Estuary could impact on internationally important waterfowl populations during breeding season, migration and wintering.	Unlikely	Slight Adverse
Bats	The following actions could impact on bats: - Removal/pruning of mature trees with roosting opportunities. - Renovation/demolition of buildings/structures with roosting opportunities. - Increased artificial lighting during construction and operation. - Removal of hedgerow- used for commuting and foraging. - Disturbance of suitable foraging areas, such as woodland and grassland areas. - Fragmentation of woodland and disused railways.	Unlikely	Moderate Adverse
Badgers	Works within 30 m of an active badger sett could impact on this species. Removal of suitable sheltered habitat, such as scrub, hedgerow and woodland could disturb this species.	Unlikely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/crayfish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore otters or water voles should not be disturbed.	Unlikely	Neutral

Package 3 (Capacity Enhancements) – Flint/Mold - Chester

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Criteria	Assessment	Confidence Level NB	Significance of Impact of most Severe Option (without mitigation)
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites, although not all would be affected by the works: - River Dee and Bala Lake/Afon SAC - Dee Estuary SPA, SAC, Ramsar and SSSI - Inner Marsh Farm and Dee Estuary SSSI - Deeside and Buckley Newt Sites SAC - Buckley Claypits and Commons SSSI - Connah's Quay Ponds and Woodland SSSI - River Dee SSSI - Shotton Lagoons and Reedbeds SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Option reference 41, 69 and 70 could potentially involve construction close to the River Dee and Bala Lake/Afon SAC and Deeside Estuary Ramsar, SAC and SPA. Further sites are likely to be within 2 km of works, where options 37, 39, 100, and 95 have unknown locations of work.	Likely	Large Adverse
Habitats			
Watercourses/water features	- Options proposed within this package may involve construction within and adjacent to a number of watercourses, including the River Dee, River Alyn, Black Brook, Warren Dingle, and Wepre Brook. - The River Dee and Dee Estuary is afforded protection as a SAC, SPA, Ramsar and SSSI - Disturbance to watercourses/water features could affect protected species such as; birds, water vole, otter, fish, GCN and crayfish where present. - Construction run off has the potential to contaminate nearby watercourses/water features.	Unlikely	Slight Adverse
Woodland and trees	- It is likely that the scheme will require the removal of a number of mature trees, in particular along the disused railway for option 40. Other none mapped options may also impact on trees and wooded areas depending on the chosen locations/routes. - Woodland areas have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.	Likely	Moderate Adverse
Scrub	- Options within this package could require areas of scrub removal, particularly for creation of walking/cycling routes, and park and ride/car share facilities. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Likely	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of small areas of hedgerow. - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN, reptiles, and breeding birds.	Likely	Slight Adverse

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Package 3 (Capacity Enhancements) – Flint/Mold - Chester			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Grassland	- Options within this package could require the removal of some areas of amenity, and improved. - Amenity and improved grassland is considered to be of low ecological value. Grasslands can provide foraging habitat for protected species such as bats, badger, GCN and reptiles.	Unlikely	Slight Adverse
Built Structures – including bridges, tunnels and buildings.	- Options within this package may require the demolition or maintenance of buildings or bridges. - Some building types have the potential to support protected species; such as bats and breeding birds.	Unlikely	Slight Adverse
Mud and sandflats	- Construction within or adjacent to the River Dee could potentially affect mud and sandflats which are present on the Dee Estuary. - These habitats support breeding, wintering and passage birds of international importance	Unlikely	Moderate Adverse
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows, in particular for option 40. Loss of these areas of habitat may impact on those species present.	Likely	Slight Adverse
Fish	Any work within or immediately adjacent to watercourses, such as the River Dee and smaller streams could impact on fish species present.	Unlikely	Slight Adverse
Amphibians	Any works within 500 m of a pond/ditch which supports GCN could impact on this species without mitigation, in particular for option 40. The study area is known for populations of GCN, including an SAC designated to protect them, and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence.	Likely	Large Adverse
Reptiles	Soil disturbance and/or the removal of suitable vegetation such as dense scrub and sections of hedgerow could impact on reptiles if present, in particular for Option 40.	Likely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures Any work adjacent to the River Dee Estuary could impact on internationally important waterfowl populations during breeding season, migration and wintering. This includes Option 41.	Likely	Moderate Adverse
Bats	The following actions could impact on bats: - Removal/pruning of mature trees with roosting opportunities. - Renovation/demolition of buildings/structures with roosting opportunities. - Increased artificial lighting during construction and operation. - Removal of hedgerow- used for commuting and foraging. - Disturbance of suitable foraging areas, such as woodland	Likely	Moderate Adverse

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Package 3 (Capacity Enhancements) – Flint/Mold - Chester			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	and grassland areas. - Fragmentation of woodland and disused railways.		
Badgers	Works within 30 m of an active badger sett could impact on this species. Removal of suitable sheltered habitat, such as scrub, hedgerow and woodland could disturb this species, in particular Options 40 and 41.	Unlikely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/crayfish	- Any work within or close to watercourses which support water voles/otter/crayfish could have a negative impact on these species. Option reference 41 in particular could involve construction within the River Dee and Bala Lake/Afon SAC, which is known to support otter. Also, options 24, 21, 18 and 17 may involve works within/adjacent to watercourses.	Unlikely	Slight Adverse

Package 4 (Making Best Use) – Wrexham-Deeside (via Mold/Buckley)			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites: - River Dee and Bala Lake/Afon SAC - Dee Estuary SPA, SAC, Ramsar and SSSI - Midland Meres and Mosses Phase 2 Ramsar - Inner Marsh Farm and Dee Estuary SSSI - Buckley Claypits and Commons SSSI - Deeside and Buckley Newt Sites SAC - Connah's Quay Ponds and Woodland SSSI - Llay Bog SSSI - Gatewen Marsh SSSI - Marford Quarry SSSI - Vicarage Moss SSSI - River Dee SSSI - Shotton Lagoons and Reedbeds SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Further sites are likely to be within 2 km of works, where options 4, 35, 36, 42, and 45 have unknown locations of work.	Likely	Slight Adverse
Habitats			

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Package 4 (Making Best Use) – Wrexham-Deeside (via Mold/Buckley)			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Watercourses/water features	- Options proposed within this package may involve minor construction adjacent to a number of watercourses, including the River Dee, River Alyn, River Ceredog, and River Terreg. - The River Dee and Dee Estuary is afforded protection as a SAC, SPA, Ramsar and SSSI - Disturbance to watercourses/water features could affect protected species such as; water vole, otter, GCN and crayfish. - Construction run off has the potential to contaminate nearby watercourses/water features.	Unlikely	Slight Adverse
Woodland and trees	- Where options within this package involve minor improvements to highways, creation of new signage along roads and cycleways, and lighting of cycle parking etc, this could impact on edges of wooded area, and individual trees. - It is possible that the scheme will require the removal of some mature trees. - Woodland areas and trees have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.	Unlikely	Slight Adverse
Scrub	- Options within this package could require small areas of scrub removal, particularly adjacent to the highway corridor where improvements are made, or signage along cycleways. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Unlikely	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of small areas of hedgerow, particularly for minor highway improvement options. - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN, reptiles, dormouse and breeding birds.	Unlikely	Slight Adverse
Grassland	- Options within this package could require the removal of some areas of amenity and improved grassland. - Amenity and improved grassland considered to be of low ecological value. However, can provide foraging habitat for protected species such as bats, badger and reptiles.	Unlikely	Neutral
Buildings	- Options within this package are unlikely to require the demolition of buildings. - Some building types may have the potential to support protected species; such as bats and breeding birds.	Unlikely	Neutral
Mud and sandflats	- There is unlikely to be any construction adjacent to the River Dee, which could potentially affect mud and sandflats present on the Dee Estuary. - These habitats support breeding, wintering and passage birds of international importance .	Extremely Unlikely	Slight Adverse

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Package 4 (Making Best Use) – Wrexham-Deeside (via Mold/Buckley)			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Unlikely	Neutral
Fish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore fish species are unlikely to be adversely affected.	Unlikely	Slight Adverse
Amphibians	Any works within 500 m of a pond/ditch which supports GCN could impact on this species without mitigation. The study area is known for populations of GCN, including an SAC designated to protect them, and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence. There will be limited areas of suitable habitat disturbed within potential working areas as the majority will be small areas adjacent to/within barriers to GCN dispersal. This is most likely to occur in Options 6, 7 and 16 where minor improvement to the highway may occur in areas where GCN records are known.	Unlikely	Moderate Adverse
Reptiles	Soil disturbance and/or the removal of suitable vegetation such as dense scrub and sections of hedgerow could impact on reptiles if present. This may occur when installing signs along cycle routes.	Unlikely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures Any work within or adjacent to the River Dee Estuary could impact on internationally important waterfowl populations during breeding season, migration and wintering.	Unlikely	Slight Adverse
Bats	The following actions could impact on bats: - Removal/pruning of mature trees with roosting opportunities. - Renovation/demolition of buildings/structures with roosting opportunities. - Increased artificial lighting during construction and operation. - Removal of hedgerow- used for commuting and foraging. - Disturbance of suitable foraging areas, such as woodland and grassland areas. - Fragmentation of woodland and disused railways.	Unlikely	Moderate Adverse
Badgers	Works within 30 m of an active badger sett could impact on this species. Removal of suitable sheltered habitat, such as scrub, hedgerow and woodland could disturb this species.	Unlikely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/crayfish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the	Unlikely	Neutral

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Package 4 (Making Best Use) – Wrexham-Deeside (via Mold/Buckley)			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	watercourse, and therefore otters or water voles should not be disturbed.		

Package 5 (Capacity Enhancements) – Wrexham - Deeside			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites, although not all would be affected by the works: - River Dee and Bala Lake/Afon SAC - Dee Estuary SPA, SAC, Ramsar and SSSI - Inner Marsh Farm and Dee Estuary SSSI - Buckley Claypits and Commons SSSI - Deeside and Buckley Newt Sites SAC - Connah's Quay Ponds and Woodland SSSI - Gatewen Marsh SSSI - River Dee SSSI - Shotton Lagoons and Reedbeds SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Option reference 23 and 70 could potentially involve construction within/adjacent to the River Dee and Bala Lake/Afon SAC and the Deeside Estuary Ramsar, SAC and SPA., Option 104 may affect the Buckley Claypits and Commons SSSI and Deeside and Buckley Newt Sites SAC. Further sites are likely to be within 2 km of works, where options 37, 100, 72, 95 and 84 have unknown locations of work.	Likely	Large Adverse
Habitats			
Watercourses/water features	- Options proposed within this package may involve major construction within and adjacent to number of watercourses, including the River Dee, River Alyn, River Ceredog, and River Terreg. - The River Dee and Dee Estuary is afforded protection as a SAC, SPA, Ramsar and SSSI - Disturbance to watercourses/water features could affect protected species such as; birds, water vole, otter, fish, GCN and crayfish where present. - Construction run off also has the potential to contaminate nearby watercourses/water features.	Likely	Large Adverse
Woodland and trees	- Options within this package involve new stations, road widening, highway improvement and creation of a new bridge. These could impact on a number of wooded areas including Bilberry Wood, an area of ancient woodland, and several smaller woodland copses. A number of the	Likely	Moderate Adverse

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Package 5 (Capacity Enhancements) – Wrexham - Deeside			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	unmapped options could also affect woodlands. - It is likely that the scheme will require the removal of some mature trees. - Woodland areas have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.		
Scrub	- Options within this package could require areas of scrub removal, particularly adjacent to the highway corridor for road widening, new stations, creation of walking/cycling routes, and park and ride/car share facilities. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Likely	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of hedgerow, particularly adjacent to the highway corridor for road widening options. - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN, reptiles, and breeding birds.	Likely	Slight Adverse
Grassland	- Options within this package could require the removal of some areas of amenity, improved, semi-improved and marshy grassland. - Amenity and improved grassland considered to be of low ecological value, however semi-improved and marshy grassland may hold more value. Grasslands can provide foraging habitat for protected species such as bats, badger, GCN and reptiles.	Likely	Slight Adverse
Built Structures – including bridges, tunnels and buildings.	- Options within this package may require the demolition or maintenance of buildings or bridges for options involving new stations and parking facilities. - Some building types have the potential to support protected species; such as bats and breeding birds.	Likely	Slight Adverse
Mud and sandflats	- Construction within or adjacent to the River Dee could potentially affect mud and sandflats which are present on the Dee Estuary, in particular for option 23. - These habitats support breeding, wintering and passage birds of international importance .	Likely	Large Adverse
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Unlikely	Slight Adverse
Fish	Any work within or immediately adjacent to watercourses, such as the River Dee and smaller streams could impact on fish species present.	Likely	Moderate Adverse
Amphibians	Any works within 500 m of a pond/ditch which supports GCN could impact on this species without mitigation. The study area is known for populations of GCN, including an SAC designated to protect them, and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence. This is most likely to occur in Options 104, 84 and 59 which may occur in areas where GCN	Likely	Large Adverse

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Package 5 (Capacity Enhancements) – Wrexham - Deeside			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	records are known.		
Reptiles	Soil disturbance and/or the removal of suitable vegetation such as dense scrub and sections of hedgerow could impact on reptiles if present.	Likely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures Any work within or adjacent to the River Dee Estuary could impact on internationally important waterfowl populations during breeding season, migration and wintering.	Likely	Large Adverse
Bats	The following actions could impact on bats: - Removal/pruning of mature trees with roosting opportunities. - Renovation/demolition of buildings/structures with roosting opportunities. - Increased artificial lighting during construction and operation. - Removal of hedgerow- used for commuting and foraging. - Disturbance of suitable foraging areas, such as woodland and grassland areas. - Fragmentation of woodland and disused railways.	Likely	Moderate Adverse
Badgers	Works within 30 m of an active badger sett could impact on this species. Removal of suitable sheltered habitat, such as scrub, hedgerow and woodland could disturb this species.	Likely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/crayfish	- Any work within or close to watercourses which support water voles/otter/crayfish could have a negative impact on these species. Option reference 23 in particular could involve construction within the River Dee and Bala Lake/Afon SAC, which is known to support otter. Also, options 84, 95, and 59 may involve works within/adjacent to watercourses.	Likely	Moderate Adverse

Package 6 (Making Best Use) – Chester - Wrexham			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites: - River Dee and Bala Lake/Afon SAC - Gatewen Marsh SSSI - River Dee SSSI - Ancient woodland	Unlikely	Slight Adverse

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Package 6 (Making Best Use) – Chester - Wrexham			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Further sites are likely to be within 2 km of works, where options 35, 36, 42, and 45 have unknown locations of work.		
Habitats			
Watercourses/water features	- Options proposed within this package may involve minor construction adjacent to a number of watercourses, including the River Gwenfro, and other minor watercourses. - Disturbance to watercourses/water features could affect protected species such as; water vole, otter, GCN and crayfish. - Construction run off has the potential to contaminate nearby watercourses/water features, which may also flow into the River Dee.	Unlikely	Slight Adverse
Woodland and trees	- Where options within this package involve creation of new signage along cycleways, interchange facilities, lighting of cycle parking, and bus priority measures, this could impact on edges of wooded area, and individual trees. - It is possible that the scheme will require the removal of some mature trees. - Woodland areas and trees have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.	Unlikely	Slight Adverse
Scrub	- Options within this package could require small areas of scrub removal, particularly adjacent to the highway corridor for bus priority measures, or signage along cycleways. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Unlikely	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of small areas of hedgerow, particularly adjacent to the highway corridor for bus priority measures. - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN, reptiles, dormouse and breeding birds.	Unlikely	Slight Adverse
Grassland	- Options within this package could require the removal of some areas of amenity and improved grassland. - Amenity and improved grassland considered to be of low ecological value. However, can provide foraging habitat for protected species such as bats, badger and reptiles.	Unlikely	Slight Adverse
Buildings	- Interventions within this option are unlikely to require the demolition of buildings. - Some building types have the potential to support protected species; such as bats and breeding birds.	Unlikely	Neutral
Mud and sandflats	- Interventions within this option are unlikely to require construction adjacent to the River Dee and therefore	Extremely Unlikely	Neutral

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Package 6 (Making Best Use) – Chester - Wrexham			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	would not affect mud and sandflats which are present on the Dee Estuary. - These habitats support breeding, wintering and passage birds of international importance		
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Unlikely	Slight Adverse
Fish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore fish species are unlikely to be adversely affected.	Unlikely	Slight Adverse
Amphibians	Where options will affect suitable habitat within 500 m of ponds, there will be a low risk of amphibians. There will be limited areas of suitable habitat disturbed within potential working areas as the majority will be small areas adjacent to/within barriers to GCN dispersal, however the study area is known for populations of GCN and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence.	Unlikely	Slight Adverse
Reptiles	Where options will affect suitable habitat such as hedgerows, scrub and adjacent bare ground, there is a low potential for reptiles within working areas. Any removal of vegetation or disturbance of soil could impact on reptiles.	Unlikely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures	Likely	Slight Adverse
Bats	The railway corridors, watercourses and hedgerows are likely to be important for commuting and foraging for bats. Mature trees, bridges or buildings could also be used as roosts. Impacts may occur where options require removal of suitable mature trees. Any works which increases lighting and disturbance in these areas could impact on these species.	Unlikely	Moderate Adverse
Badgers	Impacts may occur where options require removal of suitable habitats for installation of signs etc. Setts may lie within suitable habitat adjacent to the working areas, and therefore disturbance could occur.	Unlikely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/crayfish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore otters or water voles should not be disturbed.	Unlikely	Neutral

Package 7 (Capacity Enhancements) – Chester - Wrexham

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Criteria	Assessment	Confidence Level NB	Significance of Impact of most Severe Option (without mitigation)
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites, although not all would be affected by the works: - River Dee and Bala Lake/Afon SAC - Midland Meres and Mosses Phase 2 Ramsar - Llay Bog SSSI - Gatewen Marsh SSSI - Marford Quarry SSSI - Vicarage Moss SSSI - River Dee SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Further sites are likely to be within 2 km of works, where options 37, 100, 72, and 95 have unknown locations of work.	Unlikely	Slight Adverse
Habitats			
Watercourses/water features	- Options proposed within this package may involve major construction within and adjacent to number of watercourses, including the River Dee (minor only), River Alyn, River Gwenfro, River Clywedog, and Pulford Brook. - Disturbance to watercourses/water features could affect protected species such as; birds, water vole, otter, fish, GCN and crayfish where present. - Construction run off also has the potential to contaminate nearby watercourses/water features.	Likely	Moderate Adverse
Woodland and trees	- Options within this package involve new stations/multi-modal hub, highway/junction improvements and creation of new cycleways and park and ride facilities. These could impact on a number of wooded areas including Marford wood, Wilderness/Black wood, and Ball's wood, Black/Bretton wood, and several smaller woodland copses, some of which are areas of ancient woodland. A number of the unmapped options could also affect woodlands. - It is likely that the scheme will require the removal of some mature trees. - Woodland areas have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.	Likely	Moderate Adverse
Scrub	- Options within this package could require areas of scrub removal, particularly the highway corridor for junction improvements and new roads, new stations, creation of walking/cycling routes, and park and ride/car share facilities. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Certain	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of hedgerow, particularly the highway corridor for junction improvements and new roads.	Likely	Slight Adverse

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Package 7 (Capacity Enhancements) – Chester - Wrexham			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	- Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN, reptiles, and breeding birds.		
Grassland	- Options within this package could require the removal of some areas of amenity, improved, semi-improved and marshy grassland. - Amenity and improved grassland considered to be of low ecological value, however semi-improved and marshy grassland may hold more value. Grasslands can provide foraging habitat for protected species such as bats, badger, GCN and reptiles.	Likely	Slight Adverse
Built Structures – including bridges, tunnels and buildings.	- Options within this package may require the demolition or maintenance of buildings or bridges for options involving new stations and parking facilities, and new road junctions. - Some building types have the potential to support protected species; such as bats and breeding birds.	Likely	Moderate Adverse
Mud and sandflats	- Construction within or adjacent to the River Dee could potentially affect mud and sandflats which are present on the Dee Estuary. - These habitats support breeding, wintering and passage birds of international importance.	Unlikely	Slight Adverse
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Unlikely	Slight Adverse
Fish	Any work within or immediately adjacent to watercourses, such as the River Dee and smaller streams could impact on fish species present.	Likely	Moderate Adverse
Amphibians	Any works within 500 m of a pond/ditch which supports GCN could impact on this species without mitigation. The study area is known for populations of GCN, and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence. This is most likely to occur in Options 71, 17, 18, 39 and 95. Unmapped options could also have impacts.	Likely	Large Adverse
Reptiles	Soil disturbance and/or the removal of suitable vegetation such as dense scrub and sections of hedgerow could impact on reptiles if present.	Likely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures.	Likely	Moderate Adverse
Bats	The following actions could impact on bats: - Removal/pruning of mature trees/woodland with roosting opportunities. - Renovation/demolition of buildings/structures with roosting opportunities. - Increased artificial lighting during construction and operation.	Likely	Moderate Adverse

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Package 7 (Capacity Enhancements) – Chester - Wrexham			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	- Removal of hedgerow- used for commuting and foraging. - Disturbance of suitable foraging areas, such as woodland and grassland areas. - Fragmentation of woodland and disused railways.		
Badgers	Works within 30 m of an active badger sett could impact on this species. Removal of suitable sheltered habitat, such as scrub, hedgerow and woodland could disturb this species.	Likely	Moderate Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/crayfish	- Any work within or close to watercourses which support water voles/otter/crayfish could have a negative impact on these species.	Likely	Moderate Adverse

Package 8 (Making Best Use) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites: - River Dee and Bala Lake/Afon SAC - Dee Estuary SPA, SAC, Ramsar and SSSI - Midland Meres and Mosses Phase 2 Ramsar - Inner Marsh Farm and Dee Estuary SSSI - Buckley Claypits and Commons SSSI - Deeside and Buckley Newt Sites SSSI - Connah's Quay Ponds and Woodland SACI - Maes Y Grug SSSI - Llay Bog SSSI - Gatewen Marsh SSSI - Marford Quarry SSSI - Vicarage Moss SSSI - River Dee SSSI - Shotton Lagoons and Reedbeds SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Further sites are likely to be within 2 km of works, where options 1, 2, 3, 102, 35, 36, 42, and 45 have unknown locations of work.	Unlikely	Slight Adverse
Habitats			
Watercourses/water features	- Options proposed within this package may involve minor construction adjacent to a number of watercourses/water features, including the River Dee, River Alyn, River Cegidog and Wepre Brook.	Unlikely	Slight Adverse

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Package 8 (Making Best Use) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	- The River Dee and Dee Estuary is afforded protection as a SAC, SPA, Ramsar and SSSI - Disturbance to watercourses/water features could affect protected species such as; water vole, otter and crayfish. - Construction run off has the potential to contaminate nearby watercourses/water features.		
Woodland and trees	- Should options within this package involve creation of new signage along cycleways, VMS on A55/A494/A483, interchange facilities, lighting of cycle parking, this could impact on edges of wooded area, and individual trees. - It is likely that the scheme will require the removal of some mature trees. - Woodland areas and trees have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, great crested newt and plants.	Likely	Slight Adverse
Scrub	- Options within this package could require small areas of scrub removal, particularly adjacent to the highway corridor for installation of VMS, or signage along cycleways. - Areas of scrub could potentially support protected species such as; breeding birds, badger, great crested newt and reptiles.	Likely	Slight Adverse
Hedgerows	- Options within this package could require the removal of sections of small areas of hedgerow, particularly adjacent to the highway corridor for VMS installation. - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, great crested newt, reptiles, dormouse and breeding birds.	Unlikely	Slight Adverse
Grassland	- Options within this package could require the removal of some areas of amenity and improved grassland. - Amenity and improved grassland considered to be of low ecological value. However, can provide foraging habitat for protected species such as bats, badger and reptiles.	Likely	Slight Adverse
Built Structures – including bridges, tunnels and buildings.	- Options within this package are unlikely to require the demolition of buildings or bridges. - Some building types have the potential to support protected species; such as bats and breeding birds.	Unlikely	Neutral
Mud and sandflats	- Construction adjacent to the River Dee could potentially affect mud and sandflats which are present on the Dee Estuary. - These habitats support breeding, wintering and passage birds of international importance.	Unlikely	Slight Adverse
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Likely	Neutral
Fish	No watercourses are likely to be adversely affected by	Unlikely	Slight Adverse

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Package 8 (Making Best Use) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore fish species are unlikely to be adversely affected.		
Amphibians	Where options will affect suitable habitat within 500 m of ponds, there will be a low risk of amphibians. There will be limited areas of suitable habitat disturbed within potential working areas as the majority will be small areas adjacent to/within barriers to GCN dispersal, however the study area is known for populations of GCN and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence.	Unlikely	Slight Adverse
Reptiles	Where options will affect suitable habitat such as hedgerows, scrub and adjacent bare ground, there is a low potential for reptiles within working areas. Any removal of vegetation or disturbance of soil could impact on reptiles.	Likely	Slight Adverse
Breeding Birds	There is high potential for breeding birds within the scrub, mature trees and hedgerows. Where options require the removal of vegetation, this could impact on breeding birds when removed during the bird breeding season.	Likely	Slight Adverse
Bats	The railway corridors, watercourses and hedgerows are likely to be important for commuting and foraging for bats. Mature trees, bridges or buildings could also be used as roosts. Impacts may occur where options require removal of suitable mature trees. Any works which increases lighting and disturbance in these areas could impact on these species.	Likely	Slight Adverse
Badgers	Impacts may occur where options require removal of suitable habitats for installation of VMS etc. Setts may lie within suitable habitat adjacent to the working areas, and therefore disturbance could occur.	Likely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Slight Adverse
Otters/water voles/Crayfish	No watercourses are likely to be adversely affected by options within this package, with the exception of potential construction runoff of where working adjacent to the watercourse, and therefore these species should not be disturbed.	Unlikely	Slight Adverse

Package 9 (Capacity Enhancements) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
Designated Sites			
Designated Sites	Options proposed within this package fall within 2 km of the following protected sites, although not all would be affected by the works: - River Dee and Bala Lake/Afon SAC - Dee Estuary SPA, SAC, Ramsar and SSSI - Midland Meres and Mosses Phase 2 Ramsar - Inner Marsh Farm and Dee Estuary SSSI - Buckley Claypits and Commons SSSI - Deeside and Buckley Newt Sites SAC	Likely	Large Adverse

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Package 9 (Capacity Enhancements) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	- Connah's Quay Ponds and Woodland SSSI - Maes Y Grug SSSI - Llay Bog SSSI - Gatewen Marsh SSSI - Marford Quarry SSSI - Vicarage Moss SSSI - River Dee SSSI - Shotton Lagoons and Reedbeds SSSI - Ancient woodland Potential effects would depend on the proximity of the works to the designated feature, the scope and timing of the works, and the reasons for the designation. Option reference 27 and 10 could potentially involve construction within the River Dee and Bala Lake/Afon SAC, and 24 and 25 may affect the Buckley Claypits and Commons SSSI and Deeside and Buckley Newt Sites SAC.		
Habitats			
Watercourses/water features	- Options proposed within this package may involve major construction within and adjacent to a number of watercourses, including the River Dee, River Alyn, River Cegidog, Northop Brook and Wepre Brook. - The River Dee and Dee Estuary is afforded protection as a SAC, SPA, Ramsar and SSSI - Disturbance to watercourses/water features could affect protected species such as; birds, water vole, otter, fish, GCN and crayfish where present. - Construction run off has the potential to contaminate nearby watercourses/water features.	Likely	Large Adverse
Woodland and trees	- Highway options within this package involve widening the A494 and A55, junction improvements, and creation of a new road. These could impact on a number of wooded areas including Wared Wood, Wepre Wood and Leadbrook Wood; all area of ancient woodland, and several smaller woodland copses. - The new road (Option 21) has the potential to severe and fragment Leadbrook Wood, should it be directed through the woodland. - It is likely that the scheme will require the removal of some mature trees. - Woodland areas have the potential to support a number of protected species including; breeding birds, bats, badger, polecat, reptiles, GCN and plants.	Likely	Large Adverse
Scrub	- Options within this package could require areas of scrub removal, particularly adjacent to the highway corridor for road widening, junction improvements, new roads, creation of walking/cycling routes, and park and ride/car share facilities. - Areas of scrub could potentially support protected species such as; breeding birds, badger, GCN and reptiles.	Likely	Slight Adverse
Hedgerows	- Options within this package could require the removal of	Likely	Moderate Adverse

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Package 9 (Capacity Enhancements) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	sections of small areas of hedgerow, particularly adjacent to the highway corridor for road widening options, and larger sections if creating a new road. - Well established hedgerows within the study area have the potential to provide sheltered habitat for protected species such as; badger, GCN, reptiles, and breeding birds.		
Grassland	- Options within this package could require the removal of some areas of amenity, improved, semi-improved and marshy grassland. - Amenity and improved grassland considered to be of low ecological value, however semi-improved and marshy grassland may hold more value. Grasslands can provide foraging habitat for protected species such as bats, badger, GCN and reptiles.	Likely	Slight Adverse
Built Structures – including bridges, tunnels and buildings.	- Options within this package may require the demolition or maintenance of buildings or bridges. - Some building types have the potential to support protected species; such as bats and breeding birds.	Unlikely	Slight Adverse
Mud and sandflats	- Construction within or adjacent to the River Dee could potentially affect mud and sandflats which are present on the Dee Estuary. - These habitats support breeding, wintering and passage birds of international importance.	Likely	Large Adverse
Species			
Invertebrates	There may be invertebrates present in some areas of habitat lost, including the scrub, grassland and hedgerows. Loss of these areas of habitat may impact on those species present.	Unlikely	Slight Adverse
Fish	Any work within or immediately adjacent to watercourses, such as the River Dee and smaller streams could impact on fish species present.	Likely	Moderate Adverse
Amphibians	Any works within 500 m of a pond/ditch which supports GCN could impact on this species without mitigation. The study area is known for populations of GCN, including an SAC designated to protect them, and therefore disturbance could occur. Disturbance of this species would potentially require a Development Licence.	Likely	Large Adverse
Reptiles	Soil disturbance and/or the removal of suitable vegetation such as dense scrub and sections of hedgerow could impact on reptiles if present.	Likely	Slight Adverse
Breeding Birds	The following actions could impact on breeding birds when conducted within bird breeding season: - Hedgerow and scrub removal - Tree felling/pruning - Renovation/demolition of buildings/structures Any work within or adjacent to the River Dee Estuary could impact on internationally important waterfowl populations during breeding season, migration and wintering.	Likely	Moderate Adverse
Bats	The following actions could impact on bats: - Removal/pruning of mature trees with roosting opportunities. - Renovation/demolition of buildings/structures with roosting opportunities.	Likely	Moderate Adverse

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Package 9 (Capacity Enhancements) – Strategic Trips			
Criteria	**Assessment**	**Confidence Level NB**	**Significance of Impact of most Severe Option (without mitigation)**
	- Increased artificial lighting during construction and operation. - Removal of hedgerow- used for commuting and foraging. - Disturbance of suitable foraging areas, such as woodland and grassland areas. - Fragmentation of woodland and disused railways.		
Badgers	Works within 30 m of an active badger sett could impact on this species. Removal of suitable sheltered habitat, such as scrub, hedgerow and woodland could disturb this species.	Likely	Slight Adverse
Dormouse	The following actions could impact on this species if present in the local area: - Hedgerow removal - Pruning and felling of mature trees, which offer suitable nesting sites - Woodland fragmentation	Unlikely	Moderate Adverse
Otters/water voles/crayfish	- Any work within or close to watercourses which support water voles/otter/crayfish could have a negative impact on these species. Option reference 27 in particular could involve construction within the River Dee and Bala Lake/Afon SAC, which is known to support otter. Also, options 24, 21, 18 and 17 may involve works within/adjacent to watercourses.	Unlikely	Moderate Adverse

11.6 Potential Mitigation Measures and Further Surveys

It is not possible to fully prescribe mitigation for the study area until further surveys have been conducted. However, it is likely that the following forms of mitigation are likely to be required following the associated surveys.

11.6.1 Extended Phase 1 Habitat Survey

Once the preferred options have been identified, further, more detailed site surveys will be required. An Extended Phase 1 Habitat Survey will need to be undertaken, in accordance with the JNCC Handbook for Phase 1 Habitat Survey (2004), and will include all areas of land to be affected by the works.

The Extended Phase 1 Survey is a standard ecological survey method for the collection of baseline data. The methodology is defined in Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment 1995), which recommends the use of the Phase 1 Habitat Survey (JNCC 2004), together with a desktop study and a protected species walkover.

During an Extended Phase 1 Survey all habitats present within the surveyed area are recorded and the potential for the area to support protected species is assessed. Protected species assessments will take into account habitat suitability, direct sightings of individuals and evidence of presence through their activities (droppings, prints, hairs, pathways etc).

All parcels of land within the study area are surveyed and classified in accordance with the Phase 1 habitat codes. Maps are annotated in the field, recording key features, habitats and species present. Phase 1 target notes (TN) are taken as appropriate.

It is not possible to fully prescribe mitigation for the study area until further surveys have been conducted. However, it is likely that the following forms of mitigation are likely to be required as a minimum.

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11.6.2 Species

There are a number of options that have the potential to have a likely significant adverse environmental effect on species associated with, or are the qualifying features of Natura sites within the study area. Any potential effects on the integrity or conservation value of species associated with these sites would be subject to a more detailed assessment as part of the Appropriate Assessment process.

Invertebrates

Surveys for invertebrates may be required depending on what habitats the chosen route affect. These may include surveys on woodland, scrub, hedgerows and streams.

Reptiles

Should the chosen options involve disturbance or significant suitable reptile habitat removal, reptile surveys will be required prior to construction.

Reptile survey methods are frequently based on transect and artificial refugia techniques in order to determine the presence of a range of reptile species within an area. Roofing felt 'tiles' and tin tiles are placed in appropriate locations at an approximate density of 10 per hectare. These are checked between five and seven times (in appropriate weather conditions) during March and June (April and May being optimal), or September and October, in accordance with the methodology described in the Herpetofauna Workers Manual (Gent and Gibson 2003) and the sampling effort described in the Froglife Reptile Survey Guidelines (1999).

If reptiles are found within the proposed area of works, further trapping and exclusion may be required. This will need to involve consultation with CCW (Wales) and NE (England). Mitigation will depend on the population identified. A large population may require trapping and translocation to a specially prepared receptor site which may also require a survey to ensure that the receptor site is not already at its carrying capacity. Small populations may be managed through a programme of a sensitive vegetation and soil stripping programme combined with a watching brief.

Bats

Any mature trees and built structures that will be affected by the chosen option/s will need to be assessed by an experienced ecologist for their potential to support roosting bats.

If any features are assessed as providing moderate to high potential for roosting bats, further dusk emergence and dawn re-entry surveys will be required to meet the Bat Survey Guidelines (BCT 2007). Any suitable features would need to be subjected to at least three survey visits, well spaced throughout the optimal survey season of May – September, with at least one dawn survey. The surveys should incorporate a sufficient number of surveyors to provide adequate surveys of bat activity including commuting and foraging behaviour of the entire study area.

Should any roost be determined to be present on site, then a licence would be required prior to any works commencing on site and appropriate exclusion mitigation may be required.

If surveys confirm the presence of a bat roost and / or significant commuting corridors, and disturbance is considered likely, then a protected species licence, WAG (Wales) or NE (England), will be required to allow the development to proceed lawfully. Mitigation will be required to obtain a licence. Required mitigation is likely to include protection of important commuting corridors, sensitive external lighting design and provision of new roost sites. This should be considered during the design stage to avoid potential changes at a later date. New lighting along the railway, woodland , hedgerow and river corridors should be avoided. In the limited areas where lighting cannot be avoided for health and safety purposes, it should be heavily mitigated, to reduce light spill to a minimum, with street lighting being switched off after peak hours. In all areas, lighting design should follow the best practice guidance by the Bat Conservation Trust Bats and Lighting in the UK.

These include:

- Using low or high pressure sodium lights instead of mercury or metal halide lamps

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- Direct lighting to where needed and avoid spillage e.g. direct lighting towards the building front and design the luminaire appropriately, including the use of hoods, cowls, shields etc to avoid spillage onto the river corridor and tree lines.
- Using lighting modelling programs to indicate where the light spill will occur.
- Only light areas which need to be lit, and use the minimal level of lighting required to comply with guidance such as Institute of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light (2005).
- Use movement sensors or timers on security lighting.
- Do not use a lamp greater than 150W for security lighting.

Badger

Depending on the options chosen and the types of habitat affected, badger surveys may be required prior to the commencement of works. Badger surveys can be conducted between September and April and as a minimum will require one survey.

Should a badger sett be found within 30 m of the works, site compound or access, then impacts may occur. Buffer zones around setts may need to be established and a licence from CCW or NE may be required if works were to significantly impact upon badgers and their setts. Timing restrictions may apply to working close to setts.

In summary, a CCW/NE badger disturbance licence would be required for any activity that did not meet the following conditions:

- that there will be no harm to the badgers themselves or
- damage to the sett(s),
- no disturbance of the badgers (above existing levels),
- no isolation, fragmentation or severance of the badger territory, and that access is maintained between the sett and all other areas of a territory

Artificial lighting at night should be avoided wherever possible to reduce the impact upon foraging or commuting badgers in the area. If artificial lighting is essential, it should be designed and installed carefully to light working areas without causing light spill onto the surrounding areas.

Otter, water vole and crayfish

Any watercourses, including drains and ditches, within the study area which will be crossed or lie adjacent to the proposed works, will need to be surveyed for their potential to support otter, water vole and crayfish. Any watercourses assessed as having potential to support these species should be subject to further, more detailed surveys.

With regards to otter, surveys can be conducted at anytime of the year, however detection of otter holts is often easier during the winter when there is less vegetation cover (between November and February). Signs of recent activity could include the presence of spraints, holts, lay-ups, foot prints and feeding remains, within 10m of the bank.

The optimum survey period for water voles is between May and September. Signs of recent activity could include faeces, feeding stations, burrows, nests and footprints.

Crayfish surveys should be carried out between July and October and should employ a range of survey techniques, including; trapping (under licence and permission from the EA), netting and hand searching under rocks and in suitable crevices etc.

If evidence of these species are found, dependant on the nature and extent of the works, further mitigation, including trapping and translocation, may be required. Licences may be required.

Dormouse

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Should the chosen options affect groups of trees, woodland areas or require the removal of sections of well established hedgerow, dormouse surveys should be undertaken prior to construction. Dormouse surveys can stretch over several months and should include a range of methods. Surveys can include nest box surveys (undertaken between March and October), nest searches (undertaken between September and February) and searching for nut remains (undertaken between September and December).

A development licence is required before the commencement of any development that might impact on dormice or dormouse habitats.

Breeding Bird

To avoid disturbance to breeding birds, it is recommended that any vegetation clearance is undertaken during October to February inclusive (outside of the breeding bird season). If works are undertaken from March to September inclusive, the area should first be inspected by an ecologist, at most 48 hours before work begins in an area. If any nests are found they will have to be left undisturbed, along with a surrounding buffer area until the chicks have fledged. This could take up to six weeks depending on species. More protection is afforded to Schedule 1 species.

The level of mitigation employed will depend the extent of habitat removal/destruction but could include the installation of bird boxes and tailored replanting schemes.

In some areas of the study area, wintering and migration surveys may also be required, in particular where sited close to the SPAs and Ramsars, such as the Dee Estuary. Options involving creation of new bridges and modifications to existing infrastructure across the River Dee would require particular consideration. Any construction activity should aim to avoid periods where passage, breeding and over-wintering birds for which the Natura 2000 sites are designated for are using the site in significant numbers.

Consultation with CCW should be considered at the earliest possible stage for options with the potential to impact upon European protected sites (SPA, Ramsar and SAC).

GCN

Any ponds and ditches within 500 m of the proposed works should be assessed by an ecologist for their potential to support GCN . This assessment can be assisted by the GCN Habitat Suitability Index (HSI).

The Habitat Suitability Index (HSI) is a tool used to provide a numerical indication of suitability on a scale of 0-1 (0 indicating unsuitable habitat, 1 representing optimal habitat). HSI scores incorporate ten suitability indices, all of which are factors thought to affect GCN s, namely;

- site location;
- size of the pond;
- pond drying;
- water quality;
- perimeter shading;
- presence of waterfowl;
- presence of fish;
- number of ponds within 1km;
- terrestrial habitat; and
- Macrophyte cover.

Typically, presence/absence surveys would be undertaken on any ponds considered to offer habitat opportunities, i.e. those which receive a score between 0.5 and 1. The survey methodology followed would be that of English Nature ‘GCN Mitigation Guidelines’ (2001). GCN pond surveys comprise a minimum of four survey visits, which should are carried out

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between mid-March and mid-June, with a further 2 surveys required for ponds found to contain GCN in order to provide a population estimate.

Further mitigation measures could include trapping and translocation, requiring GCN development licence from WAG (Wales) or NE (England). Application and assessment of the licence can be a lengthy process, with up to 40 working days required to grant a licence following submission. Periods of trapping can last from 15 days to 90 days of suitable weather, only completing when 5 days of clear results have been obtained.

Fish

Fish surveys may be required should the works involve construction within a watercourse, such as the River Dee. It may be possible to request up-to-date species records from organisations, such as the Environment Agency. If not, fish surveys may be required prior to construction. Any surveys and subsequent construction within the river should not take place in the spring or in late autumn/early winter, so as not to interfere with fish migration patterns.

Native Flora

Dependant on the options chosen, protected and notable flora species surveys may be required, within areas of potential conservation interest. Plant species lists may be compiled during Extended Phase 1 Habitat Surveys (discussed above). Such information can be used to carry out National Vegetation Classification Surveys (NVC); a system of classifying natural habitat types in Great Britain according to the vegetation they contain. Should plant species of conservation concern be identified, further mitigation may be required. Mitigation could include protecting plants in situ, permanent or temporary translocation.

Controlled plant species

Each area where works are proposed should be subject to a controlled species survey, prior to construction. This type of survey can be incorporated into an extended phase 1 habitat survey (discussed above). As it is illegal to assist the spread of controlled plant species, such as Japanese knotweed and Himalayan balsam, a suitable method statement must be put in place prior to any works in areas where such species are found, to avoid their spread during construction. Vegetation and soil removal and disposal from contaminated areas should follow current controlled waste regulations.

11.6.3 Habitats

Any development should aim to retain features of ecological value within the scheme design. The highest priorities for protection are the River Dee and estuary, ponds, riparian habitats, wetland areas, woodland areas (particularly ancient woodland), important hedgerows, railway, and veteran trees. However, consideration should also be given to the scrub, mature trees, hedgerows, stone walls and grass verges. Ideally, green space should be provided with consideration to biodiversity to provide an overall ecological gain as recommended in TAN 5 and PPG 9.

There are a number of options that have the potential to have a likely significant adverse environmental effect on Natura or Ramsar sites within the study area. Any potential effects on the integrity or conservation value of the sites would be subject to a more detailed assessment as part of the Appropriate Assessment process.

Scrub and Hedgerows

Scrub and hedgerows should be retained where possible. Hedgerow surveys may be required, dependant on the options chosen. In areas where vegetation must be removed it should be replaced by compensatory planting of local, native species. Appropriate timing of works combined with ecological supervision of scrub and hedgerow removal is recommended to reduce the risk to a number of protected species. It should also be noted that in certain cases, a hedgerow removal notice may be required to be submitted prior to the commencement of any removal works to hedgerows, this can take several weeks to be processed.

Trees

Mature trees should be retained. The Root Protection Areas should be calculated and any development, including installation of signs and lighting, should be planned to avoid damaging tree roots. Any removed trees should be replaced

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by compensatory planting of locally native tree species. Guidelines within BS5837 *Trees in Relation to Construction* should be followed.

Watercourses

Run-off from the study area during both construction and operation should be managed in accordance with current Environment Agency regulations and should reduce the potential for transmission of particulates and pollutants into the water course.

11.7 Residual Effects

It is not possible to fully identify residual effects for the scheme options until further surveys have been conducted and more detailed mitigation has been recommended. However, it is likely that residual effects may include the following.

11.7.1 Package 1

This package gives a range of options to encourage the use of freight, car sharing, walking and cycling routes, to alleviate pressures on the road network. All of these will help to reduce traffic within the study area, thereby potentially having positive effects on the designated sites, habitats and species in the study area through reduction in emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions. No significant negative residual impacts have been identified.

11.7.2 Packages 8, 2, 4 and 6

Options within these packages aim to make more efficient use of existing transport facilities and infrastructure. Options seek to improve existing walking and cycling routes, bus and rail networks and publicise the whereabouts and services from possible port rail and inland rail terminals. Options may help reduce traffic within the study area, thereby potentially having positive effects on the designated sites, habitats and species within the study area through reduced emissions, cleaner surface water run-off from the roads and reduction in potential wildlife/vehicle collisions. Works could have a slight/moderate adverse impact on designated sites including Natura and Ramsar if works will not be fully contained within the highway when close to these sites. When occurring within these sites, the residual impacts listed below could affect the integrity of the site or the species and habitat for which they qualify for the designation. An Appropriate Assessment may be required if this is the case, alternatively a Test of Significance may rule out any impacts if the works are fully contained within the highway. Residual impacts may include

- Only minor habitat loss through sign installation may occur only if works are not fully contained within the highways (tarmac and pavement).
- An increase in external lighting, especially in areas not previously lit, could fragment existing dark wildlife corridor and foraging areas for nocturnal animals, if appropriate mitigation measures are not implemented.

11.7.3 Packages 9, 3, 5 and 7

Works included within packages 9, 3 and 5 could have a large adverse impact on designated sites, including Natura and Ramsar, where works will be required within or close to these sites. When occurring within these sites, the residual impacts listed below could affect the integrity of the site or the species and habitat for which they qualify for the designation. An Appropriate Assessment will be required where works will fall within/close to the Natura and Ramsar sites, in particular for options that include creation of new bridges, or new foot/cycle paths. Alternatively a Test of Significance may rule out any impacts where only minor works are required close to the designations. Package 7 may not include options that will have an adverse impact on Natura and Ramsar sites and therefore may only require a Test of Significance to illustrate this.

- Direct habitat loss through landtake.
- Fragmentation of habitats and habitat corridors. Smaller areas of land may be more vulnerable to loss, damage or change, and may be unable to continue to support their original number and diversity of species.

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- Severance or creation of barriers which will divide habitats or wildlife corridors preventing movement across the landscape.
- An increase in traffic will increase air pollution which will impact on habitats and species.
- An increase in traffic will increase noise pollution which may impact on species.

Increase in noise levels from an increase in traffic levels and human presence have the potential to disturb fauna and impact on habitats

- An increase in external lighting, especially in areas not previously lit, will fragment existing dark wildlife corridor and foraging areas for nocturnal animals, if appropriate mitigation measures are not implemented.
- Increase in the area of hard standing will reduce infiltration and increase the volume of run-off which can overload the capacity of water courses. Run-off from road can contain oil, de-icing salt, particulates and accidental spillages. These pollutants and changes in flow could impact on the local water quality and the species associated with the watercourses, if appropriate treatment/containment facilities were not installed as part of the road drainage.
- Animals may be killed trying cross a road or development which cuts across their traditional territory or foraging routes.

11.8 Cumulative Effects

It is not possible to fully identify cumulative impacts for the scheme until further surveys have been conducted. However, the impacts of this scheme will combine with those from other developments to form cumulative adverse impacts. The most likely are identified below:

There are a number of developments planned/allocated for the site and surrounding area, including housing, employment and commercial allocations.

Additional developments, will add to the impacts that will be caused by this Scheme and cumulative adverse impacts may include the following:

- Direct habitat loss through landtake.
- Fragmentation of habitats and habitat corridors. Smaller areas of land may be more vulnerable to loss, damage or change, and may be unable to continue to support their original number and diversity of species.
- Severance or creation of barriers which will divide habitats or wildlife corridors preventing movement across the landscape.
- An increase in traffic will reduce the air qualities which will impacts on habitats and species.
- An increase in human presence may result in disturbance to sensitive habitats and species.
- An increase in external lighting, especially in areas not previously lit, will fragment existing dark wildlife corridor and foraging areas, if appropriate mitigation measures are not implemented.
- Increase in the area of hard standing will reduce infiltration and increase the volume of runoff which can overload the capacity of water courses. Run-off from road can contain oil, de-icing salt, particulates and accidental spillages. These pollutants could impact on the local river water quality and the species associated with the river, if appropriate treatment/containment facilities were not installed as part of the road drainage.

11.9 Conclusion

AECOM was commissioned by Welsh Government and Taith to undertake a high level biodiversity assessment of the study area of proposed transport regeneration schemes for the NEWABTS. The assessment aims to provide an overall ecological assessment of the nine packages, and identify potential ecological constraints within the study area and give a preliminary summary of potential ecological constraints. This assessment is based on the methodology outlined within

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the WelTAG guidance and is supported by the findings of a desk study and a high level site survey, undertaken where access was permitted.

Preliminary site visits of the study area were undertaken, where possible, by and Chris Sutton (IEEM Associate), and Fran Tarry (IEEM Grad) on 4th and 18th November 2010. Due to access restrictions, the site visit was largely restricted to the main corridor of the scheme, including the A55, A494, A483, A541 and the A548. Secondary, locally used roads were used to access land outside of the main corridor as much as possible. Despite the described restrictions, the site visit was useful in giving an overview of key ecological features and potential issues associated with the scheme, within the study area. During the site visit, key habitats, land use and ecological features were noted where possible. Aerial photographs were used to fill in information on broad habitat types, where access was not available. The study area was also broadly assessed for its potential to support protected species. This was in order to identify potential ecological constraints and to guide recommendations for potential further survey requirements for these species.

There are eleven nationally designated and six internationally designated sites within the study area, including some that would be directly affected by some of the options within the packages, such as the Dee Estuary SAC, SPA and Ramsar. In addition, there are areas of Ancient Semi-Natural Woodland (ANSW) within the study area. A Habitat Regulations Assessment (HRA) should be undertaken to ascertain whether the proposals are likely to have a significant effect on any European Sites within the study area or in adjacent areas.

The combination of a high level site survey and desk study suggests that the study area has the potential to support a range of protected species, including GCN, wintering, migratory and breeding birds, reptiles, badger, bats, water vole, otter and crayfish, for which further surveys may be required. Protected species and controlled plant species surveys are likely to be required, but will be dependent on the options chosen. An Extended Phase 1 Habitat Survey is also recommended, once the options have been narrowed down.

Any development should aim to retain features of ecological value within the scheme design. The highest priorities for protection are the River Dee and estuary, ponds, riparian habitats, wetland areas, woodland areas (particularly ancient woodland), important hedgerows, railway, and veteran trees. However, consideration should also be given to the scrub, mature trees, hedgerows, stone walls and grass verges. Ideally, green space should be provided with consideration to biodiversity to provide an overall ecological gain as recommended in the TAN5, and PPG9.

It is not possible to fully prescribe mitigation for the study area until further surveys have been conducted. However, we can predict that the following forms of mitigation are likely to be required; retention of or compensation for the removal of scrub, mature trees and woodland; appropriate management and timing of vegetation removal for breeding birds, badger and reptiles; potential translocation of GCN; mitigation of lighting for bats and otters and compensation of loss of any bat roost sites. Remediation of the area from Japanese Knotweed may be required prior to any works at the study area. Vegetation and soil removal and disposal from contaminated areas should follow current controlled waste regulations.

The main findings of the biodiversity WelTAG assessment are summarised below:

- Two Local Nature Reserves, eleven nationally designated sites and eleven Internationally designated sites fall within the study area boundary. Package 1 is unlikely to have any impact on the Natura and Ramsar sites. Packages 8, 2, 4, 6 and 7 could impact on these sites where works will not be fully contained within the highway. Packages 9, 3, and 4 could have a large adverse impact without mitigation on these sites where option involve works within/close to them, in particular those that include the creation of new bridges. Appropriate mitigation will reduce these impacts. An HRA should be undertaken where necessary to establish whether the proposals are likely to have a significant effect on any European Sites.
- The study are incorporates a range of habitats including important habitats such as watercourses/ponds, mud and sand flats, and trees and woodland (including areas of ancient woodland), The packages may impact on these habitats where land take is required, or where construction and operation would affect sensitive habitat through indirect effects such as pollution. Package 1 is unlikely to have an adverse impact on important habitats, Packages 8, 2, 4 and 6 could impact on these habitats where works will not be fully contained within the highway. Options within packages 9, 3, 4 and 7 could have a large adverse impact without mitigation on some of these habitats

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where the options involve land take causing loss and fragmentation of the habitat, and where works are required within/adjacent to sensitive habitats, Appropriate mitigation will reduce these impacts.

- The study area has a high potential to be used by foraging, commuting and roosting bats, GCN, wintering, migratory and breeding birds, badger, reptiles, dormouse, otter and water vole. These species include European Protected Species that would require EPS licences where options will affect them and their habitat. Impacts cannot be fully ascertained until full protected species surveys have been conducted. Package 1 is unlikely to have an adverse impact on these species, Packages 8, 2, 4 and 6 could impact on these species where works will not be fully contained within the highway. Options within packages 9, 3, 4 and 7 could have a large adverse impact without mitigation on some of these species where the options involve loss of habitat, fragmentation of the habitat, and disturbance to the species, Appropriate mitigation will reduce these impacts.

Further Requirements

- Further surveys are likely to be recommended for; GCN, reptiles, bats, breeding birds, wintering and passage birds badger, otter, water vole, crayfish, dormouse, native flora, controlled plant species and trees.
- Any development should aim to retain features of ecological value within the scheme design.
- The following forms of mitigation are likely to be required; retention of or compensation for the removal of any scrub, hedgerows, mature trees and woodland; appropriate management and timing of vegetation removal for breeding birds, badger, GCN and reptiles; mitigation of lighting for mammal species; trapping and translocation of protected species and compensation of loss of any bat roost.
- Appropriate Assessment may be required to ascertain the likely impacts on the European Designated Sites, depending on which Packages and Options are taken forward.
- Remediation of controlled plant species from the study area will be required prior to any works where it is growing. Vegetation and soil removal and disposal from contaminated areas should follow current waste regulations.

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11.10 References

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The Hedgerows Regulations 1997 Statutory Instrument 1997 No. 1160 http://www.opsi.gov.uk/si/si1997/19971160.htm

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12 Heritage

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13 Heritage

13.1 Introduction

The aim of the Stage 1 Assessment is to '*provide an assessment of the scale and seriousness of impacts on historic heritage'* (Welsh Transport Planning and Appraisal Guidance, June 2008). This section provides an assessment of the proposed route option on the cultural heritage assets.

The NEWABTS has nine packages of options which relate to three levels of proposal: 1 Managing Demand, 2 Making Best Use and 3 Capacity Enhancements. The packages under consideration are summarised in Section 1.

Within each package are four strategic areas, these are Strategic Trips, Flint/Mold to Chester, Wrexham to Deeside and Chester to Wrexham. These all contain separate improvements or changes which are proposed and where they are expected to take place.

13.2 Methodology

The Stage 1 assessment presented in this section has been prepared in accordance with Welsh Transport Planning and Appraisal Guidance (WelTAG 2008). The results of the assessment of the impact significance is summarised using a seven –point scale, as follows:

Large beneficial;

Moderate beneficial;

Slight beneficial;

Neutral;

Slight adverse;

Moderate adverse; and

Large adverse.

Archaeological constraints are discussed, and an indication of further surveys is considered.

The assessment of impacts on the cultural heritage assets was undertaken through the analysis of data obtained from The Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) and its online database, Coflein and from Heritage Gateway.

A corridor of 250m either side of each option has been assessed to gain an understanding of the nature of the surrounding archaeological landscape and to place sites within their wider context.

13.3 Policies and their implications

Welsh national legislation and guidance that is relevant to cultural heritage for these areas comprises:

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas) Act 1990;
- Planning and Policy Statement 5: Planning for the Historic Environment;
- Planning Policy Wales Edition 3 (July 2010);
- Welsh Office Circular 1/98: Planning and the Historic Environment: directions by the Secretary of State for Wales;
- Welsh Office Circular 60/96: Planning and the Historic Environment – Archaeology; and
- Welsh Office Circular 61/96: Planning and the Historic Environment: Historic Buildings and Conservation Areas.

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- Protection of Wrecks Act 1973; and,
- Institute for Archaeologists Standards and Guidance for Desk-Based Assessment (2008).

Regional and local planning policies that are relevant to the consideration of cultural heritage comprise:

Flintshire Unitary Development Plan (Draft) published 2003.

This contains the following proposed policies that pertain to the historic environment:

- HE1 Development Affecting Conservation Areas
- HE2 Alteration, Extension and Change of Use of Listed Buildings
- HE3 Demolition of Listed Buildings or Buildings in Conservation Areas
- HE4 Buildings of Local Interest
- HE5 Protection of Landscapes, Parks and Gardens of Special Historic Interest
- HE6 Scheduled Ancient Monuments and other Nationally Important Archaeological Sites
- HE7 Other Sites of Lesser Archaeological Significance
- HE8 Recording of Historic Features

It is presumed that policies HE2 and HE3 will not apply for the A55/A494 scheme but have been retained in the list of relevant policies as they may be applicable at later stages of planning if routes and improvements are altered.

Wrexham Unitary Development Plan 1996-2011, adopted February 2005.

This contains the following proposed policies that pertain to the historic environment found in the Environment and Conservation areas section:

- EC 7 Conservation Areas
- EC 9 Alterations or demolition to Listed Buildings
- EC11 Archaeology

Environmental Planning Cheshire 2016: Structure Plan Alterations R1 and R2.

Local Development Scheme 2009. Saved policies ENV31, ENV32, ENV33 & ENV34.

13.4 Baseline

13.4.1 Study Area

The general study area comprises a range of heritage assets of all dates. The majority of known heritage assets date to the post-medieval period, although earlier sites are found but are less frequent. Full details of cultural heritage features have been presented in Annex 7.1.

Prehistoric (to AD43)

There is surprisingly little known regarding the earlier prehistoric periods within the study area. The north east of Wales has many sites of prehistoric date ranging from the Palaeolithic through to the late Iron Age. The evidence of Palaeolithic and Mesolithic date has been found in the north east of Wales predominantly in the cave systems which are found in the area and the estuarine areas and coastal fringes. Recorded examples of Mesolithic material have been found at Rhyl and Rhuddlan to the north of the area and the reconstructed palaeo-environmental data suggests that the Dee Estuary was a deep river valley prior to the rise in sea levels in the early post-glacial period. These would suggest that this area would have been an attractive habitat to exploit for seasonal resources.

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The Neolithic and Bronze Age periods in north east Wales are well documented and a large amount of research has been undertaken particularly with regard to burial archaeology. These sites are more visible in the landscape and consequently have been investigated more than other site types.

The Iron Age period of this part of Wales has seen an emphasis on sites such as hill forts and enclosed settlements. The area was inhabited during the Iron Age by a tribe called the *Deceangli* by the invading Roman military[28].

Roman (AD43 to AD450)

Wales was important to the Romans for its natural resources which were abundant in the hills. These included gold, silver and lead, all of which were found in the study area. The main legionary fortress at Chester was the key Roman base from which to exert pressure into north east Wales. Roman roads ran between Chester to Wrexham in the south of the study area as well as from Chester to Flint to the east.

Roman remains are limited to the settlement at Pentre Bridge that appears to have been associated with the lead mining at Halkyn Mountain to the west. The A548 road may also have possible origins in this period. The excavations at Pentre Bridge uncovered high status buildings, lead-working industrial remnants and extensive settlement evidence as well as a cemetery. A Roman port is presumed to have been present at Flint although this has not been located.

The Roman city of Chester was an important centre for the Romans in the north west of England. The fort at Chester, known as *Deva Victrix,* was the base for the main Roman legion and was one of the largest outside of London. It was from the base at Chester that the Romans advanced west into Wales and north in to England. The city of Chester falls within the study area and there a considerable number of finds associated with this. These are mainly from the civilian settlement, which surrounded the fort, and from which the city of Chester grew.

Early Medieval (450 to 1066)

Offa's Dyke and Wat's Dykes are both found bisecting the area to the west of Flint, Northop and Ewloe and in the south through Wrexham. Evidence of early medieval activity is otherwise scarce. Some ecclesiastical sites are purported to originate during this period although physical evidence is lacking. Place-name analysis and historic map regression of the earlier church boundaries suggest that some areas such as Hawarden originated in this period.

Medieval (1066 to 1500)

The medieval period saw a number of castles constructed in a number of towns in the study area. These were mainly for defensive purposes due to the hostility between the Welsh and English in this area, which intensified after the Norman invasion.

Several of the towns within the study area are documented during this period. Flint itself dates to the mid-13th century and originally acted as a campaign base for Edward I[29] and as a result had extensive defensive arrangements. The towns of Northop, Ewloe and Hawarden all appeared during the medieval period and Ewloe and Hawarden both have castles dating to this date. The area saw much unrest and conflict as it is located in the borderlands between Wales and England. Wepre Woods, close to Ewloe Castle, was the scene of an ambush and battle where the Welsh forces of Owain Gwynedd and the invading forces of Henry II clashed in 1157. Although the Welsh forces won the battle, the English were ultimately victorious and this led to a permanent loss of Welsh independence.

Post-Medieval (1500 to 1900)

The area saw a rapid expansion during the post-medieval period. The expansion was linked primarily to the industrial rise of coal and lead mining and the associated movement of workers to exploit this surge. This in turn led to a rise in the ecclesiastical structures that serviced their spiritual requirements. There is a wide variety of denominations represented in the churches and chapels found within the study area. The numbers of extant structures illustrate this multitude of ecclesiastical sites. Further examples of built heritage show the types of industrial processes occurring within this part of the Dee Estuary. Iron and steel works, textile mills and alkali works are all present within the study area although these generally date to the later post-medieval. A number of transport related sites are present, mainly connected to the rail

[28] http://www.cpat.org.uk/ycom/flint/flipre.htm accessed 19/11/2010.
[29] http://www.cpat.org.uk/ycom/flint/flimed.htm accessed 22/11/2010.

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industry, which allowed the movement of raw materials and finished goods. The main development in terms of landscape was the canalisation of the River Dee. The new canal portion opened for river traffic in 1737 and this allowed large areas of former marshland to be reclaimed in the Shotton and Queensferry areas. The many railways which bisect the area also originate to this period running from Chester to north Wales as well south to Wrexham and beyond into central Wales.

Modern (1900 to present)

The sites of modern date generally comprise of examples of built heritage and infrastructure constructed in the early 20th century. These include a number of chapels, commercial buildings and worker's housing.

A number of Conservation Areas are also located within the towns of the study area.

13.4.2 Existing Conditions

Package 2 - Making best use – Flint/Mold to Chester

The heritage assets which are located within the area are mainly post-medieval in date. No sites earlier than the medieval period are recorded in the area.

Several sites of medieval date recorded in the area comprise three Scheduled Monuments. These comprise Flint Castle and two moated sites at Green Lane Farm and Bretton Hall.

The sites which are post-medieval in date comprise listed buildings of churches, county buildings and public establishments. Many listed buildings are found in the town centre of Flint and the centres of the villages of Connah's Quay, Shotton and Broughton.

Package 3 - Capacity enhancements – Flint/Mold to Chester

The majority of cultural heritage assets which are located within the area comprise post-medieval listed buildings found within the settlements where the options are proposed, particularly around Chester, Flint, Mold, Broughton and Connah's Quay.

There are a number of sites of Bronze Age barrows and other prehistoric find spots found in the area, as well as a considerable number of assets relating to the Roman sites at Pentre Bridge and the legionary fort at Chester.

A number of early medieval and medieval sites are also recorded in the towns. Castles were built as part of the defence of Wales the 13th century. Many of the towns in the area grew up around these castles.

Package 4 - Making best use – Wrexham to Deeside

The cultural heritage assets which are located within the area which could be impacted range in date from prehistoric to modern.

The sites of earlier date comprise prehistoric mounds, most likely funerary monuments of barrows, as well as a standing stone. A number of sites of early medieval date are recorded, including sections of Wat's Dyke.

The majority of sites are post-medieval in date and comprise listed buildings found in the centres of towns and villages

Package 5 - Capacity enhancements – Wrexham to Deeside

The majority of cultural heritage assets which are located within the area comprise post-medieval listed buildings found within the towns where the options are proposed, particularly around Mold, Flint, Shotton, Buckley and Connah's Quay.

There are a small number of sites of prehistoric date including a Bronze Age barrow and find spots.

A number of early medieval and medieval sites are also recorded in the towns. Castles were built as part of the defence of Wales the 13th century. Many of the towns in the area grew up around these castles.

Package 6 - Making best use – Chester to Wrexham

The majority of cultural heritage assets which are located within the area are post-medieval in date.

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No sites earlier than the early medieval period are recorded in the area. The site of early medieval date comprises Wat's Dyke, part of which is scheduled.

Sites of post-medieval date comprise listed buildings of churches and houses. Many listed buildings are located in the town centre of Wrexham and the city centre of Chester.

Package 7 - Capacity enhancements – Chester to Wrexham

The majority of the heritage assets in the area comprise post-medieval listed buildings found within the settlement centres, particularly around the centres of Chester, Wrexham, and Gresford.

There are a number of earlier sites of prehistoric date and a considerable number of assets relating to the Roman sites at the legionary fort at Chester.

Package 8 - Making best use – Strategic Trips

The heritage assets which are located within the area are mainly post-medieval in date. No sites earlier than the early medieval period are recorded in the area. Several sites of early medieval and medieval date are recorded in the area. These comprise Wat's Dyke, which runs for several kilometres in the study area, more than 1.5km of which has been destroyed. , 130m of the dyke is still extant south west of Wrexham station, part of which is scheduled. Two castle sites at Flint and Hawarden, both of which are scheduled monuments, are medieval in date.

The sites of post-medieval date comprise listed buildings of churches, county buildings and public establishments. Many listed buildings are found in the town centre of Wrexham and the centres of the villages and towns which run between Wrexham and Flint.

Package 9 - Capacity enhancements – Strategic Trips

The majority of cultural heritage assets which are located within the area comprise post-medieval listed buildings found within the towns where the options are proposed, particularly around Chester, Wrexham, Mold and Gresford.

There are a number of Bronze Age barrows and prehistoric find spots found in the area, as well as a considerable number of assets relating to the Roman sites at Pentre Bridge and the legionary fort at Chester.

A number of early medieval and medieval sites are also recorded in the towns such as Flint where castles were built as part of the defence of Wales in the 13th century. Many of the towns in the area grew up around these castles.

13.5 Potential Effects

The potential effects on the proposed development on cultural and built heritage include:

- Physical impacts upon archaeological features.
- Physical impacts on the historic landscape.
- Visual impacts upon the setting of archaeological features.
- Visual impacts upon the setting of built heritage features.
- Visual impacts on the historic landscape.

The potential effects are listed below within each individual package.

13.5.1 Package 1: Managing Demand

This package will not have any adverse impacts on known or previously unrecorded cultural and built heritage. If the stated objective of reducing road traffic is achieved, this may result in a slight beneficial effect on elements of built heritage. This is due to members of the public being able to appreciate the character of the built heritage by enhancing the setting.

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13.5.2 Package 2 - Making best use – Flint/Mold to Chester

The cultural heritage sites which could be impacted with the proposed changes in the area are listed buildings within the centres of the towns and villages, in particular Flint, Mold and Chester. There are listed buildings at the majority of the railway stations where alterations are proposed to take place in options 32, 55 and 106, and along the high streets of Connah's Quay and Broughton as part of option 106. There could be impacts on Conservation Areas in the study area, especially where options pass through the towns.

13.5.3 Package 3 - Capacity enhancements – Flint/Mold to Chester

The cultural heritage assets which could be impacted are listed buildings within the town centres of Chester Mold and Flint as part of options 49 and 40. There are also likely to be impacts upon heritage assets within the towns and villages of Broughton, Shotton, Saltney, Broughton, Connah's Quay and Penyfford as part of options 69, 70, 72 and 14. These assets are likely to be impacted visually rather than physically. There could be adverse impacts on Conservation Areas in the study area, especially where options pass through the towns.

13.5.4 Package 4 - Making best use – Wrexham to Deeside

The cultural heritage sites which could be impacted with the proposed changes are listed buildings within the centres of the towns and villages. There are listed buildings at the majority of the railway stations where alterations are proposed to take place as part of options 32, 55 and 106. Listed buildings within villages where highway improvement measures are proposed as part of options 6, 7 and 16 may have their setting affected. There could be adverse impacts on Conservation Areas in the study area, especially where options pass through the towns.

13.5.5 Package 5 - Capacity enhancements – Wrexham to Deeside

The cultural heritage assets which could be impacted with the proposed changes in the area are listed buildings within the town centres of Wrexham, Chester, Mold and Shotton as part of options 50, 104 and 59. There are also likely to be impacts on assets within the towns and villages of Buckley, Deeside, and Wrexham as part of options 13, 23, 47 and 104. These assets are likely to be impacted visually rather than physically. There could be adverse impacts on Conservation Areas in the study area, especially where options pass through the towns.

13.5.6 Package 6 - Making best use – Chester to Wrexham

The cultural heritage assets which could be impacted with the proposed options in the area are listed buildings within the town centre of Wrexham as part of options 32 and 55. These are likely to be impacts on the setting of the buildings. There could be adverse impacts on Conservation Areas in the study area, especially where options pass through the towns.

Options 10, 17, 21, and 24-27,as part of highway alterations, may have physical impacts on heritage assets. The heritage assets located along these proposed routes, particularly those off-line, also have the potential to impact on currently unrecorded heritage assets. There could be adverse impacts on Conservation Areas in the study area, especially where options pass through the towns.

13.5.7 Package 7 - Capacity enhancements – Chester to Wrexham

The cultural heritage assets which could be impacted with the proposed changes in the area are listed buildings within the town centres of Chester and Wrexham as part of options 39 and 47. There are also likely to be impacts within the village of Burton with option 71. Options 17 and 18 will also have impacts upon heritage assets. These are likely to be impacted visually. Option 17, which is off-line, to the current highway, could have physical impacts on heritage assets. There could be impacts on Conservation Areas in the study area, especially where options pass through the towns.

13.5.8 Package 8 - Making best use – Strategic Trips

The cultural heritage sites which could be impacted with the proposed changes in the area are mainly listed buildings within the centres of the towns and villages. There are listed buildings at the majority of the railway stations where

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alterations are proposed as part of options 55 and 32. There could be adverse impacts on Conservation Areas in the study area especially where options pass through towns.

13.5.9 Package 9 - Capacity enhancements – Strategic Trips

The cultural heritage assets which could be impacted are listed buildings within the town centre of Wrexham as part of option 39. There are also likely to be impacts upon heritage assets within the towns and villages of Northop, Ewloe, Broughton, Shotton, Buckley, Mold and Penyfford as part of options 40, 33, 104, 51 and 41. These heritage assets are likely to be impacted visually rather than physically.

13.6 Potential Mitigation Measures

A Stage 2 WelTAG Assessment will be the next stage of assessment required. This will be conducted using the same methodology as a Stage 1 assessment but will be undertaken to a greater level of detail and a full impact assessment will be provided. It is likely to comprise a full desk-based assessment to allow further consideration of the transport options; and to further clarify constraints and impacts. This will include consultation with the RCAHMW, the Clywd Powys Archaeological Trust and the archaeological advisor for Chester and Cheshire West Council.

Further evaluation works may be required including, but not limited to, geophysical assessment, evaluation trenching and full area assessment. The exact nature of this works cannot be determined until the Stage 2 WelTAG assessment and consultation has been completed. However, it is likely that there may be a greater requirement for these where any proposed infrastructure improvements are located in previously undeveloped land.

Little can be undertaken to mitigate against the impact of the scheme on the historic landscape or the setting and visual impacts on historic features. Where possible vegetation should be retained although additional screening may, in places, create an impact on the setting of these features. Advice should be sought on the placement and appearance of any intended improvements such as cycle parking facilities. The impact resulting from these may be partially mitigated during the design and planning phase by strategic placement of the new facilities.

13.7 Residual Effects

13.7.1 Package 1

This package will not result in any adverse impacts to cultural heritage. It is possible that the envisaged reduction in traffic may result in a slight beneficial impact as members of the public will be able to appreciate the historic environment in an improved setting. The residual impact is therefore considered to be neutral at worst and slight beneficial at best.

Packages, 2, 3, 4, 5, 6, 7, 8 and 9

All these packages contain changes which are likely to have residual impacts on cultural heritage. The impact on the cultural heritage assets during both the construction and operation stages of the development is likely to be permanent. The identified impacts on cultural heritage arising from the various packages have not been definitively established and thus it is not possible to state with any certainty at this stage which impacts will remain following mitigation. Consequently, once a detailed design is produced for the proposed scheme the residual effects can assessed in more detail.

13.8 Cumulative Impacts

The overall cumulative impacts from the various proposed packages for improvements alongside other contemporary and future developments are likely to be adverse. At this stage any magnitude or significance of these impacts has not been quantified.

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13.9 Conclusion

This Stage 1 assessment has collated data from the RCAHMW, the Heritage Gateway and readily available documentary sources. The data was obtained from the RCAHMW online resource Coflein.

The WelTAG assessment has identified over previously recorded archaeological and cultural heritage sites within the package areas. These were gained from a search of the RCAHMW's databases. Most of these sites relate to the built heritage of the area and date to the post-medieval period.

The Stage 1 WelTAG assessment has demonstrated that heritage assets are distributed throughout the study area, although the main concentrations were within established urban centres. These were primarily of built heritage assets dating from the post-medieval and modern periods. Additional sites of earlier date are recorded but these are less frequent. A large number of sites of Roman date are recorded within and close to the city of Chester. The medieval period saw a growth in established settlements and particularly of castles.

The Stage 1 assessment has concluded that all packages that contain elements of intrusive ground works have the potential for adverse cultural heritage impacts. Package 1 has the potential for a slight beneficial effect on cultural heritage if managed correctly.

13.10 References

Ancient Monuments and Archaeological Areas Act 1979.

Planning (Listed Buildings and Conservation Areas) Act 1990.

Flintshire Unitary Development Plan (Draft) published 2003.

Institute for Archaeologists Standards and Guidance for Desk-Based Assessment (2008).

Planning Policy Wales Edition 3 July 2010.

Planning Policy Statement s: Planning for the Historic Environment

Welsh Transport Planning and Appraisal Guidance, June 2008.

Welsh Office Circular 1/98: Planning and the Historic Environment: directions by the Secretary of State for Wales.

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14 Soils

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15 Soils

15.1 Introduction

This Section discusses the environmental constraints and potential environmental impacts of the proposed nine transport packages on the ground conditions, as well as constraints that ground conditions may pose on the transport options (e.g. through the presence of contaminated land). Impacts on groundwater are considered in Section 9. This section presents the environmental baseline conditions and the assessment of significance for each of the scheme options, mitigation measures and the likely residual impacts.

15.2 Methodology

The Stage 1 assessment presented in this Section has been prepared in accordance with Welsh Transport Planning and Appraisal Guidance (WelTAG 2008), which refers to Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 (Welsh Government, 2009). Baseline information is presented by corridor where appropriate (i.e. for geology and soils); then each of the proposed transport packages is taken in turn for discussion of potential effects, mitigation measures, residual effects, and (where applicable) cumulative impacts.

15.2.1 Baseline

The following sources of information have been consulted to determine baseline information:

- British Geological Survey (BGS) (1999),Geological Map Sheet 108(Flint), combined Solid and Drift Edition, 1:50,000;
- BGS (1999), Geological Map Sheet 109 (Cheshire), Drift Edition, 1:50,000;
- BGS (1999), Geological Map Sheet 109 (Cheshire), Solid Edition, 1:50,000;
- BGS (1994), Geological Map Sheet 121 (Wrexham), combined Solid and Drift Edition, 1:50,000;
- Lawes Agricultural Trust (1983), Soil Survey of England and Wales Sheet 3: Soil Survey of Midland and Western England, 1:250,000;
- Ragg, JM *et al* (1984) Soils and Their Uses in Midland and Western England. Harpenden: Whitstable;
- Environment Agency (EA) (2010), Online Interactive Landfill Map. http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=waste&layerGroups=default&lang=_e&ep=map&scale=1&x=357683&y=355134 (accessed on 17 November 2010);
- EA (2010), Online Interactive Groundwater Map. http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=drinkingwater (accessed on 4 November 2010);
- Multi-Agency Geographic Information for the Countryside (MAGIC) website;
- EA (2002) Contaminated Land Research (CLR) Report 8: Potential Contaminants for the Assessment of Land;
- Historical Ordinance Survey Maps reviewed at the National Library of Scotland Map Library, reviewed between 12 and 16 November, 2010;
- Department for Environment, Food and Rural Affairs (DEFRA) / EA Contaminated land legislation: Environmental Protection Act 1990, Part IIA; and,
- Department of Environment (1995) Industrial Profiles.

The review of historic OS mapping was conducted at the National Library of Scotland's map library; 1:10,000 or 1:10,560 map editions dating from 1899 to 1994 (the most recent ones held at this library) were reviewed at intervals of approximately every 10 years, where available. The entire study area was included in this review, and locations where potentially contaminative land uses were recorded, along with the kilometre-square in which they exist. To assess

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potential effects and compare between the packages, we then examined the kilometre squares along the packages, and identified which land uses would affect the routes.

15.2.2 Impact Assessment

The potential impacts of the construction and operation of the proposed development on soils and geology have primarily been assessed by a qualitative assessment. The assessment has sought to identify whether the impact is beneficial or adverse based on no mitigation measures being implemented.

The importance of soils and geology resources identified in the baseline is determined following DMRB, and is summarised in Table 8.1 below:

Table 8.1: Criteria to determine the importance of soils and geology resources

Importance of Resource	Criteria description and examples
Very High	Human Health, Land designated as Site of Special Scientific Interest (SSSI) due to geological reasons, Agricultural Land Use Classification 1.
High	Land that has been designated as a Regionally Important Geological Sites (RIGSs)or Geological Conservation Review (GCR) site, Agricultural Land Use Classification 2.
Medium	Attribute has a medium quality and rarity on local scale, Agricultural Land Use Classification 3.
Low	Attribute has a low quality and rarity on local scale, Agricultural Land Use Classification 4+.

The magnitude of an adverse effect is considered qualitatively following 552 'Contaminated Land Risk Assessment, A Guide to Good Practice', and is summarised in Table 8.2 below:

Table 8.2: Criteria to determine the magnitude of an adverse impact on soils and geology resources

Magnitude of Effect	Criteria Description and Examples
Major	Acute risk to a particular ecosystem including soils and geology, or organism forming part of such ecosystem Acute risk to human health likely to result in "significant harm" as defined in the Environmental Protection Act, Part IIA. Catastrophic damage to buildings/property.
Moderate	Chronic damage to Human Health ("significant harm" as defined in the Environmental Protection Act, Part IIA.). A significant change in a particular ecosystem including soils and geology, or organism forming part of such ecosystem.
Minor	Significant damage to soils, geology, crops, buildings, structures and services. Damage to sensitive buildings/services or the environment
Negligible	Harm, although not necessarily significant, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.). Easily repairable effects of damage to soils, geology buildings, structures and services.

The assessment of the impact significance is determined using the following matrix:

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Table 8.3: Impact significance matrix

		Predicted Magnitude of Effect			
		Major	**Moderate**	**Minor**	**Negligible**
Importance of Resource	**Very High**	Large beneficial or Large adverse	Moderate beneficial or Moderate adverse	Moderate beneficial or Moderate adverse	Moderate beneficial or Moderate adverse
	High	Moderate beneficial or Moderate adverse	Moderate beneficial or Moderate adverse	Moderate beneficial or Moderate adverse	Slight beneficial or Slight adverse
	Medium	Moderate beneficial or Moderate adverse	Moderate beneficial or Moderate adverse	Slight beneficial or Slight adverse	Neutral
	Low	Moderate beneficial or Moderate adverse	Slight beneficial or Slight adverse	Neutral	Neutral

15.3 Policies and their implications

Limited direct regulation currently exists with respect to the protection of soils, although they are indirectly protected by other legislation such as that covering the prevention of pollution and contamination, and for land use planning.

The European Union adopted a Soil Thematic Strategy and a proposal for a Soil Framework Directive with the objective of providing protection to soils across the EU in September 2006, although currently no agreement has been implemented. In response DEFRA, on behalf of the UK Government has undertaken stakeholder consultation and in September 2009 issued the "Soil Strategy for England – Safeguarding our Soils" supporting the aims of the Soil Thematic Strategy with respect to the national interests of England. Whilst the strategy is limited to England, the issue of soils being a devolved responsibility, the strategy considers that the issues highlighted facing soils are reflected throughout the UK. The "Environment Strategy for Wales" WAG 2006 outlines soils as an important resource to be managed sustainably. UK Government policy for protection of the best and most versatile agricultural land is set out in Planning Policy Statement 7 (PPS7) 'Sustainable Development in Rural Areas' published in August 2004 (paragraphs 28 and 29). This outlines that the presence of best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification), should be taken into account alongside other sustainability considerations. The Minerals Planning Policy Wales (2000) (MPPW) sets out overarching policy guidance for all types of mineral extraction in Wales. It aims to provide positively for the working of minerals resources to meet society's needs by identifying areas for future working where practicable and by safeguarding mineral resources from permanent development that would prevent their future development.

Relevant legislation with regards contaminated land fall under Part IIA of the Environmental Protection Act (1990) which has introduced a statutory definition for Contaminated Land, as follows:

"…any land which appears to the local authority in whose area it is situated to be in such a condition, by reason

of substances in, on or under the land, that:

a) significant harm is being caused or there is a significant possibility of such harm being caused, or

b) significant* pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused"

*The Water Resources Act 1991 (amended 2003) has introduced the concept of a significance test to the assessment of the degree of contamination to controlled waters, excluding that which is contained in underground strata but above the saturation zone. The significance test is designed to screen out minor contamination issues and ensure only significant historic contamination of controlled waters is considered.

In England and Wales, The Water Resources Act 1991 (amended 2003) gives the Environment Agency (EA) powers and duties to prevent or remedy the pollution of controlled waters. Under this act it is a criminal offence if a person causes or knowingly permits pollution of controlled water.

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The term 'pollutant linkage' indicates that all three elements (i.e. source/ pathway / receptor) have been identified. The study area can only be designated as Contaminated Land if there is a pollutant linkage and the contamination meets the criteria, outlined above. The source/ pathway/ receptor approach used to assess this study area is widely accepted in the industry, although it does not take into account less scientific factors such as perceived risk.

The basis of an environmental risk assessment is detailed within the Contaminated Land Report 11 (CLR 2004) “Model Procedures for the Management of Land Contamination”. This provides guidance on the processes of risk assessment and identification/evaluation of remediation options. Planning Policy Statement 23: Planning and Pollution Control (PPS 23) explains the relationship between the planning and part IIA regimes. In brief, as a minimum, after carrying out a development and commencement of its use, the land should not be capable of being determined as contaminated land under Part IIA.

15.4 Baseline

15.4.1 Geology

Superficial

Superficial geology in the Study Area mainly comprises Till, with Alluvium along the river Dee, and large areas of Glacial Sand and Gravel (in the vicinity of Wrexham-Gresford and as a linear feature from approximately Ween-ddu to Astow/Castle Hill Farm), Lacaustron deposits (around and north of Burton Meadows), River Terrace deposits (between Marland, Darland, and Broadoak), and Marine Deposits (along the Dee). Pockets of these and other materials (notably peat, head, and scree) were noted throughout the study area.

A significant section of the Deeside Industrial Park is shown to comprise Made Ground. Small, occasional pockets of Infilled ground, Made Ground (on existing land surface), and landslips were also noted in the study area.

Bedrock

Bedrock geology in the study area is shown divided into two distinct areas. A fractured mixture of sandstones and interbedded sandstone, mudstone, shale, siltstone and/or limestone formations, with coals and seat earth (Lower Coal Measures, Middle Coal Measures, and/or Holywell Shales Formation) are shown in the western half of the study area. In the eastern half of the study area a mixture of sandstones (Kinnerton Sandstone Formation, Gwespyr Sandstone Formation and Pebble Beds of the Sherwood Sandstone Group; Lower Mottled Sandstone; and Erbistock Formation) are shown.

Several large north-south trending Faults are shown in the study area, and a few small east-west trending faults are shown in the study area to the south of the Dee. Coal crops of named seams are shown in several places to the south of the river.

Numerous boreholes and shafts were noted on the geological map; further mining activity may have occurred onsite.

Geodiversity

SSSIs within the area are identified in Section 6. Only one of these, Vicarage Moss to the south of Gresford (NGR SJ3599541), is of geological interest. This is one of the best-developed kettle hole complex in Wales and is representative of many that have developed throughout the Wrexham area in sands and gravels of the Wrexham Delta Terrace. Additionally, several of the SSSIs identified within the Study Area developed as a consequence of the legacy mining industry in the area. Of particular note is Connah’s Quay Ponds and Woodlands in Flintshire, which is contiguous with the Deeside and Buckley Newt Sites SAC.

The Geological Conservation Review (GCR) was created to identify key geological sites in Britain that display features that further our understanding of Earth science and the geological history of Britain; many of these sites are protected as SSSIs or are under consideration for this status. There is one GCR site within the Study Area; the aforementioned Vicarage Moss site.

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As the Vicarage Moss site is over a kilometre from any of the Packages, it is not considered likely that it will be impacted by the scheme.

15.4.2 Landfilling

There are 15 active and 155 inactive landfills within the Study Area. These are primarily concentrated around areas of former mining, i.e. south-east of Flint from around Connah's Quay to just north of Buckley, between Caergwrle and Gresford, and just north of Bretton, although landfills are scattered throughout the Study Area. Of the active landfills, four are listed as Hazardous, four are classed as Non-Hazardous, one is classed as Inert, and the classification of the remaining six is unknown.

15.4.3 Agricultural Land

The MAGIC website, which refers to the DEFRA Agricultural Land Classification Map, only covers the parts of the study area which are within England. For the English portion of the study area, the majority of the agricultural land has been recorded on the interactive map under a classification of Grade 3 - Good to Moderate Quality Agricultural Land. Small pockets of land following watercourses are indicated on the map under a classification of Grade 4 – Poor Quality, and Chester itself has a Grade 5.

For each corridor, the Associations listed on the Soil Survey Map are discussed below.

Table 8.4: Associations listed on the Soil Survey Map by transport corridor

Corridor	Soil Survey
Flint/Mold -Chester	Primarily 711n or 711m south-west of the River Dee and 812b north-east of the river. Pockets of 541r south of the river along watercourses, and Unclassified, 861b, and 551a around Chester.
Chester-Wrexham	Chester-Bretton 812b (with pockets of Unclassified soil), Bretton to Pulford is 711m. From Pulford to Wrexham, soil association shown is a mixture of 811b, 831c, 541r, 551d, 711m, and Unclassified. Wrexham is Unclassified.
Wrexham-Deeside	The area around the River Dee is shown to be 812b. The largest fraction of this study corridor is shown to be 711m and 711n, with the area around Penyffordd-Drury shown as 713g and Wrexham shown as Unclassified. Pockets of 541r, 811b, 611d, and 551d are also shown.
Strategic Trips	The branches for this Corridor run through lands classified as 541r, 551d, 561b, 572m, 611a and d, 711m and n, 713g, 811b, 812b, 813e, and 861b.

Associations 831c, 812b, 561b, 813e, 713g, 811b, and 711m are from alluvial sources and tend to be wet or seasonally waterlogged; most of these are used primarily for grass or grazing (with the exception of 831c, which is frequently used for crops under rotation). Association 611a is also primarily clay, but it has better drainage properties; it too is primarily used for grazing. Associations 572m and 551d are sand or very sandy and are easy to work, but only 572m is considered a good soil. Associations 711n, 541r, and 611d are loamy soils. Association 861b is primarily comprised of peaty soils that are waterlogged in winter and a good agricultural resource if drained.

15.4.4 Potential Land Affected by Contamination

A review of historic maps indicated numerous activities that have the potential to be sources of contamination within the Study Area. Summarised below are the key activities noted and what contamination might have been left behind from these.

Mining and Landfilling

A review of the historical maps indicates that mining and related activities (e.g. brick works) has occurred at 144 separate locations within the Study Area, where a location ranges in size from an individual shaft to full grid squares with several separate shafts, quarries, and spoil tips present. Mines have the potential to have contamination associated with the material which was removed as well as contamination associated with the mining process itself. Furthermore, quarries have the potential to be backfilled with unknown material or be used as landfills or tips, and spoil heaps are

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often a source of contamination. Mining/quarrying in the Study area has been for clay (for bricks), lead, sand and gravel, stone, copper, and/or coal. Soil vapour may also be hazardous due to landfill gas. Although not specifically noted from the historic map review, salt mining cannot be ruled out based on the location of the Study Area.

Airports

Airfields have been observed on the historic maps at three locations within the Study Area. Contamination associated with airports (if present) may include metals (chromium and copper), complex cyanide, asbestos, and/or corrosive conditions.

"Works"/Industrial Activity

A review of the historical maps indicates the presence of many forms of industrial activity within the Study Area, including saw mills, limekilns, chemical works, smithys, timber yards, depots, breweries, factories, bakeries, industrial estates, candlemaking, and unspecified works. Brick Works, due to the fact that this activity typically occurs at the site of the mine, is discussed under Mining/Landfilling. Water treatment works are considered with slurry pits and other activities that have the potential for biological hazards as well as chemical contamination.

Industrial “works” have the potential to be a source of many different contaminants, depending on what activity was involved. The historic map review indicated the presence of Industrial activity/”works” at 123 locations within the Study Area.

Garages and Gasworks

A review of the historical maps indicates the presence of 21 garages/filling stations and seven gasworks/gasometers within the study area. The principle contamination associated with both of these land uses is petroleum hydrocarbons; if present, contaminants may include toxic and phytotoxic metals, cyanide, sulphur, sulphate, Polychlorinated biphenyls (PCBs) and/or asbestos, as well as hydrocarbons. Soil vapour may also contain hazardous levels of carbon dioxide and other hydrocarbons.

Substations and Power Station

Four electrical substations and two power stations are documented within the Study area. PCBs may be found in old transformers and capacitors manufactured before 1976 at these sites. Additionally, the Power Stations may be a source of many other contaminants, including metals, arsenic, selenium, sulphate, sulphide, asbestos, and corrosive conditions.

Biological Hazards

Water treatment works (including filterbeds, sewage works, and slurry pits) and a Small Pox Hospital have the potential for biological agents to adversely affect site users. One Small Pox hospital and 26 water treatment (or similar) works were observed within the study area. In addition to the biological hazards, contamination associated with water treatment works includes metals (aluminium), and gases.

Table 8.5 overleaf lists the types of industrial activity by Package, and provides an indicative level of potential for contamination within circa 1km of the route.

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Table 8.5: Types of industrial activity by transport Package

	Totals for Study Area	1*	2	3	4	5	6	7	8	9
Works	**103**	0	14	50	19	40	2	16	110	87
Airfield	**3**	0	1	2	0	1	0	0	3	2
Gasworks/ garage	**28**	0	4	13	5	15	0	3	27	22
Mining	**144**	0	15	24	26	44	0	12	141	99
Power	**6**	0	2	3	6	0	0	0	6	6
Bio	**27**	0	1	10	4	5	1	6	27	19

*As the Managing Demand Options Package contains no intrusive works, it is not considered likely that any pre-existing contamination present will significantly affect the route, nor is it considered likely that the implementation of this Option Package will create new pathways.

15.5 Potential Effects

The nine transport Packages proposed are described in detail in Section 1.5 in Section 1. These have three levels which correspond to how intrusive (and therefore, how significant the effects will be). These levels are Managing Demand (found in Package 1), which focuses solely on non-construction measures; Making Best Use (Packages 8, 2, 4, and 6) which seeks to minimize cost which means that construction will be at a minimal; and Capacity Enhancements (Packages 9, 3, 5, and 7) which involves the majority of the new infrastructure proposed. The following assessment describes both potential impacts to soils and geology involved with the development of the proposed Packages and impacts that the soils may present to the project.

15.5.1 Construction Impacts

Potential impacts on ground conditions are wide ranging and can involve the following:

- Potential instigation of stability hazards, i.e. subsidence, landslide, as a result of earthworks and erection of permanent structures, disturbance of coal or salt mines;
- Potential creation of new pollutant linkages to pre-existing contamination i.e. mobilisation / exposure of contamination, new receptors (proposed residential / commercial usage), as a result of construction activities and change in land use;
- Potential loss of mineral resources as a result of physical changes in the study area and serialisation of mineral resources beneath development; and
- Potential loss and destruction of agricultural soils, i.e. as a results of encapsulation or damage to soils through handling / earthworks.

These potential effects have guided the process of assessment of baseline conditions in the study area and assessment of likely impacts of the proposed scheme with respect to the ground conditions. Tabulated below are the transport packages and the construction impacts that these might cause. The most severe impacts are those associated with the new road connecting the A55 at Northop to the A548 at Kersterton (Package 9), widening of the A55 Ewloe to Northop and A494 Ewloe to Drome Corner (Package 9), widening of the A494 River Dee crossing (Package 9), the new cycle route between Mold and Deeside (Packages 9 and 5), the new walking and cycling route along the Dee Coast (Packages 9 and 3), the new rail curve at Shotton (Package 3), and the new the new road bridge between Connah's Quay and Deeside Industrial Park (Package 5).

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Table 8.6: Construction impacts

Package	Potential Impact	Importance of Resource	Magnitude of Potential Impact	Significance without Mitigation
Package 1: Managing Demand	Potential instigation of stability hazards	Medium	Negligible	Neutral
	Potential creation of new pollutant linkages to pre-existing contamination	Medium	Negligible	Neutral
	Potential loss of mineral resources	Medium	Negligible	Neutral
	Potential loss and destruction of agricultural soils	Medium	Negligible	Neutral
Package 2: Making Best Use, Flint/Mold-Chester	Potential instigation of stability hazards	Medium	Minor	Slight Adverse
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Low	Minor	Neutral
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight Adverse
Package 3: Capacity Enhancements, Flint/Mold-Chester	Potential instigation of stability hazards	Medium	Moderate	Moderate adverse
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Medium	Minor	Slight Adverse
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight Adverse
Package 4: Making Best Use, Wrexham-Deeside	Potential instigation of stability hazards	Medium	Minor	Slight Adverse
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Low	Minor	Neutral
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight Adverse
Package 5: Capacity Enhancements, Wrexham-Deeside	Potential instigation of stability hazards	Medium	Moderate	Moderate Adverse
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Low	Minor	Neutral
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight Adverse
Package 6: Making Best Use, Chester-Wrexham	Potential instigation of stability hazards	Low	Negligible	Neutral
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Low	Negligible	Neutral
	Potential loss and destruction of agricultural soils	Low	Negligible	Neutral
Package 7: Capacity Enhancements, Chester-Wrexham	Potential instigation of stability hazards	Low	Minor	Neutral
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Low	Minor	Neutral
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight adverse
Package 8: Making Best Use, Strategic Trips	Potential instigation of stability hazards	Medium	Minor	Slight adverse
	Potential creation of new pollutant linkages to pre-existing contamination	Medium	Minor	Slight adverse
	Potential loss of mineral resources	Medium	Negligible	Neutral
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight Adverse
Package 9: Capacity Enhancements, Strategic Trips	Potential instigation of stability hazards	Medium	Moderate	Moderate adverse
	Potential creation of new pollutant linkages to pre-existing contamination	Very High	Moderate	Moderate Adverse
	Potential loss of mineral resources	Medium	Minor	Slight Adverse
	Potential loss and destruction of agricultural soils	Medium	Minor	Slight Adverse

In summary, the packages that have the highest impact will be those with a lot of Capacity Enhancements proposals, with no package having more than a Moderate Adverse impact (prior to mitigation).

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15.5.2 Operational Impacts

The operation of the proposed transport packages could have an impact on ground conditions within the Study Area. In general, these can involve the following:

- Potential creation of new contamination and adverse impact on ground conditions i.e. accidental spills and/ or leaks of fuels, deposition of metals from exhaust emissions and use of de-icers;
- Potential creation of migration pathways for potential contaminants i.e. foundations such as piles, drainage systems and/or soakaways creating pathway into underlying receptors.

It is unlikely that these impacts will affect human health so only soils and geology as receptors have been considered. Further details regarding these impacts and how they relate to the Packages are tabulated in Table 8.7 below:

Table 8.7: Operational Impacts

Package	Potential Impact	Importance of Resource	Magnitude of Potential Impact	Significance without Mitigation
Package 1: Managing Demand	Potential creation of new contamination	Low	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight beneficial
Package PACKAGE 2: Making Best Use, Flint/Mold- Chester	Potential creation of new contamination	Low	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight Adverse
Package 3: Capacity Enhancements, Flint/Mold- Chester	Potential creation of new contamination	Lows	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight Adverse
Package 4: Making Best Use, Wrexham-Deeside	Potential creation of new contamination	Low	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight Adverse
Package 5: Capacity Enhancements, Wrexham-Deeside	Potential creation of new contamination	Low	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight Adverse
Package 6: Making Best Use, Chester-Wrexham	Potential creation of new contamination	Low	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Low	Minor	Neutral
Package 7: Capacity Enhancements, Chester-Wrexham	Potential creation of new contamination	Low	Minor	Neutral
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight Adverse
Package 8: Making Best Use, Strategic Trips	Potential creation of new contamination	Medium	Minor	Slight Adverse
	Potential creation of migration pathways for potential contaminants	Medium	Minor	Slight Adverse
Package 9: Capacity Enhancements, Strategic Trips	Potential creation of new contamination	Medium	Minor	Slight Adverse
	Potential creation of migration pathways for potential contaminants	High	Minor	Moderate adverse

Package 1 presents a neutral to slight beneficial impact regarding the creation of new contamination and migration pathways (due to the decrease in number of journeys). Most other packages are considered to be neutral to slightly adverse with respect to the creation of new contamination and slight adverse to moderate adverse with respect to creation of migration pathways.

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15.6 Potential Mitigation Measures

15.6.1 Construction Impacts

The main mitigation measure to prevent adverse impacts on soils, geology and hydrogeology, during the construction of the development is to ensure good site practice and management; this applies for all Packages under consideration. The site management practices should be undertaken in accordance with the following Environment Agency Pollution Prevention Guidelines (PPGs):

- PPG 1 – General guide to the prevention of pollution;
- PPG 2 – Above ground oil storage tanks;
- PPG 6 – Working at construction and demolition sites;
- PPG 7 – Refuelling facilities;
- PPG 8 – Safe storage and disposal of used oils;
- PPG 18 – Managing fire water and major spillages;
- PPG 21 – Pollution incidence response planning; and
- PPG 26 - Storage and Handling of Drums and Intermediate Bulk Containers.

Additionally, Site Environmental Rules should be established through an Environmental Management Plan (EMP) for the construction phase and followed at all times throughout the contract.

Ground investigation(s) for any intrusive work is likely to be required; this should include contamination testing for the re-use / disposal of material and geotechnical testing for the design of foundations and roads. A risk assessment should be undertaken to determine if the soils pose a risk to human health and or the environment. If they do remedial earthworks may be required.

A more detailed desk study review of areas where mining has occurred should be undertaken (e.g. to examine mine abandonment plans); this should inform ground investigation(s) and, where appropriate, ground stabilization (e.g. grouting of abandoned mines) or the final route to avoid any hazards detected.

A watching brief should be maintained during construction works and where contamination is identified or suspected, appropriate sampling, analysis and risk assessment should be undertaken and suitable measures put in place to prevent the creation of pollutant linkages, including the remediation of the contaminated ground, where appropriate.

If ground investigations indicate that contaminants are present and that construction activities could mobilise contaminants in the soil, which could be potentially harmful to the workforce, risk assessments should be conducted in accordance with the Health and Safety at Work Act to restrict exposure to potentially harmful substances to a safe level. Construction Design and Management practices should be applied.

Additionally, if areas of unforeseen contamination are encountered along the proposed route during construction works, then mitigation measures may need to be implemented.

Dust suppression measures can be implemented at the site to prevent against excessive dust generation, for example impermeable covers spread over mounds of bare soil and wetting of bare soil during dry conditions. Implementation of these simple measures can reduce the impacts to construction workers and adjacent site users from potentially contaminated dusts.

In areas where the presence of contamination is confirmed at the ground investigation stage, all vehicles leaving the site should go through a wheel wash to prevent spreading of contamination onto off-site roads. Furthermore, vehicles carrying contaminated soils off-site should only to be loaded up to appropriate levels and be covered to prevent conditioned sediments dropping onto roads.

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The area of excavation and disturbance should be kept to a minimum in select locations to reduce the amount of degradation or loss of valuable agricultural soils.

15.6.2 Operational Impacts

Appropriate treatment and containment facilities will be required to mitigate the potential adverse impacts from runoff and highway spillages to soils, geology and hydrogeology during the operational phase. The drainage system (gullies, drains, pipes, underground storage tanks, filter drains and catch pits) for the new road will need to be maintained regularly to reduce the likelihood of spillages and leaks onto soils and into the groundwater.

Where piled foundations are used they will be designed in accordance with the EA guidance document 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention'

15.7 Residual Effects

Residual impacts due to construction activities are anticipated to be slightly beneficial to neutral with respect to both the potential to create pollution linkages that affect agricultural soils, mineral resources and geology. This is due to the remediation anticipated should either of these be encountered during ground investigation (should it not be possible for the design to avoid these conditions). Residual impacts due to operational activities are considered to be neutral providing that mitigation measures identified in Section 8.6 are undertaken.

15.8 Cumulative Impacts

No cumulative impacts are anticipated at this stage. However, this should be re-assessed at a later stage when the preferred Package is considered in more detail.

15.9 Conclusion

- As Package 1 has no intrusive measures proposed, it is considered to have a neutral impact.
- Packages 8 and 4 are predicted to have a slight adverse impact. Providing appropriate mitigation is implemented, impacts can be effectively reduced to neutral.
- Packages 2, 6, 9, 3, 5 and 7 are predicted to have a moderate adverse impact. Providing appropriate mitigation is implemented, impacts can be effectively reduced to neutral.

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15.10 References

British Geological Survey (BGS) (1999),Geological Map Sheet 108(Flint), combined Solid and Drift Edition, 1:50,000.

British Geological Survey (1999), Geological Map Sheet 109 (Cheshire), Drift Edition, 1:50,000.

British Geological Survey (1999), Geological Map Sheet 109 (Cheshire), Solid Edition, 1:50,000.

British Geological Survey (1994), Geological Map Sheet 121 (Wrexham), combined Solid and Drift Edition, 1:50,000.

CIRIA 552 'Contaminated Land Risk Assessment, A Guide to Good Practice'

Department for Environment, Food and Rural Affairs (DEFRA) / Environment Agency Contaminated land legislation: Environmental Protection Act 1990, Part IIA.

Department of Environment (1995) Industrial Profiles.

Defra/Environment Agency's *Model Procedures for the Management of Contamination* (CLR11)(2004)

Environment Agency (EA) (2010), Online Interactive Landfill Map. http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=waste&layerGroups=default&lang=_e&ep=map&scale=1&x=357683&y=355134 (accessed on 17 November 2010).

EA (2010), Online Interactive Groundwater Map. http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=drinkingwater (accessed on 4 November 2010).

EA (2002) Contaminated Land Research (CLR) Report 8: Potential Contaminants for the Assessment of Land.

Lawes Agricultural Trust (1983), Soil Survey of England and Wales Sheet 3: Soil Survey of Midland and Western England, 1:250,000

Multi-Agency Geographic Information for the Countryside (MAGIC) website

Ragg, JM *et al* (1984) Soils and Their Uses in Midland and Western England. Harpenden: Whitstable

The Water Resources Act 1991 (as amended)

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16 Water Environment

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17 Water Environment

17.1 Introduction

This Section discusses the environmental constraints and potential environmental impacts of the proposed nine transport packages on the water environment, including surface and groundwater quality, and flood risk. It presents the environmental baseline conditions and the assessment of significance for each of the scheme packages, mitigation measures and the likely residual impacts.

There are nine main strategic transport packages being proposed. These packages are described in detail in Section 1.5 in Section 1:

17.2 Methodology

The Stage 1 assessment presented in this Section has been prepared in accordance with Welsh Transport Planning and Appraisal Guidance (WelTAG 2008). It also takes into consideration the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 10 Road Drainage and the Water Environment (HD45/09) (Welsh Government, 2009).

17.2.1 Surface Water Quality

A qualitative desk study has been carried out to establish the baseline and to identify any potential environmental constraints to development presented by the surface water environment.

The following tasks have been carried out:

- Watercourses and other surface water features have been identified from Ordnance Survey Maps;
- Water bodies sensitive to potential impacts from scheme packages have been identified;
- Information on surface water/quality/resources from the Environment Agency (EA) website (*www.environment-agency.gov.uk*) have been reviewed; and
- Potential impacts have been determined, and the need for further assessment and possible mitigation identified.

The above will be supplemented by additional data at a later stage of the assessment (if required). In particular, the following additional water quality data will be obtained from the EA:

- Details of active discharge consents and abstraction licences (location, source and use) within 2 km of the study area;
- Details of recorded pollution incidents during the last 5 years;
- Details of any other water attribute or recreational/amenity activity (e.g. angling).
- The chemical and biological General Quality Assessment (GQA) grades from the last five years (2003-2008)

Potential environmental impacts have been identified based on an appreciation of the study area and experience of other highway developments. However, it is not appropriate to carry out a quantitative assessment in accordance with HD45/09 at this early stage on the various packages. This assessment will need to be carried out on the preferred package(s) to determine the potential construction and operation impacts and develop appropriate treatment and containment drainage facilities should these be required.

The following is a list of the guidance documents that will be referred to during the detailed design and construction phase to ensure good practice:

- HA103/06 DMRB, Volume 4, Section 2, Part 1: Vegetated Drainage Systems for Highway Runoff (2006).
- CIRIA Report 697 (2007) The SUDS Manual;
- CIRIA Report 648 (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance;
- CIRIA Report 650 (2005) Environmental Good Practice on site;

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- EA (2004) Getting Your Site Right: Industrial and Commercial Pollution Prevention; and
- EA Pollution Prevention Guidance (PPG) 1 – General guide to the prevention of pollution (no date);
- EA PPG 2 – Above Ground Oil Storage Tanks (February 2004);
- EA PPG 3 – Use and Design of Oil Separators in Surface Water Drainage Systems (April 2006);
- EA PPG 5 – Works or Maintenance In, or Near Watercourses (October 2007);
- EA PPG 6 – Working at Construction and Demolition Sites (no date);
- EA PPG 7 – Refuelling Facilities (August 2004);
- EA PPG 8 – Safe Storage and Disposal of Used Oils (February 2004);
- EA PPG 13 – Vehicle Washing and Cleaning (July 2007);
- EA PPG 18 – Managing Fire Water and Major Spillages (no date);
- EA PPG 21 – Pollution Incidence Response Planning (March 2009);
- EA PPG 22 – Dealing with Spillages on Highways (no date);
- EA PPG 23 – Maintenance of structures over water;
- EA PPG 26 - Storage and Handling of Drums and Intermediate Bulk Containers; and
- EA (2004) Model Procedures for the Management of Land Contamination. Contaminated Land Report 11.

17.2.2 Groundwater

Baseline information has been compiled from a review of the following sources of information:

- EA (2010), Online Interactive Landfill Map. http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=waste&layerGroups=default&lang=_e&ep=map&scale=1&x=357683&y=355134 (accessed on 17 November 2010);
- British Geological Society (BGS), Water Wells online map, http://www.bgs.ac.uk/GeoIndex/ (8 November 2010);
- EA (2010), Online Interactive Groundwater Map. http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=drinkingwater (accessed on 4 November 2010);
- BGS (1999),Geological Map Sheet 108(Flint), combined Solid and Drift Edition, 1:50,000;
- 1999, Geological Map Sheet 109(Cheshire), Drift Edition, 1:50,000;
- 1999, Geological Map Sheet 109(Cheshire), Solid Edition, 1:50,000;
- 1994, Geological Map Sheet 121(Wrexham), combined Solid and Drift Edition, 1:50,000;
- EA (1989), Hydrogeological Map of Clwyd and The Cheshire Basin, Including parts of Hydrodynamic Areas 54, 65, 66, 67, 68, 69, and 70; 1:100,000;
- Historical Ordinance Survey Maps reviewed at the National Library of Scotland Map Library, between 12 and 16 November, 2010;
- Environment Agency (2002) Contaminated Land Research (CLR) Report 8: Potential Contaminants for the Assessment of Land;
- Department for Environment, Food and Rural Affairs (DEFRA) / EA Contaminated land legislation: Environmental Protection Act 1990, Part IIA; and,
- Department of Environment (1995) Industrial Profiles.

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Potential impacts on hydrogeological receptors during both the construction and operational phases of the scheme have been identified by a qualitative risk assessment. The risk assessment is based on the source-pathway-receptor methodology promoted by UK DEFRA and the UK EA. For there to be an identifiable risk, not only must there be contaminants present on the study area (source) there must also be a receptor and a pathway which allows the source to impact on the receptor.

Detailed information for the proposed transport packages is not available at this early design stage. Therefore for the purpose of this assessment, it is assumed that discharges to ground are included within the proposed options.

The following tasks have been carried out:

- Review of available information on groundwater/quality/resources from available sources; and
- Impact assessment identifying needs for further assessment and possible mitigation.

17.2.3 Flood Risk

A qualitative desk study has been undertaken to establish a baseline and to identify potential environmental constraints. For the purpose of this assessment the study area will include everything within approximately 1km of the packages presented. A desk based qualitative assessment has been carried out in accordance with WelTAG 2008 and the following main tasks were included:

- Mapping the location of all major and minor watercourses and other water features within the study area;
- Identification of areas sensitive to flood risk;
- Review of WAG Development Advice Maps; and
- Review of publically available information on flood risk obtained from the EA website (www.environment-agency.gov.uk) (accessed November 2010).

Potential constraints in terms of flood risk have been identified based on an appreciation of the study area and experience of other highway developments.

17.2.4 Assessment of Significance

The assessment of significance of impacts (taking into account the importance of the water feature and the magnitude of the impact) follows the guidance set out in HD45/09. Impacts are assessed without taking into account mitigation, but following good practice. The remaining impacts after taking into consideration mitigation measures are residual impacts. Temporary impacts are considered in the construction period whilst permanent impacts are discussed in the operational phase, albeit that the effect may first occur during construction (e.g. morphological changes). Impacts of moderate adverse or worse are considered to be significant. Mitigation measures have been developed based on current good practice and established standard construction techniques.

A different approach to the determination of significance is required by the WelTAG appraisal. Although this follows the same process as described above, some of the significance terminology varies. This report presents the results of the assessment in the WelTAG Appraisal Summary Table (see Annex 10.1) based on a seven-point scale (i.e. Large Beneficial, Moderate Beneficial, Slight Beneficial, Neutral, Slight Adverse, Moderate Adverse and Large Adverse) as required in the WelTAG guidance. It should be noted that the determination of an overall score for each of the packages has been a “balancing act” among the neutral, beneficial or adverse localised impacts of individual interventions so as to place them in the context of the transport package and the wider study area. This overall score has been based on experience of similar schemes and professional judgement.

17.3 Policies and their implications

The proposed transport strategy will have to comply with both European and national legislation, and with relevant planning policy.

17.3.1 Legislative Context

The relevant European and national legislation are listed below. More details are provided in Annex 9.1 and Annex 9.2.

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- European
  - The Water Framework Directive (2000/60/EC);
  - The Groundwater Directive (2006/118/EC) (replacing 1980/68/EC)[30];
  - The Freshwater Fish Directive (2006/44/EC) (replacing 78/659/EC)[30];
  - The Habitats Directive (92/43/EC);
  - The Nitrates Directive (91/676/EC);
  - The Shellfish Waters Directive (2006/113/EC) (replacing 1980/68 EC)[30];
  - The Dangerous Substances Directive (2006/11/EC) [30]; and
  - The Priority Substances Directive (2008/105/EC).
- National
  - The Floods and Water Management Act 2010;
  - The Environmental Permitting (England and Wales) Regulations 2010;
  - The Water Act 2003;
  - The Water Resources Act 1991 (as amended);
  - The Land Drainage Act 1991 (as amended)
  - The Water Environment (Water Framework Directive) Regulations 2003;
  - The Conservation (Natural Habitats &c) Regulations 1994; and
  - The Groundwater Regulations 2009.

17.3.2 Planning Policy

The Environment Strategy for Wales was published in July 2006. This framework sets out the Welsh Government's long-term strategy for the environment in Wales, including the sustainable use of water resources.

The current national planning policy for Wales in relation to surface water quality is set out in the Planning Policy Wales (National Assembly for Wales, March 2002) which provides the strategic policy framework for the effective preparation of local planning authorities' Unitary Development Plans.

As there is no Welsh policy on pollution control, the good practice advice contained within Planning Policy Statement 23 (PPS 23) Planning and Pollution Control (Communities and Local Government, 2004), applicable to England, will be applied to this assessment. PPS 23 provides guidance on the location of, and appropriateness of certain "polluting" developments, so as to prevent pollution and ensure that the environment and human health are protected.

Local planning policy is set up in the Flintshire and Wrexham Unitary Development Plans (UDPs), and the Chester District Local Plan saved policies that will be gradually replaced by policies in the Local Development Framework for Cheshire West and Chester. Policies relevant to the water environment are presented in Annex 9.3.

TAN 15

Technical Advice Note 15 (TAN 15): Development and Flood Risk (Planning Policy Wales, 2004) is the current guide on development and flood risk. TAN15 provides guidance to planners on how to consider flood risk issues in relation to development proposals, identifies when a Flood Consequence Assessment (FCA) is required, and identifies where different types of development are appropriate. This is done by assigning a flood risk level to all land in Wales through Development Advice Maps (DAM).

Several zones are defined within the DAM:

[30] To be repealed when the Water Framework Directive (WFD) is fully implemented

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- Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding.
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits.
- Zone C1: Based on EA extreme flood outline (EA Flood Zones 2 and 3), equal to or greater than 1 in 1000 (0.1% AEP) annual probability of river or sea flooding in any year. Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
- Zone C2: Based on EA extreme flood outline (EA Flood Zones 2 and 3), equal to or greater than 1 in 1000 (0.1% AEP) annual probability of river or sea flooding in any year. Areas of the floodplain without significant flood defence infrastructure.

The general approach of Planning Policy Wales (PPW), supported by TAN 15, is to advise caution in respect of new development in areas at high risk of flooding, using a precautionary framework.

The overarching aim of the precautionary framework, in order of preference, is to:

- Direct new development away from those areas which are at high risk of flooding.
- Where development has to be considered in high risk areas (Zone C) only those developments which can be justified are located within such areas.

Much urban development in Wales has taken place alongside rivers and in the coastal flood plain. It is therefore inevitable, despite the overall aim to avoid flood risk areas, that some existing development will be vulnerable to flooding and fall within Zone C. New development should be directed away from Zone C as far as practicable. Development in Zone C will only be justified if it can be demonstrated that:

- Its location in Zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or,
- Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region; and,
- It concurs with the aims of PPW and meets the definition previously developed land; and,
- The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the vulnerability and consequences of flooding.

Sections of the study area cross areas of Flood Zone C and the implications of this on the development packages depends upon whether the particular package meets with any of the four criteria (listed above). This should be investigated further, including consultation of local authority development initiatives. Potential consequences of flooding are considered in the *Potential Effects* section of this section. The Local Planning Authority may require a Flood Risk Assessment (FRA) to be submitted as part of the planning process for all development proposals.

Climate Change

TAN 15 makes it a planning requirement to account for climate change in the assessment of flood risk and in the proposed design. In the UK, climate change is expected to lead to increased rainfall intensities, increased peak river flows, and sea level rise.

Sustainable Drainage

Managing flood risk is an important part of achieving sustainable development. Sustainable Drainage Systems (SUDS) have a key role to play in flood management for new (and existing) developments, and TAN 15 recognises this. All types of land use change impacts on the natural hydrological cycle and development should not increase flood risk. Section 8 of TAN 15 sets out recommendations for the use of SUDS, referencing the National SUDS Working Group's *Interim Code of Practice for Sustainable Drainage Systems (2004)* for appropriate guidance.

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EA Flood Zones

The DAMs were last updated in 2009 and are therefore not as current as the published EA flood maps which are updated quarterly. Although the DAMs should be referred to for planning guidance in relation to TAN 15, the EA flood zone maps provide a more definitive source of information for current flood risk from rivers and seas.

The EA define four classifications for zones of flood risk, into one of which each area of the country falls:

- Zone 1: Low probability (less than 1 in 1000 (0.1% AEP) annual probability of river or sea flooding in any year).
- Zone 2: Medium probability (between 1 in 100 (1% AEP) and 1 in 1,000 (0.1% AEP) annual probability of river flooding or between 1 in 200 and 1 in 1,000 annual probability of sea flooding in any year).
- Zone 3a: High probability (1 in 100 (1% AEP) or greater annual probability of river flooding in any year or 1 in 200 (0.5% AEP) or greater annual probability of sea flooding in any given year).
- Zone 3b: High probability (1 in 20 (5% AEP) or greater annual probability of flooding in any given year). This is also classified as functional floodplain.

17.4 Baseline

17.4.1 Study Area

The NEWABTS area is illustrated on Figure 1.1 in Section 1 and covers areas of three local authorities, the eastern part of Flintshire, north and eastern parts of Wrexham and the west of Cheshire West and Chester.

There are a large number of waterbodies (i.e. watercourses, estuary, lakes and ponds) located within the study area. The most significant being the River Dee and the Dee Estuary.

The entire site lies with the catchment of the River Dee. The River Dee flows north towards Chester in the east of the study area. From Chester, the River Dee it is tidal and canalised, and flows north west into the Irish Sea. This waterbody crosses the A494 at Queensferry and the A55 to the south east of Chester.

The second major watercourse within the study area is the tributary of the River Dee, the River Alyn. The River Alyn flows south east through the study area from Mold to Wrexham, at which point it changes its direction to flow north easterly and parallel with the general alignment of the A483 to Rossett. From here it diverts east to confluence with the River Dee at SJ 401 559 (approximately 1.7 km east of the study area boundary). The catchment of the Rvier Alyn includes all the land to the south of the A55 and north of Wrexham. Within the study area this watercourse is crossed by or flows in close proximity to the following strategic road links: A483, A550, A541, A5104, A5118 and the A5119.

There several smaller watercourses within the study area, including tributaries of the River Alyn and smaller watercourses draining the land north of the A55 (south of the River Dee) and the land north of the River Dee directly into the Dee Estuary.

River Dee/Dee Estuary Catchment:

North Basin

- Finchetts Gutters flows southwards crossing beneath the Shropshire Union Canal and discharging into the Dee Estuary (at approximately SJ 395 666);
- Shotwick Brook which is crossed by the A494 south of the Deeside Industrial Park and flows into the Dee Estuary within the study area; and
- Burton Brook flows through the western side of the Deeside Industrial Park before discharging into the Dee Estuary.

South Basin

- Swinchiard Brook flows north through Flint into the Dee Estuary (at approximately SJ 245 739);

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- Kelsterton Brook and Sandycroft Drain flow into the Dee Estuary to the north east and south west of Connah's Quay (at approximately SJ 285 709 and SJ 352 667, respectively);
- Wepre Brook/Lead Brook flows north east from Northop into the Dee Estuary at Connah's Quay (at approximately SJ 303 696)[31] ;
- Balderton Drain flows in a northerly direction through Saltney discharging into Dee Estuary (at approximately SJ 378 652); and
- River Gwenfro flows through the centre of Wrexham and flows then into River Clywedog which flows in a south easterly direction towards the River Dee.

River Alyn Catchment:

- River Terrig joins the River Alyn close to the western boundary of the study area (at approximately SJ 264 629);
- Pulford Brook flows in an easterly direction underneath the A483 near Rossett and confluences with the River Dee outside the study area; and
- River Cegidog drains land to the south of Wrexham and flows west crossing the A541 and discharging into the River Alyn (at approximately SJ 312 555);

In addition to the above watercourses, the Shropshire Union Canal runs in a westerly direction before bending north at Chester towards Ellesmere Port.

The watercourses described above have been mapped and are shown in Figure 9.1 Surface Water Features and Figure 10.1 Environmental Constraints Map.

17.4.2 Existing Conditions

Surface Water Quality

The Water Framework Directive (WFD) has been transposed into Welsh law through the Water Environment (WFD) Regulations (England and Wales) 2003. It has replaced the existing methods of monitoring riverine water quality and has introduces a holistic approach with greater emphasis on ecological status as a broader indicator of water body health.

It requires Member States to take action to ensure that all water bodies achieve at least good status for all surface waters by 2015. Good status comprises either good ecological status (GES) or good ecological potential [if the water body is designated as artificial or heavily modified (A/HMWB)], and good chemical status. There are, however, certain situations in which it may be possible to extend the deadline for achieving good status from 2015 to 2021 or 2027, or even to set a less stringent target. As well as achieving GES, Member States should also strive to promote the use of water as a sustainable natural resource and conserve habitats and species that depend directly on water.

The proposed strategy area falls mainly within the Dee River Basin District (RBD), but there is a small area in the north east of the study area that falls within the North West RBD. Table 9.1 presents the WFD classification for the water features within the study area.

Table 9.1: Water Framework Classifications

Waterbody	Hydro - morphological Status	Current Ecological Status/Potential	Current Chemical Status	Predicted 2015 Ecological Status/Potential	Protected areas

[31] Wepre Brook, as shown in OS maps, is named as Lead Brook under the WFD classification. For the purpose of this assessment both names have been kept for Wepre Brook when referring to this watercourse so as to avoid any confusion with the attributes used for its importance classification.;

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Waterbody		Hydro - morphological Status	Current Ecological Status/Potential	Current Chemical Status	Predicted 2015 Ecological Status/Potential	Protected areas
	River Dee (stretch from Chester Weir to Ceiriog)	HMWB due to flood protection, water regulation (impoundment release and strategic transfer)	Moderate Potential	Fail (uncertain)	Moderate Potential due to invertebrates (Good potential by 2027)	Drinking Water Protected Area, Freshwater Fish Directive, Nitrates Directive
	Dee Estuary (Dee North Wales) From the city of Chester to the sea	HMWB due to navigation and fisheries	Moderate Potential	Good	Moderate Potential due to dissolved inorganic nitrogen (Good potential by 2027)	Shellfish Water Directive Nitrates Directive
River Dee North Catchment	Finchetts Gutter	HMWB due to flood protection	Moderate Potential	Does not require assessment	Moderate Potential due to ammonia, dissolved oxygen, phosphates (Good Potential by 2027)	Nitrates Directive
	Shotwick Brook	HMWB due to flood protection and wider environment	Good Potential	Does not require assessment	Good Potential	Not designated
	Burton Brook	HMWB due to flood protection and wider environment	Moderate Potential	Does not require assessment	Moderate Potential[32] (Good Potential by 2027)	Not designated
River Dee South Catchment	Swinchiard Brook	Not designated A/HMWB	Moderate Status	Does not require assessment	Good Status	Shellfish Water Directive
	Kelsterton Brook	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status[32] (Good Status by 2027)	Not designated
	Sandycroft Drain	HMWB due to flood protection	Moderate Potential	Does not require assessment	Moderate Potential due to invertebrates (Good Potential by 2027)	Nitrates Directive
	Wepre/Lead Brook [31]	Not designated A/HMWB	Good Status	Does not require assessment	Good Status	Not designated

[32] Current status/potential for this water body is based in professional judgement (EA website 2010)

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Waterbody		Hydro - morphological Status	Current Ecological Status/Potential	Current Chemical Status	Predicted 2015 Ecological Status/Potential	Protected areas
	Balderton Drain	HMWB due to flood protection	Moderate Potential	Does not require assessment	Moderate Potential (Good Potential by 2027) [32]	Nitrates Directive
	River Gwenfro	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status due to invertebrates, macrophytes and phytobenthos (Good Status by 2027)	Not designated
	River Clywedog (Dee to Gwenfro)	HMWB due to water regulation (impoundment release)	Moderate Potential	Fail (very certain)	Moderate Potential (Good Potential by 2027) due to zinc	Freshwater Fish Directive
River Alyn Catchment	River Alyn (Hope to confluence with Dee)	Not designated A/HMWB	Poor Status	Fail (quite certain)	Poor Status (Good status by 2027) due to fish and phosphates	Freshwater Fish Directive Nitrates Directive
	River Alyn (Leadmill to Hope, upstream sewage treatment works)			Does not require assessment		
	River Alyn (Rhydymwyn to Leadmill)	HMWB due to flood protection	Moderate Potential	Good	Moderate Potential (Good Potential by 2027)[4]	Freshwater Fish Directive
	River Terrig	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status due to fish (Good Status by 2027)	Not designated
	River Cegidog	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status (Good Status by 2027)	Freshwater Fish Directive
	Shropshire Union Canal	Artificial due to navigation	Moderate Potential	Does not require assessment	Moderate Potential due to phosphates (Good Potential by 2027)	Nitrates Directive

(Source: EA website 2010)

The River Dee (from Chester Weir to Ceiriog) and the Dee Estuary are designated as heavily modified waterbodies (HMWB), and are classified as at moderate ecological potential. It is predicted that the River Dee and the Dee Estuary will not meet the objective of achieving good ecological potential by 2015 because not all mitigation measures can be implemented due to them being technically unfeasible and disproportionately expensive, respectively. However, these

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watercourses are expected to meet this objective by 2027. Other A/HMWB within the study area include the River Alyn (Rhydymwyn to Leadmill stretch), River Clywedog, Balderton Drain, the Shropshire Union Canal, Finchetts Gutter, Sandycroft Drain, Shotwick Brook and Burton Brook. These watercourses are currently at either good or moderate ecological potential. The remaining waterbodies have not been designated as A/HMWB and all but two stretches of the River Alyn (Hope to confluence with Dee and Leadmill to Hope, upstream of the sewage treatment works) which is at poor ecological status, have been classified as having either good or moderate ecological status.

Fisheries

The River Dee, River Alyn, River Clywedog and Cegidog River are designated Salmonid rivers under the Freshwater Fish Directive (FFD) (DEFRA website, 2010).

Protected Areas

The Dee Estuary and Swinchiard Brook are designated under the Shellfish Water Directive.

The River Dee (up to its tidal limit) is within a Water Protection Zone (WPZ). WPZ is a defined area within which additional controls are introduced, prohibiting or restricting certain activities in order to reduce the risk of pollution affecting water quality.

Some of the surface water features identified in Section 9.4.1 lie within a number of protected areas (further details in Section 6 Biodiversity) such as Sites of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Sites. The Dee Estuary is a Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site. From Queensferry to Chester and beyond, the Dee Estuary designation changes to become the River Dee and Bala Lake SAC. Wepre/Lead Brook lies within the Deeside and Buckley Newt Sites SAC to the south of Connah's Quay and the north of Buckley.

SSSIs within the study area that are associated with the surface water environment include Dee Estuary SSSI, River Dee SSSI, Connah's Quay Ponds and Wetlands SSSI, Maes Y Grug SSSI , Buckley Claypits and Commons SSSI, Vicarage Moss SSSI, Llay Bog, Catewen Marsh, Marford Quay SSSI, Inner Marsh Farm SSSI, Gatewen Marsh SSSI, Shotton Lagoons and Reedbeds SSSI.

Importance of Surface Water Features

Table 9.2 below summarises the importance of the watercourses that might be impacted by the proposed transport strategy and the reasons for assigning a particular level of importance. This classification has been completed based on professional judgement and using the baseline information available at the time of writing. As scheme packages are developed and more information becomes available the level of importance will be re-evaluated.

Table 9.2: Importance of surface water features

Surface Water Feature	Justification	Importance
River Dee Dee Estuary River Alyn River Clywedog River Cegidog Wepre/Lead Brook Ponds south of Connah's Quay	River Dee, River Alyn and Cegidod River are designated Salmonid rivers under the Freshwater Fish Directive. The Dee Estuary is designated under the Shellfish Directive. The Dee Estuary, River Dee and Wepre/Lead Brook all lie within sites that are designated under the EU Habitats Directive and/ or Birds Directive. River Dee, Dee Estuary and River Clywedog are classified as having achieved moderate ecological potential under the WFD classification. River Alyn is at moderate potential and poor status at different stretches within the study area. Wepre/Lead Brook is currently at good ecological status. The ponds south of Connah's Quay lie within the one or more of the following EU designated sites: Deeside and Buckley Newt sites SAC, Maes y Grug SSSI, Buckley Claypits and Commons SSSI, Connah's Quay Pond and Woodland SSSI Taking into account the precautionary approach and considering the fact that these waterbodies	Very High

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	are designated under one or more European habitat legislation, the level of importance assigned to these watercourses is very high.	
Shotwick Brook	This watercourse has achieved good ecological potential, thus is at high level of importance.	High
River Gwenfro Balderton Drain Swinchiard Brook Shropshire Union Canal Flinchetts Gutter Sandycroft Drain River Terrig Kelsterton Brook	These watercourses have been designated under the WFD as being at moderate potential/status. They do not flow though any protected/designated sites, but do discharge into a watercourse of higher importance (except the Shropshire Union Canal which flows into a waterbody not included in this assessment). As a result it is assumed that these waterbodies have medium importance.	Medium
Unnamed minor watercourses /ponds	There is no water quality information for these minor watercourses/ponds. However, they are draining into watercourses which have been classified as being of medium/high importance and there is potential for ponds in this geographical area to include great crested newts. Further investigation will be needed to establish the importance of affected waterbodies. Therefore, these have been given a low level of importance.	**Medium**

Groundwater

Geology

Superficial geology in the Study Area primarily mainly comprises Till, with Alluvium along the river Dee, and large areas of Glacial Sand and Gravel (in the vicinity of Wrexham-Gresford and as a linear feature from approximately Ween-ddu to Astow/Castle Hill Farm), Lacaustron deposits (around and north of Burton Meadows), River Terrace deposits (between Marland, Darland, and Broadoak), and Marine Deposits (along the Dee). Pockets of these and other materials (notably peat, head, and scree) were noted throughout the study area.

A significant section of the Deeside Industrial Park is shown to comprise Made Ground. Small, occasional pockets of Infilled ground, Made Ground (on existing land surface), and landslips were also noted in the study area.

Bedrock geology in the study area is shown divided into two distinct areas. A fractured mixture of sandstones and interbedded sandstone, mudstone, shale, siltstone and/or limestone formations, with coals and seat earth (Lower Coal Measures, Middle Coal Measures, and/or Holywell Shales Formation) are shown in the western half of the study area. In the eastern half of the study area a mixture of sandstones (Kinnerton Sandstone Formation, Gwespyr Sandstone Formation and Pebble Beds of the Sherwood Sandstone Group; Lower Mottled Sandstone; and Erbistock Formation) are shown.

Several large north-south trending Faults are shown in the study area, and a few small east-west trending faults are shown in the study area to the south of the Dee. Coal crops of named seams are shown in several places to the south of the river.

Numerous boreholes and shafts were noted on the geological map; further mining activity may have occurred onsite.

Hydrogeology

The Interactive Groundwater Map published on the EA website has been reviewed to determine information on Groundwater Source Protection Zones and Superficial and Bedrock Aquifers (which replace the information previously available on Groundwater Vulnerability Maps, using terminology in line with the WFD).

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Review of the Interactive Map indicates that Superficial Aquifers are shown within the study area. An area around the Dee is classified as Secondary (undifferentiated) Aquifer associated with the Marine Deposits. Small pockets of land classified as Secondary A Aquifers are shown, principally in the Wrexham/Gresford area associated with Glacial Sand and Gravels.

The entire study area is indicated on the Interactive Map to be underlain by Bedrock Aquifers. These are indicated to be primarily Principal Aquifers in the eastern half of the Study Area associated with the sandstones, and Secondary A Aquifers in the western half of the Study Area associated with the Coal Measures. A large pocket of Secondary A Aquifers is shown around Burton/Pulford, and as primarily Secondary A aquifers to the west (with both scattered pockets of Secondary (undifferentiated) and an area of Principal Aquifer near Caergwrle).

Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer. “Secondary A” aquifers are described by the EA as “permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers”. According to the information on the EA website, a designation of “Secondary Undifferentiated” “has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.”

A review of the hydrogeological map provides some information about hydrogeological conditions in both solid and drift material. In the bedrock, the map indicates that the eastern portion of the entire Study Area is underlain by the Sherwood Sandstone group. The western half of the study area shows pockets of Gwespyr/Cerfn-y-fedw Sandstones, Coal Measures, and Carboniferous Limestone. Shallow deposits on the map are shown to be primarily Till. Other material within the drift include Alluvium and Peat (primarily along the Dee but with smaller pockets elsewhere) and Sand and Gravel (primarily around Wrexham, Mold, with smaller pockets elsewhere). Approximate groundwater contours were shown only in the Sherwood Sandstone group; these indicated a hydraulic gradient running from the western boarder of the sandstone group and heading east to a low point of approx “+10” situated around Eccleston/Poulton (south of Chester and east of the Dee).

Hydrogeological characteristics of the alluvial deposits include that it may exceed 15m in the vicinity of the Dee, consists of silty mud, and are relatively impermeable except in locations where they are coarser grained. Till is noted as limiting groundwater recharge and confining underlying aquifers. Sand and Gravel Deposits can be a significant local resource where the bedrock aquifer is at significant depth or where they overlie impermeable deposits. These deposits can also provide recharge to deeper aquifers and can have a variable quality (as it is susceptible to contamination unless there exists an overlying Till layer).

The Sherwood Sandstone Group is a nationally important aquifer and is the Principal Aquifer noted on the interactive map. This group is represented in this area by the Kinnerton Sandstone, which is noted on the hydrogeological map as “consists of 10 to 380m of weakly-cemented, fine- to medium-grained sandstones.” The map also reports that groundwater residency times are quite short. Groundwater flow within the Coal Measures of the Welsh Borders and the Carboniferous Limestone series is generally within fractures and discontinuities (including those caused by mining) and is therefore quite variable; likewise, quality can be variable. Gwespyr/Cerfn-y-fedw Sandstones are both part of the Millstone Grit group; it is reported that springs may occur where this group intersects less permeable strata. Water quality may be affected by iron and other metals, particularly where the groundwater intersects former mines.

Groundwater Abstractions

The interactive map indicates that the south-western portion of the study area is a Total Catchment source protection zone, with small areas of Inner Zone (SPZ I) in four locations within this Total Catchment zone. These are at the east of Gorstella, just south of the A55 near Bretton, just south of the A55 in Roughhill, and just north of the A483 in Black Wood. The rest of the study area (including the majority of the options described in the packages) is not indicated to lie within a Source Protection Zone.

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A “group of wells/bores or shafts” was indicated on the hydrogeological map immediately south of Queensferry, north of the Deeside Industrial Park, and east of Higher Kinnerton. Other, individual wells, bores or shafts are indicated on the same map, clustered north of the Deeside Industrial Park, west of the Chester Industrial Estate, north-east of Chester, and south-east of Leeswood. Public supply wells are indicated on the map immediately east of Gorstella and immediately east of Broughton. A spring or group of springs (licensed for groundwater abstraction) is indicated just north of Mold.

Reference to the hydrogeological map indicates several groundwater sources licensed to abstract groundwater within the Study Area.

Reference to the BGS Geo Index Water Well data indicates that there are in excess of 450 current or historic water wells in the study area.

Potentially contaminative land uses

Contamination is described in Section 8.4. The Environment Agency’s interactive map shows 15 active landfills and 155 inactive landfills within the study area. In general, the main potential sources of contamination shown on the historic maps that might affect groundwater at the site are mining and landfilling (144 separate locations have mine shafts, quarries, and/or spoils tips recorded), airports (at 3 locations), Industrial “works” (at 103 locations), garages (at 21 locations), gasworks (at 7 locations), two Power Stations, and Water Treatment works (at 26 locations). Additionally, Made Ground may be present in the study area derived from these and other land uses, but is likely to be restricted to the areas associated with current and former land uses (e.g. urban areas).

Flood Risk

Tidal Flooding (Sea)

The study area is crossed by the tidally influenced River Dee which is therefore considered as a potential source of tidal flooding. With reference to the EA flood maps, a significant amount of the study area around the Dee is located in the tidal floodplain, in EA Flood Zone 3. However, as shown by the EA flood maps and the TAN 15 DAMs, the majority of these areas are protected from flooding by formal defences, although this may only be up to a 1 in 200 year standard of protection. A number of the packages are potentially affected by, or have the potential to affect, the flood risk from this source.

Fluvial Flooding (River)

As discussed in Section 9.4.1, there are a number of watercourses within the study area which are shown by the EA flood maps to pose a risk of flooding to the areas surrounding them. This includes the River Dee which may pose a flood risk from fluvial effects in addition to the tidal effects discussed above. The flood risk from these watercourses places some surrounding areas in EA Flood Zones 2 and 3. From the EA flood maps and TAN 15 DAMs it can be seen that the majority of these areas are unprotected by defence infrastructure, with the exception of the River Dee which is discussed above. There are some local formal defences on the River Alyn in Mold, Llong and Pontblyddyn, defences along Balderton Drain in the North of the study area, and some local flood defences protecting a limited number of properties in the flood plain of the River Alyn and Pullford Brook to the east of the study area. The TAN 15 DAMs also show some local areas outside the current floodplain of a number of the watercourses as being within Zone B, which indicates that the area has flooded in the past, although the most current data suggests it is unlikely to flood presently. A number of the packages are potentially affected by, or have the potential to affect, the flood risk from fluvial sources.

Flooding from Artificial Waterbodies

The Shropshire Union Canal flows through the east of the study area around Chester. It is understood that flood risk from the canal is not represented on the EA flood maps, possibly because the canal has not been hydraulically modelled. However, the flood risk from the canal is likely to be much lower than from rivers, as the canal is likely to be less affected by rainfall events to and the level can be more readily controlled in the event of a significantly high water level. There may also be a risk of flooding from the canal due to breach of the embankments at raised sections. Local

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risk of flooding from the canal should be investigated further as part of any detailed study in that area, through liaison with British Waterways.

Land Drainage Flooding

Due to the nature of land drainage, it is difficult to ascertain from EA and Ordnance Survey mapping exactly where formal land drains are located. In order to establish the existence of formal land drains and assess the associated flood risk, further site investigations and consultation with local landowners and the EA should be undertaken at a later stage.

Overland Flow Flooding (pluvial)

The local topography of the area under consideration has potential implications on the effects of flooding from several different sources, including overland flow onto the site and off the site. It is not possible to establish at this stage whether local topography associated with each option could pose a flood risk. In order to fully establish whether the topography of each area could impact on any of the options, further study on a smaller scale should be undertaken at a later stage. However it is likely that any risk from this source can be mitigated at detailed design.

Groundwater Flooding

The geology and hydrogeology of the study area is described in the Groundwater section above. The risk of groundwater flooding affecting the individual packages should be determined at a later stage with reference to the level of the proposed infrastructure in relation to the likely local groundwater levels. The risk of groundwater flooding therefore needs further investigation. However it is likely that any risk from this source can be mitigated at detailed design.

Flooding from Water Mains/Sewers

As the study area is mostly urbanised, sewers and water mains are likely to be encountered. At this stage it is unknown whether flooding from these assets pose a risk to the scheme. Contact should be made with the sewerage and water undertaker in the area for information on public and private sewerage and water mains assets. Any sewer crossings will need to be examined more closely at the detailed design stage. It is likely that any risk from this source can be mitigated at detailed design.

Importance of Flood Risk Receptors

Table 9.3 below summarises the importance of the receptors that might be impacted by the proposed packages and the reasons for assigning a particular level of importance. This classification has been derived based on professional judgement and using the baseline information available at the time of writing. In order to fully assess the level of importance of the receptors within the study area, more detailed information will need to be assessed at a later stage. For the purpose of this assessment we have applied a precautionary approach when the existing information was such as to consider this appropriate.

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Table 9.3: Importance of flood risk receptors

Receptor	Justification	Importance
Areas in EA Undefended Flood Zone 3	Areas in EA Flood Zone 3 are by definition subject to a high probability of flooding from rivers or seas in any year. These areas potentially include numerous residential and commercial properties. Some areas may be classified as functional floodplain (Zone 3b) by the EA in which case they are critical in flooding situations.	Very High
Areas in EA Flood Zone 2 and Defended Flood Zone 3	Areas in EA Flood Zone 2 are by definition subject to a medium probability of flooding from rivers or seas in any year. Although shown to be at high risk of flooding by the EA flood maps, areas in Flood Zone 3 which are shown to be defended by formal flood defences are also subject to a medium probability of flooding when the defences are taken into account. These areas potentially include numerous residential and commercial properties.	Medium
Areas in EA Flood Zone 1	Areas in EA Flood Zone 1 are by definition subject to a low probability of flooding from rivers or seas in any year.	Low

17.5 Potential Effects

17.5.1 Construction Impacts

Surface Water Quality

Any of the proposed transport packages which involve any construction activity may to impact on the surface water environment. All packages, except Package 1, will require some construction works to be undertaken in order to implement one or more of the measures proposed as part of the transport option package.

During the construction phase temporary impacts on water quality could occur if good practice construction techniques are not followed and mitigation measures are not implemented on site. The potential effects of the proposed scheme on surface water quality could include:

- Water pollution from silt-laden runoff if allowed to drain into watercourses untreated;
- Chemical/fuel spillages and leaks from plant and machinery, and from chemicals and other polluting substances (e.g. cement, paints, etc.) used/stored on site, if allowed to enter watercourses without the appropriate treatment;
- Localised erosion of banks and beds of watercourses when works are required in their proximity (e.g. construction of new crossings and outfalls).

Pollution of watercourses also may have secondary adverse impacts on aquatic ecology and riparian habitats, and effects can propagate downstream affecting receptors beyond the immediate study area. As all watercourses identified within the study area ultimately discharge into the Dee Estuary (except the Shropshire Union Canal), any pollution incident could have a cumulative adverse impact on this water body, which has been given a very high level of importance.

Table 9.4 below presents the surface waterbodies that are likely to be affected by the construction works of each of the packages.

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Table 9.4: Construction Impacts on Surface Water Quality

Package	Water Bodies that may be affected	Comment
1	N/A	This package does not involve any construction activities.
2	Dee Estuary Kelsterton Brook Wepre/Lead Brook	The rail stations where improvements are proposed may be in the vicinity of the Dee Estuary. A number of minor on-line improvements are also proposed. Some of these may be in close proximity to the Dee Estuary, Kelsterton Brook and Wepre/Lead Brook. The likely scale of works to be undertaken is very small and the potential to affect surface water bodies is low and can be effectively mitigated.
3	Dee Estuary Sandycroft Drain	The rail stations where improvements are proposed may be in the vicinity of the Dee Estuary and Sandycroft Drain. However, likely the scale of works to be undertaken is very small and the potential to affect these waterbodies is low and can be effectively mitigated. The proposed road measures are not predicted to be implemented near any of the watercourses identified within the study area. The development of the proposed new park and ride facilities, new walking and cycling route (i.e. the Dee Coastal Path in Flintshire) will require additional environmental assessment if this package is taken forward and more detailed information becomes available.
4	Dee Estuary River Alyn River Terrig River Ceidog River Gwenfro	This package proposes some minor improvements to the A541/A550 route, in the Hope/Caergwrle area and the A541 between Mold and Wrexham that may be close to some water bodies (River Alyn, River Terrig and River Cegidog). The rail stations where improvements are proposed are not known at this stage but some stations may be in the vicinity of the Dee Estuary, River Alyn and River Gwenfro. However, the likely scale of works to be undertaken is very small and the potential to affect surface water bodies is low and can be effectively mitigated.
5	Dee Estuary River Gwenfro	This package would require construction works in close proximity to some watercourses (i.e. Wrexham General station). A new road bridge is proposed crossing over the Dee Estuary and connecting the B5129 with Deeside Industrial Park. Similar good practice measures as noted for the above would be required for all works, although additional measures will be needed to central works above and in the Dee Estuary (e.g. PPG5). Further detailed investigation would be required together with detailed design to mitigate potential adverse impacts. The development of the proposed new park and ride facilities, additional parking provision at rail station, new walking and cycling routes will require additional environmental assessment if this package is taken forward and more detailed information becomes available.
6	River Gwenfro	The rail stations where improvements are proposed is in the vicinity of River Gwenfro. However, the likely scale of works to be undertaken is very small and the potential to affect this waterbody is very low and can be effectively mitigated.
7	River Alyn River Gwenfro	This package would require minor scale construction works in close proximity to some watercourses (i.e. key junction improvements on the A483, new station at Rossett). However, the likely scale of works to be undertaken is very small and the potential to affect surface water bodies is low and can be effectively mitigated. The development of the proposed new park and ride facilities, new walking and cycling routes will require additional environmental assessment if this package is taken forward and more detailed information becomes available.

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Package	Water Bodies that may be affected	Comment
8	Dee Estuary River Alyn Wepre/Lead Brook	The number of rail stations where improvements proposed are not known at this stage but some stations may be in the vicinity of the Dee Estuary and River Alyn. The access road onto the A55 (J33A) to be closed is in close proximity to Wepre/Lead Brook. However, the scale of works to be undertaken is very small and the potential to affect surface water bodies is low and can be effectively mitigated.
9	Dee Estuary Wepre/Lead Brook Sandycroft Drain Shotwick Brook Kelsterton Brook Burton Brook River Gwenfro	The construction activities to enhance the A548 route between Flint and the A550 and to provide a road connecting the A55 and the A548, together with some other minor construction activities (i.e. provision of freight consolidation centres, truckstops, crawler lanes and hard shoulders) have the potential to affect the surrounding surface water environment. The magnitude of the impact will have to be re-assessed at a later design stage and would largely depend on the alignment of the new road and the scale of the other improvements. This package not only would require construction works in close proximity to some watercourses (i.e. on-line improvements providing three lanes in each direction on the A55/A494 route and key junction improvements on the A483) but would involve the construction of a road bridge crossing over the Dee Estuary. The scale and complexity of these construction works is greater than those that would be required for the above. Similar good practice measures as noted for the above would be required for all works, although additional measures will be needed to control works above and in the Dee Estuary (e.g. PPG5). Further detailed investigation would be required together with detailed design to mitigate potential adverse impacts The development of the proposed new park and ride facilities, new walking and cycling routes (i.e. sections of the National route 5 and the Dee Coastal Path in Flintshire) and train electrification schemes will require additional environmental assessment if this package is taken forward and more detailed information becomes available.

Groundwater

The severity of the impact will vary along the study area, depending upon the nature and thickness of any overlying superficial deposits and the sensitivity of the receiving groundwater body. The highest importance present within each Package has been assigned to that Package.

Any of the proposed transport options which involve any construction activity may lead to impacts on groundwater. All options, except Package 1, will require some construction works to be undertaken in order to implement one or more of the measures proposed as part of the transport option package. As Package 1 has no construction planned, no construction effects are anticipated and this is not included in the assessment.

During the construction phase temporary impacts on water quality could occur if good practice construction techniques are not followed and mitigation measures are not implemented on site. The potential effects of the proposed scheme on groundwater could include:

- Chemical/fuel spillages and leaks from plant and machinery, and from chemicals and other polluting substances (e.g. cement, paints, etc.) used/stored on site, if allowed to enter watercourses without the appropriate treatment;
- Disturbance of pre-existing Made Ground and/or contaminated soils (if present) during construction works may alter the chemical conditions within the study area soils resulting in mobilisation of potential contaminants into groundwater.
- Change in the flow due to dewatering may affect recharge of sensitive receiving bodies

The potential impact to groundwater per package is shown below.

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Table 9.5: Construction Impacts on Groundwater Quality

Package	Assessed Importance	Magnitude	Construction Impact
2	High	Minor	Slight Adverse
3	Very High	Minor	Moderate Adverse
4	Medium	Minor	Neutral
5	High	Minor	Slight Adverse
6	Very High	Minor	Moderate Adverse
7	Very High	Minor	Moderate Adverse
8	High	Minor	Slight Adverse
9	Very High	Minor	Moderate Adverse

Flood Risk

Any of the proposed transport packages which involve any construction activity could potentially lead to an increased risk of flooding. All options packages, except Package 1, will require some construction works to be undertaken in order to implement one or more of the measures proposed as part of the transport option package. During construction, impacts could occur if appropriate good practice construction techniques and mitigation are not implemented. Flood risk construction impacts during construction are considered below:

Tidal Flooding: Some of the proposed measures which involve construction coincide with the flood extents (EA flood zone 2 and 3) of the tidal River Dee within the study area.

Temporary storage of materials or soil within the functional flood plain (EA flood zone 3b) may reduce the available flood water storage volume within a flood plain leading to increased flooding elsewhere. This is considered to potentially present a moderate adverse impact without mitigation. Storage in flood zone 3a and flood zone 2 could also have an impact, although these are not considered a 'functional' floodplain by the EA. Loss of storage in these areas is considered to present a minor adverse impact without mitigation.

Fluvial Flooding (River): Some of the proposed measures cross watercourses or coincide with their flood extents (EA flood zone 2 and 3) or are in close proximity to them within the study area.

There is potential for mud and debris arising from the construction works to enter local rivers, causing blockages and restricting the flow which could result in localised flooding, particularly after heavy or prolonged rainfall. This is considered to potentially present a moderate adverse impact.

The construction process could potentially increase the effect of the development on flooding elsewhere if impermeable areas are temporarily increased without mitigation measures in place. Temporary hard standing or compacted soil could result in rapid surface water runoff to local watercourse via the surface water drainage system or increased overland flow. This could increase the risk of surface water flooding in the local area if there are no mitigation measures in place. This is considered to present a potential minor adverse impact without mitigation.

Also, temporary storage of materials or soil within the functional flood plain (EA flood zone 3b) may reduce the available flood water storage volume within the flood plain leading to increased flooding elsewhere. This is considered to potentially present a moderate adverse impact without mitigation. Storage in flood zone 3a and flood zone 2 could also have an impact, although these are not considered 'functional' floodplain by the EA. Loss of storage in these areas is considered to present a minor adverse impact without mitigation.

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There is the potential for the construction of any watercourse crossings or works within watercourses to cause afflux flooding upstream of the works if the method of construction impedes the flow at that point in the watercourse. This is considered to present a potential moderate adverse impact without mitigation.

Land Drainage: As it is not known at this stage whether there are any unidentified land drains in the study area, in order establish whether there are any land drains and assess the flood risks associated with these, further site investigations and consultation with local landowners and the EA should be undertaken at a later stage. Construction issues associated with land drainage are similar to those associated with fluvial flooding, but the potential impacts are likely to be less severe.

Pluvial Flooding from Overland Flow: The local topography of any construction site could influence the flood risk from surface water runoff if not adequately controlled by appropriate formal drainage and site management. The construction process could potentially increase the effect of the development on flooding elsewhere if impermeable areas are temporarily increased without mitigation measures in place. Temporary hard standing or compacted soil could result in rapid surface water runoff to adjacent sites. This could increase the risk of surface water flooding in the local area if there are no mitigation measures in place. This is considered to present a potential minor adverse impact without mitigation.

Surface Water Drainage: There is a potential for mud and debris arising from the construction works to enter any existing, new or temporary local surface water drainage systems, causing blockages and restricting the flow which could result in localised flooding, particularly after heavy or prolonged rainfall. This is considered to present a potential minor adverse impact without mitigation.

Foul Water Drainage: Foul water services are likely to be required on any construction site by either a temporary discharge to the public sewer or by storage via a self contained unit on site. These services should be maintained by a professional contractor and removed regularly for appropriate disposal. If these services are not maintained appropriately there could be a risk of foul water flooding during construction. This is considered to present a potential minor adverse impact without mitigation.

Flooding from Water Mains and Sewers: If the construction process does not take into account the location of existing water mains and sewers, there could be a risk of flooding from water mains and sewers from unintentional damage during construction. This is considered to present a potential minor adverse impact without mitigation.

An assessment of each options package in relation to the above construction flood risks is set out below. In most cases, more detailed information and further investigation will be required to fully define the exact flood zone in which the development lies, along with more details of watercourse crossings, in order to fully define construction flood risks from loss of storage, morphological changes and afflux. However the majority of these risks will apply to any intervention which involves construction and will need to be mitigated appropriately; therefore they have not been discussed separately below:

Package 1: Managing Demand

As implementation of the proposed interventions which form Package 1 involve no significant construction works, it is unlikely that there will be any significant impacts in terms of flood risk.

Package 2: Making Best Use - Flint/Mold-Chester

Within this option package there is a proposed intervention for improvements to non-car station accessibility at Flint. The station is located within flood zone 1, but at least 2 are in flood zone 2 or 3 and 2 are in the defended flood zone 3. Where the station is in flood zone 2 or 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

One intervention is for a number of minor on-line highway improvements to the B5129. The majority of this route passes through either flood zone 2 or the defended flood zone 3. Only general construction risks discussed above apply.

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Package 3: Capacity Enhancements - Flint/Mold-Chester

There is a proposal for new stations to be constructed at Queensferry and Deeside Industrial Park which are located in the defended flood zone 3 of the tidal River Dee. Compensatory flood storage during construction is unlikely to be required unless the loss of storage is significant. This can be determined and quantified at a later stage.

A number of the interventions are for new walking and cycling routes to be located within the study area: one from Chester to Denbigh, largely in flood zone 1 with 4 isolated sections in flood zone 2 or 3 at the crossings of watercourses; one from Mold to Saltney, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, and a number or watercourse crossings; a route along the Dee coast, which is primarily within the defended flood zone 3; and a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux during construction if new crossings are required.

There are two interventions which propose unspecific highway improvements; to ease access to Deeside Industrial Park and to key traffic generators in Broughton area. These improvements are likely to be in the defended flood zone 3 or flood zone 2.

Package 4: Making Best Use - Wrexham-Deeside (via Mold/Buckley)

Within this option package there is a proposed intervention for improvements to non-car station accessibility at Flint. The station is located within flood zone 1, but at least 2 are in flood zone 2 or 3 and 2 are in the defended flood zone 3. Where the station is in flood zone 2 or 3 compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

There is a proposal for new facilities at the two Shotton stations, to allow improved connectivity to other services. These are located within the defended flood zone 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

One intervention is for a number of minor on-line highway improvements to the A541/A550 route. The majority of this route is in flood zone 1, although isolated sections may pass through either flood zone 2 or 3. Only general construction risks discussed above apply.

Package 5: Capacity Enhancements - Wrexham-Deeside (via Mold/Buckley)

One intervention proposes a new road bridge crossing of the River Dee, which is located in flood zone 3. Temporary works could potentially impact on the flood risk from this source by afflux during construction. Compensatory flood storage during construction may be required if the loss of storage at each end is significant. This can be determined and quantified at a later stage.

One of the proposed interventions is for new park and ride facilities to be constructed within the study area. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings, therefore compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage, and there may be a risk of afflux during construction.

There are proposals for new parking facilities at stations along the Wrexham to Bidston line. These locations are predominantly located in flood zone 1, but some are potentially located in the defended flood zone 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

The package proposes a new station at Deeside Industrial Park which is located in the defended flood zone 3 of the tidal River Dee. Compensatory flood storage during construction is unlikely to be required unless the loss of storage is significant. This can be determined and quantified at a later stage.

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Two of the interventions are for new walking and cycling routes to be located within the study area: One from Mold to Deeside, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, with 2 watercourse crossings including that of the Dee; And a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux during construction if new crossings are required.

One of the proposed interventions is for crawler lanes to be added to unidentified single-carriageway trunk roads within the study area. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings, therefore compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage, and there may be a risk of afflux during construction.

There is an intervention which proposes unspecific highway improvements to ease access to Deeside Industrial Park, which is likely to be in the defended flood zone 3. Compensatory flood storage during construction is unlikely to be required unless the loss of storage is significant. This can be determined and quantified at a later stage.

The proposed intervention of a multi-modal hub at Wrexham General station which is located within flood zone 1. Only general construction risks discussed above apply.

Package 6: Making Best Use - Chester-Wrexham

Within this option package there is a proposed intervention for improvements to non-car station accessibility at Wrexham. The station is located within flood zone 1. Only general construction risks discussed above apply.

Package 7: Capacity Enhancements - Chester-Wrexham

One of the proposed interventions is for new park and ride facilities to be constructed within the study area. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings, therefore compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage, and there may be a risk of afflux during construction.

Two of the interventions are for new walking and cycling routes to be located within the study area: One from Chester to Denbigh, largely in flood zone 1 with 4 isolated sections in flood zone 2 or 3 at the crossings of watercourses; And a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux during construction if new crossings are required.

The proposed intervention of a multi-modal hub at Wrexham General station which is located within flood zone 1. Only general construction risks discussed above apply.

A new station is proposed at Rossett, which could potentially be located in flood zone 3 and could potentially impact on two watercourses. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

One intervention in the package is for highway improvements on the A483. This route includes watercourse crossings and is located partially in flood zones 2 and 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. Any changes to watercourse crossings could lead to the potential for afflux flooding during construction.

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Package 8: Making Best Use - Strategic Trips

Within this option package there is a proposed intervention for improvements to non-car station accessibility at a number of stations. The majority are located within flood zone 1, but at least 2 are in flood zone 2 or 3 and 2 in the defended flood zone 3. Compensatory flood storage may be required during construction if the loss of storage is significant. This can be determined and quantified at a later stage.

Package 9: Capacity Enhancements - Strategic Trips

One of the proposed interventions is for new park and ride facilities to be constructed within the study area, another for an open access rail terminal to be constructed within the study area, one for crawler lanes to be added to unidentified single-carriageway trunk roads within the study area, and another for hard shoulders to be added to unidentified dual-carriageway trunk roads within the study area. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation of compensatory flood storage or afflux during construction. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings.

One intervention proposes a freight consolidation centre at Deeside which would be located within the defended flood zone 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

This package contains proposals for improvements to the A55 between Ewloe and Northop to increase the carriageway to 3 lanes, and capacity enhancements at the Ewloe interchange. Some of the interchange is in flood zone 2 and small areas of the route may be in flood zone 2 or 3, although most is located in flood zone 1. Any carriageway widening may include sections crossing watercourses within the study area and there is therefore a risk of afflux during construction if new crossings are required. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

Within this options package there is a proposal for the provision of a new road connecting the A548 and the A55. This would largely be located in flood zone 1, however the ends of the route may be in flood zone 2 or 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. One watercourse crossing may be required, which could lead to the potential for afflux flooding.

A number of the interventions are for new walking and cycling routes to be located within the study area: one from Chester to Denbigh, largely in flood zone 1 with 4 isolated sections in flood zone 2 or 3 at the crossings of watercourses; one from Mold to Saltney, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, and a number or watercourse crossings; a route along the Dee coast, which is primarily within the defended flood zone 3; a route from Mold to Deeside, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, with 2 watercourse crossings including that of the Dee; and a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux during construction if new crossings are required.

There are two interventions in the package for highway improvements: on the A548 and the A483. These routes include watercourse crossings and are located partially in flood zones 2 and 3, with the A548 also being located partially within the defended flood zone 3. Compensatory flood storage during construction may be required if the loss of storage is significant. This can be determined and quantified at a later stage. Any changes to watercourse crossings could lead to the potential for afflux flooding during construction.

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17.5.2 Operational Impacts

Surface Water Quality

The operation of the proposed transport packages could have a significant adverse impact on the surface water environment, in particular the River Dee and other very high important watercourses within the study area.

The proposed transport packages which include road interventions are the most likely packages that could lead to the introduction of new sources (or changed discharges) off highway runoff into receiving watercourses. Surface water runoff from roads can contain pollutants such as hydrocarbons, heavy metals, inert particulates, litter and organic matter which can cause chronic pollution of the water environment if allowed to enter watercourses without the appropriate treatment/dilution. Additionally, there is a risk that a road accident will lead to a major spillage that could cause a serious pollution incident should it be allowed to reach a watercourse untreated. Changes in the routing of traffic and the characteristics of traffic flows may result in subtle changes to the concentration of contaminants in runoff and spillage risk which are difficult to assess. Finally, construction works close to or any crossing over watercourses has the potential to have an effect on the morphology and hydrodynamics of the water body, which may lead to secondary impacts on the riverine ecosystem.

As interventions within packages are developed this impact assessment would need to be reviewed to take account of the greater level of information and to ensure designs take account of the water receptors.

Package 1: Managing Demand

Based on available information, it is predicted that the implementation of the proposed interventions not related to road infrastructure (which form Package 1) would not result in any significant adverse impacts on the surface water environment.

This package recommends measures to encourage transport alternatives to reduce car travel. These measures include promoting and supporting walking and cycling schemes, as well as strategies to better manage car demand (e.g. parking management strategy, car sharing, etc.). Furthermore, this package also includes proposals to promote rail freight and freight interchanges aiming to reduce the number of lorries transporting goods on the roads within the study area.

Because of the nature of these proposals, it is predicted that they would not have a significant effect on the quality of surface water. Although a beneficial development, changes in traffic flows from the implementation of Package 1 are not expected to be of such magnitude so as to have a significant effect on the concentration of polluting substances in highway runoff. Similarly, spillage risk is not predicted to reduce significantly as a result of the proposed transport package. Likewise, none of the measures are predicted to have any impact on the morphology of the watercourses.

Package 2: Making Best Use - Flint/Mold-Chester

Package 2 proposes the same measures to encourage walking and cycling and bus transport, together with some improvements to station accessibility to those described in Package 8, but in this case only along the Flint/Mold to Chester combined corridor.

Additional measures include improvements to traffic signal arrangements at Alltami, and minor on-line highway improvements along the B5129 between Connah's Quay and Queensferry and on the A5104. Although the extent of these interventions is still not known it is assumed that they are measures intended to improve highway safety and reduce congestion.

The surrounding areas in which these measures would be located are particularly sensitive in terms of the surface water environment. There are some surface water features classified as having very high importance (Deeside and Buckley Newt Sites SAC and Buckley Claypits and Commons SSSI) in the proximity of Alltami. The B5129 currently crosses Wepre/Lead Brook and Kelsterton Brook. Wepre/Lead Brook has been classified as being of very high importance whereas Kelsterton Brook is of moderate importance. Additionally, the two roads run close to the Dee Estuary, which is a feature of very high importance.

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It is predicted that the overall volume of traffic and the impermeable areas are likely to remain very similar to the do minimum scenario (i.e. without any package being implemented) and thus the loading of highway runoff with vehicle derived pollutants is unlikely to increase significantly. Although some measures are likely to improve safety and this may reduce the spillage risk, at this stage we are unable to quantify and determine the significance of any improvement accurately They are likely to be minor beneficial. Assuming no additional treatment measures and containment facilities are to be provided as part of the highway drainage system, no significant impact is likely to occur on the routine runoff and the spillage risk.

Package 3: Capacity Enhancements - Flint/Mold-Chester

It is predicted that measures to promote walking and cycling, bus, rail and freight transport and to manage car travel demand are unlikely to have a significant impact on the surface water environment of the study area during the operation phase although localised beneficial effects may occur.

Highway improvements include improving access to the Deeside Industrial Park and in the Broughton area. The Deeside Industrial Park is located adjacent to highly sensitive surface water receptors such as the Dee Estuary to the west and south of the site. Assuming the proposed improvements are to be undertaken on the north eastern side of the Deeside Industrial Park and that they are small scale improvements, no significant adverse impacts from construction are likely to occur.

Package 4: Making Best Use - Wrexham-Deeside (via Mold/Buckley)

Package 4 proposes measures to encourage walking and cycling, bus and rail transport, along the corridor between Wrexham and Deeside, via Mold and Buckley. It is predicted that none of these measures would have a significant adverse impact on the surface water environment.

Highway measures include considering a signage strategy between the A55 and Wrexham and with a series of minor improvements to the A541/A550 between the A55 and Wrexham, in the Hope/Caergwrle area, and on the A541 between Mold and Wrexham. River Alyn flows adjacent to the A541/A550 from Mold to the north of Gwersyllt. There is one crossing of the A550 over the River Alyn at Caergwerle, several crossings along the A541 over the Rivery Alyn and one over the River Cegidog at Sidallt. These watercourses are considered to be of very high importance. River Terrig is also crossed by the A541.

Although the extent of these highway measures is not known at this stage, it is assumed that they are minor scale improvements to the existing road network. Therefore, they are unlikely to have a significant effect on traffic flows along the links (which currently are below 20,000 AADT) and thus on the highway derived pollutant content of the road runoff. Although, some measures aim to improve road safety at some locations it is predicted that, when considering the whole study area, none of the interventions is likely to significantly modify the spillage risk along the routes, although local improvements will occur. Likewise, none of the measures are likely to have any impact on the morphology of the above watercourses. The development of the proposed highway interventions will require additional environmental assessment if this package is taken forward.

Package 5: Capacity Enhancements - Wrexham-Deeside (via Mold/Buckley)

It is predicted that measures to promote walking and cycling, bus, rail and freight transport and to manage car travel demand are unlikely to have significant adverse impact on the surface water environment of the study area during the operation phase. Although they aim to change transport patterns and avoid congestion problems at some locations, these changes are believed not to be significant for the purpose of this study.

Highway improvements include improving the ease of access to the Deeside Industrial Park and the construction of a new road bridge connecting this with the B5129 at Connah's Quay. This package is unlikely to have a significant effect on the pollutants entering the nearby watercourses due to its small scale when compared to the existing road network within the study area, although all new roads will need to be risk assessed and appropriate treatment/containment facilities included in the drainage design. However, the new road bridge over the River Dee could potentially affect the morphology of River Dee and potentially other minor watercourses depending on the proposed alignment.

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Package 6: Making Best Use - Chester-Wrexham

Package 6 proposes measures to encourage transport alternatives to reduce car travel. These measures include promoting and improving walking and cycling, bus and rail networks which are unlikely to have significant adverse effects on the surface water environment.

As no road related interventions are proposed, it is predicted that the implementation of this package would not result in any significant impacts to the surface water environment. Changes in traffic flows from the implementation of Package 6 are unlikely to be of a magnitude to significantly increase the concentrations of polluting substances in highway runoff. Similarly, spillage risk is not envisaged to change as a result of the interventions proposed by this transport package. Likewise, none of the measures are predicted to have any impact on the morphology of the watercourses.

Package 7: Capacity Enhancements - Chester-Wrexham

Similar to the above proposed packages, it is predicted that measures to promote walking and cycling, bus, rail and freight transport and to manage car travel demand are unlikely to have any significant adverse impact on the surface water environment of the study area during the operation phase, although local beneficial effects may occur.

The highway measures included as part of this package are aimed at improving key junctions on the A483. Although River Gwenfro flows in close proximity to the junction located west of Wrexham, it is unlikely that this package would have an impact on the quality and morphology of the surface water environment.

Package 8: Making Best Use - Strategic Trips

Package 8 proposes measures to encourage walking and cycling and bus transport, together with proposals to promote rail freight and suspend non essential maintenance at peak periods. Additionally, rail measures include the extension or increase in frequency of existing services across the study area. As a result of these measures there is the potential for some traffic reduction but this is unlikely to have a significant adverse effect on the water environment.

With regards to the highway measures, this package proposes to reduce the number of local access roads onto the strategic road network improving road safety at some junctions and consider signage/message strategies which are intended to reduce congestion and improve safety. Slip roads increase the risk of spillages and thus, by reducing them, there is the potential to improve safety in the immediate locality and this may reduce the spillage risk. Very high important watercourses could benefit from this intervention [including Wepre/Lead Brook which flows parallel to the A55 where the westbound access to the A55 (Junction 33a) is to be removed, and the River Dee into which most of the watercourses within the study area discharge]. The changes are unlikely to have significant effects on spillage risk. At this stage we are unable to quantify and determine the significance of any improvement accurately, although they are likely to be minor beneficial at most at local scale.

It is anticipated that only very minor changes in traffic flows are likely to occur as a result of this package. Taking into account that none of the proposed interventions would influence either the impermeable areas or the treatment measures within the road drainage system, no significant changes are expected on the pollutant concentration of the road runoff entering the surface water environment.

Package 9: Capacity Enhancements - Strategic Trips

It is predicted that measures to promote walking and cycling, bus, rail and freight transport and to manage car travel demand will not have a significant adverse impact on the surface water environment of the study area during the operation phase. Although collectively there will be reduced traffic flows, congestion and improved safety on some routes, these changes are unlikely to result in significant improvements to the water environment from changes to runoff patterns and spillage risk.

Package 9 proposes some minor on-line improvements (e.g. junction improvements) on the A548 between Flint and the A550 to the east of Deeside Industrial Park, improvements of key junctions on the A483 and the widening of the A55/A494 between Northop and Drome Corner. This package also proposes the construction of a new two lane dual carriageway connecting the A55 at Northop and the A548 at Kersterton, some junction improvements along the A55 and a road bridge crossing over the River Dee.

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The implementation of this package has the potential to have a significant effect on the highway derived pollutant content of the road runoff. Roads within the study area are likely to see an increase in traffic which will increase the pollutant loading of runoff. This will be attenuated to some extent by an increase in dilution (due to greater total volumes of runoff) but as it is believed that the existing treatment and containment facilities on these routes are limited, adverse impacts could be worsened. If this package is taken forward the need for treatment and containment measures will need to be considered. This is important since runoff may drain to very high important watercourses and the requirement under the WFD is not to cause deterioration or to prevent improvement of their status. Assuming additional treatment measures and containment facilities are to be provided as part of the highway drainage system and that existing treatment may be limited, beneficial impacts from the routine runoff and spillage risk could occur.

The implementation of this package has the potential to affect the morphology of some of the waterbodies flowing through the study area. Although the alignment of the proposed new road has not been clearly defined at this stage, a broad area has been considered for the construction of the road. Depending of the final alignment this road might cross Kelsterton Brook which flows east of the A548 Kelsterton junction and/or some other unnamed surface water bodies flowing through the area. Similarly, the provision of a three lane crossing of the A494 over the River Dee may have a negative effect on the morphology of River Dee at this location and could affect the nearby Sandycroft Drain. Furthermore, the provision of additional lanes to the A494/A55 route may cause impacts on Wepre/Lead Brook and Sandycroft Drain if any new crossings or new infrastructure are required in their proximity. Taking into consideration the precautionary approach, should any of these road improvements cross any of these water bodies, there is the potential for permanent adverse morphological impacts to occur. The EA has a policy to resist new culverts and bridge proposals should be open span design whereby the riparian corridor and river continuity are maintained. This impact will have to be reassessed at a later stage when more detailed information on the alignment of the new road and road improvements is available.

Groundwater

During the operational phase, contamination of the groundwater may occur from spillages and/or leaks of oils/fuels, the deposition of metals from exhaust emissions and the use of de-icers on roads. Contaminated water or spillages may enter the groundwater via discharges of runoff to the ground. The severity of the impact will vary along the study, depending upon the nature and thickness of the overlying superficial deposits; however, it is generally assumed to be of a minor magnitude.

Foundations can potentially provide a downward migration pathway for potential contaminants present within the ground into the underlying groundwater. The migration of contaminants into the underlying aquifer is considered to be an impact of minor magnitude.

Any of the proposed transport packages may lead to impacts on the groundwater due to operation. As Package 1 is likely to slightly reduce vehicular movements, it will have a neutral impact. The significance of the impacts to groundwater in the study area to the other packages is shown below.

Table 9.6: Operational Impacts on Groundwater Quality

Package	Assessed Importance	Magnitude	Construction Impact
2	High	Minor	Slight Adverse
3	Very High	Minor	Moderate Adverse
4	Medium	Minor	Neutral
5	High	Minor	Slight Adverse
6	Very High	Minor	Moderate Adverse
7	Very High	Minor	Moderate Adverse

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8	High	Minor	Slight Adverse
9	Very High	Minor	Moderate Adverse

Flood Risk

In accordance with TAN 15, the routing of the scheme should be carried out in such a way as to mitigate any potential flood risk to both the proposed developments and third parties and their property. This section identifies possible sources of flooding and provides more detail in relation to each package. The proposed interventions which involve new highway infrastructure, a change in surface water drainage area, river crossings, or significant construction in the flood plain are most likely to have an impact in terms of flood risk. The following potential flood risk impacts could arise from the proposals:

Tidal Flooding: Some of the proposed measures coincide with the flood extents (EAW flood zone 2 and 3) of the tidal River Dee. The operation of these proposed transport packages could therefore have an impact in terms of tidal flood risk.

With reference to the EAW flood maps, some of the packages are at a high risk of flooding - from a 1 in 200 year tidal event or greater (EAW flood zone 3) - and some are at medium risk of flooding – from a 1 in 200 year to 1 in 1000 year tidal event (EAW flood zone 2) –, although some of the areas in flood zone 3 are shown to be protected by formal defences, in which case the actual flood risk is likely to be lower. While some of the proposed schemes could potentially flood during the 1 in 200 flood event, it is the consequence of this flooding that requires consideration; The physical impact may be low (e.g. road base could be adversely affected by flood water if inappropriate construction methods are used) but the impact of flooding leading to the closure of the road or facility may be high. Without mitigation, the risk of tidal flooding is considered to pose a potential negligible to moderate adverse (flood zones 2 and defended 3a) or major adverse impact (flood zone 3b and undefended 3a). As there is no differentiation between flood zone 3a and 3b on the EAW flood maps, for the purpose of the assessment all undefended areas in flood zone 3 are assumed to be functional floodplain.

If the proposed development is located within the functional flood plain (EAW flood zone 3b) it may reduce the volume available for storage of flood water, leading to increased flooding elsewhere. This is considered to potentially present a moderate adverse impact without mitigation. Development in flood zone 3a and flood zone 2 could also have an impact, although these zones are not considered 'functional' floodplain by the EAW and therefore compensatory flood storage is unlikely to be required unless the loss is significant. Loss of storage in these areas is considered to present a minor adverse impact without mitigation.

It should also be noted that development within the tidal flood plain may be at risk of fluvial flooding from the Dee also.

Fluvial Flooding (River): Some of the proposed measures cross watercourses within the study area or coincide with their flood extents (EAW flood zones 2 and 3) The operation of these proposed transport packages could therefore have an impact in terms of fluvial flood risk.

With reference to the EAW flood maps, some of the packages are at a high risk of flooding - from a 1 in 100 year fluvial event or greater (EAW flood zone 3) - and some are at a medium risk of flooding – from a 1 in 100 year to a 1 in 1000 year fluvial event (EAW flood zone 2) –, although some of the areas in flood zone 3 are shown to be protected by formal defences, in which case the actual flood risk is likely to be lower. As for tidal flood risk, while some of the proposed schemes could potentially flood during a 1 in 100 year or greater flood event, it is the consequence of this flooding that needs consideration. Without mitigation, the risk of fluvial flooding is considered to pose a potential negligible to moderate adverse (flood zones 2 and defended 3a) or major adverse impact (flood zone 3b and undefended 3a). As there is no definition between flood zone 3a and 3b on the EAW flood maps, for the purpose of the assessment all undefended areas in flood zone 3 are assumed to be functional floodplain.

As with tidal flood risk, if the proposed development is located within the functional flood plain (EAW flood zone 3b) it may reduce volume available for storage of flood water, leading to increased flooding elsewhere. This is considered to

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potentially present a moderate adverse impact without mitigation. Development in flood zone 3a and flood zone 2 could also have an impact, although these zones are not considered 'functional' floodplain by the EAW and therefore compensatory flood storage is unlikely to be required unless the loss is significant. Loss of storage in these areas is considered to present a minor adverse impact without mitigation.

Several of the packages are likely to increase the impermeable area which will require draining. With this, and a projected increase in rainfall intensity due to climate change, there is likely to be an increase in surface water runoff which could potentially flow to local watercourses via the local surface water drainage systems or increased pluvial overland flow. This could cause an increased risk of flooding from watercourses if not attenuated to an appropriate agreed rate. This is considered to potentially present a minor adverse impact without mitigation.

Bridges and/or culverts are likely to be required in order to cross the watercourses within the study area, consequently afflux flooding is a potential risk associated with some of the packages if the crossings are not correctly sized. If the crossings are undersized then the effective flow area at the structure or obstruction is less than the flow area of the river or stream immediately upstream. The structure or obstruction could therefore impede flow, causing the upstream water level to increase. Without mitigation, the risk of fluvial flooding from these sources is considered to pose a potential moderate adverse impact.

Conversely over-sizing of any new structures could present a potential risk. If a larger structure is built, than currently exists, this could allow more flow to pass downstream, causing a detrimental effect on downstream infrastructure. Again, without mitigation, the risk of fluvial flooding from these sources is considered to pose a potential moderate adverse impact.

Other morphological changes to watercourses which may be necessary to accommodate the proposed packages such as modification of the banks or channel realignment, could also result in changes to the flow regime in the watercourse, leading to flooding upstream or downstream. Without mitigation, the risk of fluvial flooding from these sources is considered to pose a potential moderate adverse impact.

Land Drainage: As it is not known at this stage whether there are any unidentified land drains in the study area. In order establish whether there are any land drains and assess the flood risks associated with these, further site investigation and consultation with local landowners and the Environment Agency should be undertaken at a later stage. Issues associated with land drainage are similar to those associated with fluvial flooding, but the potential impacts are likely to be less severe.

Pluvial Flooding from Overland Flow: The local topography surrounding proposed packages could result in a risk of flooding from overland flow if not adequately considered in the detailed design of any package. This is considered to present a potential minor adverse impact without mitigation.

Also, some of the proposed packages could increase the impermeable area which will require draining. This, along with a projected increase in rainfall intensity due to climate change, will result in an increase in surface water runoff. This has the potential to increase the risk of offsite flooding from overland flow without adequate mitigation. This is considered to present a potential minor adverse impact without mitigation.

Groundwater flooding: It is unknown at this stage whether groundwater flooding poses a risk to the study area. The risk of groundwater flooding therefore needs further investigation at a later stage. If the level of the proposed infrastructure is below the local groundwater level there will be a requirement to mitigate against this risk within the detailed design. This is considered to present a potential moderate adverse impact without mitigation.

Surface Water Drainage: Several of the packages could increase the impermeable area which will require draining. This, along with a projected increase in rainfall intensity due to climate change, will result in an increase in surface water runoff. This has the potential to increase the risk of flooding from drains/sewers if adequate capacity and storage is not provided. This is considered to present a potential moderate adverse impact without mitigation.

There is a potential flood risk due to failure of the drainage systems (including SUDS and any pumping stations), through blockage, and reduction in storage volumes due to siltation or failure of mechanical and electrical plant. This is considered to present a potential moderate adverse impact without mitigation.

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Foul Water Drainage: Where packages are likely to include foul drainage requirements, there is a potential flood risk due to failure of the drainage systems (including any pumping stations), through blockage, and reduction in storage volumes due to siltation or failure of mechanical and electrical plant. This is considered to present a potential moderate adverse impact without mitigation.

Flooding from Water Mains and Sewers: As the study area is urbanised, sewer lines and water mains as likely to be encountered for any package. At this stage it is unknown whether flooding from these assets pose a risk to the scheme. Flooding from water mains and sewers therefore needs further investigation and is considered to present a potential minor adverse impact without mitigation.

An assessment of each package in relation to the above flood risks is set out below. In most cases, more detailed information and further investigation will be required to fully define the exact flood zone into which the development falls and fully define any flood risk, including that from land drainage, groundwater, overland flow, water mains, and sewers:

Package 1: Managing Demand

As implementation of the proposed interventions which form Package 1 involve no significant construction works, it is unlikely that there will be any significant impacts in terms of flood risk.

Package 2: Making Best Use - Flint/Mold-Chester

Within this option package there is a proposed intervention for improvements to non-car station accessibility at Flint. The station is located within flood zone 1, but at least 2 are in flood zone 2 or 3 and 2 are in the defended flood zone 3. Where the station is in flood zone 2 or 3, the infrastructure should be developed above the 1 in 200 year tidal levels (plus climate change allowance) if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary.

One intervention is for a number of minor on-line highway improvements to the B5129. The majority of this route passes through either flood zone 2 or the defended flood zone 3 and will therefore potentially be affected by flooding from the Dee. The improvements have the potential to change the impermeable area, leading to an increase or decrease in runoff, but it is likely that this will be insignificant for ‘minor’ improvements.

Package 3: Capacity Enhancements - Flint/Mold-Chester

There is a proposal for new stations to be constructed at Queensferry and Deeside Industrial Park which are located in the defended flood zone 3 of the tidal River Dee, indicating that they are likely to be at risk of flooding from events between the 1 in 1000 year and 1 in 200 year return periods. The infrastructure should be developed above the 1 in 200 year plus climate change level if practicable. Compensatory flood storage is unlikely to be required unless the loss of flood storage is significant. This can be determined and quantified at a later stage. The development may be at risk of fluvial flooding from the Dee in addition to tidal flooding. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Provision for foul drainage will also be required.

A number of the interventions are for new walking and cycling routes to be located within the study area: one from Chester to Denbigh, largely in flood zone 1 with 4 isolated sections in flood zone 2 or 3 at the crossings of watercourses; one from Mold to Saltney, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, and a number or watercourse crossings; a route along the Dee coast, which is primarily within the defended flood zone 3; and a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. All of the above have the potential to increase the impermeable area, leading to an increase in runoff and subsequent watercourse or drainage flooding, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux if new crossings are required.

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There are two interventions which propose unspecific highway improvements; to ease access to Deeside Industrial Park and to key traffic generators in Broughton area. These improvements are likely to be in the defended flood zone 3 or flood zone 2. All of the above have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage is unlikely to be required unless the loss of storage is significant. This can be determined and quantified at a later stage.

Package 4: Making Best Use - Wrexham-Deeside (via Mold/Buckley)

Within this option package there is a proposed intervention for improvements to non-car station accessibility at Flint. The station is located within flood zone 1, but at least 2 are in flood zone 2 or 3 and 2 are in the defended flood zone 3. Where the station is in flood zone 2 or 3, the infrastructure should be developed above the 1 in 200 year tidal levels (plus climate change allowance) if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary.

There is a proposal for new facilities at the two Shotton stations, to allow improved connectivity to other services. These are located within the defended flood zone 3, and the scale of the improvements is not clear at this stage. The infrastructure should be developed above the 1 in 200 year tidal levels (plus climate change allowance) if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary.

One intervention is for a number of minor on-line highway improvements to the A541/A550 route. The majority of this route is in flood zone 1, although isolated sections may pass through either flood zone 2 or 3. The improvements have the potential to change the impermeable area, leading to an increase or decrease in runoff, but it is likely that this will be insignificant for ‘minor’ improvements. *Package 5: Capacity Enhancements - Wrexham-Deeside (via Mold/Buckley)*

One intervention proposes a new road bridge crossing of the River Dee, which is located in flood zone 3. Depending on the design, this could potentially impact on the flood risk from this source by afflux and could be affected by the flood risk from this source. However, it is considered likely that any new crossing would be above the flood levels of the Dee to enable the passage of vessels. Each end of the crossing would be on land to either side of the river, likely to be in the defended flood zone 3, and may be affected by the direct flood risk from the river but would not itself cause afflux. The intervention has the potential to increase the impermeable area, leading to an increase in runoff and subsequent watercourse or drainage flooding, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

One of the proposed interventions is for new park and ride facilities to be constructed within the study area. The primary risk associated with this is likely to be the increase in impermeable area, which could lead to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings.

There are proposals for new parking facilities at stations along the Wrexham to Bidston line. These locations are predominantly located in flood zone 1, but some are potentially located in the defended flood zone 3 and could therefore be potentially subject to a tidal flood risk. The primary risk associated with this is likely to be the increase in impermeable area, which could lead to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

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The package proposes a new station at Deeside Industrial Park which is located in the defended flood zone 3 of the tidal River Dee, indicating that it is likely to be at risk of flooding from events between the 1 in 1000 year and 1 in 200 year return periods. The infrastructure should be developed above the 1 in 200 year plus climate change level if practicable. Compensatory flood storage is unlikely to be required unless the loss of storage is significant. This can be determined and quantified at a later stage. The development may be at risk of fluvial flooding from the Dee in addition to tidal flooding. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Provision for foul drainage will also be required.

Two of the interventions are for new walking and cycling routes to be located within the study area: one from Mold to Deeside, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, with 2 watercourse crossings including that of the Dee; and a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. All of the above have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux if new crossings are required.

One of the proposed interventions is for crawler lanes to be added to unidentified single-carriageway trunk roads within the study area. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings. There is likely to be an increase in impermeable area associated with such a scheme, which could lead to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary.

There is an intervention which proposes unspecific highway improvements to ease access to Deeside Industrial Park, which is likely to be in the defended flood zone 3. This has the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage is unlikely to be required unless the loss of storage is significant. This can be determined and quantified at a later stage.

The proposed intervention of a multi-modal hub at Wrexham General station which is located within flood zone 1, therefore is unlikely to affect or be affected by direct fluvial or tidal risks. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent watercourse or drainage flooding, to be dealt with by appropriate formal drainage and attenuation as necessary. Foul drainage provision may be required.

Package 6: Making Best Use - Chester-Wrexham

Within this option package there is a proposed intervention for improvements to non-car station accessibility at Wrexham. The station is located within flood zone 1, therefore is unlikely to affect or be affected by direct fluvial or tidal risks. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary.

Package 7: Capacity Enhancements - Chester-Wrexham

One of the proposed interventions is for new park and ride facilities to be constructed within the study area. The primary risk associated with this is likely to be the increase in impermeable area, which could lead to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings.

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Two of the interventions are for new walking and cycling routes to be located within the study area: One from Chester to Denbigh, largely in flood zone 1 with 4 isolated sections in flood zone 2 or 3 at the crossings of watercourses; And a number of other new routes which are to be determined and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. All of the above have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux if new crossings are required.

The proposed intervention of a multi-modal hub at Wrexham General station is located within flood zone 1, and therefore is unlikely to affect or be affected by direct fluvial or tidal risks. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent watercourse or drainage flooding, to be dealt with by appropriate formal drainage and attenuation as necessary. Foul drainage provision may be required.

A new station is proposed at Rossett, which could potentially be located in flood zone 3 and could potentially impact on two watercourses. The station could be at risk of flooding from events between from the 1 in 100 year return periods, and therefore infrastructure should be developed above the 1 in 100 year plus climate change level if practicable. Compensatory flood storage may be required if the loss of flood storage is significant. This can be determined and quantified at a later stage. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Provision for foul drainage will also be required.

One intervention in the package is for highway improvements on the A483. This route includes watercourse crossings and is located partially in flood zones 2 and 3. The infrastructure should be developed above the 1 in 200 year plus climate change level if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The development has the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Any changes to watercourse crossings could lead to the potential for afflux flooding.

Package 8: Making Best Use - Strategic Trips

Within this option package there is a proposed intervention for improvements to non-car station accessibility at a number of stations. The majority are located within flood zone 1, but at least 2 are in flood zone 2 or 3 and 2 in the defended flood zone 3. Where the station is in flood zone 2 or 3, the infrastructure should be developed above the 1 in 100 year fluvial or 1 in 200 year tidal levels (plus climate change allowance) if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary.

Package 9: Capacity Enhancements - Strategic Trips

One of the proposed interventions is for new park and ride facilities to be constructed within the study area, another for an open access rail terminal to be constructed within the study area, one for crawler lanes to be added to unidentified single-carriageway trunk roads within the study area, and another for hard shoulders to be added to unidentified dual-carriageway trunk roads within the study area. As there are no details on the potential locations for these facilities at this stage, further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. For the purpose of this assessment, it is assumed that these facilities could be located within any flood zone and may incorporate river crossings. There is likely to be an increase in impermeable area associated with such a scheme, which could lead to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Provision for foul drainage is also likely to be required for the rail terminal.

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One intervention proposes a freight consolidation centre at Deeside which would be located within the defended flood zone 3, indicating that it is likely to be at risk of flooding from events between the 1 in 1000 year and 1 in 200 year return periods. The infrastructure should be developed above the 1 in 200 year plus climate change level if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The development may be at risk of fluvial flooding from the Dee in addition to tidal flooding. The improvements have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Provision for foul drainage may also be required.

This package contains proposals for improvements to the A55 between Ewloe and Northop to increase the carriageway to 3 lanes, and capacity enhancements at the Ewloe interchange. Some of the interchange is in flood zone 2 and small areas of the route may be in flood zone 2 or 3, although most is located in flood zone 1. The improvements have the potential to change the impermeable area and, although this is likely to result in an insignificant increase in impermeable areas as a percentage of the whole study area, on a local level this could lead to a significant increase in runoff to be addressed by formal drainage and attenuation as necessary. Any carriageway widening may include sections crossing watercourses within the study area and there is therefore a risk of afflux if new crossings are required. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage.

Within this options package there is a proposal for the provision of a new road connecting the A548 and the A55. This would largely be located in flood zone 1. However, the ends of the route may be in flood zone 2 or 3. The infrastructure should be developed above the 1 in 200 year plus climate change level if practicable. Compensatory flood storage may be required if the loss of storage is significant. This can be determined and quantified at a later stage. The development has the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. One watercourse crossing may be required, which could lead to the potential for afflux flooding.

A number of the interventions are for new walking and cycling routes to be located within the study area: one from Chester to Denbigh, largely in flood zone 1 with 4 isolated sections in flood zone 2 or 3 at the watercourse crossings; one from Mold to Saltney, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, and a number or watercourse crossings; a route along the Dee coast, which is primarily within the defended flood zone 3; a route from Mold to Deeside, largely in flood zone 1 with isolated sections in flood zone 2, 3 and the defended flood zone 3, with 2 watercourse crossings including that of the Dee; and a number of other new routes which are to be determined, and for which further analysis will be required when the locations are chosen to determine the flood risk from rivers and seas and the need for mitigation. All of the above have the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Compensatory flood storage may be required if the loss of flood storage is significant. This can be determined and quantified at a later stage. As some of the routes include sections crossing watercourses within the study area, there is therefore a risk of afflux if new crossings are required.

There are two interventions in the package for highway improvements: on the A548 and the A483. These routes include watercourse crossings and are located partially in flood zones 2 and 3, with the A548 also being located partially within the defended flood zone 3. The infrastructure should be developed above the 1 in 200 year plus climate change level if practicable. Compensatory flood storage may be required if the loss of flood storage is significant. This can be determined and quantified at a later stage. The development has the potential to increase the impermeable area, leading to an increase in runoff and subsequent flooding from watercourses or surface water sewers, which will need to be addressed by appropriate formal drainage and/or attenuation as necessary. Any changes to watercourse crossings could have the potential for afflux flooding.

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17.6 Potential Mitigation Measures

17.6.1 Construction Impacts

Surface Water Quality

If not adequately controlled, impacts from construction may have a number of short-term effects on the quality of surface water within the study area. Under the Water Resources Act 1991 it is an offence to pollute controlled waters. Discharges will require appropriate authorisation from the EA. Therefore, mitigation measures (e.g. construction SUDS) should be implemented prior and during construction works in accordance with legislative requirements and good practice as described in guidance documents listed in Section 9.2.1 to ensure that the surface water features within the study area do not receive polluted runoff. This will need to include measures to manage silt-laden runoff and the storage and use on site of potentially polluting substances (e.g. fuel, cement). These measures could be further developed into a Construction Environmental Management Plan (CEMP) at the subsequent design stage.

Construction work will require a number of separate consents and licences from the EAW, which are in part required to prevent adverse impacts from occurring to the water environment. Application for these will be made following subsequent design and they will be put in place prior to construction works (which will then be carried out in accordance with any conditions imposed). A permit to discharge construction site runoff to controlled waters may be required under the Water Resources Act 1991 and Environmental Permitting Regulations 2010. A licence might also be required for any works in the proximity of the watercourses under the Land Drainage Act 2010 and local bylaws.

Groundwater

The main mitigation measure to prevent adverse impacts on hydrogeology receptors during the construction phase of the proposed Packages with intrusive works is to ensure good study area practice and management. The study area management practices should be undertaken in accordance with the following EA Pollution Prevention Guidelines (PPGs):

PPG 1 – General guide to the prevention of pollution;

PPG 2 – Above ground oil storage tanks;

PPG 6 – Working at construction and demolition study areas;

PPG 7 – Refuelling facilities;

PPG 8 – Safe storage and disposal of used oils;

PPG 18 – Managing fire water and major spillages;

PPG 21 – Pollution incidence response planning; and

PPG 26 - Storage and Handling of Drums and Intermediate Bulk Containers.

Chemical and fuel storage areas should be located away from groundwater abstraction points.

Information obtained from the proposed ground investigations should be used to undertake a Controlled Waters risk assessment for the Packages to be adopted; this will determine if potential pollutant linkages exist or may be formed by the construction works. If contaminants are considered to pose a risk, suitable measures should be put in place to prevent the creation of pollutant linkages.

A watching brief should be maintained during construction works and where contamination is identified or suspected. If encountered, appropriate sampling, analysis and risk assessment should be undertaken and suitable measures put in place to prevent the creation of pollutant linkages.

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Flood Risk

The following mitigation measures should be considered as necessary:

Tidal Flooding: Any loss of floodplain storage can be mitigated by providing compensatory storage in an appropriate and agreed form and location. The details and quantification of compensation will be determined at the detailed design stage, and the scheme should ensure that no loss of floodplain storage occurs during the temporary construction stage. Where practicable, construction equipment should not be stored within the floodplain or without the agreement of EA. This risk is therefore considered negligible.

Fluvial Flooding (River): Any loss of floodplain storage can be mitigated by providing compensatory storage in an appropriate and agreed form and location. The details and quantification of compensation will be determined at the detailed design stage, and the scheme should ensure that no loss of floodplain storage occurs during the temporary construction stage. Where practicable, construction equipment should not be stored within the floodplain or without the agreement of EA. This risk is therefore considered negligible.

The increased risk of surface water flooding, as result of increasing the proportion of impermeable area within the study area, should be mitigated by installing an appropriate temporary drainage system which utilises SUDS components where practicable. Any SUDS adopted must be maintained adequately to ensure their correct operation. The surface water drainage arrangements should be discussed with the Environment Agency, Local Authority, and Dŵr Cymru Welsh Water. Any surface water discharge to watercourses will require the consent of the EA and any surface water discharge to public sewers will require the consent of Dŵr Cymru Welsh Water. The use of detention basins or other temporary attenuation may be required during construction to limit flow to the existing rate of runoff or 'greenfield' equivalent rate, as appropriate to ensure that an increase in flow is not passed forward. This risk is considered negligible.

The risk of afflux flooding as a result of the construction of new watercourse crossings should be mitigated by appropriately designed temporary works and construction methods, which do not impede or increase watercourse flow. Any works affecting the watercourses may require Land Drainage Consent from the EA. This risk is considered negligible.

Land Drainage: The full extent of land drainage affected by the proposals should be determined at a future stage. If necessary, mitigation should follow the guidance given for fluvial flooding mitigation. This risk is therefore considered negligible.

Flooding from Overland Flow: The risk of flooding from overland flow, should be mitigated by installing an appropriate temporary drainage system (as discussed above) which takes into account the topography of the site and local area to ensure that any significant overland flows are intercepted or diverted to avoid causing inundation from flooding. This risk is therefore considered negligible.

Surface Water Drainage: Debris and other material should be prevented from entering temporary drainage systems through appropriate site management, to ensure that the systems remain operational. This risk is considered negligible.

Foul Water Drainage: Appropriate temporary foul drainage should be provided to any construction site. The temporary services should be maintained by a professional contractor and removed regularly for appropriate disposal. This risk is therefore considered negligible.

Flooding from Water Mains and Sewers: Any proposed development, including the proposed construction works, should take account of the location of existing water mains and sewers and ensure that construction does not impact upon these assets. Any necessary works to divert or make use of these assets should be carried out to the requirements of the appropriate statutory authority. This risk is considered negligible.

17.6.2 Operational Impacts

Surface Water Quality

Further assessment of potential impacts on water quality will be required of those packages that proceed to the next design stage to ensure alignments and design take account of water receptors. In particular, where packages may significantly change the nature of traffic flows, or there are new roads being proposed, an assessment using the method in HD45/09 may be required. These investigations will identify whether or not runoff treatment measures and spillage

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containment facilities are required. If required, appropriate treatment measures may include sustainable drainage/vegetative systems (e.g. grassed swales, buffer strips and ponds) as described in HA103/06. Containment facilities may include penstocks, valves, ponds, oil interceptors, etc.

The proposed schemes will need also to consider during subsequent, design the potential physical effects on water bodies that need to be crossed or flows discharged into them. Wherever possible, open span bridges which maintain riparian corridors and allow easy access to watercourses should be considered.

Groundwater

Appropriate treatment and containment facilities will be required to mitigate the potential adverse impacts from runoff and highway spillages during the operation phase.

Information obtained from the ground investigations should be used to undertake a Controlled Waters risk assessment for each Package to be adopted to determine if potential pollutant linkages exist or may be formed by the operational works.

Where piled foundations are used they will be designed in accordance with the EA guidance document 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention'.

Flood Risk

The following mitigation measures should be considered as necessary:

Tidal Flooding: In order to mitigate against flooding from the tidal River Dee, it would normally be stipulated that the road level or finished floor level is 600mm above the 1 in 200 year plus climate change event to minimise the impact of flooding. If this is implemented the impact will be considered negligible. Whether or not this is practicable will be for determination at a future stage. If the risk of flooding cannot be fully mitigated, then the consequences of flooding will need to be acceptable in accordance with TAN 15, and the impact will be a moderate adverse impact.

Any loss of floodplain storage can be mitigated by providing compensatory storage in an appropriate and agreed form and location. The details and quantification of compensation will be determined at the detailed design stage, and the scheme should ensure that no loss of floodplain storage occurs during operation. This risk is therefore considered negligible.

Fluvial Flooding (River): In order to mitigate against flooding from watercourses, it would normally be recommend that the road level or finished floor level is 600mm above the 1 in 100 year plus climate change event to minimise the impact of flooding. If this is implemented the impact will be considered negligible. Whether or not this is practicable will be for determination at a future stage. If the risk of flooding cannot be fully mitigated, the consequences of flooding will need to be acceptable in accordance with TAN 15, and the risk will be considered a moderate adverse impact.

Any loss of floodplain storage can be mitigated by providing compensatory storage in an appropriate and agreed form and location. The details and quantification of compensation will be determined at the detailed design stage, and the scheme should ensure that no loss of floodplain storage occurs during operation. This risk is therefore considered negligible.

The increased risk of surface water flooding, as result of increasing the proportion of impermeable area within the study area, should be mitigated by installing an appropriate formal drainage system which utilises SUDS components where practicable. Any SUDS adopted must be adequately maintained to ensure their correct operation. Surface water drainage arrangements should be discussed with the EA, Local Authority, and Dŵr Cymru Welsh Water. Any surface water discharge to watercourses will require the consent of the EA and any surface water discharge to public sewers will require the consent of Dŵr Cymru Welsh Water. The use of attenuation may be required to limit attenuate flow to the existing rate of runoff or 'greenfield' equivalent rate, as appropriate to ensure that an increase in flow is not passed forward. This risk is considered negligible.

The risk of afflux flooding and flooding as a result of new watercourse crossings should be mitigated by designing appropriately sized bridges and culverts, which do not impede or increase watercourse flow. Wherever possible culverting of watercourses should be avoided in favour of open span crossings that do not impinge on flow areas and

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maintain the riparian corridor. Further hydraulic modelling should be undertaken to assess the impact of the proposed watercourse crossings on the watercourses and inform the design of appropriately sized bridges and culverts. New development should be set back from the top of banks by a distance of between 5 and 10m (depending on status) to ensure the riparian corridor is maintained and to allow access for maintenance and flood control works etc, should they be required in the future. This risk is considered negligible.

Morphological changes to watercourses should be assessed at a future stage with detailed hydraulic modelling to assess the impact of the proposed changes. Providing appropriate design and modelling is undertaken, this risk is considered negligible.

Land Drainage: The full extent of land drainage affected by the proposals should be determined at a future stage. If necessary, mitigation should follow the guidance given for fluvial flooding mitigation. This risk is therefore considered negligible.

Flooding from Overland Flow: This risk should be assessed in more detail at a local level when designing any surface water drainage systems. Landscaping and drainage of the site should be designed to dispose of any runoff resulting from increased hard paved areas and take into account the topography of the site and local area to ensure that any significant overland flows are intercepted or diverted appropriately, thus mitigating any increase in risk to offsite areas from overland flow. This risk is therefore considered negligible.

Groundwater flooding: At this stage it is unknown if groundwater flooding will present a risk to the development packages. However, if it is found that groundwater flooding is significant, there are methods of construction and appropriate materials that can be used which prevent the ingress of groundwater into any below ground sections of the development. Packages include installing an impermeable barrier to present groundwater ingress or removal by pumping. Assuming such techniques/materials are incorporated into the design then the risk of groundwater flooding to the development is considered to be negligible.

Surface Water Drainage: The proposed surface water drainage should be designed to make use of SUDS where practicable - these solutions reduce the risk of flooding, by more effectively managing the discharge of surface water to watercourses. Any new or modified surface water discharges from the site will be attenuated to the existing runoff rate for that area, to be agreed with the EA during detailed design. Appropriate storage will be provided to ensure that these restrictions do not cause an increase risk of flooding. This risk is therefore considered negligible.

There will be a requirement for regular inspection and maintenance of the drainage systems in accordance with good practice guides and the information to be provided in Operation and Maintenance manuals. Systems should be designed in accordance with current guidance to ensure that the potential for siltation and blockages is minimised under normal operation. It is assumed that any pumping stations will be designed to Building Regulations Part H or Sewers for Adoption which allows for the provision of emergency storage and telemetry to warn of high levels/pump failure. Assuming implementation of the above, the risk of flooding from failure of the drainage systems is considered to be negligible.

Foul Water Drainage: As for surface water systems, where foul drainage is required, there will be a requirement for regular inspection and maintenance of the drainage systems in accordance with good practice guides and the information to be provided in Operation and Maintenance manuals. The systems should also be designed in accordance with current guidance to ensure that the potential for siltation and blockages is minimised under normal operation. It is assumed that any pumping stations will be designed to Building Regulations Part H or Sewers for Adoption which allows for the provision of emergency storage and telemetry to warn of high levels/pump failure. Detailed design will ensure that the risk of flooding from any emergency overflows is ‘designed out’ (if a significant failure was to occur there would be sufficient storage on site to enable tankers to arrive and to pump out sewage to then be taken off site for appropriate disposal in accordance with UK waste water legislation). Assuming implementation of the above, the risk of flooding from failure of the drainage systems is considered to be negligible.

Flooding from Water Mains and Sewers: Any proposed development should take account of the location of existing water mains and sewers and ensure that the development does not impact upon these assets. Contact should be made with the sewerage and water undertaker in the area for information on public and private assets. Any crossings of sewers will have to be looked at more closely at the detailed design stage. It is possible that the sewers will have to be

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diverted or upgraded to cope with the added weight of vehicular loads associated with the crossing. Assuming implementation of the above, the risk of flooding from this source is considered to be negligible.

17.7 Residual Effects

17.7.1 Construction Impacts

Surface Water Quality

As described in Section 9.5.1, proposed transport packages which involve any construction activity (i.e. all packages except Package 1) may lead to impacts on the surface water environment. When these potential construction impacts are re-assessed taking into account mitigation measures, the remaining impacts are the residual construction impacts.

Assuming appropriate mitigation measures (as described in Section 9.6.1) are implemented, it is predicted that construction impacts on the surface water environment due to contamination from silt laden runoff and chemical spillages can be effectively mitigated for all packages. It is likely that works required for the construction of road bridges crossing very high important waterbodies (i.e. Packages 9 and 5 crossing over the Dee Estuary) will result in temporary adverse impacts of minor magnitude after mitigation measures are implemented if works are required in the watercourse.

Groundwater

Residual construction impacts with respect to the disturbance of contaminated soils or the creation of new pollution incidents is, if appropriate mitigation is put in place, considered to be neutral. The removal or remediation of Made Ground should result in a slight beneficial impact to groundwater for those packages that involve the construction of new roads and infrastructure.

Flood Risk

Providing appropriate mitigation measures are implemented, residual construction impacts with respect to flood risk are considered to be neutral.

17.7.2 Operation Impacts.

Surface Water Quality

Package 1 Managing Demand

The implementation of Package 1 is not likely to result in any significant adverse impacts on the surface water environment.

Package 2: Making Best Use - Flint/Mold-Chester

Package 2 proposes small scale improvements along the Flint/Mold-Chester corridor, which are unlikely to result in any significant adverse effect on the surface water environment

Package 3: Capacity Enhancements - Flint/Mold-Chester

It is concluded that Package 3 is unlikely to result in any significant impacts on the surface water environment and no residual impacts are expected on the quality and morphology of surface water as a result of the operation of this package.

Package 4: Making Best Use - Wrexham-Deeside (via Mold/Buckley)

This package includes a number of small scale improvements along the Wrexham-Deeside corridor, which are unlikely to result in any significant adverse impact on the surface water environment.

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Package 5: Capacity Enhancements - Wrexham-Deeside (via Mold/Buckley)

This package is unlikely to have a significant adverse effect on the pollutants entering the nearby watercourses due to its small scale when compared to the existing road network within the study area.

Further assessment will be required during the design of the new road bridge over the Dee Estuary. If open span structures are proposed that maintain the riparian corridor, impacts may be completely mitigated (i.e. impact of negligible magnitude). If works in riparian banks or new piers are required in the channel, significant impacts of moderate adverse magnitude may occur.

Package 6: Making Best Use - Chester-Wrexham

It is concluded that Package 6 is unlikely to result in any significant adverse impacts on the surface water environment and no residual impacts are expected on the quality and morphology of surface water as a result of the operation of this package as no road improvements are proposed.

Package 7: Capacity Enhancements - Chester-Wrexham

It is concluded that Package 7 is unlikely to result in any significant impacts to the surface water environment and no residual impacts are expected on the quality and morphology of surface water as a result of the operation of this package.

Package 8: Making Best Use - Strategic Trips

It is predicted that Package 8 is unlikely to result in any significant adverse impact on the surface water environment.

Package 9: Capacity Enhancements - Strategic Trips

Assuming new treatment and containment facilities are installed as part of the new drainage system of the road network, it is predicted that this package is likely to result in neutral or even beneficial impacts to the surface water environment (that is assuming that limited treatment existed in the do-minimum scenario).

Further assessment will be required during the design of stream crossings. If open span structures are proposed that maintain the riparian corridor, impacts may be completely mitigated (i.e. impact of negligible magnitude). If works in riparian banks or new piers are required in the channel, significant impacts of moderate adverse magnitude may occur, particularly as a result of the River Dee crossing.

Groundwater

If mitigation measures are employed during the operation of the scheme, the residual impacts are considered to be neutral for all transport Packages.

Flood Risk

Providing appropriate mitigation measures are implemented, residual operation impacts with respect to flood risk are considered to be neutral.

17.8 Cumulative Impacts

Cumulative impacts as a result of the proposed strategy alongside other developments might occur. Therefore, as packages are progressed cumulative impacts within the packages and with other developments will need to be assessed.

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17.9 Conclusion

The nine packages for the NEWABTS have been assessed to identify the likely impacts that could occur on the water environment. It should be noted that this assessment has been based on limited scheme information and will need to be revised at a later design stage of the scheme.

Providing good practice mitigation measures are implemented, construction impacts can be reduced to neutral for all water receptors within the study area, with the exception of Packages 9 and 5. These two packages are likely to result in temporary adverse impacts of minor to moderate magnitude as they include a new bridge over the River Dee. The magnitude of the impact would largely depend on the nature of the works that need to be undertaken. With regards to the operational phase, it is difficult to assess the potential effects of routine runoff and spillage risk without more information. Despite all packages aiming to provide safety and reduce congestion, it has been concluded that none of the packages is likely to significantly change the loading of highway derived pollutants in surface water bodies. This is because of the predicted changes in traffic flows as a result of the packages and the dilution taking place before polluting substances reach a very high important surface water feature. Similarly, the risk of spillages is also unlikely to significantly increase as a consequence of any of the packages. Assuming new treatment and containment measures are put in place and that the existing network does not provide with the appropriate treatment/containment facilities, it is concluded that Package 9 could result in a beneficial impact of minor magnitude. Packages 9 and 5 are likely to have an adverse impact on the morphology of some of the surface water features flowing through the study area if structures are required in the watercourses. However, if these packages involve the provision of open span bridges which are unlikely to cause any damage to the riparian corridor, negligible impacts are expected on the surface water environment.

In terms of groundwater, any of the proposed transport Packages may lead to impacts on the groundwater due to the construction and operation phases. Package 1 and 4 will have a neutral impact.

With regard to flood risk, providing good practice is followed and mitigation measures are put in place, construction impacts can be reduced to neutral for flood risk receptors within the study area. All packages except Package 1 could result in an increase in impermeable area draining to watercourses or sewers which could have an adverse impact without appropriate mitigation. Packages which potentially propose infrastructure within flood zones 2 and 3 (all packages except Packages 1 and 6) may be susceptible to direct flooding from rivers and the sea. For these, the level of mitigation to be provided will depend on the vulnerability of the infrastructure and the requirements for its operation in times of flood. Flooding due to loss of flood plain storage could potentially be caused by all packages except Packages 1 and 6, and flooding due to afflux from watercourse crossings could potentially be caused by Packages 9, 3, 5, and 7; these risks will require appropriate mitigation to allow development to take place. Other flood risks should be assessed in more detail at a later stage, but are normally able be adequately mitigated without difficulty.

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18 Conclusions

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19 Conclusions

19.1 Overview

This section of the report provides a summary of the key findings for each specialist section.

19.1.1 Noise

- The overall assessment for packages 1, 2, 4, 6, 3, 5 and 7 is neutral.
- The overall assessment for packages 8 is slight beneficial.
- The overall assessment for packages 9 is slight adverse.

The above assessments and significance of impacts have been carried out by balancing the adverse and beneficial impacts within each of the packages taking into account both the level and the area of the impacts. A more detailed assessment would need to be carried out to refine these assessments, in particular, package 9 which indicated a slight adverse impact.

19.1.2 Local Air Quality

- Package 1 is likely to have a neutral effect. Slight beneficial impacts may occur, although these are unlikely to be significant in terms of pollutant concentrations.
- All remaining packages are considered to have, on balance, a slight beneficial impact in terms of local air quality, however adverse impacts may be experienced at some locations should traffic flows increase in certain areas.
- Further, more detailed assessment is required in order to determine the effects of each of the proposed packages on local air quality over the road network as a whole and to determine the location and extent of any associated adverse impacts.

19.1.3 Greenhouse Gas Emissions

- Package 1 is likely to have a neutral effect. Slight beneficial impacts may occur, although these are unlikely to be significant in terms of pollutant concentrations.
- All remaining packages are considered to have, on balance, a slight beneficial impact in terms of greenhouse gas emissions, however adverse impacts may be experienced at some locations should traffic flows increase in certain areas.
- Further, more detailed assessment is required in order to determine the effects of each of the proposed packages on greenhouse gas emissions over the road network as a whole and to determine the location and extent of any associated adverse impacts.

19.1.4 Landscape and Townscape

- Package 1, will have no direct or physical effect on the character of the landscape/townscape resource or designated features within it and as such, would have no significant effect.
- Packages 8, 2, 4 and 6 mainly comprise minor improvements to existing infrastructure or operational enhancements which have little influence on the character of the landscape/townscape. Where options could affect the landscape/townscape resource or designated features, effects are generally deemed to be small scale and/or located in an appropriate context, and as such proposals can be successfully accommodated within the landscape setting with only low levels of mitigation required in most cases. Where more significant effects have been identified due to the cumulative effect of numerous schemes (package 4) more extensive mitigation and considered siting and design could help to reduce impacts over time.
- Packages 9, 3, 5 and 7 have the greatest potential for adverse effects as they comprise the most significant levels of change to landscape/townscape resource and designated features, particularly in the short to medium term, prior to establishment of planted mitigation. A number of the potential effects identified could be avoided through carefully

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considered siting and sensitive design in most cases, which would reduce the need for additional, potentially substantial mitigation.

- Short term effects would be greatest where packages propose new infrastructure/development or substantial improvements to existing transport corridors. Schemes of this type can be highly intrusive, particularly where located in proximity to sensitive areas/features, and often require the removal of substantial areas of vegetation, including existing screen/mitigation planting previously planted within road corridors. Mitigation measures could reduce the significance of adverse effects over time which, due to the scale and character of the existing landscape setting, could be successfully accommodated as part of each individual scheme, if landscape issues are considered at an early stage of the design process.

19.1.5 Biodiversity

- Two Local Nature Reserves, eleven nationally designated sites and eleven internationally designated sites fall within the study area boundary. Package 1 is unlikely to have any impact on the Natura and Ramsar sites. Packages 8, 2, 4, 6 and 7 could impact on these sites where works will not be fully contained within the highway. Packages 9, 3, and 4 could have a large adverse impact without mitigation on these sites where option involve works within/close to them, in particular those that include the creation of new bridges. Appropriate mitigation will reduce these impacts. An HRA should be undertaken where necessary to establish whether the proposals are likely to have a significant effect on any European Sites.
- The study area incorporates a range of habitats including important habitats such as watercourses/ponds, mud and sand flats, and trees and woodland (including areas of ancient woodland), The packages may impact on these habitats where land take is required, or where construction and operation would affect sensitive habitat through indirect effects such as pollution. Package 1 is unlikely to have an adverse impact on important habitats, Packages 8, 2, 4 and 6 could impact on these habitats where works will not be fully contained within the highway. Options within packages 9, 3, 4 and 7 could have a large adverse impact without mitigation on some of these habitats where the options involve land take causing loss and fragmentation of the habitat, and where works are required within/adjacent to sensitive habitats. Appropriate mitigation will reduce these impacts.
- The study area has a high potential to be used by foraging, commuting and roosting bats, GCN, wintering, migratory and breeding birds, badger, reptiles, dormouse, otter and water vole. These species include European Protected Species that would require EPS licences where options will affect them and their habitat. Impacts cannot be fully ascertained until full protected species surveys have been conducted. Package 1 is unlikely to have an adverse impact on these species, Packages 8, 2, 4 and 6 could impact on these species where works will not be fully contained within the highway. Options within packages 9, 3, 4 and 7 could have a large adverse impact without mitigation on some of these species where the options involve loss of habitat, fragmentation of the habitat, and disturbance to the species. Appropriate mitigation will reduce these impacts.

19.1.6 Heritage

- The Stage 1 WelTAG assessment has demonstrated that heritage assets are distributed throughout the study area, although the main concentrations were within established urban centres. These were primarily of built heritage assets dating from the post-medieval and modern periods. Additional sites of earlier date are recorded but these are less frequent. A large number of sites of Roman date are recorded within and close to the city of Chester. The medieval period saw a growth in established settlements and particularly of castles.
- The Stage 1 assessment has concluded that all packages that contain elements of intrusive ground works have the potential for adverse cultural heritage impacts. Package 1 has the potential for a slight beneficial effect on cultural heritage if managed correctly.

19.1.7 Soils

- As Package 1 has no intrusive measures proposed, it is considered to have a neutral impact.
- Packages 8 and 4 are predicted to have a slight adverse impact. Providing appropriate mitigation is implemented, impacts can be effectively reduced to neutral.

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- Packages 2, 6, 9, 3, 5 and 7 are predicted to have a moderate adverse impact. Providing appropriate mitigation is implemented, impacts can be effectively reduced to neutral.

19.1.8 Water Environment

Surface Water Quality

- Providing good practice mitigation measures are implemented, construction impacts can be reduced to neutral for all water receptors within the study area, with the exception of Packages 9 and 5. These two packages are likely to result in temporary adverse impacts of minor to moderate magnitude as they include a new bridge over the River Dee.
- Despite all packages aiming to provide safety and reduce congestion, it has been concluded that none of the packages is likely to significantly change the loading of highway derived pollutants in surface water bodies. This is because of the predicted changes in traffic flows as a result of the packages and the dilution taking place before polluting substances reach a very high important surface water feature. Similarly, the risk of spillages is also unlikely to significantly increase as a consequence of any of the packages. Assuming new treatment and containment measures are put in place and that the existing network does not provide with the appropriate treatment/containment facilities, it is concluded that Package 9 could result in a beneficial impact of minor magnitude. Packages 9 and 5 are likely to have an adverse impact on the morphology of some of the surface water features flowing through the study area if structures are required in the watercourses. However, if these packages involve the provision of open span bridges which are unlikely to cause any damage to the riparian corridor, negligible impacts are expected on the surface water environment.

Groundwater

- Any of the proposed transport packages may lead to impacts on the groundwater due to the construction and operation phases. Package 1 and 4 will have a neutral impact.

Flood Risk

- Providing good practice is followed and mitigation measures are put in place, construction impacts can be reduced to neutral for flood risk receptors. All packages except Package 1 could result in an increase in impermeable area draining to watercourses or sewers which could have an adverse impact without appropriate mitigation. Packages which potentially propose infrastructure within flood zones 2 and 3 (all packages except Packages 1 and 6) may be susceptible to direct flooding from rivers and the sea. For these, the level of mitigation to be provided will depend on the vulnerability of the infrastructure and the requirements for its operation in times of flood. Flooding due to loss of flood plain storage could potentially be caused by all packages except Packages 1 and 6, and flooding due to afflux from watercourse crossings could potentially be caused by Packages 9, 3, 5, and 7; these risks will require appropriate mitigation to allow development to take place. Other flood risks should be assessed in more detail at a later stage, but are normally able be adequately mitigated without difficulty.

19.2 Overall Conclusion

At this Stage 1 it is very difficult to fully assess which is the preferred package in term of environmental impacts due to a number of reasons including the high level of uncertainty in some of the options and the relatively lack of knowledge on the existing conditions and the potential to implement proposed mitigation measures. It should be noted that this assessment has been based on limited scheme information and will need to be revised at a later design stage.

Therefore, the approach followed for this assessment takes into account those uncertainties by providing a “range” for the overall impact significance where necessary. The impact overall score provided considers both the best and worst case scenarios that may occur as a result of the implementation of the transport packages. The worst case scenario considers all or some mitigation measures are not put in place and the existing level of uncertainty. The best case scenario takes into account residual impacts (i.e. takes into consideration that all necessary mitigation measures are put in place).

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An overview of the significance for each Environment Topic is presented in Table 10.1.

Table 10.1: Summary of significance

WelTAG Environment Topic		Summary of significance finding								
		Option 1	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Option 6**	**Option 7**	**Option 8**	**Option 9**
Noise		N	N	N	N	N	N	N	SB	SA
Local Air Quality		N/SB	SB	SB	SB	SB	SB	SB	SB	SB
Greenhouse Gas Emissions		N/SB	SB	SB	SB	SB	SB	SB	SB	SB
Landscape and Townscape		N	SA^1-N^2	SA^1-N^2	MA^1-SA^2	LA^1-SA^2	N	LA^1-SA^2	SA^1-N^2	LA^1-MA^2
Biodiversity		N	SA^1-N^2	LA^1-SA/N^2	SA^1-N^2	LA^1-SA/N^2	SA^1-N^2	MA^1-SA/N^2	SA^1-N^2	LA^1-SA/N^2
Heritage		N/SB	MA^1-N^2	MA^1-N^2	MA^1-N^2	MA^1-N^2	MA^1-N^2	MA^1-N^2	MA^1-N	MA^1-N^2
Soils		N	MA^1-N	MA^1-N	SA^1-N	MA^1-N	MA^1-N	MA^1-N	SA^1-N^2	MA^1-N
Water Environment	Water Quality	N	N	N	N	SA-N^2	N	N	N	MA^1-N^2
	Ground Water	N	SA^1-N^2	MA^1-N^2	N	SA^1-N^2	MA^1-N^2	SA^1-N^2	SA^1-N^2	MA^1-N^2
	Flood Risk	N	LA^1-N^2	LA^1-N^2	LA^1-N^2	LA^1-N^2	SA^1-N^2	LA^1-N^2	LA^1-N^2	LA^1-N^2

LA: Large Adverse; MA: Moderate Adverse; SA: Slight Adverse; N: Neutral; SB: Slight Beneficial; MB: Beneficial; LB: Large Beneficial.

[1] Significance of the worst case scenario considered (i.e. without all/some mitigation measures put in place and taking into account the high degree of uncertainty at this stage); [2] Significance of the best case scenario (i.e. residual effects)

The WelTAG Stage 1 **Appraisal Summary Tables** covering Environment Topic Areas for each option are included in Annex 10.1.

A drawing showing the Environmental Constraints for the proposed study area is shown in Figure 10.1 where information is available, from all the topics included in this WelTAG Stage 1 Environmental Report.

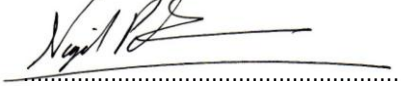
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NEWABTS Stage 1 Appendix D: Habitat Regulations Assessment (HRA)



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NEWABTS Stage 1 Appendix D: Habitat Regulations Assessment (HRA)

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1	Draft Submission	SE	NBP	19/01/11
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1 Introduction

1.1 Background

The Wales Government (WG) and Taith Consortium are developing a North East Wales Area Based Transport Study (NEWABTS). Under the European Directive 92/43/EEC (The Habitats Directive), and as part of the preparation of the NEWABTS, WG and the Taith Consortium are required to undertake a Habitat Regulations Assessment (HRA) to ascertain whether the policies and proposals within the NEWABTS are likely to have a significant effect on any European Sites (defined below) within the plan area or in adjacent areas.

For the purpose of this report, and consistency with the NEWABTS, the policies and proposals are referred to as interventions and proposals respectively.

1.2 The Habitats Directive

European Directive 92/43/EEC on the 'Conservation of Natural Habitats and Wild Fauna and Flora', referred to as the 'Habitats Directive', provides legal protection for habitats and species of European importance. Article 2 of the Directive requires the maintenance or restoration of habitats and species of European Community interest, at a favourable conservation status. Articles 3 - 9 provide the legislative means to protect habitats and species of Community interest.

In particular, Article 6 (3) of the Directive states:

"*Any plan or project not directly connected with, or necessary to, the management of the [European] site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives*".

A 'European Site' or Natura 2000 Site includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). For the purposes of HRA in Wales, the Welsh Government (WG) also expects plan making to treat all Ramsar sites, candidate SACs (cSACs) and potential SPAs (pSPAs) in the same manner as European Sites when considering the implications of development plans.

1.3 The Habitats Directive in Wales

In October 2005, the European Court of Justice ruled that the UK had failed to correctly transpose the provisions of Articles 6(3) and (4) of the Habitats Directive into national law; in that it had failed to ensure land use plans were subject to Appropriate Assessment where they might have a significant effect on a European Site.

Following this ruling, the Department for Environment, Food and Rural Affairs (DEFRA) published the amended Habitat Regulations 2010 – formally known as the Conservation (Natural Habitats, & c.) Regulations 1994 – to transpose the requirements in accordance with these amendments of the Habitats Directive into domestic legislation for England and Wales. An Appropriate Assessment is required for national, regional and local planning documents, including the NEWABTS.

1.4 Application to the NEWABTS

In accordance with the legislation set out in Sections 1.2 and 1.3, the Habitats Directive and Habitats Regulations require a Habitats Regulations Assessment (HRA), to be carried out to assess the potential impacts of the NEWABTS on the Conservation Objectives of any European Site and enable the WG and the Taith Consortium to ascertain whether or not it will significantly affect the integrity of any European Site.

Where significant effects are identified, alternative options (e.g. NEWABTS interventions or proposals) should be examined, or avoidance and mitigation measures should be included in the plan to prevent the plan from detrimentally influencing the site's conservation objectives.

1.5 Habitat Regulations Assessment

The methodology for the Habitat Regulations Assessment will at all times take cognisance of the EU guidance document 'Assessment of plans and projects significantly affecting Natura 2000 sites, Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Guidance is set out in the CCW 2009 Draft guidance for plan making authorities in Wales, *The appraisal of plans under the Habitats Directive*

Draft Annex to Technical Advice Note (TAN) 5 (Nature Conservation and Planning) which has now been superseded by the amended TAN 5 (Annex 6) (September 2009).

It has become generally accepted that a stage by stage approach should be followed for a Habitats Regulation Assessment as proposed by the latest European Commission guidance are:

- **Stage One: Screening** — the process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

- **Stage Two: Appropriate Assessment —** the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are significant impacts, an assessment of the potential mitigation of those impacts**;**

- **Stage Three: Assessment of alternative solutions** — the process which examines alternative ways of achieving the objectives of the project or plan that avoid significant impacts on the integrity of the Natura 2000 site;

- **Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain —** an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

  Each stage determines whether a further stage in the process is required. If, for example, the conclusions at the end of Stage One are that there will be no significant impacts on the Natura 2000 site, there is no requirement to proceed further. This is reflected in the approach and method applied to the NEWABTS as set out in Table 1.1 below.

Table 1.1 Stages in the HRA for NEWABTS

Stages / Tasks		Description	
1	**Likely Significant Effects or 'Screening'**	▪ Assess whether the interventions and associated proposals either alone or in combination with other plans or projects is likely to have a significant impact on the site(s).	
2	**Appropriate Assessment**	***2A***	▪ Analysing the site(s) and the reasons for its designation, and the underlying trends affecting it
		2B	▪ Analysing the intervention, including key components and how the proposals would be implemented in practice
		2C	▪ Analysing other plans and projects that could contribute to 'in combination' effects
		2D	▪ Analysing how the interventions and proposals in combination with other plans and projects and the site will 'interact' come implementation of the proposals i.e. Appropriate Assessment
		2E	▪ Where applicable, propose and assess mitigation measures for addressing adverse effects
		2F	▪ Preparing an Appropriate Assessment Report for consultation with key stakeholders including CCW
3	**Assessment of Alternative Solutions**	▪ Reassessing alternatives if effective mitigation proves impossible and develop / select a different alternative that does not harm site integrity. If no such alternatives exist the process continues to Stage 4	
4	**Assessment where no alternative solutions remain and where adverse impacts remain**	▪ At this stage proposals which even with mitigation still have a significant effect on the site(s) integrity should be dropped. ▪ Assessing whether a proposal can be justified by 'imperative reasons of overriding public interest' (IROPI). Permitted on the grounds of human health, public safety or primary beneficial consequences for the environment.	

1.6 Document layout

This report has been set out as follows:

Chapter 1 – Introduction

Chapter 2—Description of the Plan

Chapter 3 – European sites

Chapter 4 – Potential Adverse Effects of the RTP

Chapter 5 – Screening Methodology

Chapter 6 – Screening

Chapter 7 – Screening Results

Chapter 8 – In-combination Effects

Chapter 9 – Appropriate Assessment

Chapter 10 – Conclusions

2 Description of the Plan

2.1 Introduction

The North East Wales Area Based Transport Study (NEWABTS) will establish a transport strategy for North East Wales consistent with the aims and commitments set out in the National Transport Plan (NTP) published in March 2010. The focus of the study is to look at transport links between settlements in the study area (Wrexham, Chester and Deeside), access to areas outside the study area and transport issues which impact on trips throughout the study area. The study will be undertaken from the Welsh perspective but to avoid looking at the issues in isolation the study will also consider the cross border issues and seek to liaise with cross border partners.

2.2 Objectives of the NEWABTS

In July 2010, a stakeholder consultation was carried out to identify the main transportation problems within the study area. The issues are categorised into the three main corridors, Wrexham to Chester, Wrexham to Deeside and Deeside to Chester.

The transport planning objectives for the NEWABTS are as follows:

- To improve transport connections for businesses within the study area to key economic centres and employment sites
- To improve access between employment sites and workforce catchment areas
- To reduce carbon emissions from transport in the study area
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts
- To improve the actual and perceived safety and personal security of all transport users in the study area
- To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight.
- To reduce social deprivation through improving access to jobs and other key services
- To maintain and make more efficient use of the existing transport infrastructure in the study area
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

These NEWABTS objectives will be achieved using a series of interventions and the implementation of specific proposals developed from the interventions. In order to meet the objectives of the NEWABTS the interventions were based and developed from 6 separate topics, which are listed below;

- Walking and Cycling
- Bus
- Rail
- Freight
- Highway
- Demand on Management

The following packages have been produced by dividing the options identified at the WeITAG planning stage into three distinct levels described below;

Managing Demand -	Options which aim to reduce the demand for travel
Making Best Use -	Options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost
Capacity - Enhancements	Options involving the provision of new infrastructure

A comprehensive list of the interventions and proposals can be found in Annex A.

2.3 The NEWABTS Area

The NEWABTS area is illustrated on Figure 1 and encompasses parts of three local authorities, the eastern part of Flintshire, north and eastern part of Wrexham and the west of Cheshire West and Chester.

The region is predominately rural and coastal in character. The majority of urban/built development is located within the coastal areas which extend along the northern boundaries of the study area. The main towns in the study area include Chester, Wrexham, Mold, and the coastal towns of Flint, and Connah's Quay. Tourism is an important industry for the area, which is reflected by 73% of jobs being linked to the service industry sector. A large proportion of the region's transport needs feed into this commercial sector, with other major contributors being the freight and haulage industry. The transport links across North Wales, from the border with England in the east to Holyhead in the west, represent a strategic European transport corridor. The remaining transport links in North Wales are predominantly road links and a limited number of rail links.

Study corridors have been identified within the NEWABTS area and were then assessed against the various packages and interventions.

The study corridors within the NEWABTS area are detailed below and have been abbreviated for ease;

- Strategic Trips – ST
- Flint/Mold –Chester (via Deeside/Broughton) - FMC
- Wrexham-Deeside (via Mold/Buckley) - WD
- Chester- Wrexham – CW

3 European Sites

3.1 Introduction

This section of the report provides an introduction to the different designations under which a European Site may be classified and lists all the relevant sites that are located within the area of influence of the NEWABTS.

3.2 European Designations

As referred to in section 1.2, there are three European designations that are to be considered under the HRA. These are discussed below.

Ramsar Sites

Ramsar sites are wetlands of international importance that have been designated under the Ramsar Convention (1971). Sites are selected for their international significance relating to all ecology, botany, zoology, limnology or hydrology wetland components. The designation recognises the importance of wetlands as economic, social and environmental entities, and the need to conserve them.

Special Protection Areas (SPA)

Special Protection Areas (SPA) are strictly protected sites that have been implemented to protect rare and vulnerable bird species and their habitats. They are classified in accordance with the European Birds Directive (79/409/EEC) and aim to safeguard bird species and populations that are listed in Annexes I and II of the Directive.

Special Areas of Conservation (SAC)

Special Areas of Conservation (SAC) are high quality conservation sites that have been given strict protection under the European Habitats Directive (92/43/EEC). These important sites are selected to conserve rare and vulnerable animals, plants and habitats (excluding birds) that are listed in Annexes I and II of the Directive (as amended).

Candidate (c) and potential (p) designations (cSAC, pSPA, pRamsar) are sites that have been submitted to the appropriate authorities and are currently in the process of being considered for formal designation. It is important to acknowledge that current WG guidance regards candidate and potential sites as if they were fully designated.

3.3 List of Relevant Natura 2000 and Ramsar Sites

Within the NEWABTS boundary there is 1 SPA, 2 SACs and 2 Ramsar sites. These are listed in Tables 3.1-3.3 below and are shown in Figures 1. Natura 2000 and Ramsar sites adjacent to or within 2km of the NEWABTS boundary may still be affected by the plan and are listed in Tables 3.4. This area has been referred to as the study area throughout this report. European sites within 15km of the NEWABTS boundary may still be affected by wider ranging impacts and are listed in Table 3.5 – 3.7.

Ramsar Sites and pRamsar

Table 3.1: Ramsar Sites and pRamsar within the NEWABTS boundary

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
Aber Dyfrdwy / The Dee Estuary Ramsar	Criterion 1: The site supports an extensive area of intertidal mud and sand flats (20km by 9km) with large expanses of saltmarsh towards the head of the estuary. Criterion 2 The site supports vulnerable, endangered, or critically endangered species or threatened ecological communities	There are a large number of conservation objectives for the site, which is a result of the large quantity of interest features for the site. The broad objective for each of these relates to maintaining each interest feature's extent and viability. Detailed	Flintshire	SJ 190 819

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
	Criterion 5: Bird assemblages of international importance. Criterion 6: Bird species / populations of international importance	conservation objectives for each interest feature can be found in the site's core management plan.		
Midland Meres and Mosses Phase 2 Ramsar	Criterion 1: The site comprises a diverse range of habitats from open water to raised bog. Criterion 2:Supports a number of rare species of plants associated with wetlands, including the nationally scarce	Conservation objectives have yet to be defined for this site.	Wrexham	SJ 487 364

Table 3.2 Special Protection Areas (SPA / pSPA) within the NEWABTS boundary

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
Aber Dyfrdwy / The Dee Estuary (Wales) SPA	Annex I Birds and regularly occurring migratory birds:	There are a large number of conservation objectives for the site, which is a result of the large quantity of interest features for the site. The broad objective for each of these relates to maintaining each interest feature's extent and viability. Detailed conservation objectives for each interest feature can be found in the site's core management plan	Flintshire	SJ 190 819

Table 3.3 Special Conservation Areas (SAC / cSAC) within the NEWABTS boundary

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
Aber Dyfrdwy / The Dee Estuary SAC	Annex I Habitats but not a primary selection include Mudflats and sandflats not covered by seawater at low tide, Salicornia and other annuals colonising mud and sand, Atlantic salt meadows	There are a large number of conservation objectives for the site, which is a result of the large quantity of interest features for the site. The broad objective for each of these relates to		

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
	Annex I Habitats present as a qualifying feature, but not a primary reason for selection of this site - Estuaries, Annual vegetation of drift lines, Vegetated sea cliffs of the Atlantic and Baltic coasts, Embryonic shifting dunes, Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`), Fixed dunes with herbaceous vegetation (`grey dunes`), Humid dune slacks. Annex II Species present as a qualifying feature, but not a primary reason for site selection Sea lamprey (*Petromyzon marinus*), River lamprey (*Lampetra fluviatilis*), Petalwort *(Petalophyllum ralfsii*).	maintaining each interest feature's extent and viability. Detailed conservation objectives for each interest feature can be found in the site's core management plan		
Afon Dyfrdwy a Llyn Tegid / River Dee and Bala Lake SAC	Annex I habitats that are a primary reason for selection of this site: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation Annex II species that are a primary reason for selection of this site: Atlantic salmon (*Salmo salar*), Floating water-plantain (*Luronium natans*). Annex II species present as a qualifying feature, but not a primary reason for site selection: Sea lamprey (*Petromyzon marinus*), Brook lamprey (*Lampetra planeri*), River lamprey (*Lampetra fluviatilis*), Bullhead (*Cottus gobio*), Otter (*Lutra lutra*).	In summary, the river and lake should maintain good water quality / quantity and flow variability to support and protect the important fauna and floral communities that exist. Natural processes of erosion and deposition will operate without interference. Aquatic vegetation extents and species populations should be maintained with the exception of natural fluctuations.	Denbighshire, Flintshire, Wrexham	SH 910 404
Deeside and Buckley Newt Sites SAC	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles. Annex II species that are a primary reason for selection of this site: Great crested newt (*Triturus cristatus*).	The woodland habitat objectives include maintaining the canopy and its current extent (68ha), cover, canopy composition, and regeneration potential and dead wood cover. Targets for the favourable condition of the great crested newt	Flintshire	SJ 291 678

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
		include: population numbers (1,000 during breeding season), breeding success and maintaining good quality aquatic and surrounding terrestrial habitats.		

Natura sites 2000 sites that fall outwith the NEWABTS boundary but within a 2km radius are detailed in Table 3.4.

Table 3.4 Special Conservation Areas (SAC / cSAC) within 2km of the NEWABTS study area

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
Halkyn Mountain / Mynydd Helygain SAC	Annex I habitats that are a primary reason for selection of this site - Calaminarian grasslands of the *Violetalia calaminariae*. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:- European dry heaths, Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*), Molinia meadows on calcareous, peaty or clayey-silt-ladensoils (*Molinion caeruleae*). Annex II species that are a primary reason for selection of this site - Great crested newt (*Triturus cristatus*)	In summary, the habitat interest feature extents should be maintained with the following spatial area - calaminarian grassland > 12ha; dry heath >111.8ha; semi-natural grassland >43.4ha; and Molinia meadows >1ha. The habitat communities will support associated vegetation species that characterise them by ensuring adequate physical conditions and processes persist. The SAC habitat conditions should continue to support adult great crested newts as identified by torch surveys in the spring. Great crested newt breeding and display ponds across the site will be restored to a condition whereby they support sufficient open water and aquatic macrophytes to support the great crested newt population	Flintshire	SJ196715
Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Annex I Habitats that are a primary reason for selection: Tilio-Acerion forests of slopes, screes and ravines. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site	The qualifying features should be kept in favourable condition including • Tilio-Acerion forests of slopes, screes and ravines. • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae,*	Flintshire	SJ196630

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) *	*Salicion* albae). • Dry grasslands and scrublands on chalk or limestone - Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)		

Natura 2000 and Ramsar sites outwith the NEWABTS study area which may be affected by wider ranging impacts that could propagate further than the 2km radius are considered below;

Table 3.5 Ramsar sites outwith 2km of the study area but within 15km of the NEWABTS boundary

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
Mersey Estuary Ramsar	Ramsar criterion 5 Assemblages of international importance: Species with peak counts in winter: Ramsar criterion 6 – Species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Common shelduck , *Tadorna tadorna*, Black-tailed godwit , *Limosa limosa islandica*, Common redshank , *Tringa totanus totanus*, Eurasian teal , *Anas crecca*, Northern pintail , *Anas acuta*, Dunlin , *Calidris alpina alpina*,	The conservation objectives for the site are to maintain the following features in favourable condition – Intertidal sediments, Rocky shores Saltmarsh	Cheshire/Merseyside	SJ451800

Table 3.6 Special Protection Areas (SPA / pSPA) outwith the study area but within 15km of the NEWABTS boundary

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
Mersey Estuary SPA	Annex I species *Pluvialis apricaria*. Annex II species Supports regularly occurring migratory species: *Anas acuta*, *Anas crecca*, *Anas penelope*, *Calidris*	The conservation objectives for the site are to maintain the following features in favourable condition – Intertidal sediments,	Cheshire/Merseyside	SJ451800

Site Name	Qualifying Features	Conservation Objectives	County	Grid reference (site centroid)
	alpina alpina, *Limosa limosa islandica*, *Numenius arquata*, *Pluvialis squatarola, Podiceps cristatus*, *Tadorna tadorna*, *Tringa totanus*, *Vanellus vanellus*, *Charadrius hiaticula*, *Tringa totanus*	Rocky shores Saltmarsh		
Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Annex I Birds and regularly occurring migratory birds: Hen Harrier (*Circus cyaneus*), Merlin (*Falco columbarius*), Peregrine Falcon (*Falco peregrinus*), Red Kite (*Milvus milvus*).	There are a large number of conservation objectives for the site, which is a result of the large quantity of interest features for the site. The broad objective for each of these relates to maintaining each interest feature's extent and viability. Detailed conservation objectives for each interest feature can be found in the site's core management plan	Wrexham	SH918280

Table 3.7 Special Conservation Areas (SAC / cSAC) outwith the study area but within 15km of the NEWABTS boundary

Site Name	Qualifying Features	Conservation Objective	County	Grid reference (site centroid)
Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SAC	Annex I Habitats that are a primary reason for selection - European dry heaths, Blanket bogs. Annex I Habitats present as a qualifying feature, but not a primary reason for selection of this site - Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco Brometalia*), Transition mires and quaking bogs, Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*), Calcareous rocky slopes with chasmophytic vegetation.	There are a large number of conservation objectives for the site, which is a result of the large quantity of interest features for the site. The broad objective for each of these relates to maintaining each interest feature's extent and viability. Detailed conservation objectives for each interest feature can be found in the site's core management plan.	Wrexham	SH918280
Johnstown Newt Sites SAC	Annex II species that are a primary reason for selection of this site: Great crested newt (*Triturus cristatus*)	A summary of some of the conservation objectives are presented below. The entire list can be viewed in the site's core conservation plan.	Wrexham	SJ310466

Site Name	Qualifying Features	Conservation Objective	County	Grid reference (site centroid)
		1. No less than 300 great crested newts will be present on the site 2. At least 30 display/breeding ponds will be found throughout the entire site 3. Great crested newt larvae will be found in 7 or more of the breeding ponds 4. Half of the display/breeding ponds on the site will have a water depth of 10cm or more during the summer months. 5. Native macrophytes will cover at least half of the pond surface yet some of the water surface will still remain open. 6. Aquatic marginal vegetation will be present around the ponds		
Fenn's Whixall Bettisfield, Wem, and Cadney Mosses SAC	Annex I: The site comprises a diverse range of habitats from open water to raised bog. Annex II: The site supports a rare number of plant species associated with wetlands (e.g. nationally scarce cowbane (*Cicuta virosa*) and elongated sedge (*Carex elongata*), the nationally scarce bryophytes Dicranum affine and Sphagnum pulchrum, and several rare species of invertebrates including the following Red Data Book listed species: the moth *Glyphipteryx lathamella*, the caddisfly *Hagenella clathrata* and the sawfly *Trichiosoma vitellinae*.	In summary, the conservation objectives for this SAC relate to maintaining the extent of bog and other wetland habitats. It is important that water quality and levels are maintained at a level that supports the rare plant and invertebrate species associated with these wetland areas	Wrexham	SJ487365

4 Potential Adverse Effects of the NEWABTS

4.1 Introduction

This chapter sets out the potential significant ecological effects that the NEWABTS interventions and associated proposals could have on the identified Natura 2000 and Ramsar sites within North East Wales.

4.2 North East Wales NEWABTS Interventions

In order to achieve the objectives of the NEWABTS which are set out in Chapter 2 a series of interventions have been identified. The interventions have been grouped under 6 topics and specific details of the interventions can be found in Annex A.

4.3 Identifying potential adverse effects of NEWABTS Interventions

4.3.1 Possible adverse ecological effects of the NEWABTS

To understand whether the European Sites listed in Chapter 3 would potentially be affected by the NEWABTS it is necessary to firstly identify whether the interventions and proposals would have an impact on species and habitats, and what that impact would be. The implementation of the NEWABTS interventions may lead to specific transport infrastructure development or changes to transport movements that could have associated significant impacts on European Sites. Interventions where there are no significant impacts anticipated to the European Site were scoped out during the preliminary screening assessment and are listed as red in Annex A. These include interventions which express general intentions or developing strategies/campaigns and would therefore not involve the construction and operation of transport related infrastructure and would have no effect on European Sites.

The potential significant impacts are presented in Table 4.1 below with descriptions of their origin.

Table 4.12 Potentially Significant Impacts

Potential Ecological Impacts
E1 Water Pollution
Surface water runoff and groundwater sub-surface flow generated from construction works or from increased traffic levels can transport polluting materials and sediments to nearby watercourses: E1.1 Water pollution (chemical contamination): There is potential for an increased transport of chemical contaminants reaching the aquatic environment from runoff or spray construction and operation.. This could range from concrete leaks and fuel leaks (oil and diesel) during construction and vehicle emissions and surface runoff during operation. Changes to water quality can have harmful effects on populations of fauna and flora, which can be a result of lowered oxygen levels, direct toxic effects and changes to ecosystem function. E1.2 Water pollution (sediments): Increased sediment loads from construction works can increase turbidity levels and sediment deposition within aquatic systems. This can adversely impact on associated wildlife by causing shading effects that can inhibit plant and algal growth and smother organisms thereby limiting productivity and survival.
E2 Air Pollution
The construction phase of proposals can generate dust emissions from operating machinery that can cause localised smothering of vegetation or potential health issues in large animals e.g. birds. An intervention may also lead to increased traffic levels and associated increases in the nitrogen oxide deposition levels on surrounding sensitive habitats.
E3 Land Take
The construction of transport infrastructure could lead to direct loss of habitat availability and/or indirectly fragment inter-connecting habitats that are important for species movement and population viability.
E4 Disturbance
Increased noise levels and human presence have the potential to disturb fauna and impact on habitats (e.g. trampling on plants).

Potential Ecological Impacts
E5 Changes to Hydrology
During both the construction and operational phases of infrastructure developments there is potential to alter the hydrology of sensitive habitats and species by either increasing or decreasing runoff or water percolation into aquifers.
E6 Lighting
Increased lighting from construction works or infrastructure operation has the potential to impact on the behaviour of certain species and deter the usage of species on certain habitats.
E7 Pests / Invasive Species
During construction there is potential for invasive species to be inadvertently transported to European Sites. The introduction of such species could out-compete and replace desirable native organisms.

Based on these potential effects, each of the interventions presented in the NEWABTS have been assessed by way of a preliminary screening assessment to determine if they could give rise to any of the potential ecological impacts in Table 4.1 above.

5 Screening Methodology

5.1 Introduction

The principle aim of this chapter is to identify any NEWABTS interventions / proposals that are likely to cause a significant impact upon the European designated sites identified in Chapter 3. It forms an initial part of the screening process that uses informed judgment to determine whether an intervention will have significant impacts to the integrity of a European Site in terms of its conservation objectives. A precautionary line is taken when insufficient information is available to make a judgment, by assuming that a significant effect is possible.

5.2 Aim and Objectives

Stage 1 (Screening) has four main stages and aims to determine whether the NEWABTS interventions and associated proposals, will require a full HRA (including an Appropriate Assessment). Determination of the requirement for a full HRA will require the following activities:

- Identifying European Sites that lie within the NEWABTS boundary and those that are outside the NEWABTS area that may be affected by the NEWABTS;
- Acquiring the Interest Features and Conservation Objectives for these European Sites;
- Determine whether the plan is directly connected with or necessary to the management of the site – if it is, then no further assessment is required;
- Identifying the broad elements of the NEWABTS interventions that may interact with European Sites
- Collating information on other plans and projects that may have “in combination effects”. In-combination effects refers to the cumulative effects caused by other projects or plans that are currently under consideration together with the effects of any existing or proposed projects or plans;
- Identify the potential effects and ascertaining whether the European Site(s) are at risk of a significant effect from the NEWABTS;
- Consulting with CCW and Natural England to determine which proposals should be assessed within the HRA; and
- Providing recommendations for the following stages of the HRA.

5.3 Approach and Methodology

5.3.1 Preliminary screening assessment

Due to the large scale of the plan a preliminary screening assessment has been carried out on the interventions and associated proposals. The preliminary assessment has been designed to reduce the long list of interventions and their associated proposals to those that have the potential to have an impact on the local biodiversity. Potential ecological impacts could arise from the construction and/or operation of transport related infrastructure. Interventions which express general intentions or develop transport related strategies/campaigns and which do not involve the construction/operation of any new infrastructures have been screened out by this preliminary screening assessment as no ecological impacts were envisaged. This preliminary screening assessment does not identify a proposal’s proximity to a European Site, the potential for hydrological links or potential effects associated with increased emissions, it simply provides an indication of whether the intervention/proposal itself could potentially have an ecological impact. The result of this preliminary screening assessment is a condensed list of interventions/proposals that have some potential to impact on a European Site. This condensed list is presented in Annex A and summarised in Chapter 4. The preliminary screening assessment has identified a number of interventions where proposals are yet to be developed under them; therefore at this stage it has not been possible to determine the potential for significant effects. Where proposals are brought forward under these interventions this preliminary screening assessment will need to be revisited and additional HRA may need to be undertaken to ascertain whether impacts are likely to be significant.

5.3.2 Screening assessment

From the results of the preliminary screening assessment those interventions / proposals that were identified as having the potential to have an ecological impact were further screened to determine whether they are likely to have significant effects on a European Site. Where screening identifies a likely significant effect of an intervention / proposal on a European Site, The Conservation of Habitats and Species Regulations 2010 requires that the impact of the particular proposal is considered in combination with other plans and projects. These possible in-combination effects are illustrated in the Assessment Matrices presented in Annex B. The results of the screening assessment are presented in Chapter 6.

6 Screening

6.1 Introduction

The aim of screening is to identify whether the individual intervention and any associated proposals have the potential to have a likely significant effect upon any of the identified Natura 2000 and Ramsar sites presented in Tables 3.1 to 3.3. The assessment has considered the proximity of the specific intervention and associated proposal to each of the European Sites. The proximity of the proposal, whether it's hydrologically connected and whether the proposal would result in an increase in emissions are relevant factors to take into consideration when assessing whether proposals will affect European Sites. Factors that would trigger a potential likely significant effect on a European Site are given below:

- Any European Site within 2km of a proposal will automatically be identified as having the potential to have a likely significant effect;
- Any European Site that is likely to be hydrologically connected to a proposal. This includes all proposals upstream of European Sites, direct impacts on main rivers e.g. sediment disturbance, increased runoff or disturbance to mobile species; and
- Proposals will also be looked at individually to determine whether they are likely to have any wider ranging impacts that could propagate further than the 2km radius such as increased emissions which could affect Natura 2000 sites both within and outside of the NEWABTS boundaries.

In accordance with CCW (2009) The Draft Guidance on Habitats Regulation Appraisal of Plans and taking into consideration the factors that consider a likely significant effect, each intervention was categorised using the screening schedule in Table 6.1

Category	Definition
A	Interventions of the plan that would have no negative effect on a European Site at all
B	Interventions of the plan that would have no significant effect on the site
C1	Interventions that could directly affect a European Site because it provides for, or steers, a quantity or type of development onto a European site, or adjacent to it
C2	Intervention that could indirectly affect a European Site e.g. because it provides for, or steers a quantity or type of development that may be very close to it, or ecologically, hydrologically or physically connected to it or it may increase disturbance as a result of recreational or other pressures
C3	Proposals for a magnitude of a development that no matter where it was located, the development would be likely to have a significant effect on a European site
C4	An option, intervention that makes provision for a type of development, generally, (any may indicate a broad scale and / or one or more broad locations e.g. a particular part of the plan area), so a likelihood of a significant effect cannot be rule out, but the more precise scale and / or detailed location of the development is to be selected following consideration of options in a later, more specific, lower tier plan, subject to a Habitats Regulation Appraisal
C5	Options, interventions or proposals for developments or infrastructure projects that could block options or alternatives for the provision of other developments or projects in the future, which will be required in the public interest, that may lead to adverse effects on European site which would otherwise be avoided
C6	Options, interventions which depend on how the interventions are implemented in due course for example through the development management process. There is a theoretical possibility that if implemented in one or more particular ways, the proposal could possibly have significant effect on a European site, and is not merely a general statement of policy
C7	Any other interventions or proposals that would be **vulnerable to failure** under the Habitats Regulation at a project level assessment stage; to include then in the plan would be regarded by the EC as "faulty planning"

C8	Any other intervention that may have an adverse effect on a European Site, which might try to pass the tests of a Habitats Regulation at project assessment stage by arguing that the **plan provides the imperative reasons** of over-riding public interest to justify its consent despite a negative assessment

The screening assessment has been presented in Annex C. Where a potential likely significant effect cannot be ruled out at this stage due to insufficient design and spatial information, it will be necessary to further assess proposals under these interventions when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. This is only considered appropriate where the following criteria apply:

- The NEWABTS cannot reasonably assess the effects in a meaningful way;
- The project HRA will be able to change the proposals so as to avoid any potential effects and won't be constrained by the NEWABTS; or
- The plan or project and HRA of the project is required as a matter of law or by Government policy.

6.2 Screening matrixes

An assessment has also been made to determine whether a likely significant effect can be identified at this stage based on current information. All of the potential impacts on Natura 2000 and Ramsar sites should also be considered at project level when detailed design is fixed. .

Screening matrixes have been prepared for all of the Natura 2000 and Ramsar sites and are presented in Annex B. These matrices are based on the criteria outlined by the European Commission (EC, 2001) and are structured as follows:

- A brief description of the European Site;
- A list of the interest features for which it is designated;
- A summary of the pressures to which the European Site's integrity is currently vulnerable;
- A description of the individual elements of the NEWABTS to which the European Site may be vulnerable;
- A description of any likely direct, indirect or secondary impacts of the NEWABTS (either alone or in combination with other plans or projects) on the European Site;
- A description of the likely changes to site integrity as a result of the NEWABTS;
- A description of the likely impacts on the European Site as a whole; and
- A description of where impacts are likely to be significant, or where the scale or magnitude of the impacts is not known.

The Standard Data Forms for each European Site can be found on the Joint Nature Conservation Committee (JNCC) website www.jncc.gov.uk. The matrices are presented to allow for a comparison of the site designations to the NEWABTS proposals presented in the previous chapter. Should any of the proposals during the Habitat Regulation Assessment be considered to have the potential for likely significant effects on the sites, the proposals will be subjected to a more detailed Appropriate Assessment.,. A statement will be produced to inform the Appropriate Assessment for consideration and evaluation by the relevant authority which will then determine its outcome..

6.3 Wider ranging impacts

Any proposal which could contribute to increased emissions could have wider ranging impacts on proposals outside the NEWABTS boundary as well as those inside. Increased emissions from transport proposals could affect nitrogen deposition and acidification impacting on the critical loads of European Sites many of which are currently above their critical loads. Therefore Natura 2000 sites outside of the NEWABTS boundary which are not hydrologically linked have been included within the screening matrixes. The screening matrixes for all sites include a sub matrix detailing which of the features are sensitive to nitrogen deposition and acidification.

7 Results of Screening

7.1 Introduction

The screening process identified the potential for likely significant effects on sites up to 15km from the from the NEWABTS boundary. In accordance with CCW 2009 guidance interventions categorised A or B, can be scoped out and no further assessment is required. Annex C lists the Natura 2000 and Ramsar sites that have been identified in Chapter 6 as having the potential to be significantly affected by one or more of the interventions / proposals (category C) contained within the NEWABTS. For a number of the interventions identified as having the potential to cause ecological impacts, it was not possible to then determine whether these would have a likely significant effect on any European Site as insufficient detail is available in their current form and specific proposals have not yet been developed. For these interventions, we cannot conclude that the intervention will not have a likely significant effect upon European Sites. As a result it will be necessary to further assess proposals which are developed under these interventions when further spatial and design information becomes available. The intervention cannot be adopted until this information is made available. . Any intervention that could have a significant effect on the integrity of a European or international site will not be in accordance with the delivery of the NEWABTS.

Avoidance and cancellations measures could be implemented during construction or operation to reduce likely significance impacts on Natura 2000 and Ramsar sites listed in Annex C. Avoidance and cancellation mitigation measures to address potential likely significance impacts are detailed below in table 7.1.

Table 7.1 Best Practice Avoidance Measures to address Potential Significant Impacts

Reason for Potential Likely Significant Effect upon Natura or Ramsar Sites as a result of the implementation of the intervention	**Proposed Avoidance / Cancellation Measures**
Water pollution from surface runoff either from construction or during operation could significantly affect sensitive habitats and species if allowed to discharge uncontrolled into waterbodies	Normal controls / licences would be required at a project level. However the following avoidance and cancellation measures would be included (subject to the detailed project level HRA) in the NEWABTS for these proposals: ▪ Any construction works close to watercourses would be carried out under appropriate consents and in a way to minimise any adverse impact. ▪ Good practices undertaken should be in accordance with the EA Pollution Prevention Guidelines PPG 1, PPG 2, PPG 6, PPG 7, PPG 8, PPG 18, PPG 21, PPG 26 ▪ Sediment laden runoff would be prevented from being discharged without treatment. Temporary discharge consents will be obtained where necessary. ▪ Where any chemicals are required these would be stored appropriately on site away from watercourses and in bunded areas with isolated drainage systems. ▪ Any vehicles that are required during construction would be inspected before and regularly during their use. Drip trays fitted where appropriate and spill kits available if required. Emergency plans in the event of a spillage would be developed. ▪ Wheel wash facilities or road sweepers would be in place on entrance and exit points to construction sites in accordance with EA PPG 13 and vehicles made to use them. ▪ Any proposed bridge structures would be set back from the river banks and working within the river would be avoided to prevent any potential species disturbance
Localised Air pollution from construction activities and during operation could	▪ Restrict vehicle speed ▪ Use of ultra low sulphur diesel during construction and operation

Reason for Potential Likely Significant Effect upon Natura or Ramsar Sites as a result of the implementation of the intervention	**Proposed Avoidance / Cancellation Measures**
significantly affect sensitive habitat and species	▪ Fencing to be implemented on site to restrict dust emissions from propagating large distances
Noise and Vibration disturbance from construction activities and during operation could significantly affect sensitive species and habitats.	▪ Any construction activity would aim to avoid periods where passage, breeding and over-wintering birds for which the Natura 2000 sites are designated for are using the site in significant numbers. Wintering and migration bird surveys may be required. ▪ Development of appropriate conditions to avoid environmental impacts during the construction of these proposals from disturbing species and sensitive habitats such as appropriate fencing or barriers.
Close proximity of proposals to site could result in physical and visual disturbance to sensitive habitats and species on site during construction or operational phases of the proposal	▪ Protected species surveys undertaken prior to works commence and standard mitigation measures implemented to protect specific species (such as otters and GCN) and their territories. Any work which may destroy or affect a sensitive species habitat must be discussed with CCW and the EA. ▪ Fencing to be implemented into the design of the proposal and restrict access to sensitive areas to reduce disturbance to wintering, breeding and passage birds. ▪ Fencing and buffer zones would also be incorporated as part of the overall proposal to prevent protected species such as otters gaining access to the construction compound. ▪ Appropriate consents would be required from CCW and EA where construction would require physical disturbance to the River. However the following mitigation measures (subject to the detailed project level HRA) should be included within the NEWABTS for this proposal. ▪ Any proposed bridge structures would be set back from the river banks and working within the river would be avoided to prevent any potential species disturbance. ▪ Any new bridge would provide a safe passage for mammals. ▪ Any works would be carried outside the of the spawning period for salmonids ▪ Fish passage conditions must be maintained at all times.
Increased lighting from operational infrastructure could cause increased illumination to sensitive habitat and species on site.	▪ Using low or high pressure sodium lights instead of mercury or metal halide lamps. ▪ Direct lighting to where needed and avoid spillage e.g. direct lighting towards the proposal and design the luminaire appropriately, including the use of hoods, cowls, shields etc to avoid spillage onto features of ecological interest. ▪ Using lighting modelling programs to indicate where the light spill will occur if appropriate. ▪ Only light areas which need to be lit, and use the minimal level of lighting required to comply with guidance such as Institute of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light (2005). ▪ Use movement sensors or timers on security lighting.

Reason for Potential Likely Significant Effect upon Natura or Ramsar Sites as a result of the implementation of the intervention	**Proposed Avoidance / Cancellation Measures**
	▪ Do not use a lamp greater than 150W for security lighting. ▪ Care should also be taken with temporary lighting during the construction period. This would only be used during the hours of work and switched off at night.

Taking into consideration the avoidance/cancellation measures detailed in Table 7.1 likely significant impacts could be reduced to minor impacts and interventions could therefore be scoped out from further assessment. Annex C indicates whether likely significance impacts can be avoided against the interventions listed in the NEWABTS. Chapter 9 Appropriate Assessment details likely significant effects from the implementation of the interventions that cannot be avoided through such measures. .

8 In-Combination Effects

8.1 Introduction

The Habitats Regulations state that when considering whether a specific plan or project is likely to have a significant effect on a European Site, this should consider the effect of the proposal in isolation and in-combination effects with other plans or projects. Part of the HRA process is to identify the plans, programmes and projects that could have in-combination effects. TAN 5 (September 2009) states that if the plan is not likely to have a significant effect on its own it must still be considered whether it is likely to have a significant effect in combination with other plans and projects. In assessing in combination effects the following projects should be considered:

- Projects which have already been implemented or completed;
- Projects which have been given consent but which have not yet been implemented or completed;
- Projects for which applications for consent have been made; and
- Ongoing projects that are subject to periodic regulatory reviews, such as discharge consents or waste management licences.

In addition to the above other plans or programmes that in combination with the NEWABTS could have a significant effect on a Natura 2000 site also need to be considered.

8.2 Other plans, programmes and projects

In summary, a series of other plans and projects have been reviewed when determining possible in-combination effects. These are outlined in Table 8.1 below and have been referred to in the relevant site matrices in Annex B where appropriate.

Table 8.1 Plans and Projects which may have in-combination effects with the NEWABTS

Other Plans and Projects
National level plans / projects
The Transport (Wales) Act (2006).
Walking and Cycling Action Plan (2009-2013)
Wales Transport Strategy (April 2008).
National Transport Plan (March 2010)
Nuclear Energy Strategic Siting Study (2008).
National Policy Statement for New Nuclear Power
Regional level plans / projects
North Wales Regional Transport Plan (2010-2015)
North Wales Regional Waste Plan (2003-2013).
North Wales Development Strategy (2006).
Taith Regional Rail Strategy, Draft (2006).
Local level plans / projects
Cheshire's Local Transport Plan 2006 - 2011
Flintshire Unitary Development Plan (2000-2015).
Wrexham Unitary Development Plan (1996 – 2011).
Wrexham Refreshed: A vision for Wrexham County Borough, 2004 – 2020.

Other Plans and Projects
Chester District Local Plan, 2006.
Wrexham LTP 2001-2006

8.3 Brief Description of Potential In-combination Effects

This sub-section provides a short overview of how different types of projects and plans could interact with the NEWABTS to cause an in-combination effect and which could have significant impacts on European Site designations.

8.4 Local Plans and Unitary Development Plans

These plans set out detailed policies that guide development within their geographic boundaries and often include details of proposals for specific sites that would be suitable for housing, industry, retail or other uses. Possible in-combination effects may therefore arise where nearby development proposals from local / unitary plans interact with NEWABTS interventions and proposals .

8.4.1 Development / Regeneration Strategies

These are local scale plans that set out a number of priorities that focus on improving the economic, social and environmental aspects of an identified area. These strategies can identify and implement development programmes and projects that help with meeting development / regeneration aims. Such programmes and projects often require the provision of infrastructure that may have the potential to have in-combination effects with the NEWABTS.

8.3.3 Transport Plans / Transport Strategies

These plans put forward a programme of transport improvements, i.e. proposals, at the local scale, which aim to improve transport infrastructure and function. Similarly, transport strategies are often at the regional or national scale that identify priorities over a wider geographic scale and set out policies that influence proposals and works within more localised plans. Together both types of plans influence a range of transport infrastructure that could have in-combination effects with the NEWABTS.

8.4.2 Regional / Local Waste Plans

These plans aim to provide a sustainable and adequate network of modern waste management facilities for identified areas. Waste plans can identify the need for new disposal areas or the need to expand current landfills. The expansion of waste facilities depending on their location could have in-combination effects with the North Wales NEWABTS.

8.4.3 Nuclear Energy Strategic Siting Study

This strategic siting study would lead to the identification of suitable sites for nuclear energy plants within Wales. Depending on the identified site locations, there would be potential for construction and operational works associated with nuclear energy plants or complimentary transport infrastructure to interact with NEWABTS interventions and proposals and adversely impact on European Sites.

8.5 Potential In-combination effects with other plans

Table 8.2 considers the relevant plans, programmes and projects listed in Table 8.1 in combination with the NEWABTS.

Table 8.2 Plans and Programmes In-Combinations Effects Assessment

Title	Potential in combination effects of the RTP with the other plans, programmes and projects
National Level Plans	
The Transport (Wales) Act (2006).	The act does not set out any development proposals or proposals therefore no in combination with this act have been identified.

Title	Potential in combination effects of the RTP with the other plans, programmes and projects
Walking and Cycling Action Plan 2009-2013	This plan sets out objectives to encourage more people to walk and cycle more safely throughout Wales. This will be delivered through regional and local authorities plans and has been taken into consideration with proposals detailed in the NEWABTS. One action of the plan involves incorporating a coastal path around Wales for the provision for usage by cyclists and walkers. There would be an in-combination effect with the NEWABTS intervention - the provision of a Dee Coastal Path in Flintshire, contributing towards an increase in human presence along the coastline which may have potential significant impacts on over wintering, passage or breeding birds on site.
The Wales Spatial Plan (2008)	This plan is the overarching framework and integration tool for Wales. It provides important underpinning in a whole range of matters including regeneration, transport improvements, greenhouse gas emissions, and developments. As this plan is a high level framework the plan itself will not have any in combination effects with the NEWABTS
Wales Transport Strategy (April 2008).	This plan sets out the strategic priorities for Wales which will be delivered through regional and local transport plans. Therefore there will be no in-combination effects with this plan itself.
National Transport Plan (March 2010)	This plans sets out proposals which aim to improve public transport services, increase sustainable travel use and support new travel infrastructure. This plan will inform regional and local plans and the plan itself will not have any in-combination effects with the NEWABTS.
National Policy Statement for New Nuclear Power	This plan is one of the primary decision-making documents when considering development consent applications for the construction of new nuclear power stations on sites in England and Wales. There will be no in-combination effects with this plan itself.
Major Proposals	
Nuclear Energy Strategic Siting Study (2008)	There are no identified sites within the NEWABTS study area. Therefore there will be no in-combination effects with this plan.
Regional level Plans/Projects	
North Wales Regional Transport Plan (2009)	This plan is a strategy for identifying and delivering improvements to the transport system in North Wales. This plan will inform Local Transport Plans. As this plan is a high level framework and any transport proposals will be included within the LTPs, the plan itself will not have any in combination effects with the NEWABTS.
North Wales Regional Waste Plan (2003-2013)	This plan provides a sustainable land use planning framework to facilitate an integrated and adequate network of new and modern waste facilities. This plan will inform Local Development Plans. As this plan is a high level framework and any development proposals will be included within the LDPs the plan itself will not have any in combination effects with the NEWABTS.
North Wales Development Strategy (2006)	This is a high level strategy for economic development within North Wales and the strategy itself does not have any in combination effects with the NEWABTS.
North Wales Rail Strategy	This strategy sets out a number of proposals to upgrade the existing railway network, construction of new stations, develop freight movement and expansion of existing car parks. The main aim of the strategy is to encourage and facilitate increased numbers of people to use the railways in turn reducing emissions and having beneficial impacts on a number of designated sites. The strategy contains a number of infrastructure projects most of which are situated within existing infrastructure or within an urban environment that significant impacts are considered unlikely. None of the infrastructure projects contained within this strategy will have in combination effects with the interventions that the NEWABTS is taking forward. The implementation of the appropriate mitigation measures and the application of good practice during construction will avoid any likely significant effects on Natura 2000 sites during construction or operation in-combination with the NEWABTS interventions.
Local level plans / projects	

Title	Potential in combination effects of the RTP with the other plans, programmes and projects
Cheshire's Local Transport Plan 2006 - 2011	This plan sets out proposals which aim to improve the transport services within the local area. Proposals which may have in-combination effects with the NEWABTS is the upgrading of the Halton Curve railway line to allow two way traffic on the existing line. This transport infrastructure improvement at Halton and the NEWABTS interventions which involve crossing the Dee Estuary have the potential to result in localised adverse air quality impacts from an increase in traffic levels.
Wrexham Unitary Development Plan (1996 – 2011)	There is the potential that there could be in combination effects with improvements to the transport network system and development proposals for employment sites set out within the Unitary Development Plans and Local Plan documents. However, the likely significant impacts of the NEWABTS proposals identified by this HRA are mainly temporary construction impacts which if appropriate mitigation is implemented and good practice applied can be avoided. Likewise any operational effects can be avoided through the implementation of mitigation and appropriate design. Providing these measures are implemented and developments phased so that construction of the NEWABTS proposals do not result in cumulative effects on any Natura 2000 site with any of the proposals in these or other plans then any potential in-combination effects will be avoided. A review of planning applications should be carried out prior to construction of any proposal.
Flintshire Unitary Development Plan (2000-2015).	
Wrexham Refreshed: A vision for Wrexham County Borough, 2004 – 2020.	
Chester District Local Plan, 2006.	
Wrexham LTP 2001-2006	

9 Appropriate Assessment

9.1 Introduction

An Appropriate Assessment is the consideration of the impact of the integrity of a Natura 2000 and/or Ramsar site either alone, or in combination with other plans and projects. Where significant impacts are identified avoidance, cancellation and reduction measures are proposed.

9.2 Potential impacts

The Appropriate Assessment has identified that two Natura 2000 or Ramsar sites could potentially be affected by the implementation of the preferred proposals within the NEWABTS.

The process has identified areas of the NEWABTS where there is a need for subsequent and more detailed HRA as the interventions are developed as more spatial and design information becomes available.

The screening process identified that the majority of the likely significance effects to Natura sites or Ramsar sites as a result of the interventions / proposals could be avoided by avoidance measures.

Screening identified that the following sites could result in likely significant effects from the interventions and associated proposals set out in the NEWABTS.

- Aber Dyfrdwy (Ramsar, cSAC, SPA) / The Dee Estuary (Wales)
- Afon Dyfrdwy a Llyn Tegid / River Dee and Bala Lake (SAC);

9.2.1 Aber Dyfrdwy (Ramsar, cSAC, SPA) / The Dee Estuary (Wales)

There are a number of factors that have the potential to cause a likely significant effect on designated features of this European Site from the implementation of the interventions listed in the NEWABTS. Factors arise from an increase in recreational pressures, disturbance (noise, vibration, physical and visual) and air and water pollution.

Intervention 1.I The provision of a Dee Coastal Path and in-combination with the Walking and Cycling Strategy have the potential to increase recreational pressures, cause disturbance to over-wintering, passage and breeding birds on site, and result in water and air pollution . Table 9.1 below details the likely significant effects during construction and operation of the intervention on the designated features of this site.

Table 9.1 Likely Significant Effects on Aber Dyfrdwy (Ramsar, cSAC, SPA) / The Dee Estuary (Wales) as a result of the implementation of Intervention 1.I Dee Coastal Path and the Walking and Cycling Strategy

Designated Features	**Likely Significant Effect**	
	Construction	**Operation**
Mudflats and sandflats not covered by seawater at low tide,	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles	Loss and fragmentation of habitat Physical disturbance to habitat by an increase in human presence
Salicornia and other annuals colonising mud and sand,	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence

Designated Features	Likely Significant Effect	
	construction personnel	
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence
Annual vegetation of drift lines	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence
Estuaries	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles.	Loss and fragmentation of habitat
Vegetated sea cliffs of the Atlantic and Baltic coasts	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence
Embryonic shifting dunes	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles.	Loss and fragmentation of habitat Physical disturbance to habitat by an increase in human presence
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles.	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence
Fixed dunes with herbaceous vegetation	Loss of habitat, direct land take for	Loss and fragmentation of habitat

Designated Features	Likely Significant Effect	
(grey dunes)	location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by construction personnel	Disturbance (trampling on plants) by an increase in human presence
Humid dune slacks	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence
Sea lamprey (*Petromyzon marinus*)	In-direct loss of habitat Water pollution incidents and air pollution from construction vehicles	None
River lamprey (*Lampetra fluviatilis*)	In-direct loss of habitat Water pollution incidents and air pollution from construction vehicles	None
Petalwort (*Petalophyllum ralfsii*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of habitat Disturbance (trampling on plants) by an increase in human presence
Common Tern (*Sterna hirundo*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Little Tern (*Sterna albifrons*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual)	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX

Designated Features	Likely Significant Effect	
	from construction activities	from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Sandwich Tern (*Sterna sandvicensis*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Northern Pintail (*Anas acuta*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (noise, vibration and visual) from construction activities and their associated machinery	Loss and fragmentation of habitat Disturbance from an increase in human presence along the coastline
Red Knot *(Calidris canutus*),	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (noise, vibration and visual) from construction activities and their associated machinery	Loss and fragmentation of habitat Loss and fragmentation of habitat Disturbance from an increase in human presence along the coastline
Oystercatcher *(Haematopus ostralegus)*	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (noise, vibration and visual) from construction activities and their associated machinery	Loss and fragmentation of habitat Disturbance from an increase in human presence along the coastline
Shelduck *(Tadorna tadorna)*,	Loss of habitat, direct land take for location of proposal	Loss and fragmentation of habitat

Designated Features	Likely Significant Effect	
	Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (noise, vibration and visual) from construction activities and their associated machinery	Disturbance from an increase in human presence along the coastline
Redshank *(Tringa. totanus)*,	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (noise, vibration and visual) from construction activities and their associated machinery	Loss and fragmentation of habitat Disturbance from an increase in human presence along the coastline
Bar-tailed Godwit *(Limosa lapponica)*	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from the operation of construction vehicles. Disturbance (noise, vibration and visual) from construction activities and their associated machinery	Loss and fragmentation of habitat Disturbance from an increase in human presence along the coastline
Curlew (*Numenius arquata*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Dunlin (*Calidris alpina alpine*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure

Designated Features	Likely Significant Effect	
Grey Plova (Pluvialis squatarola)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Teal (*Anus crecca*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure

The overall aim of the Deeside Coastal Path is to increase levels of walking and cycling in the community which would be of beneficial value to the local environment in the long term. This proposal is still at a feasibility stage and its specific location should be a key consideration in the design stage to ensure that a likely significant effect is avoided. A further (detailed project) HRA would be required when further spatial and design information becomes available to confirm whether a likely significant effect can be avoided and appropriately mitigated through avoidance, cancellation and reduction measures.

The construction and operation of two proposals, 2.v Improve the capacity of the A494 River Dee crossing and 2.y new road bridge between Connah's Quay and Deeside Park with in-combination effects with the Cheshire LTP enhancements to the Halton railway line curve, have been assessed as potentially resulting in disturbance, water pollution, localised smothering of vegetation or potential health issues in birds from an increase in traffic emissions during construction and operation. Both proposals include the implementation of new infrastructure over the designated site, the location of this new infrastructure could potentially result in the loss of valuable habitat and/or result in habitat fragmentation.

Table 9.2 Likely Significant Effects on Aber Dyfrdwy (Ramsar, cSAC, SPA) / The Dee Estuary (Wales) as a result of the implementation of Intervention 2.v and 2.y and the Cheshire LTP enhancements

Designated Features	Likely Significant Effect	
	Construction	Operation
Mudflats and sandflats not covered by seawater at low tide,	Loss of habitat, direct land take for location of proposal Water pollution incidents from construction vehicles	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels
Salicornia and other annuals colonising mud and sand,	Loss of habitat, direct land take for location of proposal	Loss and fragmentation of valuable habitat;

Designated Features	Likely Significant Effect	
	Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by construction personnel	Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SO2 from an increase in traffic levels emissions.
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions.
Annual vegetation of drift lines	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions.
Estuaries	Loss of habitat, direct land take for location of proposal Water pollution incidents from construction vehicles.	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels
Vegetated sea cliffs of the Atlantic and Baltic coasts	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions.
Embryonic shifting dunes	Loss of habitat, direct land take for location of proposal Water pollution incidents from construction vehicles.	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX

Designated Features	Likely Significant Effect	
	construction personnel	from an increase in traffic levels emissions.
Fixed dunes with herbaceous vegetation (grey dunes)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions.
Humid dune slacks	Loss of habitat, direct land take for location of proposal Water pollution incidents from construction vehicles.	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels
Sea lamprey (*Petromyzon marinus*)	In-direct loss of habitat during construction activities Water pollution incidents from construction vehicles	Water pollution from surface runoff as a result of an increase in traffic levels
River lamprey (*Lampetra fluviatilis*)	In-direct loss of habitat during construction activities Water pollution incidents from construction vehicles	Water pollution from surface runoff as a result of an increase in traffic levels
Petalwort (*Petalophyllum ralfsii*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (trampling on plants) by construction personnel	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions.

Designated Features	**Likely Significant Effect**	
Common Tern (*Sterna hirundo*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Little Tern (*Sterna albifrons*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Sandwich Tern (*Sterna sandvicensis*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Northern Pintail (*Anas acuta*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure

Designated Features	**Likely Significant Effect**	
Red Knot *(Calidris canutus*),	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Oystercatcher *(Haematopus ostralegus)*	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Shelduck *(Tadorna tadorna)*,	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Redshank *(Tringa. totanus)*,	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new

Designated Features	Likely Significant Effect	
		infrastructure
Bar-tailed Godwit *(Limosa lapponica)*	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Curlew (*Numenius arquata*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Dunlin (*Calidris alpina alpine*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure
Grey Plova (Pluvialis squatarola)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure

Designated Features	Likely Significant Effect	
Teal (*Anus crecca*)	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles. Disturbance (noise, vibration and visual) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. Disturbance (noise and visual) from an increase in traffic levels on the new infrastructure

Both proposals have been assessed as having the potential to result in water and air pollution, disturbance to birds and loss of valuable habitat during construction and operation. The location of the bridge and phasing of this proposal should be a key consideration in the design process to ensure that a likely significant effect is avoided. A further (detailed project level) HRA would be required when further design and spatial information is received. .

9.2.2 Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC

Factors that have been identified as having a likely significant effect on this European Site arise from an increase in traffic levels from the widening of the existing A494 road and the implementation of a new Dee bridge over the site which may impact on sensitive aquatic species and habitats during operation.

Both proposals in the NEWABTS 2.v Improving the capacity of the A494 river Dee crossing and 2.y New road bridge with in-combinations effects with the Cheshire LTP enhancements to the Halton Curve are situated directly over the designated site and there is potential for significant effects on aquatic plants, otters and salmon during operation. Table 9.3 details the likely significant effects on Afon Dyfrdwy a Llyn Tegid / River Dee and Bala Lake (SAC) as a result of the implementation of Intervention 2.v and 2.y and the Cheshire LTP enhancements

Table 9.3 details the likely significant effects on Afon Dyfrdwy a Llyn Tegid / River Dee and Bala Lake (SAC) as a result of the implementation of Intervention 2.v and 2.y and the Cheshire LTP enhancements

Designated Features	Likely Significant Effect	
	Construction	**Operation**
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Loss of habitat, direct land take for location of proposal Water pollution incidents and air pollution from construction vehicles and activities Damage to plants by construction activities and machinery	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels.
Atlantic salmon *Salmo salar*	Loss and fragmentation of habitat, direct land take for location of proposal Water pollution incidents from construction vehicles. Disturbance (vibration) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Ongoing vibration from an increase in traffic levels
Floating water-plantain *Luronium natans*	Loss of habitat, direct land take for location of proposal	Loss and fragmentation of valuable habitat;

Designated Features	Likely Significant Effect	
	Water pollution incidents and air pollution from construction vehicles and activities Damage to plants by construction activities and machinery	Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels.
Sea lamprey *Petromyzon marinus*	In-direct loss of habitat during construction activities Water pollution incidents from construction vehicles	Water pollution from surface runoff as a result of an increase in traffic levels
Brook lamprey *Lampetra planeri*	In-direct loss of habitat during construction activities Water pollution incidents from construction vehicles	Water pollution from surface runoff as a result of an increase in traffic levels
River lamprey *Lampetra fluviatilis*	In-direct loss of habitat during construction activities Water pollution incidents from construction vehicles	Water pollution from surface runoff as a result of an increase in traffic levels
Bullhead *Cottus gobio*	Loss and fragmentation of habitat, direct land take for location of proposal Water pollution incidents from construction vehicles. Disturbance (vibration) from construction activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Ongoing vibration from an increase in traffic levels
Otter *Lutra lutra*	Loss and fragmentation of habitat, direct land take for location of proposal. Water pollution incidents and air pollution from construction machinery and activities Disturbance (physical, noise and visual) from construction machinery and activities	Loss and fragmentation of valuable habitat; Water pollution from surface runoff as a result of an increase in traffic levels Increase deposition of NOx and SOX from an increase in traffic levels emissions. An increase in mortality rates of otters as a result of increased travel speeds on bridge as congestion levels are reduced

Both proposals have been assessed as having the potential to result in water and air pollution, disturbance to fish and otters and loss of valuable habitat during construction and operation. The location and phasing of this proposal should be a key consideration in the design process to ensure that a likely significant effect is avoided. A further (detailed project) HRA would be required when further design and spatial information.

10 Conclusion

10.1 Conclusion

This Appropriate Assessment has identified the potential for likely significant effects on Natura 2000 and Ramsar sites. A high level plan such as the NEWABTS will need to be subjected to further assessment to ensure likely significance effects are avoided as the interventions are progressed.

The majority of the likely significant effects that have been identified are those caused by land take, disturbance (noise, vibration and physical), air, and water pollution during construction and operation. Potential significant construction and operation impacts may be adequately mitigated against by avoidance, cancellation and reduction measures detailed in table 7.1. However considering that the three main bird seasons for which the Dee Estuary is designated for (over-wintering, passage and breeding bird season), and the spawning season for salmon in the River Dee SAC, leaves only a small window of opportunity for construction. Therefore the phasing and location of interventions which significantly affect these designations should be a key consideration during the progression of the interventions to ensure likely significance impacts are avoided.

In addition, construction of proposals should be phased with other NEWABTS proposals and other proposed developments to avoid an 'in combination' effect on any of the sites during construction. A review of other planning applications and developments should be undertaken prior to construction of any proposals to determine the potential for any cumulative effects and develop appropriate mitigation strategies, or identify avoidance measures, at the project level.. Any development proposal that could have an adverse effect on the integrity of a European or international site will not be in accordance with the delivery of the NEWABTS. Therefore the NEWABTS will need to consider alternative options.

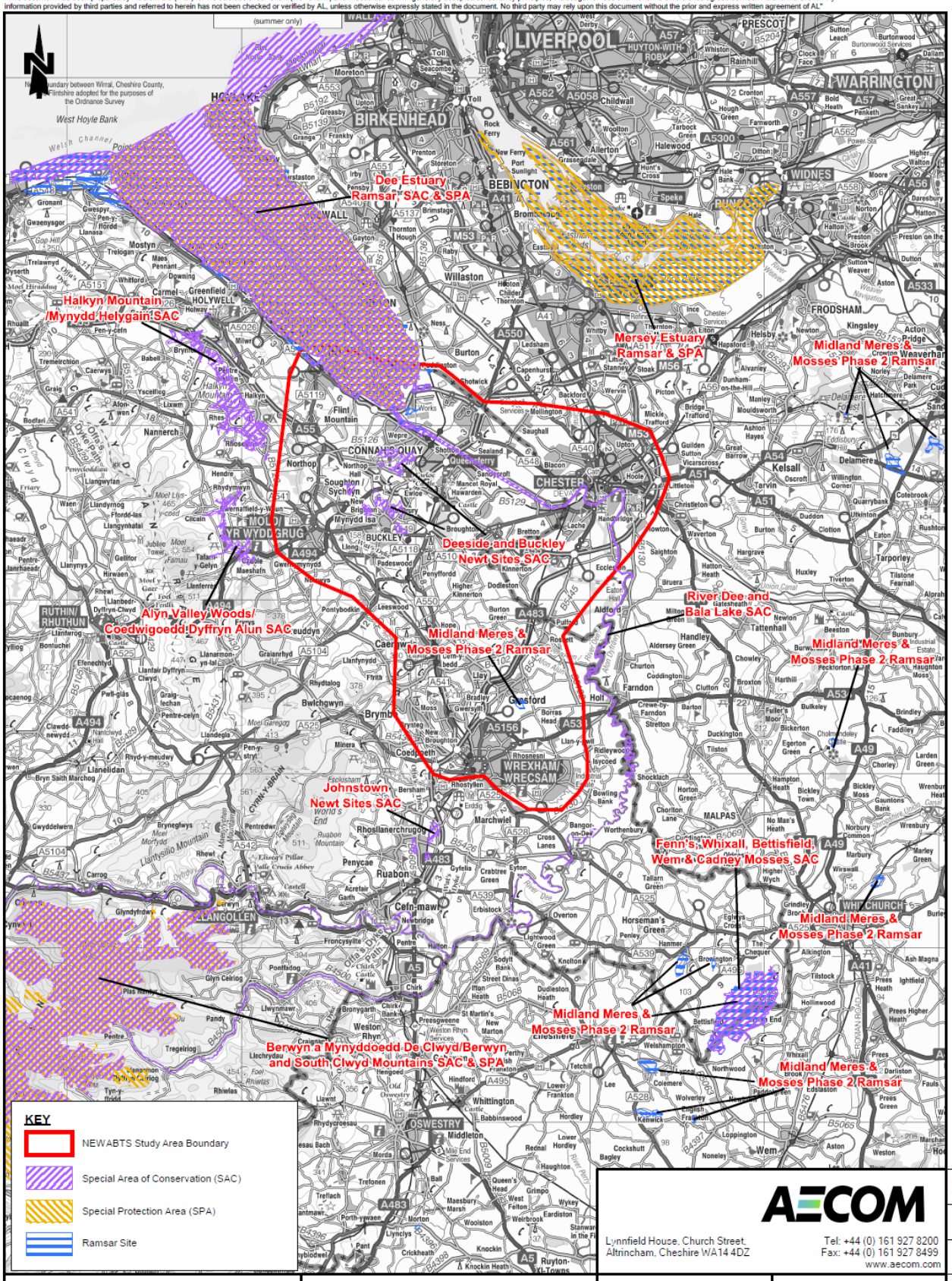
10.2 Recommendations

With respect to this HRA it is proposed that the mitigation measures detailed in Tables 7.1 are included within the NEWABTS, and assist with the preparation of mitigation measures formulated at project level. The phasing of construction activities is an important consideration when formulating such mitigation strategies as a result of the designated features found on site. The following statement will be included within the NEWABTS to ensure that the necessary mitigation measures / safeguards are put in place to ensure that the NEWABTS does not have any significant effects on Natura 2000 or Ramsar Sites.

All interventions identified in the HRA Report as having potential to have a likely significant effect will be subject to further screening at the project design / planning consent stage to determine whether, based on the provision of additional information, the proposal could have a likely significant effect and requires a full Appropriate Assessment. Any development project that could have an adverse effect on the integrity of a European or international site will not be in accordance with the delivery of the NEWABTS.

Figure 1 Natura 2000 and Ramsar Sites

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Client: WELSH ASSEMBLY GOVERNMENT AND TAITH	Title: NATURA 2000 AND RAMSAR SITES	Design: AI	GIS: AI
Project: NEWABTS HRA		Chk'd: CS	App'd: SE
		Date: 13/01/2011	Scale: 1:200,000@A3
		FIGURE 1	Rev:

cm A3

Annex A – NEWABTS Interventions

Interventions in red were screened out in the preliminary assessment

Package 1: Managing Demand

Intervention	Description
Walking and Cycling	
1.a Funds for businesses to invest in walking and cycling facilities	Provide grant funding which businesses in the study area can bid for to use on walking and cycling facilities.
1.b Encourage employers to increase cycling within its work force	Provide support to employers to help encourage walking and cycling to work.
1.c Develop a local publicity campaign to promote walking and cycling	Coordinated local publicity campaign to increase awareness of the benefits of walking and cycling and current facilities and support that is available.
Freight	
2.a Assisting the TAITH partnership in Promoting the Use of Rail Freight	The traditional way of moving a large proportion of goods is by lorry. Many companies are not even aware of a possible alternative to this and there is an opportunity for TAITH to work with industry in an awareness campaign.
2.b Freight Exchange	There are a number of internet based freight exchanges but the membership of these by hauliers is still relatively low. This could be enhanced through an independent awareness campaign.
Demand Management	
3.a Promoting car clubs and car sharing	Providing financial and other forms of support to help groups with the development of car clubs and car sharing proposals in the study area.
3.b Workplace Travel Planning	Work with employers at key employment centres in the study area to reduce car travel to work and promote alternative modes.
3.c Parking management strategy	Devise a study area wide parking management strategy to reduce demand for car travel during peak periods and incentivise travel by alternative means.
Other	

Intervention	Description
4.a Ensure that future developments mitigate any adverse impacts on the transport network	This would be a policy stance whereby the agencies in the study area who consider development control insure that future developments mitigate the adverse impacts on the transport network that they are anticipated to cause.
4.b Improve linkages between economic development plans and transportation plans	Ensuring that economic development plans and transport plans are written in a coordinated manor so that they do not cause unintended consequences for each other.

Package 2: Making Best Use

Intervention	Description
Walking and Cycling	
1.d Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.
1.e Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	A range of measures to encourage interchange between bicycle and public transport.
1.f Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	An audit to identify safety, security and maintenance issues on the existing walking and cycling network, with a range of improvements to overcome these issues.
1.g Provide additional signage for walkers and cyclists	Provide consistent signage across the existing walking and cycling network identifying safe routes to the key destinations in the study area.
Bus	
5.a Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability.	Provide bus priority measures along key routes and at key junctions to allow buses to avoid traffic congestion and improve service reliability.
5.b Improve rail and bus integration	Improve the integration of bus and rail services through improved timetabling, routing of buses and interchange facilities.
5.c Integrated Area Ticketing	Extending the existing all operator bus 'travelcard' to cover a wider area and offering a bus-train option to connect with MerseyTravel ticketing. Could include amendment to fares for different zones.
5.d Real time passenger information at bus stops	Provide real time information (RTI) at key bus stops within the study area.
5.e Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry.	Provide bus priority measures along the B5129 to allow buses to avoid traffic congestion when travelling through the Connah's Quay/Shotton area and improve service reliability.

Intervention	Description
5.f Bus priority at the A483/B5445 junction to avoid traffic congestion	Provide bus priority measures at the junction of the A483. Capacity Enhancements/B5445 to allow buses to avoid traffic congestion at this location and improve service reliability.
Rail	
6.a Extension of Llandudno-Manchester service to Manchester Airport.	Existing hourly service extended to Manchester airport. These services have a long layover time at Piccadilly.
6.b Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in NEWABTS study area where improvements can be made.
6.c Improved connection between rail and bus services at Shotton stations	Improve connectivity between Shotton High Level and Low Level stations through provision of new facilities and timetable adjustments
Freight	
2.c Publicise the whereabouts and services from possible Port Rail & Inland Rail Terminals	The infrastructure in place for intermodal distribution from local ports is not being utilised to its full potential.
2.d Suspension of non essential maintenance at peak periods	Maintenance programs can cause pinch points on the network, even during quieter periods as seen around the tunnels at Penmaenmawr.
Highway	
7.a Reduce the number of slip roads on the strategic highway network. Reduce local distributer road access.	Reduce local access roads onto the strategic road network to improve the safety of these roads and reduce their use by local traffic.
7.b Consider a signage strategy for traffic travelling to/from the Midlands	Look into options for improving the signage of traffic travelling from the study area towards the midlands.
7.c Consider a signage strategy for traffic travelling to/from North England	Look into options for improving the signage of traffic travelling from the study area towards North England.
7.d Variable Messaging Signs	Variable messaging signs on the A55/A494/A483 strategic routes to allow reduced speed limits and re-routing of traffic as a result of incidents.
7.e Improvements to Alltami Signals	Improve the traffic signal arrangements at Alltami to reduce delays at this location.
7.f Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay	Identify a series of minor on-line highway improvements which can reduce the congestion problems currently experienced along the B5129 between Connah's Quay and Queensferry.
7.g Minor on-line improvements between	Identify a series of highway measures which

Intervention	Description
Broughton and Saltney	improve safety and relieve pinchpoints on the A5104
7.h Consider a signage strategy for traffic travelling between the A55 and Wrexham	Look into options for improving the signage of traffic travelling between the A55 and Wrexham
7.i Make better use of A541 / A550 route between the A55 and Wrexham	A series of minor improvements to the A541/A550 route addressing pinch-points along this route to improve the overall capacity of this route.
7.j Overcome pinch points in the Hope/Caergwrle area	A series of minor improvements to address the pinch-point that occurs in the Hope/Caergwrle area.
7.k Improvements on the A541 between Mold and Wrexham	Identify a series of highway measures which can improve the safety and route consistency of the A541 between Mold and Wrexham

Package 3: Capacity Enhancements

Intervention	Description
Walking and Cycling	
1.h Provide walking and cycling crossing facilities on trunk roads and associated junctions	Identify demands for walking and cycling crossing facilities along the key roads in the study area and provide suitable crossing facilities.
1.i Provide safe walking and cycling routes from communities to public transport interchanges.	Identify a series of improvements and new routes that can be made to allow safe walking and cycling from local communities to public transport interchanges.
1.j Potential to link National route 5 from Chester to Denbigh and Wrexham	A new cycling and walking link connected to the existing national cycle route 5 to provide a link from Chester to Denbigh and Wrexham.
1.k Mold to Saltney cycle way	A new walking and cycling link between Mold and Saltney with connections to key destinations along the route utilising a former railway alignment.
1.l Provision of a Dee Coastal Path in Flintshire	A new walking and cycling along the Dee coast to facilitate both leisure and commuter trips, linking residential communities and major employers.
1.m Mold – Deeside cycle route	Provision of a new cycling route between Mold and Deeside.
1.n New walking and cycling links to key employment sites	New walking and cycling links to key employment, retail and leisure sites from residential areas within 5km.
Bus	
5.g Taith Express coach services	Express coach services operating between Holyhead and Manchester Airport with stops in the study area.
5.h Rail link bus routes from train stations to key employment sites	New or revised bus routes to connect rail stations to nearby key employment sites.
5.i New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Estate and Chester	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.
5.j Create a multi-modal hub at Wrexham General station	This could include bus stop and terminus facilities and facilities for taxibuses, coaches, taxis, car parking for train passengers and a Kiss & Ride drop-off/pick-up area.

Intervention	Description
5.k New cross Dee bus route between Mold and Ellesmere Port	Connecting key employment locations. Operating twice per hour and supported with highway infrastructure and traffic management improvements to support punctuality.
Rail	
6.d Service frequency increase on Borderlands Line (hourly to half-hourly),	Doubling of service frequency (to 2tph) between Wrexham and Bidston (with potential extension into Birkenhead).
6.e Fast Llandudno-Manchester Airport service	Removal of intermediate stops between Chester & Manchester (except Warrington). New hourly stopping service between Manchester & Chester
6.f Extension of London-Chester services to Bangor/Holyhead	This creates an hourly service between N Wales and London.
6.g Rhyl-Chester (with possible extension to Crewe) local shuttle	Half-hourly stopping service superimposed on existing timetable. Option to extend 1 tph through to Crewe (replacing existing Chester-Crewe shuttle). Requires new turnback facility at Rhyl.
6.h New station at Queensferry on the North Wales Main Line	New stations have been assessed as part of the NWRS study for Taith.
6.i New station at Deeside Park on the Borderlands line	New stations have been assessed as part of the NWRS study for Taith.
6.j New rail service between Borderlands Line and Chester	Enhancement to Borderlands line service, offering direct rail service into Chester via new curve at Shotton
6.k Increase parking provision at stations along Wrexham Bidston line (e.g. Penyffordd) to promote park and ride	Additional parking provision at key stations along the Wrexham – Bidston line to encourage park and ride.
6.l Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury)	Hourly shuttle service to be operated alongside existing services to give a basic half-hourly service pattern between Wrexham and Chester.
6.m New station at Rossett on the Wrexham to Chester line	New stations have been assessed as part of the NWRS study for Taith.
Freight	
2.e Freight Consolidation Centres including one at Deeside	There may be an economic case for establishing whether opening “open user” distribution centres for example at strategic points in England e.g. near Wakefield on the M62 and near Manchester on the M60 might reduce the number of vehicles that have to make a journey to Deeside.
2.f Truckstops	Lack of truck parking facilities across North Wales, sites at both ends of the A55 would be ideal in reducing the number of illegally parked vehicles overnight in lay-bys and levels of vehicle crime.
2.g Crawler Lanes on the key trunk roads and other single carriageway A-roads	Construction of crawler lanes on single lane carriageways at inclines would allow faster moving traffic to pass reducing potential congestion.

Intervention	Description
2.h Rail electrification	Electric freight trains can accelerate quicker and depending on the locomotive have the potential to pull a heavier train than a diesel.
2.i Open Access Rail Terminal	Lack of rail freight on the NWCL resulting from poor handling infrastructure despite apparent interest from industry particularly for continental services to and from Ireland.
Demand Management	
2.d Park and Car Share proposal	Provide and promote a study area wide proposal to promote park and car share arrangements.
2.e Park and Ride proposal	Introduce park and ride facilities at locations to be determined to reduce car travel into key centres.
Highway	
2.m Apply managed motorway concepts to key trunk roads	Whilst not having full hard shoulders, ITS technology could be deployed on key routes such as the A55/A494 to vary speed limits according to traffic levels determined through traffic loops and CCTV.
2.n Provide hard shoulders on dual carriageway trunk roads	Hard shoulders would improve the resilience of these routes to incidents and maintenance events and improve safety.
2.o Enhance the A548 route between Flint and the A550.	A series of highway improvements on the links and junctions on the A548 between Flint and the A550 to the east of Deeside Industrial Estate to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.
2.p A483/A55 Junction Improvement	Identify a higher capacity design for the A483. Capacity Enhancements/A55 junction which reduces the congestion problems currently experienced at this location.
2.q Improve key junctions on the A483	Identify a series of improvements to the key junctions along the A483. Capacity Enhancements which can improve the capacity and reduce delays at these locations.
2.r New road connecting the A55 and A548	A new road connecting the A55 at Northop and the A548 at Kersterton to allow the A548 to form a more strategic route through the study area taking traffic away from the A55 and A494.
2.s A55 Ewloe to Northop Improvements	Widening of the highway between Ewloe and Northop – the scale of such improvements is yet to be determined.
2.t Ewloe Interchange Improvements	Identify a higher capacity design for the A55/A494 Ewloe Interchange which reduces the congestion problems and improved the safety issues currently

Intervention	Description
	experienced at this location.
2.u A494 Ewloe to Drome Corner Improvements	Widening of the highway between Ewloe and Drome Corner – the scale of such improvements is yet to be determined
2.v Improve the capacity of the A494 river Dee crossing	Widening of the existing A494 crossing of the River Dee to improve the capacity and safety of this link.
2.w Improve road connections to Deeside Industrial Estate	Identify a series of highway improvements which can improve the ease of accessing the Deeside Industrial Estate.
2.x Improve road connections to the Broughton area	Identify a series of highway improvements which can improve the ease of accessing key traffic generators in the Broughton area
2.y New road bridge between Connah's Quay and Deeside Park	A new local road bridge connecting the B5129 at Connah's Quay with Deeside Park to reduce pressure on the existing crossing points.

Annex B Assessment Matrixes for European Sites

Matrix 1 – The Dee Estuary (Wales) / Aber Dyfrdwy Marine cSAC, SPA, Ramsar	
Brief Description	The Dee Estuary, on the North Wales / North-West England border, is rated as one of the top five estuaries in the UK for wintering and passage waterfowl populations. The site supports internationally important numbers of waterfowl and waders and extensive areas of intertidal sand and mudflats as well as saltmarsh habitat.
Marine cSAC	*Annex I Habitats that are a primary reason for selection:* 1140 Mudflats and sandflats not covered by seawater at low tide, 1310 *Salicornia* and other annuals colonising mud and sand, 1330 Atlantic salt meadows *(Glauco-Puccinellietalia maritimae).* *Annex I Habitats present as a qualifying feature, but not a primary reason for selection of this site:* 1130 Estuaries, 1210 Annual vegetation of drift lines, 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts, 2110 Embryonic shifting dunes, 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`), 2130 Fixed dunes with herbaceous vegetation (`grey dunes`), 2190 Humid dune slacks. *Annex II Species present as a qualifying feature, but not a primary reason for site selection: 1095* Sea lamprey *(Petromyzon marinus)*, 1099 River lamprey *(Lampetra fluviatilis)*, 1395 Petalwort *(Petalophyllum ralfsii).*
SPA ***Ramsar***	*Annex I Birds and regularly occurring migratory birds:* Common tern, (*Sterna hirundo*), Little Tern (*Sterna albifrons*), Sandwich Tern (*Sterna sandvicensis*) Northern Pintail *(Anas acuta)*, Red knot *(Calidris canutus*;, Oystercatcher *(Haematopus ostralegus)*, Shelduck *(Tadorna tadorna)*, Redshank *(Tringa. totanus)*, Bar-tailed Godwit *(Limosa lapponica)*, Curlew *(Numenius arquata),* Dunlin *(Calidris alpina alpine),* Grey Plova *(Pluvialis squatarola*), Teal (*Anus crecca*) *Criterion 1:* The site supports an extensive area of intertidal mud and sand flats (20km by 9km) with large expanses of saltmarsh towards the head of the estuary. *Criterion 5:* Bird assemblages of international importance. *Criterion 6:* Bird species / populations of international importance. The boundary of the Dee Estuary cSAC covers a slightly different extent compared to the SPA and Ramsar designations.
Vulnerability	The Dee is a large funnel shaped estuary which lies between the Wirral Peninsula, England and Flintshire, North East Wales. The estuary contains extensive areas of intertidal sand and mudflats, which support a variable but characteristic benthic fauna depending on the nature of the substrate. The Dee Estuary supports extensive areas of saltmarsh vegetation and exhibits a complete succession from early pioneer vegetation colonising intertidal flats through lower, middle and upper saltmarsh types to brackish and freshwater transitions at the top of the shore. The Dee Estuary is one of the most important estuaries in Britain and amongst the most important in Europe for its populations of waders and wildfowl. The Dee estuary is vulnerable to the introduction / invasion of non-native plant species, overfishing, pollution from industrial waste, general disturbance from human activities and transport infrastructure development.

Sensitivity to nitrogen deposition and acidification

SAC Feature	**Sensitive to nutrient nitrogen?**	minimum critical load for nutrient nitrogen (2010)?	Exceeds maximum critical load for nutrient nitrogen (2010)?	**Sensitive to acidification?**	Exceeds minimum critical load for acidity (2010)?	Exceeds maximum critical load for acidity (2010)?	Predicted nitrogen deposition in 2010 kg/N/ha/yr-1	Predicted sulphur deposition in 2010 kg/N/ha/yr-1

Matrix 1 – The Dee Estuary (Wales) / Aber Dyfrdwy Marine cSAC, SPA, Ramsar									
							Road transport	Other transport	Other transport
	No data available for the SAC features								
SPA Feature									
Tadorna tadorna	×	Does not exceed critical load	×	No critical loads for these features			6	3	5
Anus acuta (north-western Europe)	✓		×				6	3	5
Haematopus ostralegus (Europe and Northern / Western Africa)	✓		×				6	3	5
Calidris canutus (North-eastern Canada/Greenland/Iceland/North-western Europe)	✓		×				8	3	7
Limosa lapponica (Western Palearctic – wintering)	✓		×				6	3	5
Tringa tetanus (Eastern Atlantic	✓		×				6	3	5
Waterfowl assemblage (wintering)	×	No critical load for this feature	×						
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human	Intervention, 1.d, 5.e, 6.b,6.c,6.h, 6.i 7f, 2.v, 2.y 1.m, 5.i, 5.k, 2.o, 2.w involve improvements to existing rail and road infrastructure and facilities in Flint, Shotton, Queensferry and Deeside. All of the proposals proposed are situated in close proximity to the Dee Estuary. Potential impacts could include water pollution from surface runoff during construction, which have the potential to adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Reductions in water quality have the potential to cause impacts upon food chain dynamics and the ecosystem as a whole. Interventions 1.d, 1.l, 1.m, 5.k, 2.o, 2.r, 2.v, 2.y are located in close proximity to the European Site and there is potential for land take, disturbance by an increase in human presence and construction activities to have adverse impacts to sensitive species such as over wintering birds on site. Interventions 7.e, 1.h, 2.s propose improvements to trunk roads and walking and cycling facilities along the A55 and the A494. These interventions do not lie within 2km of the site (>2km) but potential exists for hydrological connections between the proposal and the site. Water pollution from surface runoff either from construction or operation could adversely affect sensitive habitats and species resulting in a reduction in water quality. Intervention 1.l The provision of a Dee Coastal Path in Flintshire would be situated adjacent to the Dee Estuary. This proposal has the potential to increase human presence along the coastline causing disturbance to over wintering birds during operation. Intervention 1.m, 5.i, 2.o, 2.r The construction of new cycle and bus routes over the estuary and improvements to existing road infrastructure in close proximity to the site has the potential to cause disturbance to overwintering birds during construction. Intervention 2.v, 2.y Air pollution from the construction and operation of a new bridge and transport improvement across the Dee estuary has the potential to result in localised adverse air quality impacts to sensitive habitats and species on site.								

Matrix 1 – The Dee Estuary (Wales) / Aber Dyfrdwy Marine cSAC, SPA, Ramsar	
activity - Other	
Likely Significant Effects	There is potential for the interventions to cause significant effects as a result of the implementation of the NEWABTS. Potential impacts include water pollution, recreational pressures, physical disturbance and air pollution. The significance of the impacts is dependent on the proposal's location, project design and scale of works proposed. Further assessment may be required and will be undertaken in stage 2 of the HRA process.
In-Combination Effect	Walking and Cycling Plan for Wales states that at appropriate locations along the coastal walking path, provisions for cyclists should be made. This plan has in-combination effects with NEWABTS intervention 1.I Deeside Coastal Path which would contribute towards an increase in human presence with the potential to cause disturbance to overwintering birds on site.

Matrix 2 – Deeside and Buckley Newt Sites, SAC

Brief Description	Deeside and Buckley Newt Sites SAC is situated in north-east Flintshire. The site is made up of a series of waterbodies, which are situated on coastal slopes overlooking the Dee estuary, created by clay, sand and coal extraction and agricultural actions.
Designation(s) and Interest features **SAC**	*Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site* 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles. *Annex II species that are a primary reason for selection of this site:* 1166 Great crested newt *(Triturus cristatus)*.
Vulnerability	GCN terrestrial and aquatic habitats are vulnerable to destruction, inappropriate management and nearby mineral extraction works. Woodland habitat is subject to recreational and non-native pressures.

Sensitivity to nitrogen deposition and acidification

SAC Feature	**Sensitive to nutrient nitrogen ?**	Exceeds minimum critical load for nutrient nitrogen (2010)?	Exceeds maximum critical load for nutrient nitrogen (2010)?	**Sensitive to acidification?**	Exceeds minimum critical load for acidity (2010)?	Exceeds maximum critical load for acidity (2010)?	Predicted nitrogen deposition in 2010 kg/N/ha/yr-1		Predicted sulphur deposition in 2010 kg/N/ha/yr-1
							Road transport	Other transport	Other transport
Old sessile oak wood swith Ilex	✓	✓	✓	✓	✓	×	10	3	3
Triturus cristatus	✓	No critical load for this feature		✓	No critical load for this feature		7	3	3

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation,	Interventions 1.d, 6.c, 5.e, 5.f, 5.i, 6.h, 7.a, 7.f propose improvements to railway, road and bus infrastructure and are considered unlikely to impact the site due to the scale of works proposed and urban location of the proposals. Interventions 6.b, 7.e, 1.h, 1.m, 5.k, 2.s, 2.t, 2.u include improvements to existing railway infrastructure, walking and cycling routes and minor highway infrastructure and are situated within close proximity of the site. Physical disturbance and water pollution from construction activities and water surface runoff during operation could adversely affect the woodland and great crested newts on site. Reductions in water quality have the potential to cause impacts upon food chain dynamics and the ecosystem as a whole. A potential localised increase in air pollution associated with construction activities could adversely affect the vegetation on site. Interventions 6.b, 1.h, 1.m involve improvements to railway facilities and walking and cycling routes along the A494. Increased human presence, by increasing access to the European Site has the potential to cause physical disturbance to habitats and species on site. Increased lighting from construction machinery and during operation infrastructure has the potential to cause insensitive illumination of sensitive habitats and species on site. Intervention 7.i, 2.u, A550/A541 improvement proposals are over 1km from the site, however there is potential that protected species such as great crested newt would be present within the area due to presence of ponds in the surrounding area.

Matrix 2 – Deeside and Buckley Newt Sites, SAC	
decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	
Likely Significant Effects	There is potential for the interventions to cause significant effects as a result of the implementation of the NEWABTS. Potential impacts include water pollution, recreational pressures, physical disturbance, light and air pollution. The significance of the impacts is dependent on the proposal's location, project design and scale of works proposed. Further assessment may be required and will be undertaken in stage 2 of the HRA process.
In-Combination Effects	None

<table>
<tr><th colspan="11">Matrix 3 – River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid, SAC</th></tr>
<tr><td>Brief Description</td><td colspan="10">The River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid are significant aquatic habitats that support a significant number of important habitats and species, which includes salmon, lampreys and freshwater vegetation communities.</td></tr>
<tr><td>Designation(s) and Interest features
SAC</td><td colspan="10"><u>Annex I habitats that are a primary reason for selection of this site:</u> 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

<u>Annex II species that are a primary reason for selection of this site:</u> 1106 Atlantic salmon (Salmo salar), 1831 Floating water-plantain (Luronium natans).

<u>Annex II species present as a qualifying feature, but not a primary reason for site selection:</u> 1095 Sea lamprey (Petromyzon marinus), 1096 Brook lamprey (Lampetra planeri), 1099 River lamprey (Lampetra fluviatilis), 1163 Bullhead (Cottus gobio), 1355 Otter (Lutra lutra).</td></tr>
<tr><td>Vulnerability</td><td colspan="10">The site is vulnerable to adverse changes to water quality, quantity and patterns of water flows, which includes abstraction pressures, direct and diffuse pollution, eutrophication and siltation effects. Other threats relate to degradation of riparian habitats by engineering works, agricultural practices and the introduction of invasive species.</td></tr>
<tr><td rowspan="11">Sensitivity to nitrogen deposition and acidification</td><td rowspan="2">Feature</td><td rowspan="2">Sensitive to nutrient nitrogen?</td><td rowspan="2">Exceeds minimum critical load for nutrient nitrogen?</td><td rowspan="2">Exceeds maximum critical load for nutrient nitrogen</td><td rowspan="2">Sensitive to acidification ?</td><td rowspan="2">Exceeds minimum critical load for acidity?</td><td rowspan="2">Exceeds maximum critical load for acidity?</td><td colspan="2">Predicted nitrogen deposition in 2010 kg/N/ha/yr-1</td><td>Predicted sulphur deposition in 2010 kg/N/ha/yr-1</td></tr>
<tr><td>Road transport</td><td>Other transport</td><td>Other transport</td></tr>
<tr><td>Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation</td><td>✓</td><td colspan="2" rowspan="9">No critical loads for this features</td><td>✓</td><td colspan="2" rowspan="9">No critical loads for this features</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Petromyzon marinus</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Lampetra planeri</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Lampetra fluviatilis</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Salmo salar</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Cottis gobio</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Lutra Lutra</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Luronium natans</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>3</td></tr>
<tr><td>Describe any likely direct, indirect or</td><td colspan="10">Interventions 1.d, 1.m, 2.e, 2.O, 2.r, 2.w 5.e, 6.c, 7.f propose improvements to cycle routes, railway infrastructure and facilities, highway and bus improvements and are situated within 2km of the site with</td></tr>
</table>

Matrix 3 – River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid, SAC	
secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	potential hydrological connections. Adverse impacts such as water pollution could potential impact the site during construction and operational phases of the proposal. No other impacts are envisaged. Interventions 1.d, 1.j, 1.h, 1.k, 1.l, 2.p, 2.q, 2.s, 2t, 2.x, 5.f, 5.j, 6.b, 6.k, 6.m, 7.e, 7.g, 7.i, 7.j, 7.k propose improvements to cycle routes, railway infrastructure and facilities, highway and bus improvements, however these proposals do not lie within 2km of the site (>2km) but do have the potential to have hydrological connections to the site. Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species. 6.h Air pollution from the construction of a new railway station at Queensferry could have adverse impacts to sensitive habitats and species on site. Intervention 7.a Slip road closures have hydrological connections with the site however the closures will not involve the construction and operation of any new road infrastructure and therefore there are no mechanisms to affect this site. Intervention 2.u A494 improvements are situated within 2km with hydrological connections to the site. It is considered that there will be no impacts due to the urban location of the proposal and its distance from the site. Interventions 1.l, 5.i, 5.k, 2.v, 2.y involve the construction of supporting infrastructure for highway improvements, bus routes and new coastal footpaths. During the construction and operation of the proposals adverse impacts to sensitive species and habitats could result from an increase in air pollution, noise and disturbance.
Likely Significant Effects	There is potential for the interventions to cause significant effects as a result of the implementation of the NEWABTS. Potential impacts include water pollution, recreational pressures, physical disturbance and air pollution. The significance of the impacts is dependent on the proposal's location, project design and scale of works proposed. Further assessment may be required and will be undertaken in stage 2 of the HRA process.
In-Combination Effects	The Cheshire LTP proposes to upgrade the Halton curve railway line to allow two way traffic, this will have an in-combination effect with road and bus improvements interventions across the River/Estuary contributing towards an increase in air pollution adversely affecting sensitive species and habitats on site.

Matrix 4 – Midland Meres and Mosses Phase 2 Ramsar, SAC

Brief Description	The Meres & Mosses form a geographically discrete series of lowland open water and peatland sites in the north-west Midlands of England. The site comprises a diverse range of habitats from open water to raised bog and supports a number of rare species of plants associated with wetlands including five nationally scarce species together with an assemblage of rare wetland invertebrates (three endangered insects and five other British Red Data Book species of invertebrates).
Designation(s) and Interest features **SAC** **Ramsar**	*<u>Annex I habitats that are a primary reason for selection of this site</u>* *Natural dystrophic lakes and ponds* *Transition mires and quaking bogs* *<u>Criterion 1</u>* The site comprises a diverse range of habitats from open water to raised bog. *<u>Criterion 2</u>* Supports a number of rare species of plants associated with wetlands,
Vulnerability	Colonisation of open schwingmoors or Sphagnum lawns and rafts in the West Midland Mosses by birch and pine is controlled by works under Management Agreement or by National Nature Reserve management, and in liaison with the local wildlife trust at Abbots Moss. Several sources of nutrient enrichment, including atmospheric deposition of nutrients, pose a potential threat at these sites. A Management Agreement controls agricultural run-off at Chartley Moss. Trees at this site trap airborne nutrients and provide roost areas for birds, but the enrichment effect of both is only localised. At Abbots Moss the threat of enrichment from atmospheric sources has been reduced by clear-felling of basin slopes adjacent to the mires. All parts of that site are vulnerable to recreational disturbance, particularly the northern portion which is a scout camp.

Sensitivity to nitrogen deposition and acidification

Feature	**Sensitive to nutrient nitrogen?**	Exceeds minimum critical load for nutrient nitrogen?	Exceeds maximum critical load for nutrient nitrogen	**Sensitive to acidification ?**	Exceeds minimum critical load for acidity?	Exceeds maximum critical load for acidity?	Predicted nitrogen deposition in 2010 kg/N/ha/yr-1		Predicted sulphur deposition in 2010 kg/N/ha/yr-1
							Road transport	Other transport	Other transport
Acid peat-stained lakes and ponds	✓	✓	✓	✓	No critical loads for this features		7	3	4
Transition mires and quaking bogs	✓	✓	×	✓	✓	✓	6	3	4

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale;	A localised effect on air pollution associated with construction activities and machinery from the implementation of various interventions (new walking and cycling routes, railway infrastructure at Penyfford and Wrexham and road improvements) could have significant effects on sensitive habitats and species on site. No other impacts are envisaged due to the nature and scale of works proposed.

Matrix 4 – Midland Meres and Mosses Phase 2 Ramsar, SAC	
- Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	
Likely Significant Effects	Potential impacts include localised air pollution
In-Combination Effects	None

European Sites within the Study Area

<table>
<tr><th colspan="10">Matrix 5 – Halkyn Mountain/ Mynydd Helygain, SAC</th></tr>
<tr><td>Brief Description</td><td colspan="9">Halkyn Mountain is a large area of mostly common land in north-east Wales. The landscape is much modified by human activities, with abandoned metalliferous mining and rock quarries a prominent feature of the site. Quarrying predominantly for limestone still continues today. The terrestrial habitat is very varied, with calcareous grassland, heathland and scrub prominent throughout. The site is grazed mostly by sheep.</td></tr>
<tr><td>Designation(s) and Interest features
SAC</td><td colspan="9"><u>Annex I habitats that are a primary reason for selection of this site</u>
Calaminarian grasslands of the Violetalia calaminariae

<u>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</u>
European dry heaths
Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)

<u>Annex II species that are a primary reason for selection of this site</u>
Great crested newt Triturus cristatus</td></tr>
<tr><td>Vulnerability</td><td colspan="9">The site is vulnerable to quarrying and reclamation pressures, change in grazing management practices and inappropriate agricultural practices (e.g. grazing, livestock feeding and watering, burning and cutting).</td></tr>
<tr><td rowspan="5">Sensitivity to nitrogen deposition and acidification</td><td>Feature</td><td>Sensitive to nutrient nitrogen?</td><td>Exceeds minimum critical load for nutrient nitrogen ?</td><td>Exceeds maximum critical load for nutrient nitrogen ?</td><td>Sensitive to acidification ?</td><td>Exceeds minimum critical load for acidity?</td><td>Exceeds maximum critical load for acidity?</td><td>Predicted nitrogen deposition in 2010 kg/N/ha/yr-1</td><td>Predicted sulphur deposition in 2010 kg/N/ha/yr-1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Road transport</td><td>Other transport</td><td>Other transport</td></tr>
<tr><td>European dry heaths</td><td>✓</td><td>✓</td><td>×</td><td>✓</td><td>✓</td><td>×</td><td>8</td><td>4</td><td>5</td></tr>
<tr><td></td><td>✓</td><td colspan="2">Does not exceed critical loads for this features</td><td>✓</td><td>Does not exceed critical loads for this features</td><td>Does not exceed critical loads for this features</td><td>8</td><td>4</td><td>5</td></tr>
<tr><td>European dry heaths</td><td>✓</td><td colspan="2">Does not exceed critical loads for this features</td><td>✓</td><td>Does not exceed critical loads for this features</td><td>Does not exceed critical loads for this features</td><td>8</td><td>4</td><td>5</td></tr>
</table>

Matrix 5 – Halkyn Mountain/ Mynydd Helygain, SAC									
	Semi-natural dry grasslands and scrubland facies: on calcareous substrates *(Festuco-Brometalia)* Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae)*	✓	Does not exceed critical loads for this features	✓	✓	×	8	4	5
	Great crested newt *Triturus cristatus*	✓	No critical loads for this features	✓	No critical loads for this features		8	4	5
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	A localised effect on air pollution associated with construction activities and machinery from the implementation of various interventions (new walking and cycling routes, railway infrastructure at Buckley, Flint, Shotton and Penyfford, bus routes, highway improvements) could have significant effects on sensitive habitats and species on site. No other impacts are envisaged due to the distance, nature and scale of works proposed.								
Likely Significant Effects	Air pollution								
In-Combination Effects	None								

European Sites which may be affected by wider ranging impacts outside of the study area but within 15km of the NEWABTS boundary

<table>
<tr><th colspan="9">Matrix 6 – Alyn Valley Woods / Coedwigoedd Dyffryn Alun, SAC</th></tr>
<tr><td>Brief Description</td><td colspan="8">Coedwigoedd Dyffryn Elwy / Elwy Valley Woods is located along steep valley-sides and ravines and is one of a few sites to represent Tilio-Acerion forest across its geographic range on the Carboniferous limestone of north Wales. The site is an excellent example of the habitat with an outstanding lower-plant flora.</td></tr>
<tr><td>Designation(s) and Interest features
SAC</td><td colspan="8"><u>Annex I Habitats that are a primary reason for selection</u>: Tilio-Acerion forests of slopes, screes and ravines.

<u>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</u>
Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) *</td></tr>
<tr><td>Vulnerability</td><td colspan="8">The cliffs and crags surrounding the river and its tributaries have previously been worked for minerals and limestone, with unused quarries currently existing nearby. The site is subject to recreational pressures.</td></tr>
<tr><td rowspan="5">Sensitivity to nitrogen deposition and acidification</td><td rowspan="2">Feature</td><td rowspan="2">Sensitive to nutrient nitrogen?</td><td rowspan="2">Exceeds minimum critical load for nutrient nitrogen?</td><td rowspan="2">Exceeds maximum critical load for nutrient nitrogen</td><td rowspan="2">Sensitive to acidification ?</td><td rowspan="2">Exceeds minimum critical load for acidity?</td><td rowspan="2">Exceeds maximum critical load for acidity?</td><td colspan="2">Predicted nitrogen deposition in 2010 kg/N/ha/yr-1</td><td>Predicted sulphur deposition in 2010 kg/N/ha/yr-1</td></tr>
<tr><td>Road transport</td><td>Other transport</td><td>Other transport</td></tr>
<tr><td>Tilio-Acerion forests of slopes, screes and ravines.</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td colspan="2" rowspan="3">Does not exceed critical loads for this features</td><td>5</td><td>3</td><td>4</td></tr>
<tr><td>Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia</td><td>✓</td><td colspan="2">Does not exceed critical loads for this features</td><td>✓</td><td>7</td><td>3</td><td>4</td></tr>
<tr><td>Alluvial forests with Alnus glutinosa</td><td>×</td><td colspan="2">No critical loads for this features</td><td>×</td><td colspan="2">No critical loads for this features</td><td>7</td><td>3</td><td>4</td></tr>
</table>

Matrix 6 – Alyn Valley Woods / Coedwigoedd Dyffryn Alun, SAC								
	and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*)							
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	A localised effect on air pollution associated with construction activities and machinery from the implementation of various interventions (new walking and cycling routes, railway infrastructure at Buckley, Flint, Shotton and Penyfford, bus routes, highway improvements) could have significant effects on sensitive habitats and species on site. No other impacts are envisaged due to the distance, nature and scale of works proposed.							
Likely Significant Effects	Potential Impacts include localised air pollution							
In-Combination Effects	None							

Matrix 7 – Mersey Estuary Ramsar, SPA	
Brief Description	The Mersey is a large, sheltered estuary which comprises large areas of saltmarsh and extensive intertidal sand and mudflats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large and internationally important populations of waterfowl. During the winter, the site is of major importance for duck and waders. The site is also important during spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain.

Matrix 7 – Mersey Estuary Ramsar, SPA

Designation(s) and Interest features **Ramsar**	*Ramsar criterion 5* Assemblages of international importance: Species with peak counts in winter: Ramsar criterion 6 Species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Common shelduck , *Tadorna tadorna*, Black-tailed godwit , *Limosa limosa* islandica, Common redshank , *Tringa totanus totanus*, Eurasian teal , *Anas crecca*, Northern pintail , *Anas acuta*, Dunlin , *Calidris alpina alpina*,
SPA	*Annex I species* *Pluvialis apricaria*. *Annex II species* Supports regularly occurring migratory species: *Anas acuta, Anas crecca, Anas penelope, Calidris alpina alpina, Limosa limosa islandica, Numenius arquata, Pluvialis squatarola, Podiceps cristatus, Tadorna tadorna, Tringa totanus, Vanellus vanellus, Charadrius hiaticula, Tringa totanus*
Vulnerability	Physical loss (removal and smothering) through land claim, development and coastal defences. These processes reduce the amount of land available for inland migration of saltmarsh (known as 'coastal squeeze'). Physical damage (abrasion) caused by maintenance dredging, recreational use, dock development and overgrazing. Non-physical disturbance (noise and visual) from transport activities, industry and recreation. Toxic contamination (introduction of synthetic compounds and non-synthetic compounds) and non toxic contamination (changes in nutrient loading and organic loading). Biological disturbance (introduction of non-native species and translocation and selective extraction of species) through encroachment of non native cord grass Spartina anglica over mudflats used by feeding birds has contributed to the loss of intertidal sediments and to an increase in the extent of saltmarsh. Bait digging can result in the removal of sediment and associated sediment communities from the intertidal area.

Sensitivity to nitrogen deposition and acidification

Feature	**Sensitive to nutrient nitrogen?**	Exceeds minimum critical load for nutrient nitrogen?	Exceeds maximum critical load for nutrient nitrogen	**Sensitive to acidification ?**	Exceeds minimum critical load for acidity?	Exceeds maximum critical load for acidity?	Predicted nitrogen deposition kg/N/ha/yr-1		Predicted sulphur deposition kg/N/ha/yr-1
							Road transport	Other transport	Other transport
Pluvialis apricaria	×	No critical loads for this features		×	No critical loads for this features		7	5	41
Anas acuta	✓	Does not exceed critical loads for this features		×	No critical loads for this features		7	5	41
Anas crecca	✓	Does not exceed critical loads for this features		×	No critical loads for this features		7	5	41
Anas penelope	✓	Does not exceed critical loads for this features		×	No critical loads for this features		7	5	41
Calidris alpina alpina	×	Does not exceed critical loads for this features		×	No critical loads for this features		7	5	41
Limosa limosa islandica	✓	Does not exceed critical loads for this features		×	No critical loads for this features		7	5	41

Matrix 7 – Mersey Estuary Ramsar, SPA								
	Numenius arquata	✓	Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
	Pluvialis squatarola	✓	Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
	Podiceps cristatus	✓	Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
	Tadorna tadorna	×	Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
	Tringa totanus	✓	Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
	Vanellus vanellus	×	No critical loads for this features	×	No critical loads for this features	7	5	41
	Charadrius hiaticula	✓	✓ Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
	Tringa totanus	✓	Does not exceed critical loads for this features	×	No critical loads for this features	7	5	41
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage	A localised effect on air pollution associated with construction activities and machinery from the implementation of various interventions (railway infrastructure at Queensferry, Flint, and Shotton, new bus routes and highway improvements) could have significant effects on sensitive habitats and species on site. No other impacts are envisaged due to the distance the site is from the proposals..							

Matrix 7 – Mersey Estuary Ramsar, SPA	
or disturbance as result of access recreation and other human activity - Other	
Likely Significant Effects	Potential Impacts include localised air pollution
In-Combination Effects	None

Matrix 7 – Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA										
Brief Description	Large moorland area located in the north east of Wales, supporting heath, blanket mire and upland birds.									
Designation(s) and Interest features **SAC**	Annex I Birds and regularly occurring migratory birds: Hen Harrier (Circus cyaneus), Merlin (Falco columbarius), Peregrine Falcon (Falco peregrinus), Red Kite (Milvus milvus).									
Vulnerability	The blanket bog, heaths, fens, and grasslands have been threatened by inappropriate agricultural development including drainage, reseeding, application of fertilisers, burning, track construction and the adoption of damaging grazing regimes. Some areas of grassland and heath are also threatened by the encroachment of bracken. Local tourist pressure and damage by recreational vehicles can cause erosion problems.									
Sensitivity to nitrogen deposition and acidification	Feature	**Sensitive to nutrient nitrogen?**	Exceeds minimum critical load for nutrient nitrogen?	Exceeds maximum critical load for nutrient nitrogen	**Sensitive to acidification ?**	Exceeds minimum critical load for acidity?	Exceeds maximum critical load for acidity?	Predicted nitrogen deposition in 2010 kg/N/ha/yr-1		Predicted sulphur deposition in 2010 kg/N/ha/yr-1
								Road transport	Other transport	Other transport
	Circus cyaneus	✓	✓	Does not exceed critical loads for this features	×	✓	Does not exceed critical loads for this features	9	4	2

Matrix 7 – Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA									
	Falco columbarius	×	✓	Does not exceed critical loads for this features	×	✓	Does not exceed critical loads for this features	9	4	2
	Falco peregrinus	×	✓	Does not exceed critical loads for this features	×	✓	Does not exceed critical loads for this features	9	4	2
	Milvus milvus	×	✓	✓	×	✓	Does not exceed critical loads for this features	12	5	2
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of: - Size and scale; - Land-take - Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.;	A localised effect on air pollution associated with construction activities and machinery from the implementation of various interventions (new walking and cycling routes, railway infrastructure at Wrexham, Buckley, Penyfford, new bus routes and road improvements) could have significant effects on sensitive habitats and species on site. No other impacts are envisaged due to the distance and lack of hydrological connection..								

Matrix 7 – Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	
- Increase in damage or disturbance as result of access recreation and other human activity - Other	
Likely Significant Effects	Potential Impacts include localised air pollution
In-Combination Effects	None

<table>
<tr><th colspan="10">Matrix 8 – Johnston Newt Sites, SAC</th></tr>
<tr><td>Brief Description</td><td colspan="9">The site is located in the environs of the village of Johnstown, south west of Wrexham. It is of special interest for its population of the greatcrested newt Triturus cristatus. The majority of the water bodies originated following the cessation of mineral extractive industries including coal mining and quarrying for clay and associated industrial developments. Certain ponds, particularly at Hafod, were specifically created for amphibian conservation purposes. Surrounding areas of land support a mosaic of scrub and planted trees, grassland, and tall ruderal vegetation. These form important foraging and over wintering areas for adult and juvenile amphibians.</td></tr>
<tr><td>Designation(s) and Interest features
SAC

Ramsar</td><td colspan="9"><u>Annex II species that are a primary reason for selection of this site</u>:
Great crested newt (Triturus cristatus)</td></tr>
<tr><td>Vulnerability</td><td colspan="9">The site is vulnerable to destruction and inappropriate management, threats from unregulated public access, flytipping, pollution and development pressure</td></tr>
<tr><td rowspan="3">Sensitivity to nitrogen deposition and acidification</td><td rowspan="2">Feature</td><td rowspan="2">Sensitive to nutrient nitrogen?</td><td rowspan="2">Exceeds minimum critical load for nutrient nitrogen?</td><td rowspan="2">Exceeds maximum critical load for nutrient nitrogen</td><td rowspan="2">Sensitive to acidification ?</td><td rowspan="2">Exceeds minimum critical load for acidity?</td><td rowspan="2">Exceeds maximum critical load for acidity?</td><td colspan="2">Predicted nitrogen deposition in 2010 kg/N/ha/yr-1</td><td>Predicted sulphur deposition in 2010 kg/N/ha/yr-1</td></tr>
<tr><td>Road transport</td><td>Other transport</td><td>Other transport</td></tr>
<tr><td>Triturus cristatus</td><td>✓</td><td colspan="2">No critical loads for this features</td><td>✓</td><td colspan="2">No critical loads for this features</td><td>5</td><td>2</td><td>3</td></tr>
<tr><td>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of:
- Size and scale;
- Land-take
- Distance from the European Site or key features of the site;
- Resource requirements;</td><td colspan="9">A localised effect on air pollution associated with construction activities and machinery from the implementation of various interventions (new walking and cycling routes, railway infrastructure at Wrexham, Buckley, Penyfford, new bus routes and road improvements) could have significant effects on sensitive habitats and species on site. No other impacts are envisaged due to the distance and lack of hydrological connection.</td></tr>
</table>

Matrix 8 – Johnston Newt Sites, SAC	
- Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	
Likely Significant Effects	Potential impacts include localised air pollution
In-Combination Effects	None

<table>
<tr><th colspan="2">Matrix 8 – Fenn's Whixall Bettisfield, Wem, and Cadney Mosses, SAC</th></tr>
<tr><td>Brief Description</td><td>This is a large lowland raised bog that straddles the English/Welsh border. It is amongst the largest and most southerly raised bogs in the UK. Although much of the site has been subject to peat extraction, areas of partially-cut and uncut mire still remain. In areas formerly subject to commercial peat-cutting, recent conservation management has led to the regeneration of bog-forming vegetation.</td></tr>
<tr><td>Designation(s) and Interest features
SAC

Ramsar</td><td><u>Annex I habitats that are a primary reason for the selection of this site:</u>

Active raised bogs

<u>Annex I habitats present as a qualifying feature but not a primary reason for the selection of this site:</u>

Degraded raised bogs still capable of natural regeneration</td></tr>
<tr><td>Vulnerability</td><td>The lowland raised mire is dependent upon high water levels and a continuation of active peat-forming processes. Much of the site is subject to mineral planning consents for peat extractions which are currently being reviewed. The site has a history of peat-cutting and until recently, part of the site has been subject to largescale commercial extraction, involving drainage over much of the peat body. Afforestation and agricultural improvement on marginal areas of the peat body have accelerated the lowering of water levels, resulting in encroachment by scrub and a decline in the extent of peat forming communities.</td></tr>
<tr><td>Sensitivity to nitrogen deposition and acidification</td><td>
<table>
<tr><th rowspan="2">Feature</th><th rowspan="2">Sensitive to nutrient nitrogen?</th><th rowspan="2">Exceeds minimum critical load for nutrient nitrogen?</th><th rowspan="2">Exceeds maximum critical load for nutrient nitrogen</th><th rowspan="2">Sensitive to acidification ?</th><th rowspan="2">Exceeds minimum critical load for acidity?</th><th rowspan="2">Exceeds maximum critical load for acidity?</th><th colspan="2">Predicted nitrogen deposition in 2010 kg/N/ha/yr-1</th><th>Predicted sulphur deposition in 2010 kg/N/ha/yr-1</th></tr>
<tr><th>Road transport</th><th>Other transport</th><th>Other transport</th></tr>
<tr><td>Active raised bogs</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>4</td></tr>
<tr><td>Degraded raised bogs</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>6</td><td>3</td><td>4</td></tr>
</table>
</td></tr>
<tr><td>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the European Site by virtue of:
- Size and scale;
- Land-take</td><td>No impacts were identified during the assessment as a result of the nature of the proposals, lack of hydrological connections and the distance the site is from the NEWABTS proposals.</td></tr>
</table>

Matrix 8 – Fenn's Whixall Bettisfield, Wem, and Cadney Mosses, SAC	
- Distance from the European Site or key features of the site; - Resource requirements; - Emissions (disposal to land, water or air); - Excavation requirements; - Transportation requirements; - Duration of construction, operation, decommissioning etc.; - Increase in damage or disturbance as result of access recreation and other human activity - Other	
Likely Significant Effects	None
In-Combination Effects	None

Annex C Screening Assessment of Interventions

Package 1 Managing Demand

Intervention	Corridor Proposals				Natura (2000) & Ramsar Sites potential affected by Interventions	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW		
Walking and Cycling						
1.a Funds for businesses to invest in walking and cycling facilities	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**	**Not required at this stage, once proposals are developed and location determined, appropriate mitigation measures will be devised. .**
Demand Management						
3.b Workplace Travel Planning	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**	**Not required at this stage, once proposals are developed and location determined, appropriate mitigation measures will be devised. .**
3.c Parking Management Strategy	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**	**Not required at this stage, once proposals are developed and location determined, appropriate mitigation measures will be devised. .**

Package 2 Making Best Use

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
Walking and Cycling									
1.d Encourage secure cycling parking at public transport interchanges	Penyffordd	Flint	Shotton/ Deeside Industrial Park	Wrexham	Aber Dyfrdwy/ Dee Estuary Ramsar, SPA, SAC potential affected by proposals at Flint and Shotton,	These proposals are within 2km of this site and are potentially hydrologically connected.	**C2**	Water pollution from surface runoff during construction could significantly affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary Disturbance from some construction activities could adversely affect sensitive habitats and species in particular wintering birds. Increased lighting from construction machinery and operational infrastructure could cause insensitive illumination to sensitive habitat and species on site. A localised effect on air pollution associated with construction activities and machinery could significantly affect sensitive habitats and species on site.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA affected by proposals Penyffordd and Wrexham	These proposals are potentially hydrologically connected	**B**	It is considered highly unlikely that adverse impacts will occur to the site due to the scale and proximity of works to the Estuary. Therefore there are no mechanisms to affect this site.	
					Afon Dyfrdwy a Llyn Tegid/ River Dee and Bala SAC could potentially be effected by	Shotton/Deeside proposal lies within 1km of the site and	**C2**	Water pollution from surface runoff during construction could significantly affect	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					proposals at Penyffordd, Wrexham, Shotton/Deeside	Penyffordd, Wrexham are potentially hydrologically connected.		sensitive habitats and species if allowed to discharge uncontrolled into hydrologically connected watercourses. Increased lighting from construction machinery and operational infrastructure could cause insensitive illumination to sensitive habitats and species on site. A localised effect on air pollution associated with construction activities and machinery at Shotton and Deeside which could have significant effects on sensitive habitats and species on site	
					Deeside and Buckley Newt sites affected by proposals proposed at Shotton/Deeside ,	Shotton/Deeside proposal lies within 2km of site	**B**	With the location of the proposal situated within existing urban infrastructure, it is considered highly unlikely that construction activities associated with this proposal would impact this site No mechanism to affect this site.	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	
					Johnstown Newt Sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's urban location and minor scale of works proposed.	
1.e Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
1.g Provide additional signage for walkers and cyclists	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
Bus									
5.a Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve service reliability	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
5.b Improve rail and bus integration	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
5.d Real time passenger information at bus stops	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
5.e Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry		Connah's Quay-Queenferry			Aber Dyfrdwy / Dee Estuary Ramsar, SAC, SPA	These proposals are within 2km of the site and potential exists for hydrological connections between the proposal and the site.	**C2**	Water pollution from surface runoff during construction could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. A localised effect on air pollution associated with construction activities and machinery which could have significant effects on sensitive habitats and species on site No other construction impacts are considered likely as the existing railway and residential properties may function as a barrier to the site.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	These proposals are within 2km of the site and potential exists for hydrological connections between the proposal and the site.	**C2**	Water pollution from surface runoff either during construction could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river A localised effect on air pollution associated with construction activities and machinery which could have significant effects on sensitive habitats and species on site No other construction impacts are considered	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								likely as the existing railway and residential properties may function as a barrier to the site.	
					Deeside and Buckley Newt Sites SAC	This proposal is within 2km of site	**B**	No mechanism to affect this Natura site due to a number of urban barriers between this proposal and the site.	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	
					Mersey Ramsar	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, urban location and minor scale of works proposed	
5.f Bus priority at the A483/B5445 junction to avoid traffic congestion				Chester Business Park	Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either during construction could significant affect sensitive habitats and species if allowed to discharge uncontrolled into the river A localised effect on air pollution associated with construction activities and machinery which could have significant effects on sensitive habitats and species on site	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Deeside and Buckley Newt Sites SAC	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery which could have significant effects on sensitive habitats and species on site.	Yes
					Aber Dyfrdwy / Dee Estuary Ramsar, SAC, SPA	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery which could have significant effects on sensitive habitats and species on site.	Yes
Rail									
6.a Extension of Llandudno-Manchester service to Manchester Airport	Llandudno – Manchester Airport				Aber Dyfrdwy / Dee Estuary Ramsar, SPA and SAC	This proposal is within 2km of site	**B**	As the extension to this line will occur outwith the study area, there will be no change and no mechanisms as a result of this proposal will affect the site	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site	**B**	As the extension to this line will occur outwith the study area, there will be no change and no mechanisms as a result of this proposal will affect the site	
					Deeside and Buckley Newt Sites SAC	This proposal is within 2km of site	**B**	As the extension to this line will occur outwith the study area, there will be no change and no mechanisms as a result of this proposal will affect the site	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
6.b Improved station accessibility (non-car station access)	Buckley Train Station	Flint	Penyffordd Train Station	Wrexham	Deeside and Buckley Newt sites could potentially be affected by improvements to Buckley train station.	This proposals are within 2km of site	**C2**	Water pollution from surface runoff either during construction could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Either direct loss of habitat and/or close proximity of the proposal to the site could cause physical disturbance to sensitive habitats and species during construction. A localised effect on air pollution associated with construction activities and during operation and machinery which could have significant effects on sensitive habitats and species on site Recreational pressures from an increase in human presence could have significant effects on sensitive habitats and species on site	Yes
					Aber Dyfrdwy / Dee Estuary Ramsar, SPA and SAC potentially affected by improvements to Flint train station	This proposal is within 2km of site	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary It is considered unlikely that this proposal will involve additional access and would focus on improving the existing access due its urban	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								location therefore no other impacts are envisaged.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC potentially affected by improvements to Buckley, Penyffordd and Wrexham train stations.	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A localised effect on air pollution associated with construction activities and during operation and machinery which could have significant effects on sensitive habitats and species on site	Yes
					Johnstown Newt Sites SAC potentially affected by improvements to Wrexham and Penyfford train stations	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery and during operation which could have significant effects on sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain SAC potentially affected by improvements to Buckley, Flint and Penyfford train stations.	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery and during operation which could have significant effects on sensitive habitats and species on site.	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Midland Meres and Mosses Phase 2 Ramsar potentially affected by Penyffordd and Wrexham train stations.	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery and during operation which could have significant effects on sensitive habitats and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains potentially affected by proposals located at Wrexham, Buckley and Penyffordd	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery and during operation which could have significant effects on sensitive habitats and species on at site	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC potentially affected by improvements to improvements to Buckley, Flint and Penyffordd train stations.	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with construction activities and machinery and during operation which could have significant effects on sensitive habitats and species on at site	Yes
6.c Improved connection between rail and bus services at Shotton stations		Shotton	Shotton		Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposals is within 2km of site	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Afon Dyfrdwy a Llyn Tegid River Dee and Bala SAC	This proposals is within 2km of site	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary.	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	
					Deeside and Buckley Newt sites SAC	This proposals is within 2km of site	**B**	No mechanism to affect Natura site due to a number of urban barriers between the site and the proposal.	
					Halkyn Mountain / Mynydd Helygain SAC potentially affected by improvements to Shotton train stations	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's urban location, distance from site and minor scale of works proposed	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC potentially affected by improvements to improvements to Buckley, Flint and Penyfford train stations.	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's urban location, distance from site and minor scale of works proposed	
Freight									
2.d Suspension of non essential maintenance at peak periods	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
Highway									
7.a. Reduce the number of slip roads on the strategic highway network. Reduce local distributer road access	Close the following accesses onto the trunk road network: A55 Westbound / Pinfold Lane – J33a (Eastbound				Deeside and Buckley Newt sites	These proposals are within 2km of site and potential exists for a hydrological connection to proposal at Pinfold Lane	**C2**	A localised effect on air pollution associated with an increase in local traffic on minor roads which could have significant effects on sensitive habitats and species on site	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
	access will be retained) A494 Northbound / Old Aston Hill A494 Northbound / Plough Lane (southbound access will be retained) A494 Southbound / Clay Hill Lane				Aber Dyfrdwy Deeside Estuary Ramsar, SAC and SPA	Within 2km of site	**C2**	A localised effect on air pollution associated with an increase in local traffic on minor roads which could have significant effects on sensitive habitats and species on site	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	A localised effect on air pollution associated with an increase in local traffic on minor roads which could have significant effects on sensitive habitats and species on site	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with an increase in local traffic on minor roads which could have significant effects on sensitive habitats and species on site	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	A localised effect on air pollution associated with an increase in local traffic on minor roads which could have significant effects on sensitive habitats and species on site	Yes
7.b Consider a signage strategy for traffic travelling to/from the Midlands	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
7.c Consider a signage strategy for traffic travelling to/from North England	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
7.d Variable Messaging Signs	Variable messaging signs on the A55/A494/A483				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
7.e Improvements to Alltami Signals		Alltami			Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Water pollution and changes to the site's hydrology could result from an increase in surface runoff during construction or during operation which could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the ponds on site. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site Disturbance from construction activities could adversely affect protected species such as great crested newts.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary.	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								No other impacts to this site have been considered due to the scale of works proposed and distance from the proposal.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. No other impacts to this site have been considered due to the scale of works proposed and distance from the proposal.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
7.f Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay		B5129 between Connah's Quay-Queensferry			Aber Dyfrdwy / Dee Estuary Ramsar, SAC, SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Disturbance during construction activities is considered unlikely as railway and residential properties may function as a barrier.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes
					Deeside and Buckley Newt Sites SAC	This proposals is within 2km of site	**C2**	No mechanism to affect Natura site due to the proposal's urban location and proximity to site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's urban location, distance from site and minor scale of works proposed	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's urban location, distance from site and minor scale of works proposed	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Mersey Estuary SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's urban location, distance from site and the minor scale of works proposed	
7.g Minor on-line improvements between Broughton and Saltney		A5104 between Broughton and Saltney			Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes
					Mersey Estuary SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to affect this site due to the proposal's urban location, distance from site and the minor scale of works proposed	
					Aber Dyfrdwy Deeside Estuary Ramsar, SAC and SPA	Potential exists for a hydrological connection	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary No other impacts are considered likely to affect this site due to the proposal's urban location, distance from site and minor scale of works proposed	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
7.h Consider a signage strategy for traffic travelling between the A55 and Wrexham		No proposals identified			Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
7.i Make better use of A541/A550 route between the A55 and Wrexham			Along the A550 & A541 between the A55 and Wrexham		Deeside and Buckley Newt sites SAC	This proposals is within 2km of site	**C2**	Disturbance during construction activities is considered unlikely as the railway line may function as a barrier and the site is approximately over 1km from the proposal. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								discharge uncontrolled into the river. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site, however this is considered unlikely due to the minor scale of works proposed and distance from the site	
					Midland Meres and Mosses Phase 2 Ramsar	This proposals is within 2km of site	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site No other impacts are considered likely due to the lack of hydrological connections and the urban town of Gresford situated between the proposal and site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance and minor scale of works proposed	
					Johnstown Newt Sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance and minor scale of works proposed	
					Aber Dyfrdwy Deeside Estuary Ramsar, SAC and SPA	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site, however this is considered unlikely due to the minor scale of works	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								proposed and distance from the site	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
7.j Overcome pinch points in the Hope/Caergwrle area			Caergwrle		Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance and minor scale of works proposed	
					Johnstown Newt Sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance and minor scale of works proposed	
					Aber Dyfrdwy Deeside Estuary Ramsar, SAC	Potential exists for wider	**B**	Localised air pollution from construction	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					and SPA	ranging impacts		machinery could significant effect sensitive habitats and species on site, however this is considered unlikely due to the minor scale of works proposed and distance from the site	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
7.k Improvements on the A541 between Mold and Wrexham					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Localised air pollution from construction	Yes

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								machinery could significant effect sensitive habitats and species on site	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance and minor scale of works proposed	
					Johnstown Newt Sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance and minor scale of works proposed	
					Aber Dyfrdwy Deeside Estuary Ramsar, SAC and SPA	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site, however this is considered unlikely due to the minor scale of works proposed and distance from the site	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site, lack of hydrological connections and the minor scale of	

Intervention	Corridor Proposals				Natura Sites (2000) potential affected	Screening criteria	Screening Category	Reason for a Potential Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								works proposed.	
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due to the proposal's, distance from site and the minor scale of works proposed	

Package 3 Capacity Enhancements

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
Walking and Cycling									
1.h Provide walking and cycling crossing facilities on trunk roads and associated junctions	Along A494 from Mold to the A55				Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	**C2**	Loss and / or fragmentation of habitat for location of proposal Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the ponds on site. Disturbance from construction activities could adversely affect protected species such as great crested newts and sensitive habitats. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site Increased lighting for construction works or infrastructure operation has the potential to cause insensitive illumination of habitat areas which may deter associated wildlife.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								into the estuary. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site Any other impacts are considered unlikely due to the location of the proposal to the site and nature of the proposals.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site Any other impacts are considered unlikely due to the location of the proposal to the site and nature of the proposals	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due the location of the proposal to the site and nature of the proposals	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
1.i Provide safe walking and cycling routes from communities to public transport interchanges	No proposals identified	No proposals identified	No proposals identified		Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
1.j Potential to link National route 5 from Chester to Denbigh and Wrexham	Chester to Wrexham	Chester to Wrexham	No proposals identified	Chester-Wrexham	Midland Meres & Mosses Ramsar	This proposal is within 2km of site	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site No other impacts are considered likely due to the lack of hydrological connections and the urban town of Gresford situated between the site and the proposal.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due the location of the proposal and nature of the proposal	
					Johnstown Newt Sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due the location of the proposal and nature of the proposal	
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								due the location of the proposal and nature of the proposal	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC Deeside Estuary	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site.	Yes
1.k Mold to Saltney cycle way	Mold-Saltney	Mold-Saltney			Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due the location of the proposal and nature of the proposal	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to affect this site due the location of the proposal and nature of the proposal	
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	
1.l Provision of a Dee Coastal Path in Flintshire providing commuter and leisure routes linking residential communities, and major employers along the Dee corridor	Along the Dee Coast From Flint to Queensferry	Along the Dee Coast From Flint to Queensferry			Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	**C1**	Loss and fragmentation of habitat Localised air pollution from construction machinery could significant effect sensitive habitats and species on site Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Disturbance from construction activities and human presence (increase in recreational pressures) during operation could significantly affect wintering, passage and breeding birds on site. Increased lighting for construction works or infrastructure operation has the potential to cause insensitive illumination of habitat areas which may	No

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								deter associated wildlife.	
					Deeside and Buckley Newt sites SAC	This proposal is situated within 2km of the site.	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site No other impacts are considered possible due to the location of the proposal, and the urban town of Flint situated between the proposal and the site.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	**C1**	Air and water pollution from surface runoff either from construction could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Disturbance from construction activities could adversely impact sensitive species such as otters as a result of the proposal's close proximity to the river.	No
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Mersey SPA, Ramsar	Potential exists for wider ranging impacts	**B**	No wider ranging impacts are considered likely to significantly affect this site due the location of the proposal and nature of the proposal	
1.m Mold – Deeside cycle route	Mold-Deeside		Mold-Deeside		Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the ponds on site. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site Disturbance from construction activities and an increase in human presence could adversely affect protected species such as great crested newts and sensitive habitats. Increased lighting for construction works or infrastructure operation has the potential to cause insensitive illumination of habitat areas which may deter associated wildlife.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	Yes	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Disturbance from construction activities could adversely affect sensitive species and habitats on site as the proposal is situated over the designation. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	Yes	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Disturbance from construction activities could adversely affect wintering, passage and breeding birds on site. Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Mersey SPA, Ramsar	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site	
1.n New walking and cycling links to key employment sites	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
Bus									
5.g Taith Express Coach Services	Holyhead to Manchester Airport				Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	B	Increase in traffic emissions during operation could result in a localised effect on air pollution which could adversely impact sensitive habitat and species on site. However this interventions will involve a modal shift of transport use from bus to car and impacts are considered not to be significant	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	Increase in traffic emissions during operation could result in a localised effect on air pollution which could adversely impact sensitive habitat and species on site. However this interventions will involve a modal shift of transport use from bus to car and impacts are considered not to be significant	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	Increase in traffic emissions during operation could result in a localised effect on air pollution which could adversely impact sensitive habitat and species on site. However this interventions will involve a modal shift of transport use from bus to car and impacts are considered not to be significant	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for a hydrological connection to and wider ranging impacts	B	Due to the nature of the proposals, air and water impacts are not considered to be significant.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for a hydrological connection to and wider ranging impacts	B	Due to the nature of the proposals, air and water impacts are not considered to be significant.	
					Mersey SPA, Ramsar	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposals, air impacts are not considered to be significant	
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposals, air impacts are not considered to be significant	
5.h Rail link bus routes from train station to key employment station	No proposals identified	No proposals identified	No proposals identified	No proposals identified	Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
5.i New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Estate and Chester		North of Flint to North of Deeside Industrial Estate to Chester			Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Disturbance from construction activities and during operation could adversely affect wintering birds on site. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	
					Deeside and Buckley Newt sites SAC Mersey Ramsar and SPA	This proposal is situated within 2km of the site.	**C2**	Localised air pollution from construction machinery could significant effect sensitive habitats and species on site. No other impacts are considered due to the distance the proposal is from the site, lack of hydrological connections and the urban location of the proposal.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff from operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Mersey SPA, Ramsar	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								sensitive habitat and species on site.	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
5.j Create a multi-modal hub at Wrexham General Station			Wrexham		Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff from operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								sensitive habitat and species on site.	
					Deeside and Buckley Newt sites SAC Mersey Ramsar and SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
5.k New cross Dee bus route between Mold and Ellesmere Port			Mold – Ellesmere Port		Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Habitat Loss or fragmentation Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into ponds on site A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site. Disturbance from construction activities could adversely affect protected species such as great crested newts.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Haibtat Loss or fragmentation Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site. Disturbance during construction activities could adversely affect sensitive habitats and species on site.	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Habitat Loss or fragmentation Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Disturbance from construction activities could adversely affect wintering birds on site. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
Rail									
6.d Service frequency increase on Borderlands Line (hourly to half-hourly),	Wrexham to Wirral				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Midland Meres and Mosses Phase 2 Ramsar	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
6.e Fast Llandudno-Manchester Airport service	Manchester to Chester				Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Deeside and Buckley Newt sites SAC	This proposal is within 2km of site	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Mersey Ramsar	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
6.f Extension of London-Chester services to Bangor/Holyhead	Bangor – Chester-London				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Deeside and Buckley Newt sites SAC	This proposal is within 2km of site	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Alyn Valley Woods / Coedwigoedd Dyffryn	Potential exists for wider	**B**	Due to the nature of the proposal, air and water	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alun SAC	ranging impacts		impacts are not considered to be significant during operation	
					Mersey Ramsar	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
6.g Rhyl-Chester (with possible extension to Crewe) local shuttle	Chester-Rhyl				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Alyn Valley Woods / Coedwigoedd Dyffryn	Potential exists for wider	**B**	Due to the nature of the proposal, air and water	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alun SAC	ranging impacts		impacts are not considered to be significant during operation	
					Mersey Ramsar, SPA	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air and water impacts are not considered to be significant during operation	
6.h New station at Queensferry on the North Wales Main Line		Queensferry			Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Disturbance from construction machinery and construction activities could significantly affect sensitive habitats and species on site.	
					Deeside and Buckley Newt sites SAC	This proposal is situated within 2km of the site	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. No other impacts are envisaged due to the urban location of the proposal with surrounding barriers.	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. .	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Mersey Ramsar, SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. .	Yes
6.i New station at Deeside Park on the Borderlands line		Deeside Industrial Estate			Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. Disturbance from construction machinery and construction activities could significantly affect sensitive habitats and species on site.	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary.	Yes
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts	**B**	Due to the location of the proposal with urban town barriers, it is considered unlikely that the site would be significantly affected by air pollution during construction or operation.	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Due to the location of the proposal with urban town barriers, it is considered unlikely that the site would be significantly affected by air pollution during construction or operation.	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	Due to the location of the proposal with urban town barriers, it is considered unlikely that the site would be significantly affected by air pollution during construction or operation.	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Mersey Ramsar and SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. .	Yes
6.j New rail service between Borderlands Line and Chester		Wirral via Shotton – Chester			Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site. Disturbance during operation could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Due to the location of the proposal and nature of the proposal, it is considered unlikely that the site would be significantly affected by air pollution during operation.	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	B	Due to the location of the proposal and nature of the proposal, it is considered unlikely that the site would be significantly affected by air pollution during operation.	
					Mersey Ramsar, SPA	Potential exists for wider ranging impacts	B	Due to the location of the proposal and nature of the proposal, it is	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								considered unlikely that the site would be significantly affected by air pollution during operation	
6.k Increase parking provision at stations along the Wrexham Bidston line (e.g. Penyffordd) to promote park and ride			Wrexham to Penyffordd railway line		Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	C2	Habitat Loss or Fragmentation Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. .	Yes
					Deeside and Buckley Newts SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	C2	Habitat Loss or Fragmentation Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site. Disturbance from construction activities could significantly affect sensitive habitats and	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								species on site.	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. Disturbance from construction activities could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Mersey Ramsar, SPA	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Midland Meres Mosses	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Johnston Newt Sites SAC	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
6.l Shuttle service between Chester and Wrexham (with possible extension to Shrewsbury)			Chester-Wrexham		Midland Meres Mosses	This proposal is within 2km of site	B	Due to the nature of the proposal, air, impacts are not considered to be significant during operation. No other impacts are envisaged due to the lack of hydrological connections and location of the site.	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	B	Due to the nature of the proposal, water and air impacts are not considered to be significant during operation.	
					Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**B**	Due to the nature of the proposal, water and air impacts are not considered to be significant during operation.	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Johnston Newt Site SAC	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air, impacts are not considered to be significant during operation.	
					Deeside and Buckley Newt Sites	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air, impacts are not considered to be significant during operation.	
					Mersey Ramsar and SPA site	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air, impacts are not considered to be significant during operation.	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Due to the nature of the proposal, air, impacts are not considered to be significant during operation.	
6.m New station at Rossett on the Wrexham to Chester line				North of Gresford	Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								could significantly impact sensitive habitat and species on site.	
					Deeside and Buckley Newt Sites	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site..	Yes
					Johnston Newt Site SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
Freight									
2.e Freight Consolidation Centres including one at Deeside	Deeside Industrial Estate				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site. Disturbance from construction activities could significantly affect sensitive habitats and species on site.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Afon Dyfrdwy a Llyn Tegid /River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities and operation could significantly impact sensitive habitat and species on site.. Disturbance from construction activities could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction related activities and during operation is considered unlikely due to the distance from the site and urban barriers between the proposal and the site	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction related activities and during operation is considered unlikely due to the distance from the site and urban barriers between the proposal and the site	
					Deeside and Buckley Newt Site SAC	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction related activities and during operation is considered unlikely due to the distance from the site and urban barriers between the proposal and the site.	
					Mersey Ramsar and SPA site	Potential exists for wider	**C2**	A potential localised effect on air pollution	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
						ranging impacts		associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	
2.f Truckstops	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
2.g Crawler Lanes on the Key trunk roads and other single carriageway A roads	No proposals identified		No proposals identified		Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
2.h Rail electrification					Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
2.i Open Access Rail Terminal	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
Demand on Management									
2.e Park and Ride Proposal	No proposals identified	No proposals identified	No proposals identified		Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
Highway									
2.m Apply managed motorway concepts to key trunk roads	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
2.n Provide hard shoulders on dual carriageway trunk roads	No proposals identified				Where proposals are yet to be developed and location determined, it has been considered not possible to determine whether the proposals would have a likely significant effect on a Natura 2000 or Ramsar site. It will be necessary to further assess proposals under this intervention when further spatial and design information becomes available. This intervention cannot be adopted until this information has become available and appropriately				

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					assessed. **A likely significant effect on a Natura 2000 or Ramsar site cannot be identified at this stage.**				
2.o Enhance the A548 route between Flint and the A550	A548 between Flint to the A550				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Potential Land take and / or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Disturbance from construction activities could significantly affect sensitive habitats and species on site. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	Yes	Potential Land take and / or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								species on site.	
					Halkyn Mountain / Mynydd Helygain SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	
					Deeside and Buckley Newt Site SAC	Potential exists for wider ranging impacts	**B**	Localised air pollution from construction related activities and during operation is considered unlikely due to the distance from the site and urban barriers between the proposal and the site	
					Mersey Ramsar and SPA site	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	
2.p A483/A55 Junction Improvement	Chester Business Park			Chester Business Park	Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	C2	Water pollution from surface runoff either from construction or during operation could significantly affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	C2	Water pollution from surface runoff either from construction or during operation could significantly affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	
					Mersey Ramsar and SPA site	Potential exists for wider ranging impacts	B	Localised air pollution from construction related activities and during operation is considered unlikely due to the distance from the site and urban barriers between the proposal and the site	
					Midland Meres and Mosses Ramsar	Potential exists for wider ranging impacts	B	Localised air pollution from construction related activities could significantly affect sensitive habitats and species on site	
					Deeside and Buckley Newt Site SAC	Potential exists for wider ranging impacts	B	Localised air pollution from construction related activities could significantly affect sensitive habitats and species on site	
2.q Improve key junctions on the A483	Along A483 south west of Wrexham			Along A483 south west of Wrexham	Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								construction activities could significantly impact sensitive habitat and species on site.	
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	B	Due to the distance the proposal is from the site water pollution from surface runoff either from construction or during operation is considered unlikely.	Yes
					Deeside and Buckley Newt Site SAC	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Midland Meres and Mosses Ramsar	Potential exists for wider ranging impacts	C2	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Johnston Newt Site SAC	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. .	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
2.r New road connecting the A55 and A548	New road between Flint and Connah's Quay between the A55 & A548				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Disturbance from construction activities and during operation could adversely affect wintering birds on site. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site. .	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Mersey Ramsar and SPA	Potential exists for wider ranging impacts to the proposal	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
					Deeside and Buckley Newt Site	Potential exists for wider ranging impacts to the proposal	C2	A potential localised effect on air pollution associated with construction activities and during operation could significantly impact sensitive habitat and species on site.	Yes
2.s A55 Ewloe to Northlop Improvements	2.s A55 Ewloe to Northlop Improvements				Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C2	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the ponds on site. Disturbance to protected species and habitat during construction activities A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Significant impacts from localised air pollution from construction related activities is considered unlikely due to the nature and scale of works proposed.	
2.t Ewloe Interchange Improvements	A55/A494 Ewloe Interchange				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
						the site.		and species if allowed to discharge uncontrolled into the estuary. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Deeside and Buckley Newt sites SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the ponds on site. Disturbance to protected species and habitat during construction activities A potential localised effect on air pollution associated with construction activities could significantly impact	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								sensitive habitat and species on site.	
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	**C2**	A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. .	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Significant impacts from localised air pollution from construction related activities is considered unlikely due to the nature and scale of works proposed.	Yes
2.u A494 Ewloe to Drome Corner Improvements	On the A494 between Ewloe and Queensferry				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	
					Deeside and Buckley Newt sites SAC	This proposal is s within 2km of the	**C2**	Habitat Loss or fragmentation Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary Disturbance from construction activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Significant impacts from localised air pollution from construction related activities is considered unlikely due to the distance from the proposal to the site and the nature of the works proposed.	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
2.v Improve the capacity of the A494 river Dee crossing	A494 over the Dee Estuary				Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Widening of the existing A494 over the River Dee has the potential to increase traffic levels resulting in potential adverse impacts on local air quality affecting sensitive species and habitats on site. A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. Disturbance from construction activities and during operation could adversely affect wintering birds or sensitive habitats on site	No
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	C1	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	No

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Disturbance from construction activities could adversely impact sensitive species such as otters and sensitive plants as a result of the proposal's close proximity to the river. Widening of the existing A494 over the River Dee has the potential to increase traffic levels resulting in potential adverse impacts on local air quality affecting sensitive species and habitats on site A potential localised effect on air pollution associated with construction activities could significantly impact sensitive habitat and species on site. Otter mortality as a result of increased speed levels on bridge as congestion levels are reduced	
					Mersey Ramsar and SPA site	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts	**C2**	Localised air pollution from construction related activities and during	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
						to the proposal		operation could significantly affect sensitive habitats and species on site.	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
2.w Improve road connections to Deeside Industrial Estate		Deeside Industrial Estate	Deeside Industrial Estate		Aber Dyfrdwy /Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Land take or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site. Disturbance from construction activities and during operation could adversely affect wintering birds or sensitive habitats on site	Yes
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	Yes	Land take or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could significantly affect sensitive habitats and species if allowed to discharge uncontrolled into the river.	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site. Disturbance from construction activities and during operation could adversely affect sensitive habitats or species on site.	
					Mersey Ramsar and SPA site	Potential exists for wider ranging impacts to the proposal	**B**	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation.	
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	**B**	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation.	
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	**B**	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation.	
2.x Improve road connections to the Broughton area		Broughton			Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	Potential exists for hydrological connection between the proposal and the site.	**C2**	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to	Yes

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								discharge uncontrolled into the river. Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	
					Aber Dyfrdwy /Deeside Estuary Ramsar, SAC and SPA	Potential exists for hydrological connection between the proposal and the site.	C2	Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to discharge uncontrolled into the river. Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Midland Meres and Mosses Ramsar	Potential exists for wider ranging impacts to the proposal	B	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation.	
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts to the proposal	C2	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	B	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation	

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	B	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation	
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts	**B**	Due to the nature, scale and distance of the proposals from the site, air, impacts are not considered to be significant during construction or operation	
2.y New road bridge between Connah's Quay and Deeside Park			Connah's Quay to Deeside Park		Aber Dyfrdwy / Deeside Estuary Ramsar, SAC and SPA	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could significantly affect sensitive habitats and species if allowed to discharge uncontrolled into the estuary. Disturbance from construction activities or during operation could adversely affect wintering birds on site. Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	No
					Afon Dyfrdwy a Llyn Tegid / River Dee and Bala SAC	This proposal is within 2km of site and potential exists for a hydrological connection to the proposal.	**C1**	Loss or fragmentation of habitat Water pollution from surface runoff either from construction or during operation could adversely affect sensitive habitats and species if allowed to	No

Intervention	Study Corridors and Propoasls				Natura (2000) sites Potential affected	Screening Cr	Screening Category	Reason for Likely Significant Effect	Can Significant Impacts be Avoided?
	ST	FMC	WD	CW					
								discharge uncontrolled into the river. Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site. Disturbance from construction activities could significantly impact sensitive species and habitat s on site.	
					Halkyn Mountain / Mynydd Helygain	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Alyn Valley Woods / Coedwigoedd Dyffryn Alun	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SPA	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes
					Deeside and Buckley Newt sites SAC	Potential exists for wider ranging impacts to the proposal	**C2**	Localised air pollution from construction related activities and during operation could significantly affect sensitive habitats and species on site.	Yes

NEWABTS Stage 1 Appendix E: Strategic Environmental Assessment - Non Technical Summary



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NEWABTS Stage 1 Appendix E Strategic Environmental Assessment - Non Technical Summary

Rev No	Comments	Checked by	Approved by	Date
1	Final Draft	SE	SE	10/01/2011
2	Final Report	SP	CB	24/09/12

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1 Introduction

This report represents the Non Technical Summary (NTS) of the Strategic Environmental Assessment (SEA) of the North East Wales Area Based Transport Study (NEWABTS) prepared for the Welsh Government (WG) and Taith.

1.1 Strategic Environmental Assessment

In accordance with the SEA Directive (2001/42/EC) and Environmental Assessment of Plans and Programmes Regulations 2004 as transposed into Welsh Law (July 2004) the NEWABTS requires an SEA on the basis that the proposals set out within the NEWABTS could potentially have significant effects on the environment.

1.1.1 Objectives of the SEA Directive

The objectives of the SEA Directive, as set out in Article 1 (2001/42/EC), are, "*to provide a high level of protection to the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development*". These objectives have been integrated into the relevant UK SEA Regulations.

1.1.2 Requirements of the SEA Directive

The main requirements of the SEA Directive and the Environmental Assessment of Plans and Programmes Regulation (Wales) 2004 include:

- Preparation of an Environmental Report;
- Consultation;
- Taking the results of the Environmental Report and consultations into account in decision making;
- Providing information on the decision making; and
- Setting out a monitoring framework.

This SEA has been carried out in accordance with the information provided in the following guidance documents:

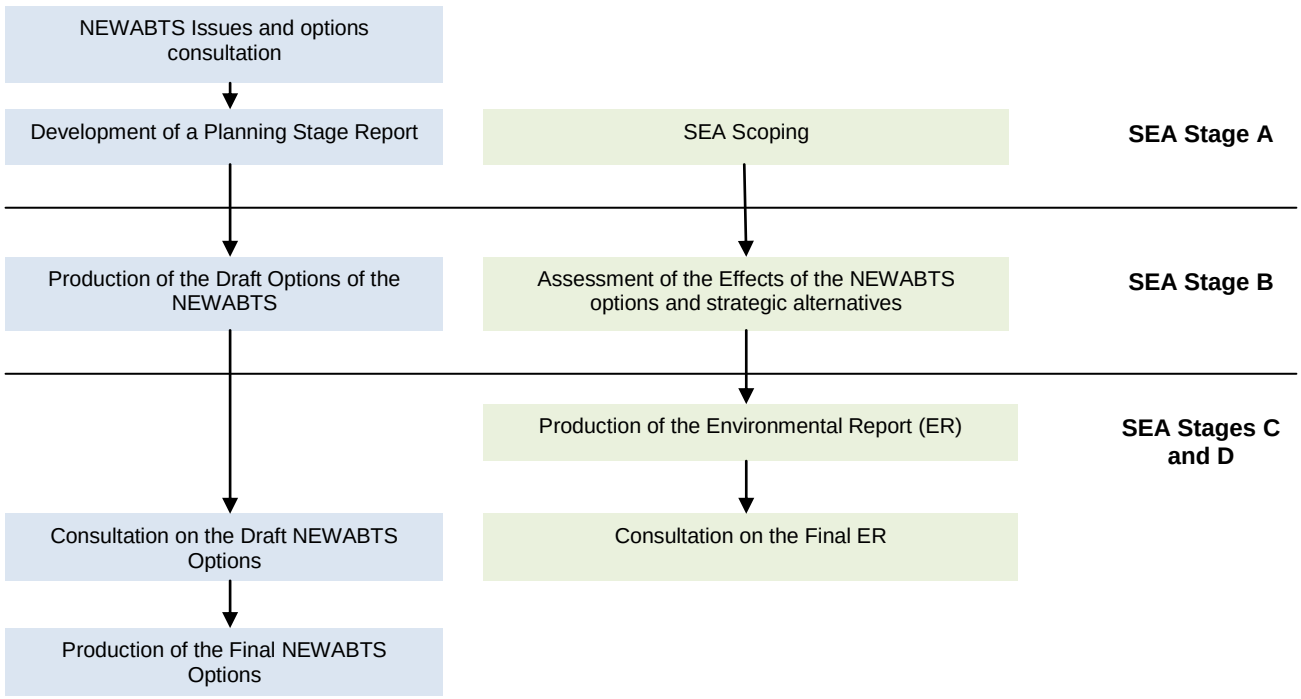
- European Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, known as the 'SEA Directive';
- Environmental Assessment of Plans and Programmes (Wales) regulations 2004 ('SEA Regulations');
- A Practical Guide to the Strategic Environmental Assessment Directive ODPM 2005;
- Strategic Environmental Assessment Directive: Guidance for Local Planning Authorities 2003;
- Strategic Environmental Assessment Guidance for Transport Plans and Programmes TAG Unit 2.11, April 2004. Department for Transport – Transport Analysis Guidance (TAG); and
- The Welsh Transport Appraisal Guidance (WelTAG);

Additional guidance documents considered in the development of this SEA included:

- Natural England Guidance note on Local Transport Plans and the Natural Environment (Natural England, 2009);
- Natural England LTP and ROWIP Integration: good practice note (Natural England, no date);
- Strategic Environmental Assessment, Sustainability Appraisal and The Historic Environment (English Heritage, no date); and
- Natural England's position on Transport and the Natural Environment (natural England, no date).

1.2 SEA and the NEWABTS

SEA is an iterative process and this SEA has been carried out in conjunction with the preparation of the NEWABTS to ensure any adverse effects of the plan on the environment have been identified, avoided and mitigated at the earliest opportunity. Figure 1 illustrates how the SEA has been undertaken alongside the NEWABTS.



2 Overview of the NEWABTS

The North East Wales Area Based Transport Study (NEWABTS) will establish a transport strategy for North East Wales consistent with the aims and commitments set out in the National Transport Plan (NTP) published in March 2010 and the North Wales Regional Transport Plan published in September 2009. The focus of the study is to look at transport links between settlements in the study area (Wrexham, Flint, Chester and Deeside), access to areas outside the study area and transport issues which impact on trips through the study area. The study is being undertaken from the Welsh perspective but to avoid looking as the issues in isolation the study has also considered the cross border issues, liaising with cross border partners.

2.1 NEWABTS Study Area

The NEWABTS area encompasses parts of three local authorities, the eastern part of Flintshire, north and eastern part of Wrexham and the west of Cheshire West and Chester. The SEA has covered the environmental, social and economic considerations within these three local authorities and the potential for trans-boundary effects including where hydrological links which may exist.

2.2 NEWABTS Objectives

In July 2010, stakeholder consultation was carried out to identify the main transportation problems within the study area. The issues are categorised into the three main links, Wrexham to Chester, Wrexham to Deeside and Deeside to Chester. A number of other issues were also identified on links between other settlements including Mold, Buckley and Northop. For each of these links the issues have been categorised modally into car, cycling, walking bus, rail and HGVs. A series of transport objectives were then developed to seek to address these issues. The transport planning objectives for the NEWABTS are as follows:

- To improve transport connections for businesses within the study area to key economic centres and employment sites;
- To improve access between employment sites and workforce catchment areas;
- To reduce carbon emissions from transport in the study area;
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts;
- To improve the actual and perceived safety and personal security of all transport users in the study area;
- To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight;
- To reduce social deprivation through improved access to jobs and other key services;
- To maintain and make more efficient use of the existing transport infrastructure in the study area; and
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

2.3 NEWABTS Packages

In order to deliver the objectives set out above the NEWABTS sets out a number of packages within which a series of options have been developed.

The study area has been split down into four corridors:

- Strategic Trips
- Flint / Mold – Chester

- Wrexham – Deeside
- Chester – Wrexham

The packages where developed by dividing the successful options identified at the WelTAG planning stage into three distinct levels:

Managing Demand – options aim to reduce the demand for travel.

Making Best Use – options seek to make more efficient use of existing transport facilities and infrastructure within minimal cost.

Capacity Enhancement – options involving the provision of new infrastructure.

The managing demand package has been applied to the whole study area whereas making best use and capacity enhancement packages have been presented for each of the four corridors. Within each package options have been developed under six broad headings: walking and cycling; bus; rail; demand management; highway; and freight. Table 2.1 below illustrates how the packages have been grouped.

Table 2.1 NEWABTS Packages

Corridor	Package	Overview
Area Wide	Managing demand	Aim to reduce the need to travel by car through encouragement of walking and cycling and increased public transport use over the whole study area.
Strategic Trips	Making best use	Aims to make the existing transport facilities, services and infrastructure more efficient for strategic trips.
	Capacity enhancements	Aims to improve the existing and create new infrastructure to improve trips within the strategic corridor.
Flint / Mold – Chester (Via Deeside / Broughton)	Making best use	Aims to make the existing transport facilities, services and infrastructure more efficient for the Flint / Mold – Chester corridor.
	Capacity enhancements	Aims to improve the existing and create new infrastructure to improve trips within the Flint / Mold – Chester corridor.
Wrexham – Deeside (via Mold / Buckley)	Making best use	Aims to make the existing transport facilities, services and infrastructure more efficient for the Wrexham – Deeside corridor.
	Capacity enhancements	Aims to improve the existing and create new infrastructure to improve trips within the Wrexham – Deeside corridor.
Chester – Wrexham	Making best use	Aims to make the existing transport facilities, services and infrastructure more efficient for the Chester – Wrexham corridor.
	Capacity enhancements	Aims to improve the existing and create new infrastructure to improve trips within the Chester – Wrexham corridor.

*Further detail on these packages is provided in the Environmental Report of the NEWABTS

3 Existing Environment

There are a large number of International and European designated sites within and adjacent to the study area. These include Dee Estuary / Aber Dyfrdwy Special Area of Conservation, Special Protection Area (SPA) and Ramsar, the River Dee and Bala Lake / Afon Dyfrdwy SAC, Deeside and Buckley Newt Sites SAC and Midland Meres and Mosses Phase 2 Ramsar. A large number of these are water dependant sites. Any transport infrastructure developments within the study area as a consequence of this study will need to consider hydrological links and the effect on routine runoff on these sites. In addition a number of interest features (Luronium natas and Old Sessile oak wood with Ilex and Blechnum) are currently exceeding critical loads for nitrogen deposition therefore the study should look at options to reduce transport derived nutrient nitrogen and acid deposition.

There is a varied historically important landscape character within the study area from undulating hills in the west and south to the coastal and estuarine flats of the River Dee and its estuary in the north and east. The Alyn River valley and its tributaries are a key characteristic of the undulating landscape in the west of the study area. This valley is surrounded by agricultural land that exhibits small irregular field patterns and interspersed with numerous pockets of woodland. In the north and east of the study area either side of River Dee the landscape is flat and dominated by the industrial processes that have built up along the banks of the river and its estuary. The areas of industry are sited in amongst agricultural fields separated by regular linear field boundaries that also act as land drainage. In the south of the study area to the north and east of Wrexham a significant area is designated as a Local Landscape Area (LLA) this is illustrated on Figure 1 Environmental Constraints. This designated area is generally associated with the River Alyn and River Dee corridors.

There is a legacy of historical contamination across the majority of the study area as a result of the legacy mining industries within the region and other industries that developed around Deeside, in particular along the banks of the River Dee. These include brickworks, steelworks, paintworks etc. Whilst not directly related to transport infrastructure the development of any new infrastructure will have to take the location of potential areas of contaminated ground into account in terms of exposing potential environmental risks and the associated cost of remediation. In particular a number of these sites lie adjacent to the existing road network as transport infrastructure generally developed around the existing industry in the area therefore this is particularly important in the context of any future road widening schemes.

One of the major rivers within the study area, the River Alyn is classified as currently being of poor ecological status from Mold to its confluence with the River Dee. This river is crossed and flows adjacent to a number of strategic roads within the study area and it is likely that it receives a high proportion of road drainage from these. Therefore any schemes proposed as a consequence of the study should consider the implementation of or additional treatment measures to outfalls to this watercourse. The A494 crosses the River Dee at Queensferry. This bridge currently takes large volumes of traffic and is regularly congested due to the narrowing of the carriageway and reduced speed limits through this section. It is likely that little treatment is in place to treat the routine runoff prior to discharge into the River Dee therefore any schemes which look to improve this crossing should include the implementation of treatment measures prior to outfall.

There are a number of strategic roads that dissect the study area in particular the A55, A494 and the A483. These roads in particular the A55 and the A494 take large volumes of traffic both local and passing including large volumes of tourist traffic both at the weekends and during holiday periods. As a consequence there is a significant amount of transport related noise adjacent to these roads. Whilst the A55 takes the largest volume of traffic and the 55-59dB noise levels from this road cover a wide corridor, there are few receptors within the rural sections. However, where the road passes through Queensferry there are a number of receptors adjacent to the road including a school which falls within the 65-69dB band. In addition there is a significant noise corridor along the A483 through Wrexham in particular around the A541 junction which becomes congested at peak times.

There is a large amount of heavy industry within the study area this is mainly concentrated around the Deeside Industrial Park and along the banks of the River Dee between Flint and Chester. This industry is vital for employment within the area, however as a result Flintshire is the 3rd highest CO_2 emitter of the 22 Welsh Counties. In addition in terms of transport related air pollution Flint is the 5th highest CO_2 emitter of the Welsh counties. It is likely that this is attributed to the presence of the A55/A494 that takes large volumes of traffic between north west England and Wales as well commuter and local traffic. Whilst it is acknowledged that this study will not address the impact of holiday traffic that use this section of the road to reach north Wales and the port of Holyhead the study should look at ways of increasing the modal shift in local and commuter journeys.

4 Approach and Method

4.1 Assessment Methodology

The assessment process comprises a series of four stages, the output from each informing the following stage as set out below. These stages include:

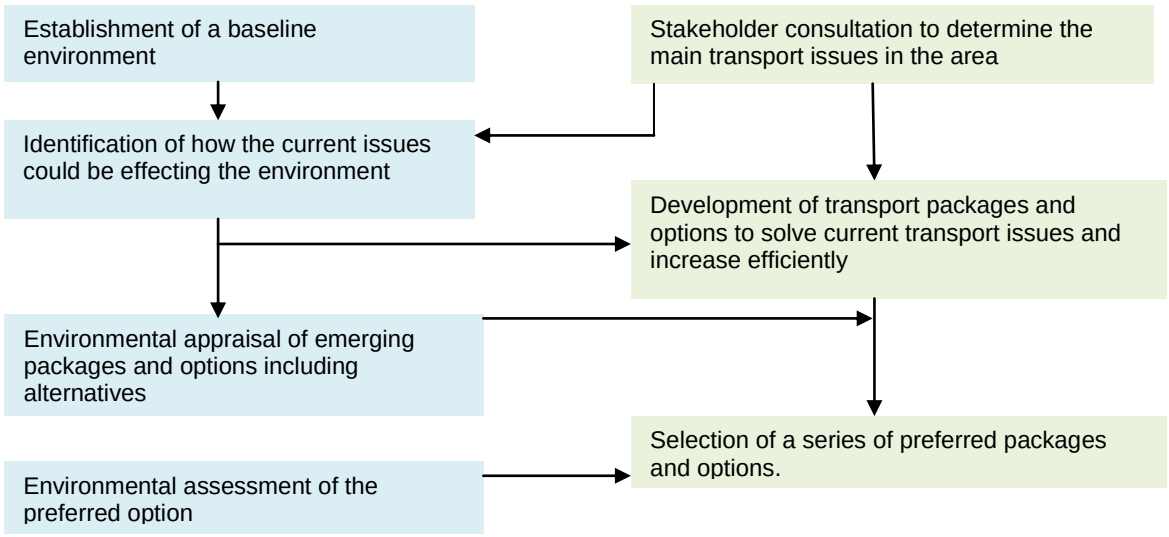
1. Establishing the baseline and subsequently highlighting any key issues (informed from the scope).
2. Assessing the effects of the proposed policies on the environment.
3. Assessing the cumulative and in-combination effects of the NEWABTS.
4. Identification of appropriate mitigation measures to avoid, reduce or offset any adverse effects that are identified and opportunities for improving the effectiveness of the NEWABTS.
5. Setting out any monitoring requirements as a consequence of this assessment.

4.1.1 Assessing the Effects of the NEWABTS

SEA is an iterative process which can be used to inform selection of the preferred policies. Figure 2 below illustrates how the SEA process has informed the development of the NEWABTS policies and the selection of the preferred policies to ensure they are environmentally sustainable.

The assessment did not involve any weighting of the SEA topics and each topic has been considered in terms of its own value. The main purpose of the SEA is to provide guidance and advice on where potentially significant adverse effects could occur and how these can be avoided or reduced. It is not the role of the SEA to determine which of the topics assessed are of greater or lesser value than others.

Figure 2: The SEA process in the development of the NEWABTS



The evaluation criteria used in the assessment of the NEWABTS reflects the strategic high level nature of this SEA.

Significance is a measure of the magnitude of a potential effect compared to / in relation to the sensitivity or importance of the receptors. An accurate and robust determination of effect magnitude or sensitivity of a receptor requires a certain level of

qualification or quantification. This is generally based on the information contained within the plan, programme or strategy being assessed and the information contained within the baseline review.

Table 4.1 below sets out the evaluation criteria that will be used to assess the emerging packages and options against the SEA topics.

Table 4.1: Evaluation Criteria

Potential Effect		Evaluation Criteria
Significant Adverse	✖✖	The precise measure for **significant adverse effect** will vary across the different SEA topics. However, in general, the key factors influencing the potential for a significant adverse effect to occur are likely to include: - Permanent, long term or irreversible change in baseline conditions e.g. reduction in quality of baseline environment or effect on baseline features (receptors); - Direct and indirect effect on baseline features of international or European importance e.g. habitats, species and sites designated under the EU Habitats or Birds Directives; and - Direct effect on baseline features of national importance (e.g. habitats or species of national value/importance) . It should be noted that each SEA topic, and the baseline environment/features (receptors) associated with that topic, will need to be considered on a case by case basis. There is potential that the criteria listed above will be subject to modification during the assessment to reflect specific characteristics of the baseline environment. However, any modifications will be reflective of the main principles of an assessment of **significant adverse effect** listed above.
Negative	✖	As above, the measure for **negative effect** will vary across the different SEA topics. However, in general, the key factors influencing the potential for a negative effect to occur are likely to include: - Temporary, short term or reversible change in baseline conditions e.g. reduction in quality of baseline environment or effect on baseline features (receptors); - Indirect effect on baseline features of national importance (e.g. habitats or species of national value/importance); and - Direct effect on baseline features that are not designated under international, European or national legislation.
No Impact	=	The will be no interaction between the drainage strategy option and the baseline environment / feature.
No Change From Baseline	~	There will be no change in baseline environment/features resulting from the implementation of the drainage strategy option.
Slight Beneficial	✓	The implementation of the drainage strategy option will have a slight positive effect on the baseline environment/features.
Beneficial	✓✓	The implementation of the drainage strategy option will have a positive effect on the baseline environment/features.

5 Assessment Results

5.1 Introduction

The assessment was carried out in two stages. The first stage identified potential short term environmental effects that the interventions could have on the environment as a result of construction practices and the second stage assessed potential permanent effects which could result as consequence of implementing the NEWABTS.

5.2 Construction Impacts and Mitigation

Some options are predicted to have potential temporary negative effects on the environment as a result of construction activities. These relate mainly to the provision of new infrastructure/facilities (e.g. new roads, footpaths, cycleways, bus stops and stations etc) or upgrades/changes to existing infrastructure/facilities e.g. road widening or realignment. Construction activities are generally short term and temporary, most occurring during the construction period only, ceasing once a development becomes operational. The majority of these potential effects can be avoided or reduced through recognised mitigation and application of good practice procedures.

However, there are some effects that occur during construction that have long term, occasionally permanent effects such as habitat loss/removal. Although these potential effects have been considered below in relation to construction activities they are also considered in respect to the operation of certain options/schemes.

Construction activities generally include the following:

- Vegetation removal
- Ground/earth movements
- Movement of materials (import of construction materials and removal of waste)
- Traffic movements to and from site
- Noise generated by construction machinery/activities
- Construction of contractor compounds
- Changes to water drainage patterns (below ground and surface)
- Generation of dust resulting from earth movements and construction activities

Table 5.1 below provides details on the potential short term and temporary effects in relation to each of the SEA subject areas that may arise from construction activities associated with the options. The extent of construction required for each of the options is not known at this stage therefore the potential negative effects shown in Table 5.1 may not occur as an consequence of construction activities of all options listed instead it details the general potential effects that could arise from construction activities.

Table 5.1 also sets out potential mitigation measures to minimise construction effects. However specific measures will need to be developed as part of the scheme development. A number of the schemes would require large scale infrastructure development these will require further assessment and should be screened to determine whether they may require for an Environmental Impact Assessment (EIA) and other assessments e.g. Appropriate Assessment.

Table 5.1: Potential temporary construction effects and suggested mitigation.

SEA Topic	Potential Effects	Potential Mitigation Measures
Biodiversity	- Vegetation removal - Loss and fragmentation of habitat	- Minimise tree/vegetation/topsoil removal - Habitat restoration
	- Disturbance of protected species	- Protected Species surveys - Timing of construction - Footbridges and underpasses
	- Hedgerow removal	- Avoid/ minimise removal - Replanting of hedgerows
	- Impacts on breeding / wintering birds	- Site clearance outside the bird breeding season - Breeding bird surveys
	- Impacts on fish	- Any works within and close to watercourses should be carried outside of the spawning period for fish
Landscape	- Visual impacts of construction activities	- Techniques to integrate the scheme into the surroundings - Visual barriers (fencing /hedge planting) - Retain and manage existing vegetation
Archaeology and Heritage	- Loss or disturbance of Scheduled Monuments, listed buildings or structures	- Consult with Country Archaeologist prior to construction - Minimise and monitor ground disturbance
	- Loss or disturbance of unknown archaeology due to excavation work	- Geophysical surveys - Archaeology watching brief
Water	- Temporary discharges/ risk of pollution	- Use of construction SUDS and adoption of best practices to avoid pollution of watercourses
	- Pollution incidents and run off	- Consultation with the EA and obtaining the necessary temporary discharge consents. - Adoption of best practices to avoid pollution of watercourses e.g. Construction Pollution Prevention Guidelines - Monitoring of Private Water Supplies - Appropriate storage of fuels and solvents.
Noise	- Noise and vibration resulting from construction activity (machinery, construction traffic)	- Restrict hours of operation - Use of Best Practicable Means, such as low noise emission machinery - Erection of temporary noise screens where required
Air	- Creation of dust and particulates	- Follow appropriate guidelines for construction dust management - Implementation of construction traffic management plans
Climatic Factors	- Emissions from construction vehicles	- Types of vehicles used - Implementation of construction traffic management plans which should also include guidelines for good practice such as ensuring the ignition is turned off when not in use.
Soil	- Erosion or damage to soil	- Implement soil erosion prevention measures outlined in best Practice Guidance
	- Waste generation (from aggregates (rubble, concrete etc) and earth)	- Preparation of a waste management plan demonstrating how targets for the recycling and reuse of aggregates and other waste (60%) will be met.

SEA Topic	Potential Effects	Potential Mitigation Measures
		- Management of waste in line with Developers Duty of Care.
	- Land contamination	- Pre construction surveys and application of Good Practice Guidelines
Population	- Nuisance (noise odour, dust)	- Good Practice Guidelines - Consultation with the Environmental Health Officer (EHO)
	- Footpath, bridleway and cycleway closures and diversions	- Consultation with local residents and users of footpaths, cycleways and bridleways. - Provision of alternative routes (diversions) during construction.
	- Changes to public transport timetables	- Liaise with residents
	- Construction traffic	- Traffic management and calming - Limit construction working hours
Material Assets	- Damage to existing infrastructure	- Regular inspections
	- Demand for construction materials	- Reuse of materials where appropriate
Human Health	- Accidents from construction traffic - Poor air quality due to construction dust - Noise from construction traffic and machinery	- Noise insulation - Appropriate construction methods - Speed regulations - Consultation with the Environmental Health Officer (EHO) - Follow appropriate guidelines for construction dust management
All Topics	- Various	- Development of a Construction Management Plan (CMP).

Most of the potential effects listed in Table 5.2 above can be reduced or avoided through the implementation of appropriate mitigation measures. Any construction works will also need to be timed appropriately so as to avoid significant effects on the qualifying features of designated sites and protected species. Therefore, it is unlikely that, during construction, any of the options/ schemes included in the NEWABTS if implemented alone will have significant adverse effects on the environment. However, in order to ensure that the options taken forward under the NEWABTS do not have any potential significant adverse effects on the environment it will be necessary for the NEWABTS to include specific statements/commitments requiring individual options/schemes to be subject to specific detailed assessments which will identify project level mitigation to be implemented and timed accordingly.

5.3 Operational Impacts

Generally the options and packages seek to encourage a modal shift from reliance on the car to more sustainable forms of transport. In particular the NEWABTS aims to identify the measures to create a modal shift to public and more sustainable forms of transport.

5.3.1 Managing Demand

The options focus on a modal shift from reliance on the car to walking and cycling and where this is not possible car sharing. None of the options require any new infrastructure development and are unlikely to result in any significant adverse effects on the environment. However, where the options look to restrict the use of the car by implementing parking management strategies in town centres this could affect accessibility for some people, especially those in rural communities who have limited access to other transport services.

The overall package is aimed at encouragement of a modal shift which in turn should reduce congestion potentially having positive effects on biodiversity, air, climatic factors and human health. A reduction in traffic volumes may also reduce the routine runoff concentration having positive effects on water quality and aquatic habitats. However, it is unlikely that this package implemented by itself will result in any significant beneficial effects on the above.

5.3.2 Making Best Use

Generally the overall aim of these packages is to encourage a modal shift from reliance on the private car and reduce congestion resulting in positive effects on the environment, in particular biodiversity, air quality, climatic factors, water quality and human health from reduced emissions. However, it is unlikely that the implementation of this package alone will result in any significant environmental benefits. Where the options presented seek to improve public transport services and walking and cycling routes this will also result in a positive effect on both accessible and physical fitness. In addition where the options seek to improve the safety of the existing highway network this should decrease the spillage risk and the associated effects water quality and aquatic habitats.

These packages are aimed at making best use of the existing infrastructure therefore any infrastructure works proposed are likely to only be minor on line improvements. Even though the works are likely to be minor, if not appropriately designed they could lead to negative effects on biodiversity where land take / habitat loss is required and on protected species where the installation of lighting is used inappropriately. Negative effects could also arise on landscape and the historic environment from inappropriate siting of signage and alterations to a number of stations which are listed structures. The packages also have the potential to negatively affect air quality from the diversion of traffic from the strategic highway to local roads from the closure of slip roads and if bus priority measures result in increased congestion for other road users. However, the implementation is unlikely to lead to any significant adverse effects on the environment.

5.3.3 Capacity Enhancements

These packages are aimed at reducing congestion through infrastructure developments to increase capacity and encouragement of a modal shift by the provision of new cycleways and footpaths and increased public transport services. Generally the options presented will lead to reduced congestion and therefore positive effects on biodiversity, air quality, climatic factors, water quality and human health associated with reduced emissions. However, it should be noted that individual options by themselves are unlikely to result in a significant beneficial effect.

The assessment has identified that for most of the options where any infrastructure development is required there is the potential for negative effects on biodiversity, landscape, the historic environment, noise levels and local air quality. However, these effects can potentially be reduced through scheme design and siting. It is likely that a number of the options will involve a certain level of land take which could potentially have a negative effect on biodiversity due to habitat loss, fragmentation of habitat and disturbance of protected species. In addition the increase in the amount of impermeable surface area in the study area, if not appropriately mitigated could have negative effects on flood risk.

However, the assessment has also identified that there are a number of options that have the potential to have likely significant adverse environmental effects. The provision of a Dee Coastal Footpath, and new road bridge over the Dee Estuary, depending on their proximity to the Dee Estuary has the potential to cause disturbance to over-wintering, passage and breeding birds all of which are qualifying features of the SPA designation. Any potential effects on the integrity or conservation value of the SPA would be subject to more detailed assessment as part of the Appropriate Assessment process. It is likely that detailed mitigation would have to be developed to ensure that there are no adverse effects on the SPA.

The provision of park and ride schemes throughout the study area, again, depending on their location, have the potential for significant habitat loss and species disturbance and longer term adverse effects on local air quality and noise levels due to increased traffic movements in the local area. Where park and ride schemes involve the provision of new hard standing car

parking there is potential for the schemes to have negative and significant adverse effects on flooding due to increases in the area of impermeable surfaces.

One of the options included in this package is the provision for the widening the A494 River Dee crossing and new road bridge over the Dee. This assessment has identified that these schemes could potentially have a number of likely significant adverse effects, one of which includes the potential for significant effects on the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC designation due to potential direct disturbance to the river and immediate surrounding environ (e.g. increased runoff of pollutants and sediment). Again it is likely that these options would be subject to more detailed assessments as part of which mitigation would have to be developed to ensure that there are no adverse effects on the SAC. Other potential likely significant effects include effects on landscape character due to changes in the road alignment and appearance plus habitat loss. Although the focus of the scheme would be to reduce local congestion in the area and improve traffic flow through the area, there is potential that the scheme could have adverse effects on local noise levels due to increased volumes of traffic on the road and local air quality. However, through detailed design and the implementation of appropriate mitigation measures these effects could be reduced.

However, although there is potential for adverse effects, there are also a number of benefits that could result from this option such as reduced congestion (which will help to improve local air quality and local road safety) and improved water quality. The provision of the new road bridge between Connah's Quay and Deeside Industrial Park could also result in significant effects, however is unlikely to result in as significant benefits as the widening of the A494 crossing. The option which is likely to result in the most significant adverse effect is the provision of the new road between the A55 and the A548 and the implementation of this option should be assessed against the benefits that would result both with and without the implementation of the other options.

6 Cumulative Effects

6.1 Introduction

The following sets out the potential construction and operational cumulative effects.

6.1.1 Temporary Effects

Negative cumulative effects could occur where construction activities occur at the same time and in the same general area. In addition negative cumulative effects could also result on protected sites that are hydrologically linked to construction sites or that are linked by other causal pathways.

Where construction is undertaken on the highway network this is likely to result in a temporary increase in congestion resulting in temporary effects on local air quality, noise and accessibility. However, if construction works are also to be undertaken at the same time in close proximity or the same general area or on a known alternative route these effects could be exacerbated. The potential for temporary cumulative effects will not be known until scheme implementation at which point other construction projects in the area and their implementation will be timed accordingly.

6.1.2 Permanent Operational Effects

The main aim of all the packages is to reduce congestion and facilitate a modal shift. As discussed in Chapter 6 it is unlikely that a number of the minor options, if implemented alone, will have result in any significant decrease in emissions or modal shift thus significant environmental benefits are unlikely to be realised. However, where a number of options are implemented together, for example increased frequency of bus and rail services with measures to improve ticketing and integration the cumulatively beneficial effect on the environment is likely to be greater.

Development of a number of the larger scale infrastructure schemes in a localised area could potentially have significant cumulative adverse effects in terms of effects on landscape character and visual amenity, biodiversity due to habitat loss and species disturbance over a larger area, and possible effects on local noise levels and air quality. Further work is underway to examine in more detail these potential effects, particularly in relation to the A494/A55 widening and River Dee Crossing Schemes which are currently being subject to more detailed environmental assessments through (WelTAG). As part of these schemes the results from this SEA and the WelTAG assessment will be incorporated into final plans and option designs, including options for reducing or offsetting potential adverse environmental effects through detailed scheme design.

7 Mitigation

7.1 Introduction

The following presents detail on possible mitigation measures and enhancement.

7.2 Mitigation Measures

Part of the SEA assessment process requires the identification of measures to prevent, reduce or offset any significant adverse effects likely to occur as a result of implementing the NEWABTS and to maximise its performance in terms of sustainability. These are commonly referred to as mitigation measures, and include both the proactive avoidance of adverse effects as well as the identification of actions to be taken once effects are identified. Measures also often include recommendations for improving beneficial effects.

The mitigation measures suggested for the NEWABTS are based upon:

- Level of detail provided in the intervention;
- Scale of the potential effect (e.g. local authority wide or site specific);
- Level of detail in the baseline information (e.g. scale of coverage);
- Understanding of the environmental and sustainability issues affecting the area; and
- Requirements/deliverable of the NEWABTS.

The packages provided within the NEWABTS are generally very high level options where the specific location is not known. Consequently the lack of spatial reference (e.g. identification of specific sites or locations for development) associated with the options limits the accuracy by which their effect on the environment can be predicted and evaluated. Without knowledge of the exact area that will be affected by an intervention it is also difficult to accurately identify the receptors that will affected, their relative importance and how the baseline will change (magnitude).

With regard to the identification of the mitigation measures, whilst it is necessary for these to be developed in the context of the NEWABTS and the SEA process, in the absence of development or site specific proposals it is not practical to identify specific mitigation measures. The approach to the identification of the mitigation measures is therefore based on general understanding and appreciation of the types of measures that can be applied at a project level. Further work is required to determine which of the measures are appropriate and practical and can be timed appropriately.

Proposed mitigation measures are listed in Table 7.1 below.

Table 7.1: Proposed Mitigation Measures.

SEA Topic	Mitigation Measures and Enhancement
Biodiversity	It is not possible to fully prescribe mitigation for the study area until further surveys have been conducted. However the following forms of mitigation are likely to be required following the associated surveys: - Extended Phase 1 Habitat Survey will need to be undertaken, in accordance with the JNCC Handbook for Phase 1 Habitat Survey (2004), and will include all areas of land to be affected by any works. - Surveys for invertebrates - Any mature trees and built structures that will be affected by the chosen option/s will need to be assessed by an experienced ecologist for their potential to support roosting bats. - New lighting along the railway, woodland, hedgerow and river corridors should be avoided.

SEA Topic	Mitigation Measures and Enhancement
	- Badger surveys - Any watercourses will need to be surveyed for their potential to support otter, water vole and crayfish. - Dormouse surveys should be undertaken prior to construction. - To avoid disturbance to breeding birds, it is recommended that any vegetation clearance is undertaken during October to February inclusive (outside of the breeding bird season). - In some areas of the study area, wintering and migration surveys may also be required, in particular where sited close to the SPAs and Ramsars, such as the Dee Estuary. Options involving creation of new bridges across the River Dee would require particular consideration. Consultation with CCW should be considered at the earliest possible stage for options with the potential to impact upon European protected sites (SPA, Ramsar and SAC). Any construction activity should aim to avoid periods where passage, breeding and over-wintering birds for which the Natura 2000 sites are designated for are using the site in significant numbers - Any ponds and ditches within 500 m of the proposed works should be assessed by an ecologist for their potential to support the Great Crested Newt (GNC). - Fish surveys may be required should the works involve construction within a watercourse, such as the River Dee. - Any proposed bridge structures should be open span and set back from the river banks. - Dependant on the options chosen, protected and notable flora species surveys may be required, within areas of potential conservation interest. - Each area where works are proposed should be subject to a controlled species survey, prior to construction. - Any development should aim to retain features of ecological value within the scheme design. The highest priorities for protection are the River Dee and estuary, ponds, riparian habitats, wetland areas, woodland areas (particularly ancient woodland), important hedgerows, railway, and veteran trees. However, consideration should also be given to the scrub, mature trees, hedgerows, stone walls and grass verges. Ideally, green space should be provided with consideration to biodiversity to provide an overall ecological gain as recommended in TAN 5 and PPG 9. - Scrub and hedgerows should be retained where possible. - Mature trees should be retained. - Run-off from the study area during both construction and operation should be managed in accordance with current Environment Agency regulations and should reduce the potential for transmission of particulates and pollutants into the water course.
Landscape	There are a number of mitigation measures that could be proposed to avoid and/or reduce potential landscape/townscape and visual effects identified. The type of mitigation measures proposed would vary in accordance with the scale of individual proposals and sensitivity of the specific landscape setting, on a scheme by scheme basis. At a broad scale, the following measures could be considered for mitigation of all schemes where potential adverse effects have been identified. - Where new development or extensions to existing infrastructure are proposed, they should be carefully routed/located to avoid direct impacts on areas of designated landscape/townscape such as Ancient Woodland, Local Landscape Areas, Listed Buildings, Conservations Areas, registered Parks and Gardens; and - where possible, the routing/siting of proposed development could be undertaken to avoid direct impacts upon other existing features that contribute to the character of the landscape/townscape, such as woodland, mature trees (including those covered by a Tree Protection Order), historic field boundaries, existing screen planting. Where effects cannot be fully mitigated through routing and siting design, specific landscape mitigation proposals could be developed alongside overall scheme design, to reduce effects upon landscape/townscape

SEA Topic	Mitigation Measures and Enhancement
	character and key visual receptors. Mitigation measures could include: - Mass native tree and shrub planting; - A combination of ground modelling and mass native tree and shrub planting; - Use of appropriate or vernacular materials in design of new development, particularly in areas of designated landscape or townscape quality/value to complement/enhance the setting; - Considered micro-siting of new development to avoid the requirement for new, urbanising structures within rural areas; - Landscape enhancement and/or restoration measures; and - Proposed planting and use of appropriate materials where development is in close proximity to designated areas.
Archaeology and Heritage	- Surveys will be undertaken prior to the implementation of a scheme to determine the whether it will affect sites or areas of archaeological importance. - New transport schemes that are likely to generate an increase in traffic (road or rail) will be assessed prior to installation to determine whether the vibrations that would be generated from the traffic would cause damage to listed buildings. Where the levels of vibration would have adverse effects on a listed building the scheme may require modification or removal. - Adverse effects on the character and quality of conservation areas will be avoided or reduced by improving the quality, design and appropriateness of street furniture, lighting, road signs, safety features, public transport facilities (bus stops) and by reducing street clutter. Improvements to the quality and design of new and existing highways, footpaths and cycleways will also have positive effects on the character and quality of conservation areas. - By reducing congestion the NEWABTS will also have a positive effect on the character and quality of conservation areas by reducing or removing the intrusion of road traffic.
Water	- Ensure that all new transport schemes and transport improvement works involving construction activities adhere to appropriate environmental protection standards, good codes of practice, construction principles and design guides to ensure that the correct measures are implemented to prevent the pollution of surface water and groundwater. - Ensure all new transport schemes and transport improvement works will implement appropriate measures to minimise pollution from surface water runoff e.g. oil separators and silt traps. - Where new transport schemes and transport improvement works are likely to cause disturbance to contaminated land, advice will be sought from the Environmental Health Departments of the relevant Local Planning Authority. Where necessary PPC (Pollution Prevention Control) Permits will be obtained from the Environment Agency. - In areas where there are high water tables surveys will be required prior to the implementation of schemes involving construction activities to ensure that the there are no breaches of the groundwater and there are not future risks of groundwater pollution from road drainage schemes. - Where a scheme may effects sensitive wetlands (SPAs, Ramsar Sites, SSSIs) an EIA and Appropriate Assessment will be required to ensure that any changes to water quality or drainage patterns do not have adverse effects on the integrity of the wetland. - In accordance with Planning Policy Statement 25: development and Flood Risk, and on advice of the Environment Agency, Flood Risk Assessments will be carried out for all new schemes and transport infrastructure improvements that are to be located in 'flood risk zones 2 or 3' or by their nature have to the potential to cause flooding. - All new transport schemes and transport infrastructure schemes that are located in coastal areas will be assessed prior to implementation to ensure that they do not compromise existing coastal flood defences and do not prevent the installation of future coastal flood defences. - All new transport schemes and transport infrastructure schemes that are located in coastal areas will be assess prior to installation to ensure that they will not increase risk, or current rates of coastal erosion. - Promote the implementation of Sustainable Urban Drainage Schemes (SUDS) in all new transport

SEA Topic	Mitigation Measures and Enhancement
	developments.

Noise	- Carry out noise impact assessments involving:
	  - Ambient noise survey at identified noise sensitive locations
	  - BS 5228 assessment and mitigation
	  - Development of noise mitigation based on BS 4142
	  - Traffic assessment in accordance with CTRN
	- Implement appropriate noise attenuation measures where there is potential for schemes or initiatives to have an adverse effect on noise levels.

Air	Historically, it has proven extremely difficult to improve areas of poor air quality associated with road transport emissions. It is therefore extremely important that any transport options which are implemented should be designed with due regard to areas of poor air quality e.g. Chester AQMA. The benefits associated with reducing car usage by encouraging bus use should be maximised by utilising buses with the highest emissions standard possible. Likewise freight consolidation centres could use Low Emission Vehicles to transport goods to locations in areas with poor air quality. The locations of park and ride schemes and rail and freight depots should be carefully chosen to minimise any localised air quality impacts which may result. Should changes in road alignment be proposed, it is important to ensure, where practicable, that the distance between road traffic and sensitive receptors is not significantly reduced. Where the opportunity presents itself, the distance between road traffic and sensitive receptors with poor air quality should be increased in order to improve local air quality at these receptors.
Climatic Factors	
Soil	- Develop partnership working to ensure that the all new developments located on areas of previously developed land are accessible by public transport. - Investigate the implementation of schemes that will encourage and support future economic growth and the reuse of previously developed land. - Where new transport schemes and transport improvement works are likely to cause disturbance to contaminated land, advice will be sought from the Environmental Health Departments of the Local Planning Authorities. Where necessary PPC (Pollution Prevention Control) Permits must be obtained from the Environment Agency. - Develop partnership working to ensure that new transport schemes minimise the use of greenfield land and the severance of agricultural land holdings.
Population	- Ensure adequate consultation is carried out with rail passengers and other stakeholders with regards to any disruption of rail timetables due to implementation of any intervention.
Material Assets	- Ensure appropriate measures are put in place to mitigate any impact associated with the increased maintenance that may result from an increased frequency of train services.
Human Health	- No specific mitigation measures identified.

7.3 Enhancement Opportunities

It is unlikely that the individual options within the packages will result in beneficial effects on the environment. However, when implemented together the resulting effect could be a modal shift from reliance on the private car and reduced congestion having beneficial effects on the environment.

In order to enhance any beneficial effect, options from all the packages should be considered together rather than on a package basis. For example there are a number of options in the capacity enhancement packages which provide increased walking and cycling routes which could facilitate a modal shift and increased physical fitness. However, if these options are implemented with the options in the managing demand package which promote walking and cycling this will potentially result in a greater beneficial effect.

7.4 Summary of Residual Effects

The residual effect is the remaining effect on a receptor after the application of mitigation measures. Table 7.2 below provides details of the residual effects associated with each of the three proposed packages.

Table 7.2: Residual Effects

Package	Residual Effects
Managing Demand	No significant environmental effects identified.
Making Best Use	Potential negative effects on from the proposed on line improvements can be mitigated through appropriate design and siting.
Capacity Enhancement	It is likely that through appropriate design and siting the potential effects that have been identified can be avoided or reduced so as no significant adverse effects on the environment result. However, whilst this is likely it would be inappropriate to determine a residual effect at this stage without detailed design and further surveys to identify the sensitive receptors. The options which propose new infrastructure development will be subject to further surveys and assessment and for those options where a significant adverse effect had been predicted the following has been indentified: **New road between the A55 and A548**: This option will be subject to optioneering to identify the most environmentally sustainable route. The proposed route will then be subject to EIA at which stage a residual effect can be appropriately determined. However, the value of implementing this option should be considered against implementing and not implementing the other options. It may be that the need for this option can be avoided through implementing a number of the other options. **Park and Ride**: Further studies will be undertaken to determine the most appropriate sites. Further environmental assessment (EIA or equivalent) will be undertaken on the detailed design at which stage a residual effect can be appropriately determined. **Increased capacity on A494 crossing:** It is likely that the effect of not implementing this option would be greater than implementing it. Whilst it crosses a European protected site with sensitive design it is likely that a significant effect could be avoid. This option should be subject to project level HRA and designed in close consultation with CCW and the EA. **New Bridge to Deeside Industrial Park:** Whilst it crosses a European protected site with sensitive design it is likely that a significant effect could be avoid. This option should be subject to project level HRA and designed in close consultation with CCW and the EA. However the value of implementing this option should be considered against implementing and not implementing the other options. It may be that the need for this option can be avoided through implementing a number of the other options. **Dee Costal Footpath:** Depending on the proximity of this footpath to the Estuary it may be that a significant effect on the over-wintering, passage and breeding birds caused by disturbance cannot be mitigated. However the aim of this option to facilitate increased levels of walking and cycling is a positive one. Optioneering should be undertaken in consultation with CCW to determine the feasibility

Package	Residual Effects
	for a route through this area which would avoid affecting the integrity of the designation.

The SEA has concluded that the NEWABTS has the potential to have some adverse effects. Further work is required in order to determine whether or not these effects can be avoided or appropriately mitigated. In general all options even those that have been identified as having the potential to have an adverse effect are aimed at increasing efficiency and reducing emissions, consequently there have been no suggested changes or amendments to the plan or individual options. However, the assessment has identified that there is potential for some of the options to have significant adverse effects on the environment during construction. There may also be some residual negative effects. In order to minimise these negative effects, and avoid the potential for the occurrence of significant adverse effects, all infrastructure schemes taken forward/implemented under the NEWABTS will be required to be subject to appropriate environmental assessments/appraisals e.g. EIA and AA and would be required to take into account the detailed scheme and SEA subject specific mitigation measures outlined in the ER and the NTS.

8 Monitoring

8.1 Introduction

The monitoring framework presented in Table 8.1 includes a number of possible indicators that could be used to monitor the implementation of the NEWABTS. However, taking into account the limitations associated with this approach it is suggested that monitoring is tied into the future reviews of the NEWABTS and is related to monitoring the number and type of schemes that have been implemented during the year. This would include a review of the environmental works / studies and assessments undertaken to support these schemes as suggested as part of the mitigation.

The monitoring framework set out in Table 8.1 below is preliminary and will be confirmed at the time of the adoption of NEWABTS. During public consultation additional data sources may be indentified which should be incorporated into the monitoring framework.

Table 8.1: Proposed monitoring framework.

SEA Topics	SEA Objective	Indicator
Biodiversity	To protect and enhance the biodiversity and geodiversity and to safeguard protected species within the study area.	% of SSSIs in 'favourable' or 'unfavourable recovering condition
		Change in area (ha) of designated biodiversity sites
		Change in area (ha) of BAP Habitat.
		Proportion of local sites where active management is being achieved
		Area of ancient woodland removed due to transport schemes
Landscape	To maintain and enhance the local distinctiveness, character and appearance of the rural and urban land and landscapes, including the public realm, within the study area.	Change in area (ha) of designated landscapes e.g. AONB.
		Number of new/ proposed transport schemes in areas of land designated for its landscape quality or amenity value (AONB), national parks etc.
		Number of schemes promoting landscape enhancement in urban fringe landscapes
Archaeology and Heritage	To protect and enhance the buildings, sites, areas and features of historic, archaeological and architectural interest and diversity within the study area.	Number of applications for listed building consent (inc demolitions) and scheduled monument consent associated with transport projects
		Number of transport schemes affecting historic parks and gardens
		Number of transport schemes located within or affecting conservation areas
Water	To reduce the risk of flooding. To protect and enhance the quality of ground, river and sea waters within the study area.	Number of new transport infrastructure developments located in Flood Zones 2 & 3.
		% of new transport infrastructure developments incorporating SUDS features
		% of new transport infrastructure developments incorporating

SEA Topics	SEA Objective	Indicator
		SUDS features
		% river length within Dee River Basin District and North West River Basin District achieving Good Ecological Potential
Noise	To reduce transport related noise.	Levels of noise pollution
		No. of complaints received/resolved with regard to noise.
Air	To ensure good local air quality.	No. of Air Quality Management Areas
		European Sites Affected by Air Pollutants (Critical load exceeded)
		Annual average concentration of NO2 (Local Air Quality Management Progress Report)
		Annual average concentration of PM10 (Local Air Quality Management Progress Report)
		Volume of traffic in billion vehicle kilometres (bvk)
Climatic Factors	To reduce the causes of climate change. To adapt to and mitigate for the effects of climate change.	Transport related CO2 emissions
		Number of buses and Local Authority vehicles with Euro 3 or above
		Proportion of people travelling to work by car
		Proportion of people walking/cycling to work
		Proportion of children travelling to school by car
		Distances travelled to work
		Amount of freight using rail
		Amount of freight using water
Soil	To reduce the amount of waste produced and increase the amount recycled and composted.	Proportion of materials used in transport developments that are from secondary and recycled sources
		Proportion of construction and demolition waste that is reused and recycled
Population	To ensure good accessibility for all to jobs, facilities, goods and services within the study area. Conserve and enhance opportunities for sustainable public access to the natural environment. To reduce road traffic and congestion through reducing the need to travel by car and improving travel choice.	The percentage of persons overall economically active
		The percentage of f working population age seeking Job Seekers Allowance
		Bus patronage levels
		Rail patronage
		Ward unemployment levels
		% of schools with Travel Plans.
		No. of employees working for businesses with Travel Plans.

SEA Topics	SEA Objective	Indicator
	To increase public involvement in decision-making and civic activity.	% of people travelling to work in private car involved in carshare schemes.
Material Assets	To increase the vitality of town centres. To make better use of our resources. To improve efficiency in land use through the re-use of previously developed land and existing buildings, and encourage urban renaissance. Adopt a strategic approach to planning and provision of multi functional green infrastructure	Amount (ha) of best and most versatile land lost to development
		Number of new developments completed on previously developed land.
Human Health	- To reduce crime and the fear of crime. - To improve health and reduce inequalities in health. To reduce poverty and social exclusion and close the gap between the most disadvantaged communities and the rest.	% of SOAs in lowest 20% IMD Health Domain.
		% of residents feeling ‘safe’ or ‘fairly safe’ outside in the local authority area after dark.

9 Conclusions

9.1 Introduction

This Environmental Report was prepared as part of the SEA of the NEWABTS. The NEWABTS sets out the long term transportation plans for the area for maintaining and improving transport provision through three packages, managing demand, making best use and capacity enhancements.

An SEA of these options has been undertaken in order to identify likely significant construction, operation and cumulative effects on the environment. An assessment of the alternatives (Do Nothing) was also undertaken.

A number of the NEWABTS options were predicted to have potential temporary negative effects on the environment as a result of construction activities; however, the majority of these effects are temporary in nature and can be avoided or reduced through mitigation. However, in order to ensure that the options taken forward under the NEWABTS do not have any potential significant adverse effects on the environment it will be necessary for the NEWABTS to include specific statements/commitments requiring individual options/schemes to be subject to specific detailed assessments which will identify project level mitigation to be implemented and timed accordingly.

A number of operational negative effects (landscape, biodiversity, noise and water quality/flood risk) have been identified as a result of the assessment of the NEWABTS. The majority of these relate to proposed large scale infrastructure developments.

As the options provided within the NEWABTS are generally very high level policies or options and without site specific proposals it is not practical to identify specific mitigation measures. However, these options will be subject to further environmental assessment (EIA or equivalent) at which stage a residual effect can be appropriately determined

The assessment concluded that provided that the recommended mitigation measures are implemented and additional assessments are undertaken where required, there should be no significant adverse residual effects on the environment, with only two interventions having been assessed as having a residual negative effect associated with disturbance to the wintering, passage and breeding birds from the provision of the Dee Coastal Path and new road bridge over the River Dee, however, through appropriate routing of the coastal path and design of the bridge it is likely that this effect can be avoided.

The assessment identified a number of beneficial effects for biodiversity, water, noise, air, climate, population, material assets and human health. The majority of beneficial effects are associated with a modal shift to public and sustainable forms of transport and highway capacity improvements to reduce congestion. Further beneficial effects are possible if some options are combined with other measures to aid a modal shift from reliance on the private car to more sustainable forms of transport without further severing accessibility for rural communities.

NEWABTS Stage 1 Appendix F: Strategic Environmental Assessment



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NEWABTS Stage 1 Appendix F: Strategic Environmental Assessment

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1 Introduction

This Environmental Report (ER) has been prepared as part of the Strategic Environmental Assessment (SEA) of the North East Wales Area Based Transport Study (NEWABTS) prepared by the Welsh Government (WG) and Taith.

This chapter of the ER sets out the aims and objectives of the SEA, provides information on the requirements of the SEA Directive and explains how the SEA will inform the production and the delivery of the NEWABTS.

1.1 Strategic Environmental Assessment (SEA)

On the 20th July 2004 it became a legal requirement that, under the Environmental Assessment of Plans and Programmes Regulations 2004, all spatial plans and programmes would have to undergo a SEA. The 2004 regulations transcribe the requirements of the European Directive 2001/42/EC 'the assessment of the effects of certain plans and programmes on the environment' (the Strategic Environmental Assessment (SEA) Directive).

Under the SEA Directive as transposed into Welsh Law (July 2004), the NEWABTS will require a Strategic Environmental Assessment (SEA), on the basis that proposals set out in the NEWABTS could potentially have significant adverse effects on the environment.

1.1.1 Objectives of the SEA Directive

The objectives of the SEA Directive, as set out in Article 1, are '*to provide a high level of protection to the environment and contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development*'. These objectives have been integrated into the relevant SEA Regulations.

1.1.2 Requirements of the SEA Directive

The main requirements of the SEA Directive and Environmental Assessment of Plans and Programmes Regulations (Wales) 2004 include: the preparation of an environmental report; consultation; taking the results of the environmental report and consultations into account in the decision-making; providing information on the decision; and monitoring.

1.2 The SEA Process

This SEA has been carried out in accordance with the information provided in the following documents:

- European Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, known as the 'SEA Directive';
- Environmental Assessment of Plans and Programmes (Wales) regulations 2004 ('SEA Regulations');
- A Practical Guide to the Strategic Environmental Assessment Directive ODPM 2005;
- Strategic Environmental Assessment Directive: Guidance for Local Planning Authorities 2003;
- Strategic Environmental Assessment Guidance for Transport Plans and Programmes TAG Unit 2.11, April 2004. Department for Transport – Transport Analysis Guidance (TAG); and
- The Welsh Transport Appraisal Guidance (WelTAG);

Additional Guidance documents considered in the development of this SEA included:

- Natural England Guidance note on Local Transport Plans and the Natural Environment (Natural England, 2009);
- Natural England LTP and ROWIP Integration: good practice note (Natural England, no date);
- Strategic Environmental Assessment, Sustainability Appraisal and The Historic Environment (English Heritage, no date); and

- Natural England's position on Transport and the Natural Environment (natural England, no date).

A Practical Guide to the Strategic Environmental Assessment Directive ODPM 2005, breaks the requirements of the SEA Directive down into a series of 'Stages', Stages A to E, each of which will inform and interact with the preparation and production of the North East Wales Area Transport Study.

Stages A to E of the SEA process include:

Stage A – Setting the context and objectives, establishing the baseline and deciding on the scope

Stage B – Developing and refining alternatives and assessing effects

Stage C – Preparing the Environmental Report

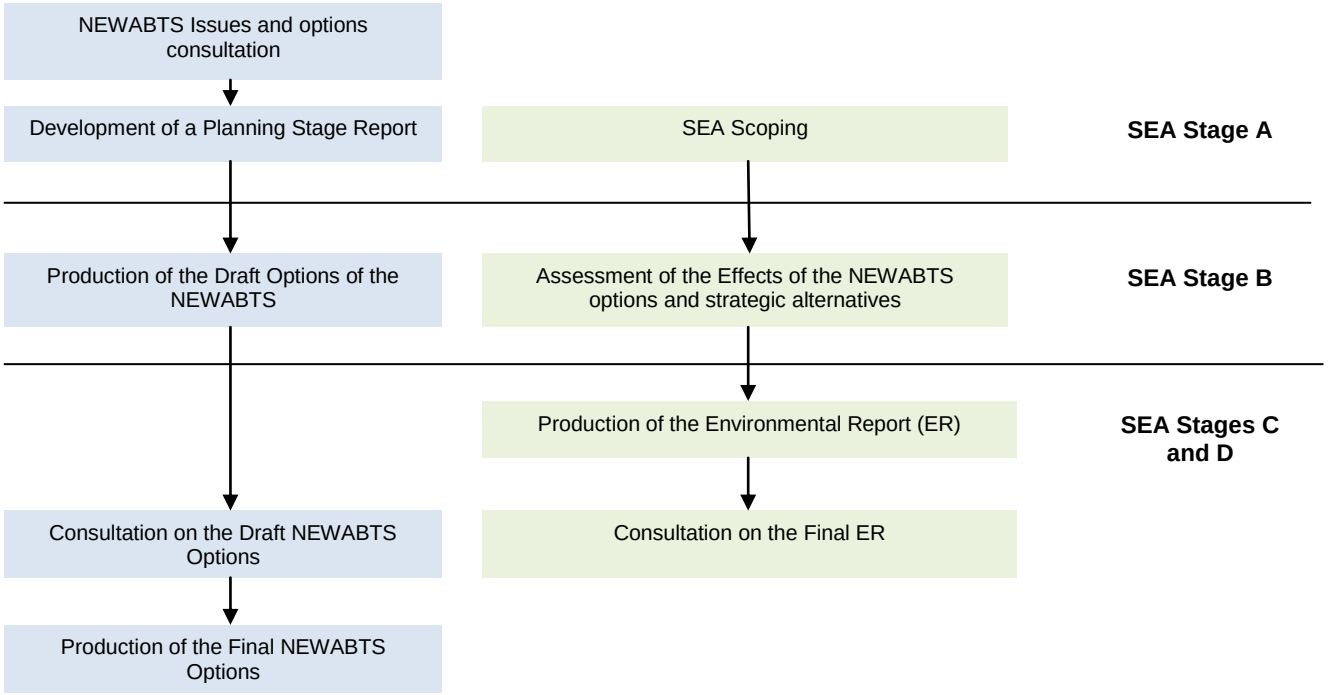
Stage D – Consulting of the draft plan or programme and the Environmental Report

Stage E – Monitoring the Significant Effects of Implementing the plan or programme on the environment.

1.3 SEA and the NEWABTS

The SEA is an iterative process which should be carried out in conjunction with the preparation of the NEWABTS to ensure any adverse effects of the NEWABTS on the environment are indentified, avoided and mitigated at the earliest opportunity. Figure A below illustrates how the SEA will be undertaken alongside the NEWABTS.

Figure A: Production of the SEA alongside the NEWABTS



1.4 Progress to Date

This report is the ER, which represents Stage C of the SEA process. The ER outlines the findings of Stage B: Developing and Refining Alternatives and Assessing Effects.

A Scoping Report, which represents Stage A of the SEA process was issued in September 2010 for formal consultation with the statutory consultees; Environment Agency (EA), Countryside Council for Wales (CCW), Cadw, Natural England (NE) and English Heritage (EH). Responses received from the statutory consultees have been taken into account in the assessment of effects and preparation of this report. A summary of the scoping report and responses received are presented in Chapter 5: Scoping Summary.

1.5 Limitations of the SEA

The SEA has been carried out in accordance with the requirements of the SEA Directive as well as the relevant guidance and good practice documents listed above.

The SEA has been based on baseline information that was available at the time of writing. The assessment of potential effects also reflects the level of detail and information that was contained within the packages set out within the NEWABTS at the time of the assessment.

To this end, there were a number of limitations associated with the assessment that should be taken into account when considering the main results and conclusions presented in the subsequent chapters.

The main limitations are related to the level of detail associated with the packages and options included in the NEWABTS. Due to the strategic level of the NEWABTS, although specific options were included, there was limited project specific information available in relation to the location of these measures, type of works that would be involved, construction requirements, scale of the options and associated timescales for delivery.

Consequently the results of the assessment reflect the knowledge, experience and understanding of the likely effects that the transport packages could potentially have on the environment, rather than detailed assessment of the individual options presented in the NEWABTS. However, the assessment of the NEWABTS should be carried out at a strategic level, not subject to a project specific, EIA type assessment.

1.6 Habitats Regulations/Appropriate Assessment

As well as the need to undertake a SEA of the NEWABTS, Regulation 102 of the Conservation of Habitats and Species Regulations 2010 requires all emerging land use plans to be subject to an “Assessment of implications for European sites and European offshore marine sites”.

A Habitat Regulation Assessment is being carried out in parallel with the preparation of the SEA.

1.7 Structure of the Environmental Report

The Environmental Report is split into three volumes: Volume 1 – Non Technical Summary, Volume 2 – Environmental Report and Volume 3 – Appendices. The structure of this report (Volume 2 – Environmental Report) is given below:

Chapter 1 – Introduction: This chapter sets out what the SEA is, the requirements of the SEA Directive and how the SEA will inform the production and delivery of the NEWABTS

Chapter 2 – NEWABTS: This chapter sets out the background to the NEWABTS, the main aims and objectives for the NEWABTS and provides and summary of the NEWABTS packages and options.

Chapter 3 – Assessment of Alternatives: This chapter sets out the alternatives considered and an assessment of these.

Chapter 4 – Assessment of relevant Plans and Programmes: This chapter of the report provides a summary of the plans and programmes and ‘other’ environmental objectives that are relevant to and which could interact with the NEWABTS and determines if/how the proposed NEWABTS will affect or have in-combination effects with any of the plans and programmes identified.

Chapter 5 – Scoping Summary: This chapter provides an overview of the consultation undertaken as part of the SEA process.

Chapter 6 – SEA Objectives and Indicators: This chapter sets out the SEA objectives and topics.

Chapter 7 – Baseline: This chapter sets out the baseline environment, taking into account any recommendations made during consultation.

Chapter 8 – Key Issues: This chapter presents the key environmental / sustainability issues or considerations that have been identified for the study area, following an evaluation of the baseline situation and through scoping / consultation.

Chapter 9 – Assessment Methodology: This chapter sets out how the SEA has informed the development of the NEWABTS and provides detail of the methodology used to deliver the SEA.

Chapter 10 – Construction Impacts and Mitigation: This chapter outlines the typical construction related impacts and mitigation for each SEA topic.

Chapter 11 – Assessment Result: This chapter provides a summary of the key findings from the assessment of the options on the SEA topics.

Chapter 12 – Cumulative Effects: This chapter sets out any cumulative effects of implementing the options identified within the NEWABTS

Chapter 13 – Mitigation: The following chapter identifies the mitigation measures required where effect cannot be avoided and opportunities for enhancement that have been suggested to increase the overall sustainability of the NEWABTS.

Chapter 14 – Monitoring: This chapter sets out the proposed monitoring framework for the implementation of the NEWABTS

Chapter 15 – Conclusions: This chapter summarises the conclusions of the assessment and sets out any recommendations.

2 NEWABTS

2.1 The North East Wales Area Transport Study

The North East Wales Area Based Transport Study (NEWABTS) will establish a transport strategy for North East Wales consistent with the aims and commitments set out in the National Transport Plan (NTP) published in March 2010. The focus of the study is to look at transport links between settlements in the study area (Wrexham, Flint, Chester and Deeside), access to areas outside the study area and transport issues which impact on trips through the study area. The study will be undertaken from the Welsh perspective but to avoid looking as the issues in isolation the study will also consider the cross border issues and seek to liaise with cross border partners.

2.1.1 NEWABTS Study Area

The NEWABTS area is illustrated on Figure 1 Study Area and encompasses parts of three local authorities, the eastern part of Flintshire, north and eastern part of Wrexham and the west of Cheshire West and Chester. The SEA will cover the environmental, social and economic considerations within these three local authorities and the potential for trans-boundary effects including where hydrological links which may exist.

2.1.2 NEWABTS Objectives

In July 2010, stakeholder consultation was carried out to identify the main transportation problems within the study area. The issues are categorised into the three main links, Wrexham to Chester, Wrexham to Deeside and Deeside to Chester. A number of other issues were also identified on links between other settlements including Mold, Buckley and Northop. For each of these links the issues have been categorised modally into car, cycling, bus, rail and HGVs. These issues are set out in Table B1 in Annex B. A series of transport objectives were then developed that will seek to address these issues. The transport planning objectives for the NEWABTS are as follows:

- To improve transport connections for businesses within the study area to key economic centres and employment sites;
- To improve access between employment sites and workforce catchment areas;
- To reduce carbon emissions from transport in the study area;
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts;
- To improve the actual and perceived safety and personal security of all transport users in the study area;
- To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight;
- To reduce social deprivation through improves access to jobs and other key services;
- To maintain and make more efficient use of the existing transport infrastructure in the study area; and
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

2.1.3 NEWABTS Packages

In order to deliver the objectives set out above the NEWABTS sets out a number of packages within which a series of options have been developed.

The study area has been split down into four corridors:

- Strategic Trips
- Flint / Mold – Chester
- Wrexham – Deeside
- Chester – Wrexham

The packages were developed by dividing the successful options identified at the WelTAG planning stage into three distinct levels:

Managing Demand – options aim to reduce the demand for travel.

Making Best Use – options seek to make more efficient use of existing transport facilities and infrastructure within minimal cost.

Capacity Enhancement – options involving the provision of new infrastructure.

The managing demand package has been applied to the whole study area whereas making best use and capacity enhancement packages have been presented for each of the four corridors. Within each package options have been developed under six broad headings: walking and cycling; bus; rail; demand management; highway; and freight. Table 2.1 below illustrates how the packages have been grouped.

Table 2.1 NEWABTS Packages

Corridor	Package
Area Wide	Managing demand
Strategic Trips	Making best use
	Capacity enhancements
Flint / Mold – Chester (Via Deeside / Broughton)	Making best use
	Capacity enhancements
Wrexham – Deeside (via Mold / Buckley)	Making best use
	Capacity enhancements
Chester – Wrexham	Making best use
	Capacity enhancements

3 Assessment of Alternatives

3.1 Introduction

This chapter of the Environmental Report sets out the alternatives considered and the likely effect on the environment.

3.2 Assessment of Alternatives

There are a number of key transport problems within the NEWABTS area. The NEWABTS has been prepared to alleviate these key issues on the transport network by promotion of alternative modes of travel, improvements to the existing infrastructure and the installation of new infrastructure. The assessment of alternatives, therefore, sets out the potential environmental effects of not implementing the NEWABTS so that an informed judgement can be made of packages that have been developed.

3.2.1 Walking and Cycling

Within the study area there are poor cycle links and a lack of direct cycleways between key settlements. This results in cyclists being forced to use the local road network. The safety concerns of cycling along local roads which are often narrow in places is likely to detract from people choosing to cycle to employment/ services etc. Without the NEWABTS it is likely that this would continue to be the case and people who would otherwise cycle or walk choosing to use the car. Whilst it is unlikely that the provision of new cycle links will result in a significant modal shift in the short term, in the long term with the implementation of other measures and wider challenges the facilitation of these key links may result in wider environmental benefits.

It has been identified that there are a number of safety concerns over some of the existing cycleways within the study area. This may be forcing people to use the car for short journeys which would otherwise be undertaken on foot/bike. The addition of safety measures such as improved lighting set out within the NEWABTS may reduce the number of short car journeys thereby having wider environmental benefits.

3.2.2 Bus

Within the study area it has been identified that whilst there are a number of good bus services there are also a number of routes where reliability and frequency of services is variable. The unreliability of bus services or routes where there is a low frequency of services may detract from their use with people choosing to use the car as the preferred method of travel. Whilst there are likely to be a number of wider reasons such as the cost of public transport and the amenity of journeys for example, the provision for improved services within the NEWABTS will aid the facilitation of a modal shift which could result in wider environmental benefits.

3.2.3 Rail

Many of the rail services within the study area are seen a being poor associated with a low frequency of services between key settlements and long journey times. This provision of poor services is likely to encourage people to use the car to commute between settlements as even with congestion on the highway network, the journeys are still likely to be shorter by car and can be made at convenient times.

Without measures set out with the NEWABTS to improve these services it is likely that this will continue to be the case. Improvements in services will provide the basis for facilitating a modal shift which would have wider environmental benefits from a reduction in emissions.

Poor parking provision and station locations have also been identified as key issues within the study area. A large proportion of the study area is rural and many small settlements and hamlets are not serviced by the rail network. To widen the network to serve these areas would likely have significant environmental effects and is unlikely to be economically viable. However the provision of parking at stations whilst not resulting in a total modal shift would allow people within these locations to easily access rail stations from where they could make the remainder of their journey. In addition a number of rail stations, in particular the one within Deeside Industrial Park have been identified as being inappropriately located and do not encourage the use of rail as the mode of transport to reach this employment area.

3.2.4 Highways

Within the study area, congestion is a problem at the major junctions on the strategic road network causing pressure on the local roads as people seek alternative routes. This has also contributed to poor safety records on a number of these roads. Without the proposals set out within the NEWABTS it is likely that congestion and safety will continue to be key issues within the study area resulting in high levels of emissions, localised air quality affects and effects on human health, biodiversity and water quality.

The residual life of the A494 Dee crossings is seen as a significant issue. This is on the main link between Northern England and North Wales and takes high volumes of traffic including seasonal traffic. As it stands the narrow lanes and reduced speed limit through this section of the A494 causes congestion. If this crossing was to close it is likely that there would be significant effects on the other routes within the study area, in particular the A55 and the A584.

3.3 Potential Effects of the Alternative

Without the introduction of the NEWABTS it is likely that the key issues described above would continue and potentially exacerbate in particular in the case of the A494 Dee crossing. Continued congestion and no measures to facilitate a modal shift is likely to result in high levels of emissions which could effect, air quality, water quality, biodiversity, human health and accessibility.

4 Assessment of Relevant Legislation, Policies, Plans and Programmes

4.1 Introduction

This Chapter of the ER provides a summary of the plans and programmes and 'other' environmental objectives that are relevant to and which could interact with the NEWABTS. It also identifies whether or not and how the proposed NEWABTS packages will affect or have in-combination effects with any of the plans and programmes identified.

4.2 Identification of Relevant Legislation, Policies, Plans, Programmes and 'other' Environmental targets

The SEA has taken into account the relationship between the NEWABTS and other relevant polices plans, programmes and environmental objectives relevant to the NEWABTS.

The contents of the NEWABTS will be partially influenced by, and will also have some influence over, objectives presented within other plans/programmes that are produced for the same area (North East Wales and Chester).

The identification of objectives within other plans is important so as to identify any inconsistencies or conflicts between the NEWABTS and other plans so that these can be addressed at the earliest stage possible. When addressing potential inconsistencies and conflicts between the NEWABTS and other plans/programmes, the hierarchy of plans, legal status and type of plan that need to be taken into account.

In addition to the identification of plans and programmes, it is also important to identify and review legislation, policy statements and guidance notes that may also be of relevance to the NEWABTS. Legislation is a 'statement of law' either international, European and UK/Welsh law.

Table 4.1 lists the plans, programmes and 'other' objectives that have been identified as being of relevant to the SEA and the NEWABTS. A summary of the plans/programmes detailing the key objectives, indicators and targets of relevance including their interaction with the NEWABTS is provided in Annex C.

Table 4.1: Summary of Relevant Plans, Policies and Programmes

International Legislation, Plans, Policies and Programmes
- Bern Convention (1979) - Bonn Convention (1979) - Intergovernmental Panel on Climate Change (IPCC) report (2007) - Johannesburg Summit on Sustainable Development (2002) - Kyoto Protocol to the UN Framework Convention on Climate Change (1992) - Local Action 21 (2002) - Ramsar Convention (1971) - The Convention on Biological Diversity (1992) - The UN Millennium Declaration and Millennium Development Goals (2002) - UNESCO Convention – Protection of World Cultural Heritage (1972)
EU Legislation, Plans, Policies and Programmes
- Convention for the protection of Archaeological Heritage – ratified by the UK in September 2000 (Valetta Convention) - Convention for the Protection of Architectural Heritage of Europe (Granada Convention 1985) - Directive 1996/62/EC on ambient air quality and management ('The Air Quality Framework Directive') - Directive 2000/60/EC establishing a framework for the community action in the field of water policy ('The Water Framework Directive') - Environment 2010: Our Future, Our Choice – EU Sixth Environmental Action Programme (2002) - Environmental Liability Directive 2004/35/CE (2004) - EU Biodiversity Strategy (1998)

International Legislation, Plans, Policies and Programmes
- EU Directive 2002/49/EC relating to the assessment and management of environmental noise – The Environmental Noise Directive (2002) - EU Directive for the Promotion of Biofuels for Transport 2003/30/EC (2003) - EU Emissions Trading Scheme (2005) - EU Sustainable Development Strategy (2004) - European Climate Change Programme (2000) - European Commission White Paper on the European Transport Policy (2001) - European Landscape Convention (Florence Convention) (2007) - European Spatial Development Perspective (1999) - Pan-European Biological and Landscape Diversity Strategy - The EC Directive on the conservation of Natural Habitats of Wild Fauna and Flora 92/43/EEC 'Habitats Directive' (1992) - The EC Directive on the Conservation of Wild Birds 79/409/EEC 'Birds Directive' (1979) - The Renewed EU Sustainable Development Strategy (2006) - The Sixth Environmental Action Program of the European Community 1600/2002/EEC - UNCED, Earth Summit, Rio (1992) Agenda 21, Chapter 9: Protection of the Atmosphere
UK and Domestic Legislation Plans, Policies and Programmes
- A Better Quality of Life: A Strategy for Sustainable Development for the UK (1999) - A Future for Transport: A Network for 2030 (2004) - Active Travel Strategy (2010) - Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007) - Ancient Monuments and Archaeological Areas Act 1979 (as amended by the National Heritage Act 1983) - Building for the Future, UK Sustainable Communities Plan (2003) - Circular on the Protection of World Heritage Sites, DCLG 07/2009 - Climate Change: The UK Programme (2006) - Climate Change and Biodiversity Adaptation – The Role of the Spatial Planning System (2009) - Conserving Biodiversity The UK Approach (2007) - Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt (2007) - Countryside and Rights of Way Act (2000) - DEFRA Rural white paper: Our Countryside: the future: A fair deal for rural England - Department of Health Choosing Health - White Paper (2004) - DfT Walking and Cycling: An Action Plan (2004) - Energy White paper, Our energy future – creating a low carbon economy (2003) - England's Biodiversity Strategy (2002) - Green Belts: A Greener Future - Main Report - Guidance on building a local sense of belonging CLG 2009 - Landscape Character Assessment: Guidance for England and Scotland (2002) - Lost Life: England's Lost and Threatened Species (no date) - Marine and Coastal Access Act (2009) - Meeting the Energy Challenge, UK Energy White Paper (2007) - MPS1: Planning and Minerals, Annex 3 Natural building and roofing stone provision (no date) - Natural England's Green Infrastructure Guidance - Part IV Environment Act, 1995 (England and Wales) - Planning (Listed Buildings and Conservation Areas) Act 1990 - Planning for a Sustainable Future, UK Planning White Paper (2007) - Draft PPS: Planning for a Natural and Healthy Environment - PPS: Planning and Climate Change - Supplement to Planning Policy Statement 1 (2007) - PPS 1: Delivering Sustainable Development (2005) - PPG 2: Green Belts (2001) - PPS 3: Housing (2000) - PPS 4: Planning for Sustainable Economic Growth (2009) - PPS 5: Planning for the Historic Environment (2010) - PPS 5 Planning for the Historic Environment: Historic Environment Planning Practice Guide - PPS 7: Sustainable Development in Rural Areas (2004) - PPS 9: Biodiversity and Geological Conservation (2005) - ODPM Circular 06/2005 Biodiversity and Geological Conservation – Statutory Obligations and their impact within the

International Legislation, Plans, Policies and Programmes
planning system (2005) - ODPM Guide to Good Practice: Planning for Biodiversity and Geological Conservation (2005) - PPS10: Planning for Sustainable Waste Management, Annex E - PPS 12: Local Spatial Planning (2004) - PPS 13: Transport (2001) - PPG 17: Planning for Open Space, Sport and Recreation (2002) - PPG 20: Coastal Planning (1992) - PPS 23: Planning and Pollution Control (2004) - PPS 24: Planning and Noise (1994) - PPS 25: Development and Flood Risk (2006) - Transport Act 2000 as amended by the Local Transport Act 2008). - Planning Policy Statement 25 Supplement: Development and Coastal Change (2010) - Natural Environment and Rural Communities Act (2006) - Rural Strategy (2004) - Securing the Future – UK Government sustainable Development Strategy (2005) - The Conservation (Habitats & c.) Regulations 1994 ('Habitats Regulations') - The Conservation of Habitats and Species Regulations (2010) - The Environmental Permitting Regulations 2010 - The End of Vehicles Regulations (2003) - The Environment Act (1995) - The Environmental Protection Act (1990) - The Future of Transport: White Paper (2004) - The Government's Statement on the Historic Environment for England (2010) - The Pitt Review – Lessons Learned from 2007 floods (2008) - The Pollution Prevention and Control (England and Wales) Regulations (2000) - The Stern Review – Review of the Economics of Climate Change (October 2006) - The Strategy for England's Trees, Woods and Forests (no date) - The UK Government's 10 Year Transport Plan (2000) - The Water Environment (England and Wales) Regulations (2003) - UK Biodiversity Action Plan (1994) - UK Climate Change Act (2008) - UK Climate Change and Sustainable Energy Act (2006) - Wildlife and Countryside Act 1981 (as amended) - Countryside and Rights of Way Act (as amended) 2001 - World class places: the Government's strategy for improving quality of place CLG (2009) - Control of Pollution (Oil Storage) (England) Regulations 2001 - Hazardous Waste (England and Wales) Regulations 2005 - Natural Environment and Rural Communities Act 2006
Welsh Legislation Plans, Policies and Programmes
- The Contaminated Land Regulations (Wales) (2006) - Transport (Wales) Act 2006 - Walking and Cycling Strategy for Wales (2003) - A Walking and Cycling Action Plan for Wales (2009 – 2013) - Road Safety Strategy Wales (2003) - Wales a Better Country the Strategic Agenda of the Welsh Assembly Government (2003) - Our Environment, Our Future, Your choice: Environment Strategy for Wales – Consultation Document (2005) - Sustainable Development Action Plan 2004-2007 (2004) - Planning Delivering for Wales - Designed for Life (2005) - People, Place, Futures – The Wales Spatial Plan (2008) - Planning Policy Wales (2002) - Towards Zero waste – The National Waste Strategy for Wales (2010) - Health, Social Care and Well-being Strategies (Wales) regulations 2003 (SI 2003 No154(W.24) - Well Being in Wales (2002) - Health Challenge Wales (2004)

International Legislation, Plans, Policies and Programmes
- Community First Guidance (Nation Assembly 2001) - A Winning Wales – the National Economic Development Strategy of the Welsh Assembly (2002+2004) - Wales: A Vibrant Economy – Emerging New Strategy - Achieving Our Potential: A Tourism Strategy for Wales (2006-2013) - Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology - Welsh Office Circular 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas - CCW Priority Habitats - TAN 5 – Nature Conservation and Planning (2009) - TAN 8 – Renewable Energy (2005) - TAN 11 – Noise (1997) - TAN 12 – Design (2009) - TAN 14 - Coastal Planning (1998) - TAN 15 - Development and Flood Risk (2004) - TAN 18 - Transport (2007) - TAN 21 - Waste (2001) - Minerals Technical Advice Note (MTAN) 1 - Aggregates (2004)
Regional Plans, Policies and Programmes
- North Wales Regional Transport Plan 2009 - Taith Regional Public Transport Strategy - Taith North Wales Rail Strategy (2009) - North Wales Regional Tourism Strategy, 2010-2015 - North Wales Regional Waste Plan 2003 – 2013 - North Wales Development Strategy - Mid Wales Regional Transport Plan 2009
Local Plans, Policies and Programmes
- The Flintshire Unitary Development Plan , A Sustainable Future for Flintshire 2000-2015 - The Flintshire Local Transport Plan 2001-2006 including the Local Bus Strategy and Walking Strategy - Wrexham County Borough Local Development Plan 2006-2021 - Wrexham Community Strategy 2009-2020 - Wrexham Refreshed: A Vision for Wrexham County Borough 2004-2020 - Wrexham Local Transport Plan , 2000 (including the public transport and walking and cycling strategies) - Chester City Local Plan 1996-2011 - Chester County Council , County Structure Plan 2016 Alteration - Chester's Local Transport Plan 3, 2011-2026 (Draft Plan) - Elsmere Port and Neston Local Plan. - Cheshire West and Chester Draft Rights of Way Plan

4.3 Implications of the Relevant Plans and Programmes for the NEWABTS

The review of plans, programmes and other objectives identified that similar environmental protection and conservation targets were required from International to local level. The main broad objective of the plans, programmes and other documents are as follows:

- To protect the environment (water, air, soil, biodiversity etc.);
- To preserve the cultural and natural landscape;
- To work towards sustainable development;
- To reduce the need to travel;
- To promote sustainable travel;
- To promote integration of transport modes;
- To promote health (encourage walking and cycling);
- To improve accessibility and social inclusion;
- To encourage economic growth; and
- To conserve and enhance the historic environment and heritage assets (from consultation responses).

From the review, it can be identified that potential conflicts may arise between protecting the environment (especially landscapes and biodiversity) and economic development and accessibility. However, sustainable planning, taking into account relevant plans, programmes and guidance should ensure that a balance is found and no detrimental effects to the environment occur as a result of necessary economic development.

5 Scoping Summary

5.1 Introduction

This Chapter of the ER provides a summary of the Stage A of the SEA process (Scoping) and a summary of the key components from scoping consultation.

5.2 Scoping Report

The NEWABTS Scoping Report was prepared in accordance with the Stage A of the SEA process. The Scoping Report contained a summary of:

- Other plans, programmes and environmental objectives that were identified as being relevant to the NEWABTS;
- A description of key environmental issues affecting the study area;
- The SEA objectives that were used to appraise the NEWABTS;
- A summary of the baseline situation; and
- A summary of the contents which will be included in the ER (this report).

5.3 Scoping Consultation

Consultation is an integral part of the SEA process. The statutory environmental bodies that must be consulted on the proposed scope of the SEA are the Environment Agency (EA), Countryside Council for Wales (CCW), Cadw, Natural England (NE) and English Heritage (EH).

A number of consultation questions were included throughout the Scoping Report to focus the feedback received by the statutory consultees. These are listed below:

Q1: Is the spatial scale appropriate for assessing the significant environmental effects of the NEWABTS?

Q2: Are there any other Policies, Plans, Programmes and ‘other’ Environmental Objectives that contain environmental protection objectives or identify relevant issues that are not covered by this list?

Q3: Could any of these Policies, Plans, Programmes and ‘other’ Environmental Objectives be omitted without losing relevant environmental protection objectives or issues?

Q4: Are there any other potential conflicts between Policies, Plans, Programmes and ‘other’ Environmental Objectives that have not been identified?

Q5: How could potential conflicts be addressed?

Q6: Are there any significant issues that are not covered by the important factors?

Q7: Are the proposed important factors appropriate in informing the development of NEWABTS?

Q8: Is there any other baseline information that will be relevant to the NEWABTS that have not been identified here?

Q9: Are there any other issues or opportunities the NEWABTS should be considering?

Q10: Do you believe that the significant environmental effects of the NEWABTS will be identified using this approach?

Q11: Is the proposed structure of the Environmental Report for the SEA of NEWABTS appropriate, or should anything be added or removed?

Table 5.1 below presents a summary of these comments.

Table 5.1: Summary of Scoping Consultation Responses

Organisation	Comments
Cadw	- No comments
English Heritage	- Suggested use of the English Heritage Guidance SEA/SA on the Historic Environment and Streets for All. - Further reference to PPS5 to be included. - English Heritage would like to see the inclusion of SEA objectives in order to assess the effects on the historic environment.
Natural England	- Highlighted the lack of detailed SEA objectives and proposed indicators in the report - Would like the environmental report to identify what changes have been made to the transport study as a result of the SEA - Would like to see reference to the Cheshire West and Chester's draft Rights of Way Improvement Plan 2011-2026 - Provided a list of relevant information on key environmental topics to be covered by the SEA - Provided a list of additional sustainability issues (climate change and carbon emissions from transport , impacts on the natural environmental from transport and associated infrastructure, poor access to the natural environment, obesity and poor mental and physical health of adults and children and car based visitor pressure affecting protected landscapes and sites of biodiversity value) and opportunities to be considered:
Environment Agency Wales	- Highlighted the need for the production and submission of a flood consequence assessment (FCA) to help determine whether the development at this location is justified. - Encouraged the use of Sustainable Urban Drainage Systems (SuDS) to achieve any attenuation of surface waters - Added that the importing of inert waste onto the site for storage or use in construction, maintenance or improvement works must be registered with the EAW under The Environmental Permitting (England and Wales) Regulations 2007and must comply with the conditions of the relevant permit - Highlighted the need to be aware of the Pollution Prevention Guidance Notes (PPGs), specifically PPG1, PPG5 and PPG22 - Highlighted that consideration should be given towards recycle and reuse (where appropriate) towards waste minimisation (EU Waste Framework Directive 2008/98/EC) and the Hazardous Waste Regulations-the Control of Pollution (Oil Storage) (England) Regulations 2001
English Heritage	- Suggested that an objective for the historic environment is included ("To conserve and enhance the historic environment and heritage assets") in order to reflect PPS5 on the broad objectives of the SEA - Suggested that Table 3.1 (SEA Topics) could reflect the terms and definitions used in PPS5 for Heritage Asset, designated and locally important - Suggested that the historic environment should be specially included in the NEWABTS planning objectives, particularly given the international importance of Chester. This objective should focus on conserving and enhancing the historic environment. - Advised to identify and include historic environment key issues in the relevant section.
Countryside Council for Wales	- Reminded that an assessment under the Conservation of Habitats and Species Regulations 2010 will be required (Habitats Regulations Appraisal) - Recommended developing specific SEA objectives against which the various plan elements can be assessed and to be used to identify suitable indicators and monitoring criteria - Highlighted that there is little or no consideration of wider biodiversity elements (habitat connectivity, local biodiversity priorities and protected species- in addition to European protected species), landscape (notably protected and historic landscapes, light pollution and the use of LANDMAP data), organic soils, sustainable transport (particularly walking and cycling), coastal and fluvial flooding or climate change mitigation and adaptation. - Recommended the consideration of a number of additional relevant plans. - Suggested the inclusion of map showing the area covered by the study - Suggested that the development stages of the plan (figure) could be clearly linked to the required stages of the SEA process and include an indicative timeline, particularly for consultations.

Comments received from the statutory consultees have been taken into account within the assessment of potential effects and the production of this ER.

6 SEA Objectives and Topics

6.1 Introduction

This chapter of the ER sets out the SEA objectives and topics that have been covered by the SEA. The list is derived from the SEA Directive and refined to make it relevant to the NEWABTS environment. The SEA topics were identified through the author's knowledge of the SEA process, the requirements of the Directive, and an understanding of the NEWABTS.

6.2 SEA Objectives and Topics

The objectives of this SEA are to:

- To protect and enhance biodiversity and geo-diversity and to safeguard protected species
- To reduce the amount of waste produced and to increase the amount recycled
- To protect and enhance the quality of ground, river, terrestrial and sea waters and to reduce the risk of flooding.
- To ensure good local air quality
- To reduce transport related noise
- To reduce the causes of climate change and to adapt to and mitigate the effects of climate change
- To protect and enhance buildings, sites, areas and features of historic, archaeological and architectural interest and diversity.
- To maintain and enhance the local distinctiveness, character and appearance of rural and urban land and landscapes, including public realm.
- To ensure good accessibility, conserve and enhance opportunities for sustainable public access, reduce road traffic and increase public involvement.
- To reduce crime, improve health and to reduce poverty and social exclusion.
- To increase the vitality of town centres, make better use of resources, improve efficiency in land use and adopt a strategic approach to planning and provision multi functional green infrastructure.

Whist SEA objectives set out an overarching goal for each of the SEA topics it is also important to set out the important factors that will ensure that the objectives are reached. Therefore Table 6.1 below identifies the key areas under the SEA Directive topics that this SEA will be considered in respect of the preferred packages and options of the NEWABTS. Table 6.1 also presents a list of typical important factors under the key areas for consideration.

Table 6.1: SEA Objectives and Topics

SEA Objective	SEA Directive Topics	Key areas for consideration	Typical Important Factors
To protect and enhance biodiversity and geodiveristy and to safeguard protected species	**Biodiversity, Flora and Fauna**	Protected Sites and Species	Natura 2000 Sites (SPAs and SACs) including Annex 2 species Ramsar Sites Sites of Special Scientific Interest (SSSIs) National Nature Reserves Local Nature Reserves Ecological connectivity Effects on key species
		Ecosystems and biological diversity	
To reduce the amount of waste produced and to increase the amount recycled	**Soil**	Sediment and geology	Re-use of aggregate in new developments Key soil types and organic soils such as peat.
To protect and enhance the quality of ground, river,	**Water**	Water Quality	Water Framework Directive targets
		Flood Risk	Transport infrastructure drainage Application of SuDS

SEA Objective	SEA Directive Topics	Key areas for consideration	Typical Important Factors
terrestrial and sea waters and to reduce the risk of flooding			Fluvial and coastal flooding
To ensure good local air quality	**Air**	Local air quality	Local Air Quality Management Areas AQMA Exceedance of critical loads
		Dust	
To reduce transport related noise	**Noise**	Noise and vibration	Traffic noise
To reduce the causes of climate change and to adapt to and mitigate the effects of climate change	**Climatic Factors**	Reducing CO_2 emissions	CO2 emissions from transport Ensuring that the transport system can cope with the unavoidable effects of climate change
To protect and enhance buildings, sites, areas and features of historic, archaeological and architectural interest and diversity.	**Archaeology and Heritage**	Historic Environment and Archaeology	Historic Parks and Gardens Ancient Woodland Scheduled Ancient Monuments Listed Buildings Conservation areas Historic landscapes on the Register of Historic Landscapes of Special and Outstanding Interest in Wales. LANDMAP areas
To maintain and enhance the local distinctiveness, character and appearance of rural and urban land and landscapes, including public realm.	**Landscape**	Natural Landscape	Landscape character Areas of local importance
		Built Landscape	Character areas Conservation areas Dereliction
To ensure good accessibility, conserve and enhance opportunities for sustainable public access, reduce road traffic and increase public involvement.	**Material Assets**	Area material assets	Transport infrastructure Residential Property Commercial and employment property
To reduce crime, improve health and to reduce poverty and social exclusion.	**Population**	Local employment, activities and residencies	Regional and district centres Villages Hamlets Agricultural land Maintaining and enhancing access to green

SEA Objective	SEA Directive Topics	Key areas for consideration	Typical Important Factors
			and open spaces Maintaining and improving public rights of way
To increase the vitality of town centres, make better use of resources, improve efficiency in land use and adopt a strategic approach to planning and provision multi functional green infrastructure.	**Human health**	Physical and mental wellbeing	Road safety (traffic accidents) Cycle safety Pedestrian safety Safety on public transport Improving health through active travel

6.2.1 Testing the Planning Objectives

Part of the SEA process involves testing the NEWABTS Planning Objectives against the SEA Topics. This is a preliminary assessment of the NEWABTS. It is used as an indicator of consistency and to highlight any areas where there is the potential for conflict to arise. This 'test' does not take into consideration, any interventions, options or schemes that will be developed under the NEWABTS Planning Objectives. These will be subject to a more detailed assessment as part of the SEA process, the findings of which will be presented within the Environmental Report (ER).

The testing of the planning objectives for the NEWABTS against the SEA topics is presented in Table 6.2.

The Criteria Used to test the NEWABTS Planning Objectives against the SEA topics:

✓ = Objectives are positively compatible

✖ = Objectives and negatively compatible

6.2.2 The NEWABTS Planning Objectives

The planning objectives of the NEWABTS are:

- To improve transport connections for businesses within the study area to key economic centres and employment sites.
- To improve access between employment sites and workforce catchment areas.
- To reduce carbon emissions from transport in the study area.
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
- To improve the actual and perceived safety and personal security of all transport users in the study area.
- To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight.
- To reduce social deprivation through improves access to jobs and other key services.
- To maintain and make more efficient use of the existing transport infrastructure in the study area.
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

Table 6.2 presents a compatibility matrix between the NEWABTS Planning Objectives and the SEA Topics. All objectives are positively compatible with one or more the SEA Topics. In relation to the transport objectives to improve access and efficiency of transport movements within the study area there are likely to be positive effects on the SEA Topics of local population and human health. Positive interactions also occur in relation to air quality and in particular climatic factors where transport emissions are reduced as a result of increased access and efficiency of transport movements.

Three of the NEWABTS Planning Objectives are directly related to conserving and enhancing the natural and built environment and thus these will be embedded into the development of the NEWABTS.

- To reduce carbon emissions from transport in the study area;
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts; and
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.

Whilst not considered as part of this initial 'test', it should still be acknowledged and highlighted at this stage, that schemes developed as a result of the NEWABTS Planning Objectives could result in a certain degree of construction/development of new infrastructure in particular the objectives which seek to:

- To improve transport connections for businesses within the study area to key economic centres and employment sites;
- To improve access between employment sites and workforce catchment areas;
- To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight; and
- To maintain and make more efficient use of the existing transport infrastructure in the study area.

It is likely that where construction results, temporary negative interactions between the objectives and the SEA topics will occur, however, this will be assessed at the next stage.

Table 6.2: Testing the Planning Objectives against the SEA Topics

NEWABTS Planning Objectives	SEA Topics										
	Biodiversity, Flora and Fauna	Soil	Water	Air	Noise	Climatic Factors	Archaeology and Heritage	Landscape	Material Assets	Population	Human Health
To improve transport connections for businesses within the study area to key economic centres and employment sites										✓	✓
To improve access between employment sites and workforce catchment areas										✓	✓
To reduce carbon emissions from transport in the study area	✓			✓		✓					
To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts	✓	✓	✓	✓							
To improve the actual and perceived safety and personal security of all transport users in the study area											✓
To ensure that the study area transport network facilitates the necessary national and regional trip movements of passengers and freight.									✓		
To reduce social deprivation through improves access to jobs and other key services										✓	✓
To maintain and make more efficient use of the existing transport infrastructure in the study area									✓		
To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.					✓	✓		✓			✓

7 Baseline

The following chapter provides a summary of the baseline information for the study area, set out under the SEA topics. More detail is provided in Annex D.

7.1 Biodiversity, Flora and Fauna

7.1.1 Natura 2000 Sites

There are a number of International, European, National and locally protected sites and species located within and adjacent to the study area. The Natura 2000 sites located within the study area are illustrated on Figure 2 (Constraints Map) and site descriptions are presented in Annex D, Additional Baseline Information. Located to the north east of the study area is the Dee Estuary / Aber Dyfdwy Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site. This site comprises of sandflats and mudflats that are not covered by seawater at low tide and Atlantic Salt Meadows. These habitats support wintering and the passage of internationally important waterfowl populations.

The Estuary itself is accreting as a result of large scale land reclamation at the head of the estuary in the 1730s. The Estuary is canalised for approximately 8 km between Shotton and Chester. Historically Chester used to be a large trading port to Ireland and the rest of Europe, however as the Estuary began to accrete and silt up the access to the port of Chester became limited even with the construction of a new channel 'New Cut' that was designed to improve access to the port in the eighteenth century. The port remained a major port of access until the early 1800s. A legacy of past industry remains along the banks of the Dee as a consequence of past trading routes within the Estuary with a large proportion of the banks between Flint and Connah's Quay containing contaminated material.

From Queensferry to Chester and beyond, the Dee Estuary / Aber Dyfdwy designation changes to become the River Dee and Bala Lake SAC which is designated for watercourses of plain montain levels, Atlantic salmon and Floating water-plantain. The rivers source is within the mountains of Snowdonia and the river passes through the Bala Lake in mid North Wales prior to flowing northwards to Chester. From Chester the river becomes canalised as discussed above. The original path of the river passed through Balcon, Saughall, Shotwick and Burton on the Wirral. The canalised section of the SAC passes beneath the A55 road bridge which is a key strategic access route into and out of North Wales and to the port of Holyhead on Anglesey.

The Deeside and Buckley Newt Sites SAC lies to the south of Connah's Quay and the north of Buckley. The site supports one of the largest populations of great crested newt in Great Britain. The waterbodies within the site have been formed by the extraction of clay, sand and coal during the industrial revolution and some more recent creations for nature conservation. The sites are located either side of the A55 /A494 road junction on the coastal slopes that overlook the Dee Estuary.

The Midlands Meres and Mosses Phase 2 Ramsar is located to the north east of Wrexham and is one in a series of 18 lowland open water and peatland sites in the North West Midlands of England and North East Wales. These sites have developed in Natural depressions in the glacial drift by receding ice sheets which formerly covered the Cheshire/Shropshire Plain. This site is not crossed or located adjacent to any strategic transport links within the study area.

European designed sites outside of the study area including Halkyn Mountain SAC, Johnstown Newt Sites SAC, Alyn Valley Woods SAC, Berwyn and South Clwyd Mountains SAC, Llwyn SAC, Elwy Valley Woods SAC, Fenns, Whixall, Bettisfield, Wem and Cadney Mosses SAC and the Berwyn SPA will be screening by the HRA for potential for likely significant effect with the implementation of the NEWABTS.

7.1.2 Sites of Special Scientific Interest (SSSI)

In addition to the Natura 2000 designated sites there are nine Sites of Special Scientific Interest (SSSIs) are located within the study area. A number of these are contiguous with the International and European designations and include the Dee Estuary /

Aber Dyfdwy and the River Dee. In addition two SSSI designated sites for their populations of great crested newt, Connah's Quay Ponds and Wetlands SSSI and Maes Y Grug SSSI are contiguous with the Deeside and Buckley Newt Sites SAC. Vicarage Moss SSSI to the north east of Wrexham is also designated as part of the Midlands Meres and Mosses Phase 2 Ramsar detailed above.

Additional SSSIs within the study area that are not contiguous with any of the International and European protected sites that are described above include Llay Bog, Catewen Marsh, Marford Quay and Inner Marsh Farm SSSIs. A large proportion of these SSSIs within the study area have developed as a consequence of the former mining industry within the area and re-colonisation of old mine workings, colliers and gravel pits.

Inner Marsh Farm is located adjacent to the east of the Dee Estuary / Aber Dyfdwy to the North of Connah's Quay Industrial Park at Burton Point. The site itself straddles the border between Wales and England and is designated for its populations of wintering Birds. The site is located on the former estuarine flats which are reclaimed from the Dee Estuary / Aber Dyfdwy in the late 19th century due to the construction of the Bidston to Wrexham railway. The site consists of a complex of open water bodies which were excavated in the late 1980s and wetland habitat.

To the south of Inner Marsh Farm within the industrial estate itself is Shotton Lagoons and Reedbeds SSSI. The site lies between an existing power station to the north and the Corus Steelworks to the south, and is adjacent to the A548 strategic road corridor This site has been designated for its breeding population of common tern (*Sterna hirundo)* and the reedswamp which is characterised by *Phragmites australis.* The site contains the largest common tern colony in Wales.

Llay Bog SSSI is located between the A541 and the A483 to the north of Wrexham and the south of the B5102, the site is a small peat bog (2ha) that has developed in an ice hollow. This site is a small peat bog in an ice hollow in the glacial drift deposits. The fringes contain species such as Marsh Cinquefoil (Potentilla palustris), Marsh pennywort (Hydrocotyle vulgaris), Marsh Violet (Viola palustris) and Soft Rush (Juncus effuses). The central part of the site contain a lawn of Bog Moss (Sphagnum spp.) with (Eriophorum angustifolium) and Cotton Grasses (E. Vaginatum), Cranberry (Vaccinium oxycocus), Bottle Sedge (Carex rostrata), Sundew (Drosera rotundifolia) and (Calluna vulgaris) and heaths (Erica tetralix).

Gatewen Marsh SSSI is located to the west of Wrexham adjacent to the confluence of the A541 and A583. This is a wetland site that occupies the site of a former colliery. This site is one of only three examples in the former county of Clwyd of the "southern mesotrophic mires" wetland type. This type is more characteristic of the south-west Wales and, in North Wales, is largely restricted to Ynya Mon and Dwyfor. The closure of the former colliery that once occupied this site has been a major factor in creating suitable conditions for the development of wetland vegetation.

Marford Quarry SSSI is located adjacent to the A483 to the north of Gresford. This site is a disused sand and gravel workings. A large diversity of lepidopteran species have been recorded including many notable species. The butterfly list is particularly diverse with around thirty individual species being recoded and is significant in a county context.

In addition to the protected sites described above there are a number of Local Nature Reserves (LNRs) and Areas of Ancient Woodland located throughout the study area. These are also illustrated on Figure 2 (Constraints Map).

7.1.3 Biodiversity Action Plans

The area contains a number of habitats and species that are listed on the National and Local Biodiversity Action Plans. Although Biodiversity Action Plans do not impose any legal responsibility in themselves, protection of biodiversity through legislation has been implemented by section 74(1) of the CRoW Act, as amended by the NERC Act 2006. This legislation places a duty on Ministers and Government Departments "to have regard" to the purpose of conserving biological diversity in accordance with the UN Convention on Biological Diversity 1992. In addition, Section 40 of the NERC Act 2006 extends to all public authorities (i.e. including planning authorities) the existing section 74 duty to "have regard to biodiversity as far as is consistent with the proper exercise of their functions". Species or habitats of principal importance for the purpose of conserving biodiversity are published on a list which follows the UK Biodiversity Action Plan (BAP) species and habitats list.

The UK BAP, published in 1994, sets out this Country's response to Article 6 of this Convention. There are currently 1150 Species Action Plans (SAP) and 65 Habitat Action Plans (HAP) that extend across the UK1. This follows the UK Biodiversity Action Plan; Report on the Species and Habitat Review 20072. The production of separate Action Plans for priority species and

[1] http://www.ukbap.org.uk/NewPriorityList.aspx

[2] UK Biodiversity Action Plan; Report on the Species and Habitat Review. BRIG (ed. Ant Maddock) 2007.

habitats, setting out clear and measurable targets, was considered to be fundamental to the process. Local conservation action, engagement in public awareness, education and developing partnerships are stated as being vital actions that form a major part of the work of LBAPs and form an essential complement to the UK action plans. LBAPs are often organised at the county or unitary authority level, although they also exist for national parks and for other administrative areas such as districts. HAPs provide targeted actions aiming to improve and enhance wildlife and habitats. They are aimed at specific habitats considered to be at risk of damage and/or extinction. SAPs provide targeted actions that aim to improve and enhance wildlife and habitats. They are aimed at species considered to be at risk of decline and/or extinction.

Some of the key habitats and species include coastal floodplain and grazing marsh, lowland calcareous grassland, lowland raised bogs, water vole and otter. A full list of the habitats with actions in Flintshire, Wrexham and Cheshire is provided in Table D13 in Annex D and species with actions for three authorities in Table D14 in Annex D. Those habitats and species highlighted in blue in both tables represent those that have been assigned actions over the three authorities.

7.1.4 Habitats

A WelTAG stage 1 assessment has been carried out of the NEWABTS (AECOM, November 2010). As part of this assessment the following habitats have been identified within the study area

7.1.4.1 Watercourses

There are numerous rivers, streams and brooks within the study area, including, but not in entirety, the River Dee, River Alyn, River Cegidog, River Clywedog, River Terrig, Lead Brook, Wepre Brook, Northrop Brook, Kelsterston Brook, Pulford Brook, and Black Brook. There are also a number of smaller unnamed watercourses within the study area. These watercourses are likely to provide important wildlife habitats and corridors.

7.1.4.2 Scrub

There are areas of scrub scattered throughout the study area. Areas of scrub have the potential to support breeding birds, and substantial dense stands of scrub may also provide suitable habitat for badgers. Areas of scrub will frequent embankments of railway lines, edges of the woodland blocks and the coastal paths. Species are likely to include bramble (Rubus fruticosus agg), gorse (Ulex spp), buddleia (Buddleja davidii.), birch (Betula spp.), dogwood (Thelycrania sanguine), dog rose (Rosa canina) and hawthorn (Crataegus monogyna).

7.1.4.3 Woodland and Mature Trees

There are tracts of Ancient woodland throughout the study area including Leadbrook Wood, Oakenholt Wood, Broadoak and Wepre Wood and Top Y Fron Dingle. These woodlands have been designated SSSI's. Ewloe wood is also within the study area and is a designated SSSI. Further woods include Bretton Wood, Black Wood, Marford Wood and Hall Wood. All areas of woodland have high potential to support badger, breeding birds, roosting bats and dormice. Footpaths that run both through and along the woodland edges are likely to be used as commuting routes by bats and badgers. Woodland edges also provide suitable basking sites for reptiles. Large numbers of mature and semi-mature scattered trees were present throughout the study area. These trees have high potential to support breeding birds and roosting bats. It is unknown if any of the trees likely to be affected by the works are protected under Tree Protection Orders (TPOs).

Upland oak woodland, wet woodland and upland mixed ash woodland are Wrexham BAP habitats. Ancient Semi-Natural Broadleaved Woodland is identified as a Cheshire BAP habitat.

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http://www.ukbap.org.uk/library/BRIG/SHRW/SpeciesandHabitatReviewReport2007andAnnexes1-3

7.1.4.4 Hedgerows

There are numerous hedgerows throughout the study area often forming traditional field boundaries. Although no species rich hedgerows were noted within the study area, it is considered likely that they are present within the study area. Hedgerows are important landscape features and are important for a large number of species, some of which are protected. Other types of traditional field boundaries likely to be present within the study area include drystone walls and earth banks or cloddiau as they are known in Wales.

Ancient hedgerows are identified as a Wrexham BAP habitat.

7.1.4.5 Grassland

The majority of grassland areas within the survey area are likely to consist of either improved agricultural pasture or amenity grassland, both of which have limited diversity in either structure or species. These open heavily grazed/used fields are of limited ecological value. However, they may be used protected species such as badgers or bats.

There are also likely to be patches of semi-improved grassland, unimproved grassland, and marshy grassland, all of which will have a higher diversity of species present.

7.1.4.6 Structures

There are both commercial and residential properties present throughout the study area. Whilst the majority of buildings are likely to be of negligible ecological value, it is considered highly likely that some of the buildings will provide suitable habitat for breeding birds and roosting/hibernating bats. In particular the scattered farm buildings with out-buildings. In addition, there are numerous bridges and tunnels that may also provide suitable habitat for some species.

7.1.4.7 Standing Water

There are numerous potential ponds within the study area. Ponds have the potential to support and provide important habitat for a number of protected species such as great crested newts and lesser silver water beetle. Some clusters of ponds within the study area have been designated for their large populations of GCN.

Ponds are identified as a Welsh priority habitat.

7.1.4.8 Swamp

Phase 1 data received from Cofnod shows areas of swamp located north of the River Dee. Such habitat may support protected species such as birds invertebrates and reptiles.

7.1.4.9 Arable

Arable land is scattered throughout the study area. Whilst insensitively farmed arable land may be of limited ecological value, arable land where practices such as conservation headlands, beetlelbanks and traditional cropping rotations have been adopted can offer valuable habitat for birds, insects and small mammals. Winter stubble also provides seed food for birds in the form of spilt grain and seeds of weeds that germinated with the preceding crop.

7.1.4.10 Amenity

Amenity grassland was identified throughout the study area. This habitat is usually of limited ecological value.

7.1.4.11 Mud and sand flats and saltmarsh

These habitats are present on the Dee Estuary. Mud and sand flats support wintering and passage of internationally important waterfowl populations.

7.1.4.12 Intertidal shingle/cobbles and shingle above high tide mark

Phase 1 Habitat data received from Cofnod identify theses habitats adjacent to the River Dee, forming part of the Dee Estuary. Such habitats may support breeding birds and invertebrates.

7.1.5 Protected or Notable Species

A WelTAG stage 1 assessment has been carried out of the NEWABTS (AECOM, November 2010). As part of this assessment the following protected or notable species have been identified within the study area.

7.1.5.1 Protected and Notable Plant Species

Plant species could not be recorded during the initial restricted site survey. However, NBN has records for a number of welsh plant species of principal importance within the study area. Species include; Fragrant Orchid (Gymnadenia conopsea), Frog Orchid (Coeloglossum viride), Large-flowered Hemp-nettle (Galeopsis speciosa), Purple Ramping-fumitory (Fumaria purpurea), Yellow Bird's-nest (Monotropa hypopitys), Slender Hare's-ear (Bupleurum tenuissimum) and Deptford Pink (Dianthus armeria) (also a Schedule 8 plant species).

7.1.5.2 Controlled Species

It is possible that there are controlled plant species present within the study area, including; Japanese knotweed (Fallopia japonica) Himalayan balsam (Impatiens glandulifera) and giant hogweed (Heracleum mantegazzianum). Japanese knotweed is typically found on brownfield land and along watercourses, railways and highways. Giant hogweed can be found on brownfield land and adjacent to watercourses, whilst Himalayan balsam rapidly colonises river banks and areas of damp ground.

7.1.5.3 Invertebrates

NBN provides a number of records for Welsh invertebrate species of principal importance, within the 10 km OS grid squares SJ27, SJ26, SJ36, SJ37, SJ46 and SJ35. Species include; High Brown Fritillary (Argynnis adippe) Small Blue (Cupido minimus) Wall (Lasiommata megera) White-letter Hairstreak (Satyrium w-album) Blood-vein (Timandra comae) Broom Moth (Melanchra pisi) and Brown-spot Pinion (Agrochola litura). Habitats noted within the study area which may provide suitable habitat for invertebrates include; woodland edges, open water, wetland areas, watercourses, hedgerow and scrub.

7.1.5.4 Fish

NBN did not return any records for protected fish species within the study area. Protected species which have been recorded within the River Dee and Bala Lake SAC, (a site which partially falls within the study area), include; Atlantic salmon (*Salmo*

salar), sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*) and bullhead (*Cottus gobio*).

The Dee Estuary / Aber Dyfdwy and Swinchiard Brook are designated under the Shellfish Water Directive.

River Dee, River Alyn, River Clywedog and Cegidog River are designated Salmonid rivers under the Freshwater Fish Directive (FFD) (DEFRA website, 2010).

7.1.5.5 Amphibians

Ordnance Survey maps show that there are numerous ponds, streams and ditches scattered throughout the study area, particularly across the agricultural land, south and west of Shotton town, around Wrexham industrial estate, and Buckley. Larger waterbodies are also present north of the River Dee, south of the A548. Deeside and Buckley Newt Sites SAC lies within the study area, just south and west of Shotton town. This site supports one of the largest populations of great crested newt in Great Britain. In addition, NBN identified records (within the last ten years) for great crested newt (*Triturus cristatus*) across the study area, within the 10 km OS grid squares SJ27, SJ26, SJ36, SJ36, SJ37 and SJ46. It is therefore highly likely that great crested newts inhabit suitable ponds and terrestrial habitat across the study area. Suitable terrestrial refuge habitat noted during the site visit included; scrub, hedgerows and woodland. The A458, A494 and railway lines are likely to act as major barriers to amphibian dispersal.

Great crested newt is included within the Cheshire and Wrexham BAPs.

Natterjack toads are known to be present within the wider area of the study site, although no records are known of within the study area. This species is included as a Cheshire BAP species.

7.1.5.6 Reptiles

NBN has records of adder (*Vipera berus*) common lizard (*Lacerta vivipara*), grass snake (*Natrix natrix*) and slow worm (*Anguis fragilis*) within the study area, with records for grass snake and common lizard dated within the last ten years. Reptiles prefer a mosaic of habitats, including sheltered areas for refuge and hibernation, adjacent to open areas for basking. Habitat features suitable for supporting reptile species which were noted during the initial site visit included; long grass, tussocky grass, scrub, woodland edges, railway embankments, track and path edges, hedgerows, bare ground patches, open water and dry stone walls. Other suitable features that may be present within the study area, which were not noted during the initial restricted site visit, may include; bog, sunny banks/slopes, brash piles, manure/compost heaps, rubble/rubbish and rock/scree.

Retiles species are included within the Flintshire BAP. Slow worm and adder feature within the Cheshire BAP.

7.1.5.7 Breeding Birds

No species of conservation concern were noted during the initial site visit; however, it is likely that vegetation within the study area is used by breeding birds, including areas of scrub, woodland, hedgerow and scattered trees. Structures, such as buildings and road/rail bridges are also likely to be used by breeding birds. Numerous notable bird species have been recorded within the 10 km OS grid squares SJ62, SJ27, SJ36 and SJ37, including; barn owl (Tyto alba), common kingfisher (Alcedo atthis) and common quail (Coturnix coturnix) (NBN, 2010). A proportion of the Dee Estuary / Aber Dyfdwy SPA falls within the study area. This site is known to support wintering and passage of internationally important waterfowl populations. Shotton Lagoons and Reedbeds SSSI also falls within the study area, adjacent to the A548, and supports the largest common tern (Sterna hirundo) colony in Wales.

7.1.5.8 Badger

NBN identified records for badger (Meles meles) with the study area. In addition, the Wepre Park website states that badger are present in and around Wepre, an area of ancient woodland north of the A55 and A494. A badger survey was not undertaken during the initial site visit, however, a dead badger was observed at the side of the A55. A number of habitat features suitable for supporting badger were noted across the study area, including; improved grassland and arable fields (suitable for foraging), woodland, scrub, hedgerows and railway embankments.

7.1.5.9 Bats

The NBN website identified a number of bat records across the study area. Species recorded within the 10 km OS Grid Squares SJ27, SJ26, SJ35, SJ36, SJ37 and SJ46 include; common pipistrelle, (Pipistrellus pipistrellus), soprano pipistrelle (Pipistrellus pygmaeus), lesser horseshoe (Rhinolophus hipposideros), brown long eared (Plecotus auritus), Daubentons (Myotis daubentonii), Natterer's (Myotis nattereri), noctule (Nyctalus noctula) and Whiskered/Brandt's Bat (Myotis mystacinus/brandtii).

A number of the commercial and residential properties within the study area have the potential to be used by roosting bats. Features include gaps between the wall and soffit and facia boards, gaps in brick work, pitched roofs and hanging tiles. These features are suitable for a number of bat species. There are numerous mature trees within the study area which have features which may suitable to support roosting bats. These features include broken limbs, peeling bark and dense ivy covered trucks and branches. Other features, such as quarries, and rail and road bridges/tunnels may also provide habitat for roosting bats.

Linear features within the study area, such as the railway line and hedgerows connecting wooded areas, may act as valuable bat commuter habitat, particularly areas which are unlit. It must be noted that although bats do tend to commute along linear features, they can also cover open ground. There are numerous suitable bat foraging habitats throughout the study area, including the water features, woodland edges, hedgerows and agricultural land.

Bat species are included within the Cheshire, Flintshire and Wrexham BAPs.

7.1.5.10 Dormice

NBN did not provide any records for dormice (Muscardinus avellanarius) within the study area. However, Flintshire county council have identified a number of known dormouse sites within the county and dormouse is identified as a Flintshire BAP species. It is possible that areas of woodland and well established hedgerows within the study area provide suitable habitat for dormice. In addition, mature trees with suitable hollow branches can provide suitable nesting sites, as well as abandoned bird nests/nest boxes (the mammal society, 2010).There are also known release sites in the wider area, including near Malpas, Cheshire.

7.1.5.11 Polecat

NBN provided records for polecat (Mustela putorius) within the study area, within the 10 km OS grid squares SJ27, SJ26, SJ35, SJ36 and SJ46. It must be noted, however, that none of the records were dated within the last ten years. Habitat features noted within the study area which may be suited to polecats include; woodland, coastal, agricultural land and riverbanks.

7.1.5.12 Water vole

NBN provided water vole (Arvicola amphibius) records within the 10 km OS grid squares SJ26, SJ27, SJ36, SJ37 and SJ46. However, none of these records were dated within the last ten years. There are several watercourses within the study area, which could not be assessed during the initial site visit. Habitat features suitable for supporting water vole, which may be present within the study area, include; slow flowing, relatively deep watercourses, dense bank-side vegetation and easily penetrable earth or silt shored banks (Strachan & Moorhouse, 2006). Water voles are known to be present in Queensferry drain.

Water vole is identified Cheshire and Wrexham BAP species.

7.1.5.13 Otter

NBN provided otter (Lutra lutra) records which fall within the study area. In addition, otter have been recorded within the River Dee and Bala Lake SAC, which falls within the study area. There are a number of watercourses located within the study area, which may provide suitable habitat for otter. However, these could not be surveyed during the initial site visit. Otter are known to inhabit a range of waterbodies, including; ditches, streams, lakes and rivers and suitable habitat features include; dense bank-side vegetation, an abundance of fish, river debris and exposed tree roots.

Otter is identified as a Wrexham and Cheshire BAP species.

7.1.5.14 White Clawed Crayfish

NBN did not identify any records for white clawed crayfish (Austropotamobius pallipes) within the study area. However, it is possible that that watercourses within the study area offer habitat opportunities for this species. Suitable habitat features can include; Rocky bottoms, submerged logs, overhanging banks and tree roots.

White clawed crayfish is identified as a Cheshire BAP species.

7.1.6 Ecological Assessment Summary

The study area cannot current be fully assessed for its value for many of the notable species such as bats or otter as this will require additional specific survey work. However, a provisional assessment of value is provided.

Table 7.1: Ecological Assessment Summary

Habitat / Species	Ecological Valuation (IEEM, 2006)
Watercourses	International
Railway line supporting vegetated embankments	Local
Woodland	National
Scrub	Parish
Amenity grassland	Parish
Improved grassland	Parish
Buildings	Local
Hedgerow	Local
Standing open water	County
Arable	Local
Mud and sandflats	International
Saltmarsh	County
Fish	County
Invertebrates	Local
Amphibians	International
Birds	International
Otter	County
Water vole	County

Habitat / Species	Ecological Valuation (IEEM, 2006)
White clawed crayfish	County
Bats	County
Dormouse	County
Badger	County
Reptiles	County

7.2 Soil

Whilst the SSSIs within the area are not directly designated as geological SSSIs a large number of the them have developed as a consequence of the legacy mining industry in the area, in particular Connah's Quay Ponds and Woodlands in Flintshire which is contiguous with the Deeside and Buckley Newt Sites SAC. In addition Vicarage Moss SSSI to the south of Gresford is of interest to the Quaternary geomorphologist as it is one of the best-developed kettle hole complex in Wales and is representative of many that have developed throughout the Wrexham area in sands and gravels of the Wrexham Delta Terrace. Additionally, several of the SSSIs identified within the Study Area developed as a consequence of the legacy mining industry in the area. Of particular note is Connah's Quay Ponds and Woodlands in Flintshire, which is contiguous with the Deeside and Buckley Newt Sites SAC.

The Geological Conservation Review (GCR) was created to identify key geological sites in Britain that display features that further our understanding of Earth science and the geological history of Britain; many of these sites are protected as SSSIs or are under consideration for this status. There is one GCR site within the Study Area; the aforementioned Vicarage Moss site.

There is very little high quality agricultural land in the County of Flintshire. There is believed to be a legacy of contamination associated with historic lead mining activity in the Halkyn area and a number of potentially contaminated sites within the Deeside industrial area. The MAGIC website, which refers to the DEFRA Agricultural Land Classification Map, only covers the parts of the study area which are within England. For the English portion of the study area, the majority of the agricultural land has been recorded on the interactive map under a classification of Grade 3 - Good to Moderate Quality Agricultural Land. Small pockets of land following watercourses are indicated on the map under a classification of Grade 4 – Poor Quality, and Chester itself has a Grade 5.

A WelTAG stage 1 assessment has been carried out of the NEWABTS (AECOM, November 2010). As part of this assessment the following Associations listed in the Soil Survey Map have been identified.

Table 7.2: Associations listed in the Soil Survey Map

Corridor	Soil Survey
Flint/Mold -Chester	Primarily 711n or 711m south-west of the River Dee and 812b north-east of the river. Pockets of 541r south of the river along watercourses, and Unclassified, 861b, and 551a around Chester.
Chester-Wrexham	Chester-Bretton 812b (with pockets of Unclassified soil), Bretton to Pulford is 711m. From Pulford to Wrexham, soil association shown is a mixture of 811b, 831c, 541r, 551d, 711m, and Unclassified. Wrexham is Unclassified.
Wrexham-Deeside	The area around the River Dee is shown to be 812b. The largest fraction of this study corridor is shown to be 711m and 711n, with the area around Penyffordd-Drury shown as 713g and Wrexham shown as Unclassified. Pockets of 541r, 811b, 611d, and 551d are also shown.
Strategic Trips	The branches for this Corridor run through lands classified as 541r, 551d, 561b, 572m, 611a and d, 711m and n, 713g, 811b, 812b, 813e, and 861b.

Associations 831c, 812b, 561b, 813e, 713g, 811b, and 711m are from alluvial sources and tend to be wet or seasonally waterlogged; most of these are used primarily for grass or grazing (with the exception of 831c, which is frequently used for crops under rotation). Association 611a is also primarily clay, but it has better drainage properties; it too is primarily used for grazing. Associations 572m and 551d are sand or very sandy and are easy to work, but only 572m is considered a good soil.

Associations 711n, 541r, and 611d are loamy soils. Association 861b is primarily comprised of peaty soils that are waterlogged in winter and a good agricultural resource if drained.

7.2.1 Contamination

There are 15 active and 155 inactive landfills within the Study Area. These are primarily concentrated around areas of former mining, i.e. south-east of Flint from around Connah's Quay to just north of Buckley, between Caergwrle and Gresford, and just north of Bretton, although landfills are scattered throughout the Study Area. Of the active landfills, four are listed as Hazardous, four are classed as Non-Hazardous, one is classed as Inert, and the classification of the remaining six is unknown. The landfalls are listed in Table D15 in Annex D.

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has identified the following sources of contamination.

A review of historic maps indicated numerous activities that have the potential to be sources of contamination within the Study Area. Summarised below are the key activities noted and what contamination might have been left behind from these.

7.2.1.1 Mining and Landfilling

A review of the historical maps indicates that mining and related activities (e.g. brick works) has occurred at 144 separate locations within the Study Area, where a location ranges in size from an individual shaft to full grid squares with several separate shafts, quarries, and spoil tips present. Mines have the potential to have contamination associated with the material which was removed as well as contamination associated with the mining process itself. Furthermore, quarries have the potential to be backfilled with unknown material or be used as landfills or tips, and spoil heaps are often a source of contamination. Mining/quarrying in the Study area has been for clay (for bricks), lead, sand and gravel, stone, copper, and/or coal. Soil vapour may also be hazardous due to landfill gas. Although not specifically noted from the historic map review, salt mining cannot be ruled out based on the location of the Study Area.

7.2.1.2 Airports

Airfields have been observed on the historic maps at three locations within the Study Area. Contamination associated with airports (if present) may include metals (chromium and copper), complex cyanide, asbestos, and/or corrosive conditions.

"Works"/Industrial Activity

A review of the historical maps indicates the presence of many forms of industrial activity within the Study Area, including saw mills, limekilns, chemical works, smithys, timber yards, depots, breweries, factories, bakeries, industrial estates, candlemaking, and unspecified works. Brick Works, due to the fact that this activity typically occurs at the site of the mine, is discussed under Mining/Landfilling. Water treatment works are considered with slurry pits and other activities that have the potential for biological hazards as well as chemical contamination.

Industrial "works" have the potential to be a source of many different contaminants, depending on what activity was involved. The historic map review indicated the presence of Industrial activity/"works" at 123 locations within the Study Area.

7.2.1.3 Garages and Gasworks

A review of the historical maps indicates the presence of 21 garages/filling stations and seven gasworks/gasometers within the study area. The principle contamination associated with both of these land uses is petroleum hydrocarbons; if present, contaminants may include toxic and phytotoxic metals, cyanide, sulphur, sulphate, PCBs and/or asbestos, as well as hydrocarbons. Soil vapour may also contain hazardous levels of carbon dioxide and other hydrocarbons.

7.2.1.4 Substations and Power Station

Four electrical substations and two power stations are documented within the Study area. Polychlorinated biphenyls (PCBs) may be found in old transformers and capacitors manufactured before 1976 at these sites. Additionally, the Power Stations may be a source of many other contaminants, including metals, arsenic, selenium, sulphate, sulphide, asbestos, and corrosive conditions.

7.2.1.5 Biological Hazards

Water treatment works (including filterbeds, sewage works, and slurry pits) and a Small Pox Hospital have the potential for biological agents to adversely affect site users. One Small Pox hospital and 26 water treatment (or similar) works were observed within the study area. In addition to the biological hazards, contamination associated with water treatment works includes metals (aluminium), and gases.

The table below lists the types of industrial activity by Option, and provides an indicative level of potential for contamination within circa 1km of the route.

Table 7.3: Types of Industrial Activity

		Package 1	Package 2				Package 3			
	Totals for Study Area	**MD1***	**ST2**	**FMC2**	**WD2**	**CW2**	**ST3**	**FMC3**	**WD3**	**CW3**
Works	**103**	0	110	14	19	2	87	50	40	16
Airfield	**3**	0	3	1	0	0	2	2	1	0
Gasworks/ garage	**28**	0	27	4	5	0	22	13	15	3
Mining	**144**	0	141	15	26	0	99	24	44	12
Power	**6**	0	6	2	6	0	6	3	0	0
Bio	**27**	0	27	1	4	1	19	10	5	6

*As the Managing Demand Options Package contains no intrusive works, it is not considered likely that any pre-existing contamination present will significantly affect the route, nor is it considered likely that the implementation of this Option Package will create new pathways.

7.2.2 Geology

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has identified the following geology in the study area.

7.2.2.1 Superficial

Superficial geology in the Study Area primarily mainly comprises Till, with Alluvium along the River Dee, and large areas of Glacial Sand and Gravel (in the vicinity of Wrexham-Gresford and as a linear feature from approximately Ween-ddu to Astow/Castle Hill Farm), Lacaustron deposits (around and north of Burton Meadows), River Terrace deposits (between Marland, Darland, and Broadoak), and Marine Deposits (along the Dee). Pockets of these and other materials (notably peat, head, and scree) were noted throughout the study area.

A significant section of the Deeside Industrial Estate is shown to comprise Made Ground. Small, occasional pockets of Infilled ground, Made Ground (on existing land surface), and landslips were also noted in the study area.

7.2.2.2 Bedrock

Bedrock geology in the study area is shown divided into two distinct areas. A fractured mixture of sandstones and interbedded sandstone, mudstone, shale, siltstone and/or limestone formations, with coals and seat earth (Lower Coal Measures, Middle Coal Measures, and/or Holywell Shales Formation) are shown in the western half of the study area. In the eastern half of the study area a mixture of sandstones (Kinnerton Sandstone Formation, Gwespyr Sandstone Formation and Pebble Beds of the Sherwood Sandstone Group; Lower Mottled Sandstone; and Erbistock Formation) are shown.

Several large north-south trending Faults are shown in the study area, and a few small east-west trending faults are shown in the study area to the south of the Dee. Coal crops of named seams are shown in several places to the south of the river.

Numerous boreholes and shafts were noted on the geological map; further mining activity may have occurred onsite.

7.3 Water

There are a number of Rivers located within the study area the most significant being the River Dee. The entire study area lies with the catchment of the River Dee. The River Dee flows north towards Chester to the east of the study area. From Chester River Dee it is tidal and canalised, and flows north west into the Irish Sea. This waterbody crosses the A494 at Queensferry and the A55 to the south east of Chester. Historically this river was used for trade to and from the port of Chester, however siltation of the Estuary further downstream made the commercial use of the port infeasible.

The River Alyn flows south east through the study area from Mold to Wrexham at which point it is diverted north east along the general alignment of the A483 to Rossett where it diverts east to its confluence with the River Dee. Within the study area this watercourse is crossed by or flows adjacent to the following strategic road links, A583, A550, A541, A5104, A5118 and the A5119.

Within the south of the study area through the centre of Wrexham the River Clywedog flows in a south easterly direction towards the River Dee.

There are a number of smaller watercourses within the study area, the River Gowy which flows north through Chester to the Mersey Estuary and Wepre Brook which flows north east from Northop to the Dee Estuary / Aber Dyfdwy at Connah's Quay.

The Water Framework Directive (WFD) has been transposed into Welsh law through the Water Environment (WFD) Regulations (England and Wales) 2003. It has replaced the existing methods of monitoring riverine water quality and has introduces a holistic approach with greater emphasis on ecological status as a broader indicator of water body health.

It requires Member States to take action to ensure that all water bodies achieve at least good status for all surface waters by 2015. Good status comprises either good ecological status (GES) or good ecological potential [if the water body is designated as artificial or heavily modified (A/HMWB)], and good chemical status. There are, however, certain situations in which it may be possible to extend the deadline for achieving good status from 2015 to 2021 or 2027, or even to set a less stringent target. As well as achieving GES, Member States should also strive to promote the use of water as a sustainable natural resource and conserve habitats and species that depend directly on water.

The proposed strategy falls mainly within the Dee River Basin District (RBD), but there is a small area to the north east of the study area that falls within the North West RBD.

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has identified the following WFD Classifications for the water features in the study area.

Table 7.4: WFD classification for the water features within the study area.

	Waterbody	Hydro - morphological Status	Current Ecological Status/Potential	Current Chemical Status	Predicted 2015 Ecological Status/Potential	Protected Areas
River Dee North Catchment	River Dee (stretch from Chester Weir to Ceiriog)	HMWB due to drinking water, flood protection, water regulation (impoundment release and strategic transfer)	Moderate Potential	Fail (uncertain)	Moderate Potential due to invertebrates (Good potential by 2027)	Drinking Water Protected Area, Freshwater Fish Directive, Nitrates Directive
	Dee Estuary (Dee North Wales) From the city of Chester to the sea	HMWB due to navigation and fisheries	Moderate Potential	Good	Moderate Potential due to dissolved inorganic nitrogen (Good potential by 2027)	Shellfish Water Directive Nitrates Directive
	Finchetts Gutter	HMWB due to flood protection	Moderate Potential	Does not require assessment	Moderate Potential due to ammonia, dissolved oxygen, phosphates (Good Potential by 2027)	Nitrates Directive
	Shotwick Brook	HMWB due to flood protection and wider environment	Good Potential	Does not require assessment	Good Potential	Not designated
	Burton Brook	HMWB due to flood protection and wider environment	Moderate Potential	Does not require assessment	Moderate Potential[3] (Good Potential by 2027)	Not designated
River Dee South Catchment	Swinchiard Brook	Not designated A/HMWB	Moderate Status	Does not require assessment	Good Status	Shellfish Water Directive
	Kelsterton Brook	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status[4] (Good Status by 2027)	Not designated
	Sandycroft Drain	HMWB due to flood protection	Moderate Potential	Does not require assessment	Moderate Potential due to invertebrates (Good Potential by 2027)	Nitrates Directive
	Wepre/Lead Brook [3]	Not designated A/HMWB	Good Status	Does not require assessment	Good Status	Not designated
	Balderton Drain	HMWB due to flood protection	Moderate Potential	Does not require assessment	Moderate Potential (Good Potential by 2027) [4]	Nitrates Directive
	River Gwenfro	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status due to invertebrates, macrophytes and phytobenthos (Good	Not designated

[3] Current status/potential for this water body is based in professional judgement (EA website 2010)

	Waterbody	Hydro - morphological Status	Current Ecological Status/Potential	Current Chemical Status	Predicted 2015 Ecological Status/Potential	Protected Areas
					Status by 2027)	
	River Clywedog (Dee to Gwenfro)	HMWB due to drinking water and water regulation (impoundment release)	Moderate Potential	Fail (very certain)	Moderate Potential (Good Potential by 2027) due to zinc	Freshwater Fish Directive
River Alyn Catchment	River Alyn (Hope to confluence with Dee)	Non designated A/HMWB	Poor Status	Fail (quite certain)	Poor Status (Good status by 2027) due to fish and phosphates	Freshwater Fish Directive Nitrates Directive
	River Alyn (Leadmill to Hope, upstream sewage treatment works)			Does not require assessment		
	River Alyn (Rhydymwyn to Leadmill)	HMWB due to flood protection	Moderate Potential	Good	Moderate Potential (Good Potential by 2027)[4]	Freshwater Fish Directive
	River Terrig	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status due to fish (Good Status by 2027)	Not designated
	River Cegidog	Not designated A/HMWB	Moderate Status	Does not require assessment	Moderate Status (Good Status by 2027)	Freshwater Fish Directive
	Shropshire Union Canal	Artificial due to navigation	Moderate Potential	Does not require assessment	Moderate Potential due to phosphates (Good Potential by 2027)	Nitrates Directive

(Source EA Website 2010)

Within the western half of the study area the groundwater quality has been classified as currently being a good quantitative quality with the eastern half including Chester and surrounding areas being classified as currently being a poor quantitative quality.

There are a number of areas at risk of flooding along the main rivers which flow through the study area the most significant of these being either side of the River Dee between Chester and Connah's Quay.

7.4 Air

There are two Air Quality Management Areas (AQMA's) in the Cheshire West and Chester local authority management area. These are located at:

- Whitby Road / Station Road in Ellesmere Port

- Boughton gyratory Chester City Centre.

The primary reason for their designation is emissions of nitrogen dioxide (NO_2) from vehicular traffic in these areas and exceedences occur at a number of roadside locations[4].

There are no AQMAs in Flintshire or Wrexham as exceedences of National Air Quality Objectives are unlikely to occur. However several locations along the major roads including the A494 (Aston Hill) dual carriageway has been identified as a hot spot location with the potential for exceedances of nitrogen dioxide (NO_2) and fine particulate (PM10) concentrations at nearby residential properties[5].

Due to the industrial reliance within the study area particularly around the head of the Dee Estuary / Aber Dyfdwy there are a number of Part A and B authorised processes within the study area. These are processes that permit controlled activities which cause emissions to air. Some of these processes include:

- Corus Site
- BHP Petroleum
- National Power plc
- Powergen Combined Cycle Gas Fired Power Station
- BAE systems
- Shotton Paper Company

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has identified the following baseline for air quality in the three authority areas.

7.4.1 Flintshire

Flintshire County Council has completed all of the compulsory Air Quality Review and Assessment reporting requirements to date. There are currently no Air Quality Management Areas (AQMAs) within the County. The 2006 Updating and Screening Assessment (USA)6 concluded that NO2 and PM10 are the key pollutants of concern in Flintshire and identified two areas for investigation through Detailed Assessment7 as monitoring results indicated pollutant concentrations close to the relevant air quality objectives at residential properties near to the A5119 / A494 in Mold. Interim Air Quality Progress Reports and the 2009 USA8 reported similar conclusions. A continuous monitoring site was commissioned at the site in 2008 and a Detailed Assessment for NO2 and PM10 produced, which showed that the air quality objectives for NO2 and PM10 around the junction were not being exceeded and so there was no requirement for an AQMA to be declared.

Air quality monitoring is carried out at a number of locations within Flintshire. Continuous monitoring of NO2 and PM10 is undertaken at two locations. Continuous monitoring of NO2 and PM10 at the A5119 Sychdyn / New Brighton site was carried out between November 2008 and November 2009 to inform a Detailed Assessment. The reported mean pollutant concentrations for this period indicate that the relevant air quality objectives for NO2 and PM10 were not exceeded, as shown in Table 7.5. The monitoring site at Mold was commissioned in December 2009 and at present there are no ratified data available. The site is affiliated to the Automatic Urban and Rural Network (AURN) and monitors NO_2 and ozone.

Table 7.5: Continuous Monitoring Results for NO_2 and PM_{10} – Flintshire

Site	Location (X, Y)	Type	Pollutant	Mean Concentration ($\mu g/m^3$)	No. of Hours NO_2 > 200 $\mu g/m^3$	No. of Days PM_{10} > 50 $\mu g/m^3$
Junction A5119 Sychdyn /	324374, 365011	Roadside	NO_2	33.0	0	
			PM_{10}	21.6		11

[4] Cheshire West and Chester Council (November 2009) Suatainability Appraisal Scoping Report: Core Strategy
[5] Hyder Consulting (2006) The Flintshire Unitary Development Plan Sustainability Appraisal and Strategic Environmental Assessment, Sustainability Report
[6] Flintshire County Council. Updating and Screening Assessment of Air Quality (2006).
[7] Flintshire County Council. Detailed Air Quality Assessment for fine particulates (PM_{10}) and nitrogen dioxide (2010).
[8] Flintshire County Council. Updating and Screening Assessment of Air Quality (2009).

New Brighton						

Note: The continuous monitoring site was operational from 5/11/2008 to 5/11/2009.
Data capture for both pollutants was greater than 99%.

The UKs Air Pollution Information System (APIS) provides details of critical loads for all SACs and SPAs in England Wales which is the exposure to deposition of one or more pollutants, below which significant harmful events do not occur. A significant proportion of deposition of pollutants (Nutrient nitrogen and sulphur) occurs as a result of road transport and other transport. Both the River Dee and Bala Lake SAC and Deeside and Buckley Newt Sites SAC are exceeding critical loads for one of their designated features. It is predicted that between 6% and 10% of nitrogen deposition in 2010 on these sites will be as a result of road transport.

In addition to continuous monitoring, Flintshire County Council operates a network of NO2 diffusion tube sites covering more than 50 locations. The results for 2008 and 2009 at roadside locations in the study area are shown in Table 7.6. The only site to exceed the annual mean objective for NO2 in 2008 or 2009 was Aston Mead, Aston, where an annual mean concentration of 55 µg/m3 was measured in 2009. This site is 1 m from the kerbside of the A494 at Aston Hill. However it should be noted that this site was relocated in April 2009 from the façade of a nearby residential property to its current position after the residential property was demolished. At present, there are no properties close to this new tube location as the Aston Mead and Lower Aston Hall properties that were very close to this carriageway were demolished in 2009. Consequently, this site is no longer at a location of relevant exposure.

Monitored annual mean NO2 concentrations at all other sites are well below the national air quality objective. Further details of the monitoring undertaken within Flintshire can be found in the Council's Review and Assessment Reports9.

Table 7.6: NO_2 Diffusion Tube Monitoring Results at Roadside Locations in Flintshire County

Site	Grid Reference		Annual Mean NO_2 Concentration ($\mu g/m^3$)	
	X	Y	2008	2009
Aston Mead, Aston	330626	367184	38	**55**
Chester Road West, Shotton	330594	368924	30	30
Wrexham Road, Mold	323801	363854	25	30
Glynne Way, Hawarden	331646	365742	34	35
Main Road, Broughton	333569	363511	29	31
Belvedere Close, Queensferry	331658	368032	30	32
High Street, Caergwrle	330423	357566	31	29
Chester Road, Pentre, Deeside	332226	367725	29	33
Mill Lane, Buckley	327848	364150	26	29
Northop Road, Flint Mountain	323864	370368	25	29
Station Road, Queensferry	331807	368271	28	25
Riverside Park, Garden City	333049	369054	23	23
High Street, Saltney	338284	365033	21	24
Chester Road Sandycroft	332670	367380	21	25
Coleshill Street Flint	324201	372989	22	23
Flint Town Council Buildings	324461	373141	24	25
Mold Road Buckley	327457	364018	18	19
Alltami Nr. Mold	326802	365671	17	20
Kelsterton Road C Quay	327183	371239	15	17

[9] Flintshire County Council Local Air Quality Review and Assessment Documents: Available upon request from Flintshire County Council.

Site	Grid Reference		Annual Mean NO_2 Concentration ($\mu g/m^3$)	
	X	Y	2008	2009
Wrexham Road Hope	330978	358683	18	17
Croes Atti School Flint	324954	372673	14	16
Kingsley Road Garden City	332549	369135	14	17
Mold Road Connah's Quay	326814	368782	12	15
Kelsterton Road C' Quay	328032	370647	13	17
Golftyn Lane C' Quay -2	327983	369423	14	12
Kelsterton Road C' Quay	328032	370647	12	12
Golftyn Lane C' Quay -2	327983	369423	11	10
A5118 Padeswood	328346	362413	11	14

Note: Exceedences of the annual average NO_2 objective (40 $\mu g/m^3$) are shown in bold.

7.4.2 Wrexham

Wrexham County Borough Council has completed all of the compulsory Air Quality Review and Assessment reporting requirements to date. There are currently no Air Quality Management Areas (AQMAs) within the County Borough.

The first stage of review and assessment was carried out in 1999 / 2000 and made the following recommendation:

“This report has identified two pollutants, particulates (PM10) and Nitrogen dioxide (NO2), which may not meet the Air Quality standards adopted by the Government. It is therefore necessary to carry out a Stage 2 review and assessment.”

The second stage of review and assessment concluded that the “exceedence of the PM10 and the NO2 objective from road sources is unlikely at any relevant location.” However, the stage two review and assessment also commented that there was insufficient monitoring data to be confident that the Air Quality Objectives would not be breached for PM10 and Sulphur Dioxide (SO2). Hence Wrexham County Borough Council proceeded to the third stage of Review and assessment, which made the following conclusion:

“The Stage 3 Assessment has indicated elevated particulate emissions from local domestic coal burning in the village of Llay. The results of the investigation indicate that the air quality standard and objective for particulate emissions in Llay may be exceeded. The Public Protection Service of Wrexham County Borough Council will recommend the declaration of an Air Quality Management Area for Llay. This will include the production of a Stage 4 Report and the implementation of an Air Quality Action Plan during 2002.”

An Air Quality Action Plan was implemented in 2003, which introduced a gas supply into the village of Llay. This had the effect of lowering the PM10 levels in the village and bringing them within the national guideline levels. This removed the need to declare an Air Quality Management Area in Llay.

The 2004 Updating and Screening Assessment (USA), 2005 Progress Report, 2006 USA, 2007 Progress Report, 2008 Progress Report and 2009 USA have all since concluded that the national air quality objectives are likely to be met within the County Borough.

Continuous monitoring of NO2 and PM10 is undertaken at two locations in Wrexham, Victoria Road and Isycoed. The results for the Victoria Road site in recent years are presented in Table 7.7 as this is a roadside location. The results for the Isycoed site are not presented as this site primarily monitors industrial emissions, and so are not relevant to this study. The results in Table 7.7 indicate that concentrations of NO2 and PM10 in recent years were well below the relevant national air quality objectives.

Table 7.7: Continuous Monitoring Results for NO_2 and PM_{10} – Wrexham

Site	Location (X, Y)	Type	Pollutant	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} > 50 µg/m^3		
				2007	2008	2009	2007	2008	2009
Victoria Road	349900, 332900	Roadside	NO_2	19.6	20.3	21.3			
			PM_{10}	19.6	20.3	15.2	22	15	4

Note: There were no occasions where the monitored hourly mean NO_2 concentration exceeded 200 µg/m^3 at this site.

In addition to continuous monitoring, Wrexham County Borough Council operates a network of NO2 diffusion tubes at 22 locations. The results in recent years at roadside locations in the study area are shown in Table 7.8. The results in Table 7.8 indicate that annual average NO2 concentrations are generally well below the national air quality objective in Wrexham.

Table 7.8: NO_2 Diffusion Tube Monitoring Results at Roadside Locations in Wrexham County Borough

Site	Grid Reference		Annual Mean NO_2 Concentration (µg/m^3)		
	X	Y	2007	2008	2009
Grosvenor Road, Wrexham	350600	333200	24.1	33.7	35.2
Hugmore Lane, Wrexham Industrial Estate	351800	337700	19.6	20.9	20.7
Mold Rd, Wrexham	351000	332600	18.7	24.1	24.9
Holt Rd, Wrexham	350700	334100	26.8	23.2	23.1
The Sycamores, Chester Road	353222	333887	30.3	29.8	30.5
Rhostyllen Roundabout, Wrexham (A483)	348170	330950	37.3	28.6	28.5
Bus Station, Wrexham	350590	333350	31.5	34.4	35.8
Smithfield Road	333981	350171			21.4

7.4.3 Cheshire West and Chester

Cheshire West and Chester Council was formed on the 1st April 2009 and comprises the old Chester City, Ellesmere Port and Neston, and Vale Royal District Councils.

Currently in Cheshire West and Chester there are two Air Quality Management Areas (AQMAs). Air Quality Management Area No 1 (Whitby Road / Station Road) was designated in 2005 by Ellesmere Port and Neston Council because of a risk of exceeding the annual mean objective for nitrogen dioxide (NO2) due to road traffic. A Further Assessment carried out by Ellesmere Port and Neston in 2007 verified the designation of the AQMA. It should be noted that this AQMA is outside of the study area for this assessment.

The second AQMA, which is within the study area for this assessment, was designated in March 2008 by Chester City Council because of an exceedence of the annual mean NO2 objective due to road traffic in the Boughton area of the city. The AQMA covers the Boughton Gyratory to the west of the city centre and is situated at the convergence of the A51 Tarvin Road and the A5155 Christleton Road.

Continuous monitoring for NO2 in the Boughton AQMA commenced in February 2010 and as such ratified annual mean concentrations are not currently available. The remaining continuous monitoring sites are located outside of the study area for this assessment and so the results from these sites have not been presented within this report.

In addition to continuous monitoring, Cheshire West and Chester Council operates a network of NO2 diffusion tubes at over 50 locations. The results in recent years at roadside locations in the study area are shown in Table 7.9, which indicate that annual average NO2 concentrations exceeded the national air quality objective at several locations within Chester.

Table 7.9: NO_2 Diffusion Tube Monitoring Results at Roadside Locations in Cheshire West and Cheshire

Site	Grid Reference		Annual Mean NO_2 Concentration (µg/m^3)		
	X	Y	2007	2008	2009
Parkgate Road, Chester	340313	367014			**47.5**
Dee Hills Park	341245	366476	30.5	33.0	38.0
105 Boughton	341633	366510			35.6
Edgeley, Boughton	341658	366487			36.7
Specialized, Bikes Boughton	341819	366475			**46.4**
Christleton Road (11)	341915	366427	**50.8**	**45.6**	**50.0**
Tarvin Road (6)	341926	366446			**64.3**
Tarvin Road (25)	341963	366457	36.7	30.3	38.3
The Mount, Boughton	341925	366383			21.0
St Giles, Boughton	341951	366396	32.9	33.7	**42.0**
Christleton Road (36)	342000	366374			**64.2**
Christleton Road (75)	342056	366354			34.5
Ingham Close, Boughton	342068	366332	**49.4**	**41.2**	**42.0**
Pram shop, Christleton Road	342114	366325			31.8
Tarvin Road (44)	342085	366446			**52.6**
Fairholme Place, Tarvin Road	342247	366496			32.0
Tarvin Road (67)	342250	366515			35.4
Tarvin Road (97)	342353	366532			36.7
A41, Christleton (old glasshouse)	343285	365844			**42.7**

Note: Exceedences of the annual average NO_2 objective (40 µg/m^3) are shown in bold.

7.5 Noise

The Welsh Government have produced noise maps for the major roads. Within the study area maps of noise levels have been presented for the A494, A5, A483, A541 and sections of the A5119. Within England noise maps from transport sources have been produced for major cities. At present information for Chester is not available therefore this report is unable to provide this information for the Cheshire West and Chester part of the study area.

Noise levels along the major roads themselves exceed 75dB with the immediate areas recording levels of 69 to 60dB. Noise levels of 55-59dB extend up to 1km either side of A55, A494 and A583 in places.

7.6 Climatic factors

The UK Climate Projections in 2009 suggest that future climate change will result in increased summer and winter temperatures with wetter winters and dryer summers. The UK has set targets under the Climate Change Act 2008 to reduce CO_2 emissions by 80% compared to 1990 levels by 2050 with an interim target of 26% by 2020.

Since 1990 Wales have decreased their CO_2 emissions by 9.5% and England by 8.7%[10]. The main source of CO_2 emissions within Wales result from electricity generation and industry with three out of the top carbon dioxide emitters in Wales falling inside the study area, these are Connah's Quay power Station, Deeside Power Station and Shotton Combined Heat Power Station. Flintshire and Wrexham have been ranked 3rd and 9th in terms of CO_2 emissions out of the 22 local authorities in Wales. The high ranking of Flintshire is attributed to the presence of large scale electricity generation in this area as in terms of industrial and commercial emissions Flintshire is ranked second only to Neath Port Talbot. In terms of CO_2 emissions from road transport Flintshire and Wrexham have been ranked 5th and 15th respectively. Again Flintshire is ranked high on the list of the 22 local authorities and this is attributed to the presence of one of the main trunk roads (A55) within Wales passing through this area.

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has identified the following estimates for CO2 emissions from all sources between 2005 and 2008 for Flintshire, Wrexham and Cheshire West and Chester.

Table 7.10: Total CO_2 Emission Estimates for Flintshire, Wrexham and Cheshire West and Chester

Year	CO_2 Emissions in ktonnes		
	Flintshire	Wrexham	Cheshire West & Chester
2005	2,265 (422)	1,487 (239)	5,642 (1,010)
2006	2,660 (421)	1,521 (238)	5,625 (1,003)
2007	2,574 (425)	1,439 (237)	5,738 (1,008)
2008	2,418 (407)	1,419 (229)	5,903 (985)

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) also identified Emissions estimates for Wales and the whole of UK are also provided for completeness (Table 7.11). These data are sourced from the Department of Energy & Climate Change (DECC) website11.

Table 7.11: Total CO_2 Emission Estimates for Wales, England and the UK

Year	CO_2 Emissions (ktonnes)		
	Wales	England	UK
2005	33,233	431,896	528,163
2006	33,563	430,166	526,190
2007	33,407	422,483	518,038
2008	32,413	413,963	506,526

From Tables 7.9 and 7.11 it can be seen that Flintshire accounted for between 6.8% and 7.9% of Wales' CO2 emissions between 2005 and 2008, and between 0.4 and 0.5% of UK emissions. Road transport accounted for between 15.8% and 18.6% of the total CO2 emissions within Flintshire between 2005 and 2008.

[10] National Assembly for Wales (December 2009) Carbon Dioxide Emissions in Wales, Members Research Service

[11] DECC, Local and Regional CO_2 Emissions Estimates for 2005 – 2008, produced by AEA (AEAT/ENV/R/2848) Updated September 2010. http://www.decc.gov.uk/en/content/cms/statistics/climate_change/climate_change.aspx

Wrexham accounted for between 4.3% and 4.5% of Wales' CO2 emissions between 2005 and 2008, and approximately 0.3% of UK emissions. Road transport accounted for between 15.6% and 16.4% of the total CO2 emissions within Wrexham between 2005 and 2008.

Cheshire West and Chester accounted for between 1.3% and 1.4% of England's CO2 emissions between 2005 and 2008, and between 1.1% and 1.2% of UK emissions. Road transport accounted for between 16.7% and 17.9% of the total CO2 emissions within Cheshire West and Chester between 2005 and 2008.

7.7 Archaeology and Heritage

The study area is rich in archaeology and heritage. Figure 1 Environmental Constraints presents the locations of Scheduled Monuments (SMs), Historic Parks and Gardens, Listed Buildings and Conservation Areas that are within the study area.

Parts of the settlements of Chester, Flint, Northop, Mold, and Wrexham are designated as conservation areas along with a number of smaller settlements within the study area. The conservation areas coincide with clusters of listed buildings with the exception of Chester where there are significant clusters outside of the conservation areas. In addition there are a significant number of listed buildings throughout the study area.

There are a number of historical parks and gardens within the study area the most significant in terms of area is Easton Hall which is situated to the south of Chester and has three spurs, one which extends into Chester a second to Broughton and a third to Pulford. The hall itself is home to the Duke and Duchess of Westminster and the hall and gardens are only open to the public three times a year. Other parks and gardens are concentrated in the west of the study area around the settlement of Mold and along the A541.

There are 178 SAMs within the study area most are within key settlements including Flint and Chester Castles, these are listed in Table D20 in Annex D.

There is a large Roman settlement in Claverton to the south of Chester on the banks of the River Dee which has also been designated. Wat's Dyke is a liner SM that runs through the western half of the study area from the A55 to the west of Northop through Mynydd to Caergwrle on the A541.

In addition to the designated sites there are many unscheduled archaeological monuments and remains that are not protected but which require protection under Planning Policy Wales (2002).

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has identified the following heritage assets for the following dates.

7.7.1 Prehistoric (to AD43)

There is surprisingly little known regarding the earlier prehistoric periods within the study area. The north east of Wales has many sites of prehistoric date ranging from the Palaeolithic through to the late Iron Age. The evidence of Palaeolithic and Mesolithic date has been found in the north east of Wales predominantly in the cave systems which are found in the area and the estuarine areas and coastal fringes. Recorded examples of Mesolithic material have been found at Rhyl and Rhuddlan to the north of the area and the reconstructed palaeoenvironmental data suggests that the Dee Estuary / Aber Dyfdwy was a deep river valley prior to the rise in sea levels in the early post-glacial period. These would suggest that this area would have been an attractive habitat to exploit for seasonal resources.

The Neolithic and Bronze Age periods in north east Wales are well documented and a large amount of research has been undertaken particularly with regard to burial archaeology. These sites are more visible in the landscape and consequently have been investigated more than other site types.

The Iron Age period of this part of Wales has seen an emphasis on sites such as hill forts and enclosed settlements. The area was inhabited during the Iron Age by a tribe called the Deceangli by the invading Roman military[12].

[12] http://www.cpat.org.uk/ycom/flint/flipre.htm accessed 19/11/2010.

7.7.2 Roman (AD43 to AD450)

Wales was important to the Romans for its natural resources which were abundant in the hills. These included gold, silver and lead, all of which were found in the study area. The main legionary fortress at Chester was the key Roman base from which to exert pressure in to north east Wales. Roman roads ran between Chester to Wrexham in the south of the study area as well as from Chester to Flint to the east.

Roman remains are limited to the settlement at Pentre Bridge that appears to have been associated with the lead mining at Halkyn Mountain to the west. The A548 road may also have possible origins in this period. The excavations at Pentre Bridge uncovered high status buildings, lead-working industrial remnants and extensive settlement evidence as well as a cemetery. A Roman port is presumed to have been present at Flint although this has not been located.

The Roman city of Chester was an important centre for the Romans in the north west of England. The fort at Chester, known as Deva Victrix, was the base for the main Roman legion and was one of the largest outside of London. It was from the base at Chester that the Romans advanced west into Wales and north in to England. The city of Chester falls within the study area and there a considerable number of finds associated with this. These are mainly from the civilian settlement, which surrounded the fort, and from which the city of Chester grew.

7.7.3 Early Medieval (450 to 1066)

Offa's Dyke and Wat's Dykes are both found bisecting the area to the west of Flint, Northop and Ewloe and in the south through Wrexham. Evidence of early medieval activity is otherwise scarce. Some ecclesiastical sites are purported to originate during this period although physical evidence is lacking. Place-name analysis and historic map regression of the earlier church boundaries suggest that some areas such as Hawarden originated in this period.

7.7.4 Medieval (1066 to 1500)

The medieval period saw a number of castles constructed in a number of towns in the study area. These were mainly for defensive purposes due to the hostility between the Welsh and English in this area, which intensified after the Norman invasion. Several of the towns within the study area are documented during this period. Flint itself dates to the mid-13th century and originally acted as a campaign base for Edward I13 and as a result had extensive defensive arrangements. The towns of Northop, Ewloe and Hawarden all appeared during the medieval period and Ewloe and Hawarden both have castles dating to this date. The area saw much unrest and conflict as it is located in the borderlands between Wales and England. Wepre Woods, close to Ewloe Castle, was the scene of an ambush and battle where the Welsh forces of Owain Gwynedd and the invading forces of Henry II clashed in 1157. Although the Welsh forces won the battle, the English were ultimately victorious and this led to a permanent loss of Welsh independence.

7.7.5 Post-Medieval (1500 to 1900)

The area saw a rapid expansion during the post-medieval period. The expansion was linked primarily to the industrial rise of coal and lead mining and the associated movement of workers to exploit this surge. This in turn led to a rise in the ecclesiastical structures that serviced their spiritual requirements. There is a wide variety of denominations represented in the churches and chapels found within the study area. The numbers of extant structures illustrate this multitude of ecclesiastical sites. Further examples of built heritage show the types of industrial processes occurring within this part of the Dee Estuary. Iron and steel works, textile mills and alkali works are all present within the study area although these generally date to the later post-medieval. A number of transport related sites are present, mainly connected to the rail industry, which allowed the movement of raw materials and finished goods. The main development in terms of landscape was the canalisation of the River Dee. The new canal portion opened for river traffic in 1737 and this allowed large areas of former marshland to be reclaimed in the Shotton and Queensferry areas. The many railways which bisect the area also originate to this period running from Chester to north Wales as well south to Wrexham and beyond into central Wales.

[13] http://www.cpat.org.uk/ycom/flint/flimed.htm accessed 22/11/2010.

7.7.6 Modern (1900 to present)

The sites of modern date generally comprise of examples of built heritage and infrastructure constructed in the early 20th century. These include a number of chapels, commercial buildings and worker's housing.

A number of Conservation Areas are also located within the towns of the study area.

7.8 Landscape

There is a varied landscape character within the study area from undulating hills in the west and south to the coastal and estuarine flats of the River Dee and its estuary in the north and east.

The Alyn River valley and its tributaries are a key characteristic of the undulating landscape in the west of the study area. This valley is surrounded by agricultural land that exhibits small irregular field patterns and interspersed with numerous pockets of woodland.

In the north and east of the study area either side of River Dee the landscape is flat and dominated by the industrial processes that have built up along the banks of the River and its estuary. The areas of industry sited are in amongst agricultural fields separated by regular linear field boundaries that also act as land drainage.

In the south of the study area to the north and east of Wrexham, a significant area is designated as a Local Landscape Area (LLA) this is illustrated on Figure 1 Environmental Constraints. This designated area is generally associated with the River Alyn and River Dee corridors.

In addition to the natural landscape, townscapes are also an important component of the overall landscape characteristic of an area. The largest settlement within the study area is the City of Chester the centre of which is rich in cultural heritage and characterised by the castle, associated walls and the original port. Over time newer housing and industrial developments have been constructed around the centre spreading to the A41 in the east and along the A5014 in the south west of the city.

The south of the study area is characterised by the settlement of Wrexham which is bound by the A483 and the A5156 to the north. The remainder of the study area is characterised by much smaller settlements including Flint, Mold and Connah's Quay, with the other main areas of settlement along the strategic road network.

The far north of the study area is characterised by past and present industry that have built up around the banks of the River Dee and head of the Estuary.

The WelTAG Stage 1 environmental assessment (AECOM, November 2010) has characterised the area into three broad zones these are described below.

7.8.1 Dee Estuary Corridor to Chester

Although the area has a long history of an industrial presence, the character of current industrial sites/zones, towns of Connah's Quay, Flint and the smaller settlements of the area are, at the wider landscape level, influenced by the wider semi-rural landscape setting. Flint also has a significant historic heritage as a border town, complete with medieval castle.

In the north eastern part of the study area the flat, canalised section of the Dee corridor broadens into the marsh dominated estuarial section of the river. This section of the Dee is an area of extensive land reclamation over a long period and from west of Flint to immediately west of Chester the river is canalised giving it a somewhat sterile character. The Dee corridor's flat lowland landscape surrounding this contains dispersed, large scale areas of industrial activity and transport infrastructure, which form significant elements within it. Whilst these are large in scale, these developments only dominate their immediate setting at a very local level and are counter balanced by an open, lowland agricultural setting much of which is formed of reclaimed land from the Dee flood plain consisting of large, rectangular fields (most notably at Deeside Industrial Estate, Broughton and other Industrial and Business Parks particularly along the Dee corridor around Flint and Connah's Quay).

The Dee estuary forms a broad expansive landscape; there are views across and along the estuary in the direction of Wirral and West Cheshire to the east and to the foothills and high points of the Clywdian Range to the west. The Dee estuary is unusual in that comparatively little water occupies so large a basin.

7.8.2 The Anglo-Welsh border area between Chester and Wrexham

This area comprises Chester, the Dee River corridor south of Chester, and adjoining pastoral lowlands around the border area as far south as Wrexham. South of Chester, the Dee runs through a rich pastoral landscape, as far as the eastern side of Wrexham which encompasses the areas both sides of the A483. The area is characterised by a gently undulating landscape with varied, degrees of tree cover and pockets of woodland, and small villages some with a degree of suburbanisation. The areas sense of place is enhanced by views of the Clwydian Range perceived as a continuous ridge of to the west and the hills of West Cheshire to the east.

Chester is one of the most important historic towns in the north of England and its virtually complete city walls contain a townscape heritage of international significance. The south western edge of Chester forms the interface with the canalised section of the Dee and reclaimed land associated with it. This area also contains a large scale retail park and Sealand Industrial Area. Chester also sits at the western edge of the belt of towns and cities of North West England to the east and is only separated from the Merseyside conurbation by a relatively narrow belt of greenbelt land.

7.8.3 Hill Landscapes of North East Wales Border

Immediately west of the lowland Dee landscape of west Cheshire and the border area, the landscape is characterised by hill scenery, varying from gentle undulations to steeper slopes, which spread throughout the eastern side of the study area. The Clywdian Range rises as an elevated ridge across north east Wales with high points at Moel Famau (475m) due west of the northern end of the study area and Ruabon Mountain (490m) east of Wrexham, both immediately west of the study area. Elevated, undulating land between the Dee corridor and the Clywdian Range from the foothills of the Clywdian Range and this area contains a number of scenic river valleys draining the area, notably the River Alun and contains many pockets of Ancient Woodland. Much of the landscape, although undesignated, is of high quality.

Many tracts of the landscape within this area were formerly blighted by traditional extractive industries and these have been comprehensively restored over many decades, though the overall character was, and remains, overwhelmingly rural. The main towns are Wrexham and Mold, along with Harwarden and other small settlements, contain significant historic centres and extensive townscape and landscape assets rooting them intimately to their wider landscapes. There are also large scale business and industrial parks associated with Wrexham. The industrial base of the other settlements is relatively modest in scale and is not a significant characteristic of the landscape setting.

7.9 Material Assets

Material assets include private and commercial property as well as transportation infrastructure. With regards to transportation infrastructure there are good strategic road and rail links between key settlements and beyond to the north west and the Midlands of England and to rest of the North Wales coast including the port of Holyhead in Anglesey.

The A494 provides a key connection between the M56 motorway to Manchester and the M53 to Birkenhead and Liverpool with the A55 to the rest of North Wales. The road itself passes through Queensferry and Ewloe where, as well as the passing traffic between the north west of England and North Wales the road takes a large volume of local traffic.

The A55 dissects the north of the study area skirting around the south of Chester from the M53 between Ewloe and Buckley and then west to Northop. This road is a major trunk road connecting the north West of England to North Wales and the Port of Holyhead and North Wales with the north west of England and the International airports of Manchester and Liverpool. This road link carries a high volume of weekend traffic on a Friday and Sunday evening, holiday traffic and during the week commuter traffic.

The A483 connects the A55 and Chester with Wrexham and takes large volume of commuter traffic during the week as this is the main link between Chester and Wrexham which are the two key employment centres within the study area.

Other significant roads which connect settlements in the area include the A541 between Wrexham and Mold, the A550 between Wrexham and Connah's Quay and the A548 which connects A494 to Flint and beyond to Mostyn, Prestatyn and Rhyl.

There are also a number of railway lines that dissect the study area north to south and east to west. There are two lines which run north to south from Wrexham to Oswestry. From Wrexham one line forks west through Shotton and Connah's Quay to the Wirral and Birkenhead. The eastern fork heads to Chester where there are connections to Birkenhead, Liverpool and Manchester. Both lines cross the North Wales coast mainline which runs from Chester through Connah's Quay to Flint and continues along the North Wales Coast eventually terminating at the Port of Holyhead on Anglesey.

The majority of people in the Cheshire West and Chester local authority area own just one car or van (43%). Only 2% of the population in this area own more than four cars or vans. However 20% of the population within this authority do not own either a car or a van therefore those 20% are reliant upon an alternative means of transport. Car ownership in this area is higher than in the North West region, where 30% of the population are reliant upon alternative means of transport.

Car ownership in the Flintshire local authority area is reflective of that in Cheshire West and Chester with the majority of the population owning just the one car or van (44%). Within the region, 19% are reliant upon another form of transport which is 1% less than in the Cheshire West and Chester region. Car ownership in Flintshire is 7% higher than the rest of Wales.

The car ownership levels within Wrexham local authority area generally replicate those in Cheshire West and Chester and Flintshire. The majority of the population in the area own just one car or van (45%). However 25% of the population are reliant on an alternative means of transport which is just 1% less the national average for Wales.

7.10 Population

The main population centre within the study area is the City of Chester, other large centres include Wrexham, Queensferry, Connah's Quay, Ewloe, Buckley, Mold, and Flint.

The strategic location of these settlements allow the residents to exploit employment in other larger settlements such as Chester, Liverpool and Manchester with easy access to a number of international airports. However, as a result a proportion of disposable income is spent outside of the area thus having a detrimental effects associated with reduced spending in the smaller towns within the study area.

Population and settlement patterns within the study area reflect the importance attached to the mining industry and more recently the manufacturing industry as settlements developed ribbon patterns along and off the main transport routes in particular the A483, A550 and the A549.

Today there is still a heavy reliance on the manufacturing industry with industries such as BAE Systems and Corus at the heart of the area. As a consequence a high proportion of people in the Flintshire and Wrexham are employed in manufacturing section 26% and 25% respectively. Within Cheshire West and Chester there is less reliance on this sector with a more even spread between manufacturing, wholesale and retail and real estate, renting and business activities. However, these statistics originate from the 2001 census and were only updated in November 2004 prior to the economic downturn therefore present percentage of employment in these sectors may differ slightly.

There is a high reliance on the car within the study area as a means of travelling to and from work. From the census data in 2001 that was updated in 2007, 44% in Flintshire, 41% in Cheshire West and Chester and 39% of people in Wrexham relied on the use of a car or van as a means of reaching employment. This is reflected by only 3% of people or three authorities using a using the bus to and less the 1% of people using the train in Wrexham and Flintshire. 6% of people either walk or cycle to work in Flintshire and Wrexham this figure increases marginally to 8% in Cheshire West and Chester.

The mode of transport used to reach work is not a reflection of the distance travelled. Within Flintshire the majority of people travel 10km to less than 20km to work which may explain why reliance on the car to reach employment in this authority is the highest (44%) of the three authorities. However, within Cheshire West and Chester the majority if people travel less than 2km to less than 5km to reach employment yet the reliance on the car in 41% which is higher than that in Wrexham (39%) where the majority of people travel slightly further (2km-less than 5km) to work. The Wrexham County Borough Council Local Development

Plan 2006-2021 identified that the figures presented above could be a reflection of the limited availability of public transport in rural areas with a lot of public transport services being centred and not catering for intra-settlement journey requirements.

7.11 Human Health

The census data from 2001 updated in 2005 presents the percentage of road accidents by type within the local authority areas. Within all three of the areas the largest percentage of people killed or seriously injured are car occupants with the second largest group in both Flintshire and Wrexham being users of two wheeled motor vehicles. This statistic is not available for the Cheshire West and Cheshire local authority. Within Cheshire West and Chester 70% of accidents that result in death of serious injury are attributed to car occupants, this figure drops to 62% in Flintshire and drops further to 50% in Wrexham. These figures may be a reflection of the presence of the key strategic road links that take high volumes of traffic between North Wales and north West England (the A55 and A494) being within these two authoritative areas where Wrexham receives fewer passing vehicles.

From the data from the 2001 census that was updated in 2004 indicates that the majority of people within the three authorities are in good health with 9%, 10% and 11% of people in Cheshire West and Chester, Flintshire and Wrexham classified as having not good health. Public transport services are limited in the more rural settlements which may restrict access of those residents to health care and community facilities resulting in detrimental effect on health.

8 Key Issues

8.1 Introduction

This chapter summaries the key environmental issues within the study area that have been identified during scoping/consultation.

8.2 Key Environmental Issues within the Study Area

There are a large number of International and European designated sites within and adjacent to the study area. These include Dee Estuary / Aber Dyfrdwy Special Area of Conservation, Special Protection Area (SPA) and Ramsar, the River Dee and Bala Lake / Afon Dyfrdwy SAC, Deeside and Buckley Newt Sites SAC and Midland Meres and Mosses Phase 2 Ramsar. A large number of these are water dependant sites. Any transport infrastructure developments within the study area as a consequence of this study will need to consider hydrological links and the effect on routine runoff on these sites. In addition a number of interest features (Luronium natas and Old Sessile oak wood with Ilex and Blechnum) are currently exceeding critical loads for nitrogen deposition therefore the study should look at options to reduce transport derived nutrient nitrogen and acid deposition.

There is a varied historically important landscape character within the study area from undulating hills in the west and south to the coastal and estuarine flats of the River Dee and its estuary in the north and east. The Alyn River valley and its tributaries are a key characteristic of the undulating landscape in the west of the study area. This valley is surrounded by agricultural land that exhibits small irregular filed patterns and interspersed with numerous pockets of woodland. In the north and east of the study area either side of River Dee the landscape is flat and dominated by the industrial processes that have built up along the banks of the river and its estuary. The areas of industry are sited in amongst agricultural fields separated by regular linear field boundaries that also act as land drainage. In the south of the study area to the north and east of Wrexham a significant area is designated as a Local Landscape Area (LLA) this is illustrated on Figure 1 Environmental Constraints. This designated area is generally associated with the River Alyn and River Dee corridors.

There is a legacy of historical contamination across the majority of the study area as a result of the legacy mining industries within the region and other industries that developed around Deeside, in particular along the banks of the River Dee. These include brickworks, steelworks, paintworks etc. Whilst not directly related to transport infrastructure the development of any new infrastructure will have to take the location of potential areas of contaminated ground into account in terms of exposing potential environmental risks and the associated cost of remediation. In particular a number of these sites lie adjacent to the existing road network as transport infrastructure generally developed around the existing industry in the area therefore this is particularly important in the context of any future road widening schemes.

One of the major rivers within the study area, the River Alyn is classified as currently being of poor ecological status from Mold to its confluence with the River Dee. This river is crossed and flows adjacent to a number of strategic roads within the study area and it is likely that it receives a high proportion of road drainage from these. Therefore any schemes proposed as a consequence of the study should consider the implementation of or additional treatment measures to outfalls to this watercourse.

There are a number of strategic roads that dissect the study area in particular the A55, A494 and the A483. These roads in particular the A55 and the A494 take large volumes of traffic both local and passing including large volumes of tourist traffic both at the weekends and during holiday periods. As a consequence there is a significant amount of transport related noise adjacent to these roads. Whilst the A55 takes the largest volume of traffic and the 55-59dB noise levels from this road cover a wide corridor, there are few receptors within the rural sections. However, where the road passes through Queensferry there are a number of receptors adjacent to the road including a school which falls within the 65-69dB band. In addition there is a significant noise corridor along the A483 through Wrexham in particular around the A541 junction which becomes congested at peak times.

There is a large amount of heavy industry within the study area this is mainly concentrated around the Deeside Industrial Park and along the banks of the River Dee between Flint and Chester. This industry is vital for employment within the area, however as a result Flintshire is the 3rd highest CO_2 emitter of the 22 Welsh Counties. In addition in terms of transport related air pollution Flint is the 5th highest CO_2 emitter of the Welsh counties. It is likely that this is attributed to the presence of the A55/A494 that

takes large volumes of traffic between north west England and Wales as well commuter and local traffic. Whilst it is acknowledged that this study will not address the impact of holiday traffic that use this section of the road to reach north Wales and the port of Holyhead the study should look at ways of increasing the modal shift in local and commuter journeys.

9 Assessment Methodology

9.1 Assessing the Effects of the NEWABTS

The assessment process comprises a series of four stages, the output from each informing the following stage as set out below. These stages include:

1. Establishing the baseline and subsequently highlighting any key issues (informed from the scope).
2. Assessing the effects of the proposed policies on the environment.
3. Assessing the cumulative and in-combination effects of the NEWABTS.
4. Identification of appropriate mitigation measures to avoid, reduce or offset any adverse effects that are identified and opportunities for improving the effectiveness of the NEWABTS.
5. Setting out any monitoring requirements as a consequence of this assessment.

9.1.1 Establishing the Baseline and Identifying the Key Issues

A summary of the relevant baseline data is presented in Chapter 7 of this Environmental Report. Key environmental issues for consideration have been identified from the analysis of this data are presented in Chapter 8 of this report.

9.1.2 Assessing the Effects of the NEWABTS

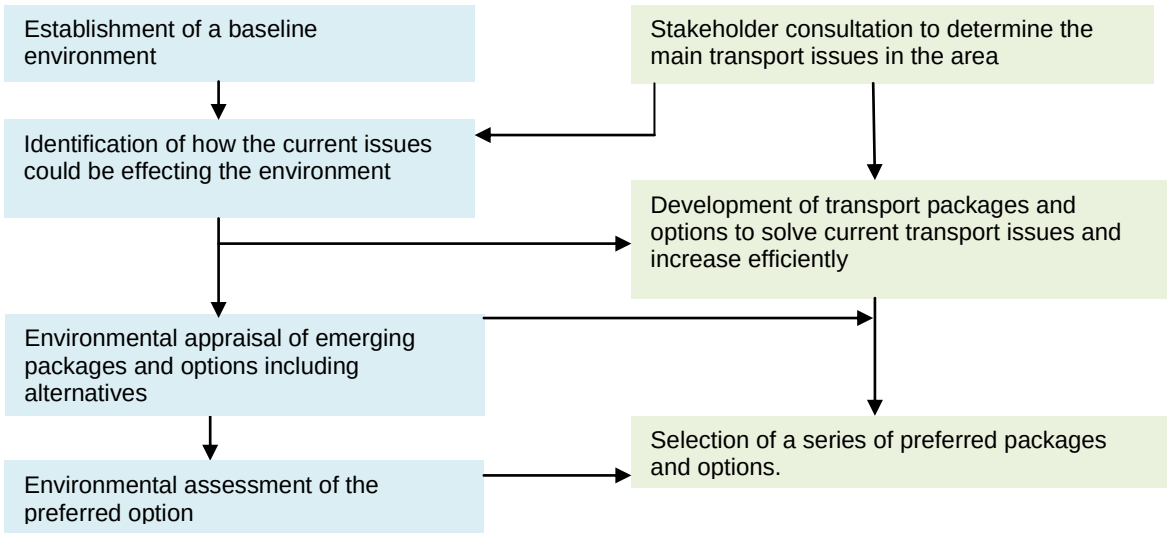
SEA is an iterative process which can be used to inform selection of the preferred policies. Figure B below illustrates how the SEA process has informed the development of the NEWABTS packages and options and the selection of the preferred policies to ensure they are environmentally sustainable.

The main focus of the SEA process is to assess, at a strategic level, the potential effects of a plan/programme on the environment. The SEA Directive and associated regulations identify a number of components /topics for which impacts can be assessed.

Although the use of SEA objectives is not a statutory requirement of the SEA Directive or SEA Regulations, it is recognised as standard practice in the SEA process as a mechanism for identifying all possible effects that need to be addressed in the assessment. However, they do not always offer the flexibility required when assessing complex plans or environments. It is therefore proposed that, due to the very strategic nature of the plan it would be more appropriate to focus the assessment on the SEA Topics that are set out in Chapter 6 rather than the objectives, however it is acknowledged that the topics presented relate directly to the objectives.

The assessment did not involve any weighting of the SEA topics and each topic has been considered in terms of its own value. The main purpose of the SEA is to provide guidance and advice on where potentially significant adverse effects could occur and how these can be avoided or reduced. It is not the role of the SEA to determine which of the topics assessed are of greater or lesser value than others.

Figure B: The SEA process in the development of the NEWABTS



9.2 Predicting the Effects of the NEWABTS

In identifying changes to the baseline and describing the magnitude of these changes the following criteria have been applied to the prediction of potential effects:

- Whether a potential effect is positive or negative, temporary or permanent, short term or long term.
- Whether a potential effect will occur during construction / installation, operation, ongoing maintenance or during decommissioning.
- Geological scale of a potential affect – local (area of development), regional or national.
- Whether a potential effect is direct or indirect, secondary, cumulative or synergistic.

9.3 Evaluation Criteria

The evaluation criteria used in the assessment of the NEWABTS reflects the strategic high level nature of this SEA.

Significance is a measure of the magnitude of a potential effect compared to / in relation to the sensitivity or importance of the receptors. An accurate and robust determination of effect magnitude or sensitivity of a receptor requires a certain level of qualification or quantification. This is generally based on the information contained within the plan, programme or strategy being assessed and the information contained within the baseline review.

Table 9.1 below sets out the evaluation criteria that will be used to assess the emerging packages and options against the SEA topics.

Table 9.1: Evaluation Criteria

Potential Effect		Evaluation Criteria
Significant Adverse	✖✖	The precise measure for **significant adverse effect** will vary across the different SEA topics. However, in general, the key factors influencing the potential for a significant adverse effect to occur are likely to include: - Permanent, long term or irreversible change in baseline conditions e.g. reduction in quality of baseline environment or effect on baseline features (receptors) - Direct and indirect effect on baseline features of international or European importance e.g. habitats, species and sites designated under the EU Habitats or Birds Directives, - Direct effect on baseline features of national importance (e.g. habitats or species of national value/importance) It should be noted that each SEA topic, and the baseline environment/features (receptors) associated with that topic, will need to be considered on a case by case basis. There is potential that the criteria listed above will be subject to modification during the assessment to reflect specific characteristics of the baseline environment. However, any modifications will be reflective of the main principles of an assessment of **significant adverse effect** listed above.
Negative	✖	As above, the measure for **negative effect** will vary across the different SEA topics. However, in general, the key factors influencing the potential for a negative effect to occur are likely to include: - Temporary, short term or reversible change in baseline conditions e.g. reduction in quality of baseline environment or effect on baseline features (receptors) - Indirect effect on baseline features of national importance (e.g. habitats or species of national value/importance) - Direct effect on baseline features that are not designated under international, European or national legislation
No Impact	=	The will be no interaction between the drainage strategy option and the baseline environment / feature.
No Change From Baseline	~	There will be no change in baseline environment/features resulting from the implementation of the drainage strategy option.
Slight Beneficial	✓	The implementation of the drainage strategy option will have a slight positive effect on the baseline environment/features.
Beneficial	✓✓	The implementation of the drainage strategy option will have a positive effect on the baseline environment/features.

10 Construction Impacts and Mitigation

10.1 Introduction

The packages and options set out within the NEWABTS have been assessed in two stages. Whilst it is important to highlight where temporary effects could occur from construction, with good practice and appropriate construction mitigation, these could be avoided. However it was felt that the presentation of these effects within the assessment matrixes presented in Annex A could mask the key issues. This chapter therefore sets out the temporary, short term effects that could occur as a result of construction of a number of options. Potential permanent operational effects are presented in Chapter 11.

Some options are predicted to have potential negative effects on the environment as a result of construction activities. These relate mainly to the provision of new infrastructure/facilities (e.g. new roads, footpaths, cycleways, bus stops and stations etc) or upgrades/changes to existing infrastructure/facilities e.g. road widening or realignment. Construction activities are generally short term and temporary, most occurring during the construction period only, ceasing once a development becomes operational. The majority of these potential effects can be avoided or reduced through recognised mitigation and application of good practice procedures.

However, there are some effects that occur during construction that have long term, occasionally permanent effects such as habitat loss/removal. Although these potential effects have been considered below in relation to construction activities they are also considered in Chapter 11 in respect to the operation of certain options/schemes.

Construction activities generally include the following:

- Vegetation removal.
- Ground/earth movements
- Movement of materials (import of construction materials and removal of waste)
- Traffic movements to and from site
- Noise generated by construction machinery/activities
- Construction of contractor compounds
- Changes to water drainage patterns (below ground and surface)
- Generation of dust resulting from earth movements and construction activities

Further detail on the potential effects associated with these activities is provided in Table 10.2 below.

A number of the packages and options included in the NEWABTS are likely to involve some degree of construction and therefore could potentially have temporary negative effects on the environment. These packages/options are listed in Table 10.1 below.

Table 10.1: Options which could potentially have temporary environmental effects during construction.

Package	Corridor	Options which may involve construction
Package 1 (Managing Demand)	None of the options presented within this package would result in construction.	
Package 2	Strategic trips	- Improve safety and security of existing walking and cycling routes to ensure they are maintained to a high standard. - Provide additional signage for walkers and cyclists. - Bus priority, such as signal priority at key junctions to avoid traffic congestion and improve reliability - Real time passenger information at bus stops - Improve station accessibility - Reduce the number of slip roads on the strategic highway network. Reduce local distributer road access. - Consider a signage strategy for traffic travelling to/from the Midlands - Consider a signage strategy for traffic travelling to/from North England.

Package	Corridor	Options which may involve construction
		- Variable Messaging signs.
	Flint, Mold, Chester	- Bus priority along the B5129 through Connah's Quay /Shotton/Queensferry - Improved connection between rail and bus services at Shotton stations - Improvements to Alltami Signals - Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay - Minor on-line improvements between Broughton and Saltney
	Wrexham Deeside	- Improved connection between rail and bus services at Shotton stations - Consider a signage strategy for traffic travelling between the A55 and Wrexham - Make better use of A541 / A550 route between the A55 and Wrexham - Overcome pinch points in the Hope/Caergwrle area - Improvements on the A541 between Mold and Wrexham
	Chester Wrexham	- Bus priority at the A483/B5445 junction to avoid congestion
Package 3	Strategic Trips	- Provide walking and cycling crossing facilities on trunk roads and associated junctions - Provide safe walking and cycling routes from communities to public transport interchanges. - Potential to link National Route 5 from Chester to Denbigh and Wrexham - Mold to Saltney cycle way - Provision of a Dee Coastal Path in Flintshire - Mold – Deeside cycle route - New walking and cycling links to key employment sites - Freight Consolidation Centres including one at Deeside - Truckstops - Crawler Lanes on the key trunk roads and other single carriageway A-roads - Rail electrification - Park and Ride scheme - Apply managed motorway concepts to key trunk roads - Provide hard shoulders on dual carriageway trunk roads - Enhance the A548 route between Flint and the A550 - A483/A55 Junction Improvement - Improve key junctions on the A483 - New road connecting the A55 and A548 - A55 Ewloe to Northop Improvements - Ewloe Interchange Improvements - A494 Ewloe to Drome Corner Improvements - Improvements to the capacity of the A494 River Dee Crossing
	Flint, Mold, Chester	- New station at Queensferry on the North Wales Main Line - New station at Deeside Park on the Borderlands line - Improve road connections to Deeside Industrial Estate - Improve road connections to the Broughton area
	Wrexham Deeside	- Create a multi-modal hub at Wrexham General station - New station at Deeside Park on the Borderlands line - Increase parking provision at stations along the Wrexham - Bidston line (e.g. Penyffordd) to promote park and ride. - Improve road connections to Deeside Industrial Estate - New road bridge between Connah's Quay and Deeside Park
	Chester Wrexham	- Create a multi-modal hub at Wrexham General station - New station at Rossett on the Wrexham to Chester line

Table 10.2 below provides details on the potential short term and temporary effects in relation to each of the SEA subject areas that may arise from construction activities associated with the options set out in Table 10.1 above. The extent of construction

required for each of the options is not known at this stage therefore the potential negative effects shown in Table 10.2 may not occur as an consequence of construction activities of all options listed instead it details the general potential effects that could arise from construction activities.

Table 10.2 also sets out potential mitigation measures to minimise construction effects. However specific measures will need to be developed as part of the scheme development. A number of the schemes would require large scale infrastructure development these will require further assessment and should be screened for the requirement for an Environmental Impact Assessment (EIA) and a project level Appropriate Assessment (AA).

Table 10.2: Potential temporary construction effects and suggested mitigation

SEA Topic	Potential Effects	Potential Mitigation Measures
Biodiversity	- Vegetation removal - Loss and fragmentation of habitat	- Minimise tree/vegetation/topsoil removal - Habitat restoration
	- Disturbance of protected species	- Protected Species surveys - Timing of construction - Footbridges and underpasses
	- Hedgerow removal	- Avoid/ minimise removal - Replanting of hedgerows
	- Impacts on breeding / wintering birds	- Site clearance outside the bird breeding season - Breeding bird surveys
	- Impacts on fish	- Any works within and close to watercourses should be carried outside of the spawning period for fish
Landscape	- Visual impacts of construction activities	- Techniques to integrate the scheme into the surroundings - Visual barriers (fencing /hedge planting) - Retain and manage existing vegetation
Archaeology and Heritage	- Loss or disturbance of Scheduled Monuments, listed buildings or structures	- Consult with Country Archaeologist prior to construction - Minimise and monitor ground disturbance
	- Loss or disturbance of unknown archaeology due to excavation work	- Geophysical surveys - Archaeology watching brief
Water	- Temporary discharges/ risk of pollution	- Use of construction SUDS and adoption of best practices to avoid pollution of watercourses
	- Pollution incidents and run off	- Consultation with the EA and obtaining the necessary temporary discharge consents. - Adoption of best practices to avoid pollution of watercourses e.g. Construction Pollution Prevention Guidelines - Monitoring of Private Water Supplies - Appropriate storage of fuels and solvents.
Noise	- Noise and vibration resulting from construction activity (machinery, construction traffic)	- Restrict hours of operation - Use of Best Practicable Means, such as low noise emission machinery - Erection of temporary noise screens where required
Air	- Creation of dust and particulates	- Follow appropriate guidelines for construction dust management - Implementation of construction traffic management plans
Climatic Factors	- Emissions from construction vehicles	- Types of vehicles used - Implementation of construction traffic management plans which should also include guidelines for good practice such as ensuring the ignition is turned off when not in use.

SEA Topic	Potential Effects	Potential Mitigation Measures
Soil	- Erosion or damage to soil	- Implement soil erosion prevention measures outlined in best Practice Guidance
	- Waste generation (from aggregates (rubble, concrete etc) and earth)	- Preparation of a waste management plan demonstrating how targets for the recycling and reuse of aggregates and other waste (60%) will be met. - Management of waste in line with Developers Duty of Care.
	- Land contamination	- Pre construction surveys and application of Good Practice Guidelines
Population	- Nuisance (noise odour, dust)	- Good Practice Guidelines - Consultation with the Environmental Health Officer (EHO)
	- Footpath, bridleway and cycleway closures and diversions	- Consultation with local residents and users of footpaths, cycleways and bridleways. - Provision of alternative routes (diversions) during construction.
	- Changes to public transport timetables	- Liaise with residents
	- Construction traffic	- Traffic management and calming - Limit construction working hours
Material Assets	- Damage to existing infrastructure	- Regular inspections
	- Demand for construction materials	- Reuse of materials where appropriate
Human Health	- Accidents from construction traffic - Poor air quality due to construction dust - Noise from construction traffic and machinery	- Noise insulation - Appropriate construction methods - Speed regulations - Consultation with the Environmental Health Officer (EHO) - Follow appropriate guidelines for construction dust management
All Topics	- Various	- Development of a Construction Management Plan (CMP).

Most of the potential effects listed in Table 10.2 above can be reduced or avoided through the implementation of appropriate mitigation measures (also listed in Table 10.2 above). Any construction works will also need to be timed appropriately so as to avoid significant effects on the qualifying features of the designated sites and protected species. Therefore, it is unlikely that, during construction, any of the options/ schemes included in the NEWABTS if implemented alone will have significant adverse effects on the environment. However, in order to ensure that the options taken forward under the NEWABTS do not have any potential significant adverse effects on the environment it will be necessary for the NEWABTS to include specific statements/commitments requiring individual options/schemes to be subject to specific detailed assessments which will identify project level mitigation to be implemented and timed accordingly

11 Assessment Results

11.1 Introduction

The following chapter of the ER provides a summary of the key findings from the assessment of the packages on the SEA topics. The chapter considers the permanent operational effects of the packages / options only. Temporary effects from construction activities are discussed in Chapter 10.

The assessment of construction effects (Chapter 10) concluded that as long as appropriate pre-construction surveys (or EIA for larger schemes) are carried out and other recommended mitigation measures are implemented where necessary, temporary construction effects can be adequately mitigated based on the level of information provided at this stage.

The detailed results tables for the assessment of operational effects are presented in Annex A. The key findings from the assessment matrixes are summarised below, according to each package. The effects presented within this chapter are those prior to mitigation; residual effects are presented in Chapter 12.

11.2 Package 1

This package is concerned with managing demand and sets out a number of options encouraging walking and cycling, consolidation of freight and travel planning.

The options focus on a modal shift from reliance on the private car to walking and cycling and where this is not possible car sharing. None of the options require any new infrastructure development and are unlikely to result in any significant adverse effects on the environment. However, where the options look to restrict the use of the car by implementing parking management strategies in town centres this may have a **negative effect** on accessibility for people, especially those in rural communities who have limited access to other transport services.

The overall package is aimed at encouragement of a modal shift which in turn should reduce congestion potentially having positive effects on biodiversity, air, climatic factors and human health. A reduction in traffic volumes may also reduce the routine runoff concentration having positive effects on water quality and aquatic habitats. However, it is unlikely that this package implemented by itself will result in any significant beneficial effects on the above.

11.3 Package 2

This package is aimed at making the best use of the existing infrastructure through improvements to existing transport interchanges, improved safety both on roads and cycle/footways, bus priority and improved signage. The package is expected to involve some minor infrastructure development, however the extent of these works is not known at this stage.

Generally the package is aimed at the encouragement of a modal shift from reliance on the private car to public transport both bus and rail and the encouragement of walking and cycling. The package also seeks to reduce congestion through improved signage allowing people to make an informed route selection, improved signals and pinch points and improved safety.

Table 11.1: Summary of the potential effects of Package 2

Theme	Potential Effects
Walking and Cycling	The options are aimed at encouragement of walking and cycling through improved facilities and improved safety. This could potentially have **positive effects** on biodiversity, air quality, climatic factors, and human health associated with reduced emissions. Increased level of walking and cycling will help to improve physical fitness which should also generate a **positive effect** on human health. Provision of secure parking facilities at public transport interchanges could **negatively affect** the character of the a number of stations which are designated as listed buildings
	The provision of additional signage for walkers and cyclists could potentially have a **negative effect** on the landscape / townscape and historic character if sited inappropriately. The improved safety of walking and cycling routes could potentially have a **negative effect** on certain protected species if inappropriate lighting is used.
Bus	These options are aimed at increasing bus patronage though bus priority reducing journey times, improved ticketing and real time information. Increased patronage will potential reduce emissions though fewer car journeys and potentially have **positive effects** on biodiversity, air quality, climatic factors and human health. Whilst these options are aimed at a modal shift potentially improving air quality there is the potential that the implementation of bus priority may have the potential for a **negative effect** on local if by instating bus priority this causes increased congestion for other road users. There are a number of listed buildings along the B5129 and the A483/B5445 where bus priority measures are proposed. Therefore there is the potential to **negatively affect** the historic environment due to effects on the setting of a number of listed buildings.
Rail	These options look to extend services to Manchester Airport, improve non car station accessibility and improved connectivity between stations. These options will potentially have **positive effects** on biodiversity, air quality, climatic factors and human health through encouragement of a modal shift and consequently reduced emissions. Where the options require modifications to train stations these have the potential to have negative effects on the historic environment as a large number of these are classified as listed buildings. If any land take is required for improved access and connectivity this could potentially result in **negative effects** on landscape and biodiversity.
Freight	These options are aimed at a modal shift from road freight and reduced congestion. These options could therefore potentially have a **positive effect** on biodiversity, air quality, climatic factors and human health through associated with potentially a reduction in emissions.
Highway	These options are aimed at reducing congestion though improving access through pinch point and the use of traffic information signs. These options also address safety on the existing highway network. The options seek to minimise congestion on the highway network thereby potentially having **positive effects** on biodiversity, air quality, climatic factors and human health from reduced congestion. Reduced congestion will also potentially have **positive effects** on population from reduced journey times. Those options which seek to improve safety, in particular, the closure of some slip roads on the strategic highway net work should reduce the risk of accidents / spillage risk resulting in **positive effects** on water quality and aquatic habitats. The options proposed that are likely to result in a degree of land take outside of the existing highway corridor such as the installation of variable messaging signs, could potentially have a **negative effect** on biodiversity from habitat loss and/or fragmentation.. There are a number of options which look at implementing signage strategies, these have the potential to **negatively affect** both landscape and the historic environment is signage is sited inappropriately. In addition if

Theme	Potential Effects
	minor improvements to highways within the Wrexham Deeside corridor are implemented within the immediate setting of listed buildings, scheduled monuments and the Local Landscape Area between Rosset and Wrexham these to have the potential to **negatively affect** landscape and the historic environment. One of the options looks to reduce the number of slip roads on the highway network whilst as discussed above this could result in a number of positive effects the reduction of the number of slips roads could potentially lead to increased congestion on local roads and **negatively effecting** biodiversity, air quality, and human health. This may also lead to **negative effects** on population associated with decreased accessibility due to increased congestion on local roads.

Generally the overall aim of package 2 is to encourage a modal shift from reliance on the private car and reduce congestion resulting in positive effects on the environment, in particular biodiversity, air quality, climatic factors, water quality and human health from reduced emissions. However, it is unlikely that the implementation of this package alone will result in any significant environmental benefits. Where the options presented seek to improve public transport services and walking and cycling routes this will also result in a positive effect on both accessible and physical fitness. In addition where the options seek to improve the safety of the existing highway network this should decrease the spillage risk and the associated effects water quality and aquatic habitats.

The package is aimed at making best use of the existing infrastructure therefore any infrastructure works proposed are likely to only be minor on line improvements. Even though the works are likely to be minor, if not appropriately designed they could lead to negative effects on biodiversity where land take / habitat loss is required and on protected species where the installation of lighting is used inappropriately. Negative effects could also arise on landscape and the historic environment from inappropriate siting of signage and alterations to a number of stations which are listed structures. The package also has the potential to negatively affect air quality from the diversion of traffic from the strategic highway to local roads from the closure of slip roads and if bus priority measures result in increased congestion for other road users. However, the implementation of package 2 is unlikely to lead to any significant adverse effects on the environment.

11.4 Package 3

This package is aimed at increasing the capacity of the transport infrastructure, including footpaths and cycleways, bus and rail services, and the highway network. The package presents a series of options which include some large infrastructure developments and some minor developments.

Whilst the package proposed infrastructure developments, these are aimed at encouraging a modal shift to walking and cycling and from the private car to the bus and train as well as capacity improvements to the highway network aimed at reducing congestion.

Table 11.2: Summary of the Potential Effects of Package 3

Theme	Potential Effects
Walking and Cycling	These options are aimed at encouraging and facilitating increased levels of walking and cycling through the provision of new routes in increased safety on existing routes. Generally these options should encourage a modal shift and therefore generate **positive effects** on biodiversity, air quality, climatic factors and human health from a reduction in emissions. In addition increased levels of waking and cycling will have a **positive effect** on physical fitness. Increased walking and cycling routes will also potentially have a **positive effect** on population through improved accessibility. Where options seek to use existing resources such as the use of the disused railway in the Mold to Saltney cycleway this could have **positive effects** on landscape through the enhancement of existing resources. Whilst there are a number of positive effects the provision of new cycleways and footpaths could potentially lead to a number of adverse effects on the environment. Where these are developed off line i.e. not using the existing infrastructure this will result in land take and associated habitat loss resulting in a **negative effect** on

Theme	Potential Effects
	biodiversity. In particular the provision of a Dee Coastal Footpath could have **significant adverse effects** on the Dee Estuary / Aber Dyfdwy designated sites, in particular disturbance to wintering, passage and breeding birds. The potential to link to the National Route 5 may also have significant adverse effects as whilst the exact route is not know could be in close proximity of a number of protected sites. In addition to land take and disturbance the use of inappropriate lighting to improve the safety of footpaths and cycleways could have **negative effects** on protected species. The development of new off line cycleways and footpaths and the use of inappropriate signage for on line cycleways and footpaths could have **negative effects** on landscape and the historic environment. Where off line infrastructure is developed there is the potential that increased impermeable surface area could have a **negative effect** on flood risk.
Bus	These options are aimed at increasing bus patronage by introducing new bus routes and multi modal hubs. Increased bus patronage could have **positive effects** on biodiversity, air quality, climatic factors and human health associated with reduced emissions from a modal shift. Improved bus services could result in a **positive effect** on population from improved accessibility of public transport services especially to employment sites and rail stations. Where new infrastructure is needed to create multi modal interchanges, or new bus routes any land take that is required may have a **negative effect** on biodiversity from fragmentation and/or loss of habitat.. The placement of new infrastructure will could also have a **negative effect** on landscape and the historic environment.
Rail	These options are aimed at increasing the frequency of train services, provision of new stations and improved accessibility of stations. These options should result in improved rail services which should in tern facilitate a modal shift from reliance on the private car to train travel. This could potentially have **positive effects** on biodiversity, air quality, climatic factors, water quality and human health. Where the options propose a service frequency increase and no additional infrastructure development is required there are unlikely to be any significant environmental effects, however, there is the potential for **negative effects** on neighbouring properties to from an increase in noise. One of the options looks at creating a fast service from Llandudno and Manchester Airport by the removal of intermediate stations. Without the implementation of a new service to serve the stations that would be removed there is the potential to have a **negative effect** on accessibility and a modal shift back to reliance on the car. Whilst the construction of new stations may help to facilitate a modal shift, there is the potential for **negative effects** on landscape and the historic environment if inappropriately designed. In addition where land take is required any associated habitat loss and /or fragmentation of habitat will have a **negative effect** on biodiversity. The provision of increased parking facilities at stations within the Wrexham and Deeside will help to facilitate a partial modal shift, however this could also result in **negative effects** on localised are quality, biodiversity and flood risk.
Freight	This options and aimed at reducing congestion on the highway network that develops a consequence of high volumes of freight and the encouragement of a modal shift from road to rail freight. Where the options seek to reduce congestion by the provision of consolidation centres, truck stops and crawler lanes these could potentially result in **positive effects** on biodiversity, air quality, climatic factors, water quality and human health. In addition reduce congestion on the strategic highway network will reduce the journey times of other road users having **positive effects** on accessibility. The provision of freight consolidations centres are aimed at consolidating and reducing the amount of freight on the highway network. The options propose a centre at Deeside within the existing industrial estate,

Theme	Potential Effects
	however if designed and sited inappropriately there is the potential for **negative effects** on landscape. The land take required for the provision of the consolidation centres, crawler lanes and truck stops is likely to result in some habitat loss and **negative effects** on biodiversity. Where the option makes the provision of crawler lanes in the strategic and Wrexham Deeside corridors there is the potential for a negative effect on air quality if the addition of the crawler lanes increases traffic volumes or reduces the distance between road traffic and sensitive receptors. Options that seek to increase the amount of freight transported by rail by improving the handling equipment and provision of electric freight trains could have **positive effects** from reduced congestion and decreased emissions. However inappropriate siting of handling equipment could result in **negative effects** on landscape and townscape.
Demand Management	These options focus on park and share and park and ride options. Essentially these options are aimed at reducing traffic volumes and congestion which could result in **positive effects** on biodiversity, air quality, climatic factors, water quality and human health. Park and share schemes are unlikely to have significant effects on the environment as generally the option will reduce traffic volumes and no new infrastructure would be required. Park and ride schemes, however, could result in **significant adverse** effects on biodiversity from loss and/or fragmentation of habitat. The introduction of new lighting could also have **negative effect** on certain protected species. The increase in impermeable surfaces could have **negative effects** on flood risk and **negative effects** on landscape and the historical environment. The provision of park and rise facilities will also have **negative effects** on air quality and noise in the surrounding areas.
Highway	These options are aimed at new infrastructure development on the highway network to reduce congestion on the highway network. These options look at increased management, road widening, junction improvements and new roads. Generally the options presented are fundamentally aimed at reducing congestion which should result in **positive effects** on biodiversity, air quality, climatic factors, water quality and human health. Whilst the overall aim of the options is aimed at having beneficial effects on the environment the development of new infrastructure if not managed appropriately could result in adverse effects. The options with potentially the most significantly adverse effects are the two new bridges over the Dee and the provision of a new road between the A55 and the A548. Widening the existing A494 river crossing has the potential to effect the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC, and the Dee Estuary / Aber Dyfdwy Ramsar, SPA and SAC if not appropriately designed and therefore **significant adverse effects** on biodiversity have been predicted. In addition if the widened road increases the traffic flow or decrease the distance to sensitive receptors there could be some negative effects on air quality and noise. However, the widening of this structure should reduce congestion through this area which is currently a pinch point in the network which in turn could have **positive effects** on local air quality and surrounding habitat. In addition the widening of the impermeable surface and the reduced congestion could have **positive effects** on water quality from increased dilution of the routine runoff. It is likely that the same negative effects described above could occur as a consequence of the provision of a second bridge across the Dee connecting the B5129 with the Deeside industrial park. However provision of the bridge may reduce congestion along the B5129 especially through settlements of Connah's Quay, Shotton and Queensferry. This could have **positive effects** on local air quality and noise in the surrounding area from reduced congestion. The provision for a new road connecting the A55 and the A548 could result in **significant adverse effects** on biodiversity as a result of habitat loss and/or fragmentation as there are a number of sensitive habitats in this

Theme	Potential Effects
	area such as ancient woodland and known protected species. If the new road is proposed to be lit then this could result in **negative effects** on certain protected species. The introduction of a new road could also lead to **negative effects** on water quality and consequently aquatic habitats through the introduction of routine runoff. The increase in impermeable surface area could also have a **negative effect** on flood risk. The introduction of a new road could also have a **significant adverse effect on landscape** and the historic environment associated with the removal of landscape features such as hedgerows and mature trees. This option also passes through an area designated as green belt. The new road will introduce a new traffic source to the area therefore there is the potential for **negative effects** on air quality and though increased traffic volumes and reduced distance to sensitive receptors. For the same reasons there is also likely to be **negative to significant adverse effect** on noise. However, the aim the works on the A55/A494 will ultimately to reduce congestion and improve traffic flow through the area potentially having **positive effects** on air quality, human health and biodiversity in adjacent areas through Queensferry. However, there are still likely to some **residual negative effects** in relation to noise levels and effects on landscape character. The other options including the provision of hard shoulders, junction improvements to A55/A494, A483/A55, A55/A548 and enhancement of the A548, A483, A55 and the A499 are all aimed at reducing congestion, potentially resulting in **positive effects** on the biodiversity, air quality, climatic factors, water quality and human health. However, where land take is required this could have **negative effects** of biodiversity, landscape and the historic environment. If the improvements result in an increase in traffic flow and a reduced distance to sensitive receptors there could be **negative effects** on air quality, noise and biodiversity. Where the improvements result in increased impermeable surfaces there could be a **negative effect** on flood risk, however this could have a **positive effect** on water quality from increased dilution of the routine runoff.

Package 3 is aimed at reducing congestion through infrastructure developments to increase capacity and encouragement of a modal shift by the provision of new cycleways and footpaths and increased public transport services. Generally the options presented will lead to reduced congestion and therefore positive effects on biodiversity, air quality, climatic factors, water quality and human health associated with reduced emissions. However, it should be noted that individual options by themselves are unlikely to result in a significant beneficial effect.

The assessment has identified that for most of the options where any infrastructure development is required there is the potential for negative effects on biodiversity, landscape, the historic environment, noise levels and local air quality. However, these effects can potentially be reduced through scheme design and siting. It is likely that a number of the option will involve a certain level of land take which could potentially have a negative effect on biodiversity due to habitat loss, fragmentation of habitat and disturbance of protected species. In addition the increase in the amount of impermeable surface area in the study area, if not appropriately mitigated could have negative effects on flood risk.

However, the assessment has also identified that there are a number of options that have the potential to have likely significant adverse environmental effects. The provision of a Dee Coastal Footpath, a new road bridge and modifications to the A494 over the Dee estuary, depending on their proximity to the Dee Estuary / Aber Dyfdwy has the potential to cause disturbance to over-wintering, passage and breeding birds all of which are qualifying features of the SPA designation. Any potential effects on the integrity or conservation value of the SPA would be subject to more detailed assessment as part of the Appropriate Assessment process. It is likely that detailed mitigation would have to be developed to ensure that there are no adverse effects on the SPA.

The provision of park and ride schemes throughout the study area, again, depending on their location, have the potential for significant habitat loss and species disturbance and longer term adverse effects on local air quality and noise levels due to increased traffic movements in the local area. Where park and ride schemes involve the provision of new hard standing car parking there is potential for the schemes to have negative and significant adverse effects on flooding due to increases in the area of impermeable surfaces.

One of the options included in this package is the provision for the widening the A494 River Dee crossing and new road bridge over the Dee. This assessment has identified that these schemes could potentially have a number of likely significant adverse effects, one of which includes the potential for significant effects on the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC designation due to potential direct disturbance to the river and immediate surrounding environ (e.g. increased runoff of pollutants and sediment). Other potential likely significant effects include effects on landscape character due to changes in the road alignment and appearance plus habitat loss. Although the focus of the scheme would be to reduce local congestion in the

area and improve traffic flow through the area, there is potential that the scheme could have adverse effects on local noise levels due to increased volumes of traffic on the road and local air quality. However, through detailed design and the implementation of appropriate mitigation measures these effects could be reduced.

However, although there is potential for adverse effects, there are also a number of benefits that could result from this option such as reduced congestion (which will help to improve local air quality and local road safety) and improved water quality. The provision of the new road bridge between Connah's Quay and Deeside Industrial Park could also result in significant effects, however is unlikely to result in as significant benefits as the widening of the A494 crossing. The option which is likely to result in the most significant adverse effect is the provision of the new road between the A55 and the A548 and the implementation of this option should be assessed against the benefits that would result both with and without the implementation of the other options.

12 Cumulative Effects

12.1 Introduction

This chapter of the Environmental Report sets out any cumulative effects of implementing the packages/options. The cumulative effect of multiple options on a SEA topic as well as the cumulative effect between SEA topics has been considered.

12.2 Cumulative Effects

12.2.1 Temporary Effects

Negative cumulative effects could occur where construction activities occur at the same time and in the same general area. In addition negative cumulative effects could also result on protected sites that are hydrologically linked to construction sites or that are liked by other causal pathways.

Where construction is undertaken on the highway network this is likely to result in a temporary increase in congestion resulting in temporary effects on local air quality, noise and accessibility. However, if construction works are also to be undertaken at the same time in close proximity or the same general area or on a known alternative route these effects could be exacerbated. The potential for temporary cumulative effects will not be known until scheme implementation at which point other construction projects in the area and their implementation will be timed accordingly.

12.2.2 Permanent Operational Effects

The main aim of all three of the packages is to reduce congestion and facilitate a modal shift. As discussed in Chapter 11 it is unlikely that a number of the minor options, if implemented alone, will have result in any significant decrease in emissions or modal shift thus significant environmental benefits are unlikely to be realised. However, where a number of options are implemented together, for example increased frequency of bus and rail services with measures to improve ticketing and integration the cumulatively beneficial effect on the environment is likely to be greater.

Development of a number of the larger scale infrastructure schemes in a localised area could potentially have significant cumulative adverse effects in terms of effects on landscape character and visual amenity, biodiversity due to habitat loss and species disturbance over a larger area, and possible effects on local noise levels and air quality. Further work is underway to examine in more detail these potential effects, particularly in relation to the A494/A55 widening and River Dee Crossing Schemes which are currently being subject to more detailed environmental assessments through (WelTAG). As part of these schemes the results from this SEA and the WelTAG assessment will be incorporated into final plans and option designs, including options for reducing or offsetting potential adverse environmental effects through detailed scheme design.

Table 12.1 below presents a summary of the overall cumulative effects of the NEWABTS on the SEA Topics.

Table 12.1: Summary of Cumulative Effects

SEA Topic	Comments	Cumulative Effect On SEA Topic (resulting from combination of effects across options and packages)	Cumulative Effects between SEA Topics (resulting from combination of effects on SEA Topics)
Biodiversity	- Some of the road improvements proposed (Highway options) have the potential for cumulative negative effects on biodiversity due to the associated land take and habitat loss. - *Provided that the mitigation measures in Chapter 13 are implemented and consideration is given to appropriate design and timing of works and where necessary additional habitat creation, there are unlikely to be any negative cumulative effects on biodiversity.* - Beneficial effects on biodiversity are associated with a decrease in deposition of pollutants due to a modal shift from reliance on the private car to more sustainable forms of transport. A reduction in deposition will also have a beneficial effect on water quality and associated aquatic habitat.	✓	***Water***
Landscape	- Some of the road improvements proposed (Highway Capacity interventions) have the potential for negative effects on landscape due to the visual impact of new infrastructure. - *These options will be subject to further environmental assessment (EIA or equivalent) during which a landscape architect will work with and influence the design to minimise effects on landscape. Provided that these further assessments are implemented, there are unlikely to be any significant cumulative effects on landscape.*	-	-
Archaeology and Heritage	- Potential for cumulative negative effects due to increased and inappropriate street furniture from the implementation of a number of interventions. - *Provided that the mitigation measures in Chapter 13 are implemented and the street furniture used is appropriate to the surrounding character, there are unlikely to be any cumulative effects on archaeology and heritage.*	-	-
Water	- Some of the road improvements proposed (Highway Capacity interventions) have the potential for beneficial effects on water due to increased dilution of routine runoff and potential to integrate treatment (SUDS) into the proposed scheme. - There is also the potential for beneficial effects on water associated with a decrease in deposition as a result of a proposed modal shift. A reduction in deposition will also have a beneficial effect on aquatic biodiversity.	✓	***Biodiversity***
Noise	- Overall, there are predicted to be cumulative beneficial effects to noise. This is associated with a reduction in congestion from both highway capacity improvements and the options which seek to encourage a modal shift towards more sustainable forms of transport. - There will be an associated beneficial effect on	✓	***Population***

SEA Topic	Comments	Cumulative Effect On SEA Topic	Cumulative Effects between SEA
	population.		
Air	- Benefits to air quality associated with a reduction congestion/ emissions due to fewer cars on the road (modal shift to public and sustainable forms of transport) and highway capacity improvements. - There will be an associated beneficial effect on human health and climatic factors.	✓	***Climatic Factors*** ***Human Health***
Climatic Factors	- Benefits for climate associated with a reduction in congestion/ emissions due to fewer cars on the road (modal shift to public and sustainable forms of transport) and highway capacity improvements - Reduced emission has benefits for air quality and human health also.	✓	***Air Quality*** ***Human Health***
Soil	- Some of the road improvements proposed (Highway Capacity interventions) have the potential for cumulative negative effects on soil due to the need for soil resources during construction. - *Provided that the mitigation measures in Chapter 13 are implemented and consideration is given to minimising waste, there are unlikely to be any cumulative effects.*	-	**-**
Population	- The Beneficial effects on population include improved public transport, better accessibility, increased flexibility, more predictable journey times to services and employment and people being more active. - Many of the options that are beneficial to population are also beneficial for human health e.g. reduced congestion means better air quality and better health. Improved public transport means people are more like to use public transport and use more sustainable modes of transport such as walking or cycling for part of their journey.	✓	***Human Health*** ***Air Quality***
Material Assets	- There is likely to be a cumulative effect on material assets due to improved infrastructure. - An improvement in maintenance of the transport network has an associated beneficial effects on road safety and therefore also on human health.	✓	***Human Health***
Human Health	- There are beneficial health effects associated with the majority of interventions. Benefits to human health are possible due to more predictable journey times to services, reduced congestion, decreased emissions and options which encourage people being to be more active. - Improved maintenance of the transport network will have an associated beneficial effect on road safety and therefore also on human health.	✓	***Population*** ***Air Quality*** ***Material Assets***

13 Mitigation and Residual Effects

13.1 Introduction

This Chapter of the Environmental Report identifies the mitigation measures required where effects cannot be avoided. It also presents opportunities for enhancements that have been suggested to increase the overall 'sustainability' of the NEWABTS.

13.2 Mitigation Measures

Part of the SEA assessment process requires the identification of measures to prevent, reduce or offset any significant adverse effects likely to occur as a result of implementing the NEWABTS and to maximise its performance in terms of sustainability. These are commonly referred to as mitigation measures, and include both the proactive avoidance of adverse effects as well as the identification of actions to be taken once effects are identified. Measures also often include recommendations for improving beneficial effects.

A number of negative effects have been identified as a result of the assessment of the NEWABTS. The majority of these relate to proposed large scale infrastructure developments e.g. options within the Highway Options Group. It is likely that most significant negative effects would occur during construction and are likely to be short term and localised. Construction effects and mitigation have been discussed within Chapter 10. It was concluded in Chapter 10 that for the major schemes further assessments (EIAs) will be undertaken and for those which are not subject to EIA further surveys including pre construction surveys will be carried out where necessary. These will identify appropriate construction mitigation such as that detailed in Table 10.1 therefore minimising the potential for any negative effects occurring during construction.

However, there are also likely to be longer terms effects associated with the use of any new infrastructure, in particular on landscape, biodiversity, noise and water quality/flood risk. As identified in Chapter 11, it is expected that a number of the potential environmental effects can be avoided or minimised through the implementation of appropriate mitigations measures. The mitigation measures suggested for the NEWABTS are based upon:

- Level of detail provided in the intervention;
- Scale of the potential effect (e.g. local authority wide or site specific);
- Level of detail in the baseline information (e.g. scale of coverage);
- Understanding of the environmental and sustainability issues affecting the area; and
- Requirements/deliverable of the NEWABTS.

The packages provided within the NEWABTS are generally very high level options where the specific location is not known. Consequently the lack of spatial reference (e.g. identification of specific sites or locations for development) associated with the options limits the accuracy by which their effect on the environment can be predicted and evaluated. Without knowledge of the exact area that will be affected by an intervention it is also difficult to accurately identify the receptors that will affected, their relative importance and how the baseline will change (magnitude).

As a consequence of this lack of spatial reference, some of the findings of the SEA are not based upon specific baseline data, but on a detailed understanding of the characteristics of the study area, and an understanding of how the packages and options are likely to interact with the surrounding environment.

With regard to the identification of the mitigation measures, whilst it is necessary for these to be developed in the context of the NEWABTS and the SEA process, in the absence of development or site specific proposals it is not practical to identify specific mitigation measures. The approach to the identification of the mitigation measures is therefore based on general understanding and appreciation of the types of measures that can be applied at a project level.

Whilst this approach has been adopted for a number of SEAs, concerns have been raised as to whether the SEA process is simply deferring responsibility for environmental protection to the project level EIA process. Whilst it is not intentional for this to be the case, it inevitably occurs due to a lack of detail in high level strategic plans. It is not always practical or appropriate to amend or delete packages or options if the SEA process is unable to accurately determine if that intervention will have significant adverse effects. In most situations it will only be possible to determine whether significant adverse effects are likely to occur once a number of detailed options or a specific site/development design has been identified.

Proposed mitigation measures are listed in Table 13.1 below:

Table 13.1: Proposed Mitigation Measures

SEA Topic	Mitigation Measures and Enhancement
Biodiversity	It is not possible to fully prescribe mitigation for the study area until further surveys have been conducted. However the following forms of mitigation are likely to be required following the associated surveys. Once the preferred options have been identified, further, more detailed site surveys will be required. An Extended Phase 1 Habitat Survey will need to be undertaken, in accordance with the JNCC Handbook for Phase 1 Habitat Survey (2004), and will include all areas of land to be affected by the works. Surveys for invertebrates may be required depending on what habitats the chosen route could affect. These may include surveys on woodland, scrub, hedgerows and streams. Should the chosen options involve disturbance or significant suitable reptile habitat removal, reptile surveys will be required prior to construction. Any mature trees and built structures that will be affected by the chosen option/s will need to be assessed by an experienced ecologist for their potential to support roosting bats. Should any roost be determined to be present on site, then a licence would be required prior to any works commencing on site and appropriate exclusion mitigation may be required. New lighting along the railway, woodland, hedgerow and river corridors should be avoided. In the limited areas where lighting cannot be avoided for health and safety purposes, it should be heavily mitigated, to reduce light spill to a minimum, with street lighting being switched off after peak hours. In all areas, lighting design should follow the best practice guidance by the Bat Conservation Trust Bats and Lighting in the UK. These include: - Using low or high pressure sodium lights instead of mercury or metal halide lamps - Direct lighting to where needed and avoid spillage e.g. direct lighting towards the building front and design the luminaire appropriately, including the use of hoods, cowls, shields etc to avoid spillage onto the river corridor and tree lines. - Using lighting modelling programs to indicate where the light spill will occur. - Only light areas which need to be lit, and use the minimal level of lighting required to comply with guidance such as Institute of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light (2005). - Use movement sensors or timers on security lighting. - Do not use a lamp greater than 150W for security lighting. Depending on the options chosen and the types of habitat affected, badger surveys may be required prior to the commencement of works. Badger surveys can be conducted between September and April and as a minimum will require one survey. Any watercourses, including drains and ditches, within the study area which will be crossed or lie adjacent to the proposed works, will need to be surveyed for their potential to support otter, water vole and crayfish. Any watercourses assessed as having potential to support these species should be subject to further, more detailed surveys. Should the chosen options affect groups of trees, woodland areas or require the removal of sections of well

SEA Topic	Mitigation Measures and Enhancement
	established hedgerow, dormouse surveys should be undertaken prior to construction. Dormouse surveys can stretch over several months and should include a range of methods. Surveys can include nest box surveys (undertaken between March and October), nest searches (undertaken between September and February) and searching for nut remains (undertaken between September and December). A development licence is required before the commencement of any development that might impact on dormice or dormouse habitats. To avoid disturbance to breeding birds, it is recommended that any vegetation clearance is undertaken during October to February inclusive (outside of the breeding bird season). If works are undertaken from March to September inclusive, the area should first be inspected by an ecologist, at most 48 hours before work begins in an area. If any nests are found they will have to be left undisturbed, along with a surrounding buffer area until the chicks have fledged. This could take up to six weeks depending on species. More protection is afforded to Schedule 1 species. In some areas of the study area, wintering and migration surveys may also be required, in particular where sited close to the SPAs and Ramsars, such as the Dee Estuary. Options involving creation of new bridges across the River Dee would require particular consideration. Consultation with CCW should be considered at the earliest possible stage for options with the potential to impact upon European protected sites (SPA, Ramsar and SAC). Any construction activity should aim to avoid periods where passage, breeding and over-wintering birds for which the Natura 2000 sites are designated for are using the site in significant numbers Any ponds and ditches within 500 m of the proposed works should be assessed by an ecologist for their potential to support the Great Crested Newt (GNC). This assessment can be assisted by the GCN Habitat Suitability Index (HSI). Fish surveys may be required should the works involve construction within a watercourse, such as the River Dee. It may be possible to request up-to-date species records from organisations, such as the Environment Agency. If not, fish surveys may be required prior to construction. Any surveys and subsequent construction within the river should not take place in the spring or in late autumn/early winter, so as not to interfere with fish migration patterns. Any proposed bridge structures should be open span and set back from the river banks. Working within the river should be avoided to prevent any potential species disturbance. Dependant on the options chosen, protected and notable flora species surveys may be required, within areas of potential conservation interest. Plant species lists may be compiled during Extended Phase 1 Habitat Surveys (discussed above). Such information can be used to carry out National Vegetation Classification Surveys (NVC); a system of classifying natural habitat types in Great Britain according to the vegetation they contain. Should plant species of conservation concern be identified, further mitigation may be required. Mitigation could include protecting plants in situ, permanent or temporary translocation. Each area where works are proposed should be subject to a controlled species survey, prior to construction. This type of survey can be incorporated into an extended phase 1 habitat survey (discussed above). As it is illegal to assist the spread of controlled plant species, such as Japanese knotweed and Himalayan balsam, a suitable method statement must be put in place prior to any works in areas where such species are found, to avoid their spread during construction. Vegetation and soil removal and disposal from contaminated areas should follow current controlled waste regulations. Any development should aim to retain features of ecological value within the scheme design. The highest priorities for protection are the River Dee and estuary, ponds, riparian habitats, wetland areas, woodland areas (particularly ancient woodland), important hedgerows, railway, and veteran trees. However, consideration should also be given to the scrub, mature trees, hedgerows, stone walls and grass verges. Ideally, green space should be provided with consideration to biodiversity to provide an overall ecological gain as recommended in TAN 5 and PPG 9.

SEA Topic	Mitigation Measures and Enhancement
	Scrub and hedgerows should be retained where possible. Hedgerow surveys may be required, dependant on the options chosen. In areas where vegetation must be removed it should be replaced by compensatory planting of local, native species. Appropriate timing of works combined with ecological supervision of scrub and hedgerow removal is recommended to reduce the risk to a number of protected species. It should also be noted that in certain cases, a hedgerow removal notice may be required to be submitted prior to the commencement of any removal works to hedgerows, this can take several weeks to be processed. Mature trees should be retained. The Root Protection Areas should be calculated and any development, including installation of signs and lighting, should be planned to avoid damaging tree roots. Any removed trees should be replaced by compensatory planting of locally native tree species. Guidelines within BS5837 Trees in Relation to Construction should be followed. Run-off from the study area during both construction and operation should be managed in accordance with current Environment Agency regulations and should reduce the potential for transmission of particulates and pollutants into the water course.
Landscape	There are a number of mitigation measures that could be proposed to avoid and/or reduce potential landscape/townscape and visual effects identified. The type of mitigation measures proposed would vary in accordance with the scale of individual proposals and sensitivity of the specific landscape setting, on a scheme by scheme basis. At a broad scale, the following measures could be considered for mitigation of all schemes where potential adverse effects have been identified. - Where new development or extensions to existing infrastructure are proposed i.e. new highways, park and ride sites, large scale junction improvements, new railway stations and highway widening, they should be carefully routed/located to avoid direct impacts on areas of designated landscape/townscape such as Ancient Woodland, Local Landscape Areas, Listed Buildings, Conservations Areas, registered Parks and Gardens; and - where possible, the routing/siting of proposed development could be undertaken to avoid direct impacts upon other existing features that contribute to the character of the landscape/townscape, such as woodland, mature trees (including those covered by a Tree Protection Order), historic field boundaries, existing screen planting. Where effects cannot be fully mitigated through routing and siting design, specific landscape mitigation proposals could be developed alongside overall scheme design, to reduce effects upon landscape/townscape character and key visual receptors. Mitigation measures could include: - Mass native tree and shrub planting to replace significant vegetation removed including that located within existing road corridors or that with a screening function in proximity to key visual receptors; - A combination of ground modelling and mass native tree and shrub planting to help integrate development within rural areas or to provide screening where located in proximity to sensitive visual receptors in both rural and urban areas; - Use of appropriate or vernacular materials in design of new development, particularly in areas of designated landscape or townscape quality/value to complement/enhance the setting, e.g. use of local stone where development is situated within or in close proximity to Conservation Areas or within setting of Listed Buildings; - Considered micro-siting of new development to avoid the requirement for new, urbanising structures within rural areas e.g. designing out the need for retaining structures as part of road widening or installation of ITS/VMS; - Landscape enhancement and/or restoration measures to compensate for the loss of important landscape features e.g. historic hedgerow restoration to mitigate loss of existing hedgerows; - Proposed planting and use of appropriate materials where development is in close proximity to designated areas e.g. Road widening or installations within highway in close proximity to Listed Buildings or Local Landscape Areas.
Archaeology and Heritage	- Surveys will be undertaken prior to the implementation of a scheme to determine the whether it will affect sites or areas of archaeological importance. - New transport schemes that are likely to generate an increase in traffic (road or rail) will be assessed prior

SEA Topic	Mitigation Measures and Enhancement
	to installation to determine whether the vibrations that would be generated from the traffic would cause damage to listed buildings. Where the levels of vibration would have adverse effects on a listed building the scheme may require modification or removal. - Adverse effects on the character and quality of conservation areas will be avoided or reduced by improving the quality, design and appropriateness of street furniture, lighting, road signs, safety features, public transport facilities (bus stops) and by reducing street clutter. Improvements to the quality and design of new and existing highways, footpaths and cycleways will also have positive effects on the character and quality of conservation areas. - By reducing congestion the NEWABTS will also have a positive effect on the character and quality of conservation areas by reducing or removing the intrusion of road traffic.
Water	- Ensure that all new transport schemes and transport improvement works involving construction activities adhere to appropriate environmental protection standards, good codes of practice, construction principles and design guides to ensure that the correct measures are implemented to prevent the pollution of surface water and groundwater. - Ensure all new transport schemes and transport improvement works will implement appropriate measures to minimise pollution from surface water runoff e.g. oil separators and silt traps. - Where new transport schemes and transport improvement works are likely to cause disturbance to contaminated land, advice will be sought from the Environmental Health Departments of the relevant Local Planning Authority. Where necessary PPC (Pollution Prevention Control) Permits will be obtained from the Environment Agency. - In areas where there are high water tables surveys will be required prior to the implementation of schemes involving construction activities to ensure that the there are no breaches of the groundwater and there are not future risks of groundwater pollution from road drainage schemes. - Where a scheme may effects sensitive wetlands (SPAs, Ramsar Sites, SSSIs) an EIA and Appropriate Assessment will be required to ensure that any changes to water quality or drainage patterns do not have adverse effects on the integrity of the wetland. - In accordance with Planning Policy Statement 25: development and Flood Risk, and on advice of the Environment Agency, Flood Risk Assessments will be carried out for all new schemes and transport infrastructure improvements that are to be located in 'flood risk zones 2 or 3' or by their nature have to the potential to cause flooding. - All new transport schemes and transport infrastructure schemes that are located in coastal areas will be assessed prior to implementation to ensure that they do not compromise existing coastal flood defences and do not prevent the installation of future coastal flood defences. - All new transport schemes and transport infrastructure schemes that are located in coastal areas will be assess prior to installation to ensure that they will not increase risk, or current rates of coastal erosion. - Promote the implementation of Sustainable Urban Drainage Schemes (SUDS) in all new transport developments.

Noise	- Carry out noise impact assessments involving:
	  - Ambient noise survey at identified noise sensitive locations
	  - BS 5228 assessment and mitigation
	  - Development of noise mitigation based on BS 4142
	  - Traffic assessment in accordance with CTRN
	- Implement appropriate noise attenuation measures where there is potential for schemes or initiatives to have an adverse effect on noise levels.

Air **Climatic Factors**	Historically, it has proven extremely difficult to improve areas of poor air quality associated with road transport emissions. It is therefore extremely important that any transport options which are implemented should be designed with due regard to areas of poor air quality e.g. Chester AQMA. The benefits associated with reducing car usage by encouraging bus use should be maximised by utilising buses with the highest emissions standard possible. Likewise freight consolidation centres could use Low Emission Vehicles to transport goods to locations in areas with poor air quality. The locations of park and ride schemes and rail and freight depots should be carefully chosen to minimise

SEA Topic	Mitigation Measures and Enhancement
	any localised air quality impacts which may result. Should changes in road alignment be proposed, it is important to ensure, where practicable, that the distance between road traffic and sensitive receptors is not significantly reduced. Where the opportunity presents itself, the distance between road traffic and sensitive receptors with poor air quality should be increased in order to improve local air quality at these receptors.
Soil	- Develop partnership working to ensure that the all new developments located on areas of previously developed land are accessible by public transport. - Investigate the implementation of schemes that will encourage and support future economic growth and the reuse of previously developed land. - Where new transport schemes and transport improvement works are likely to cause disturbance to contaminated land, advice will be sought from the Environmental Health Departments of the Local Planning Authorities. Where necessary PPC (Pollution Prevention Control) Permits must be obtained from the Environment Agency. - Develop partnership working to ensure that new transport schemes minimise the use of greenfield land and the severance of agricultural land holdings.
Population	- Ensure adequate consultation is carried out with rail passengers and other stakeholders with regards to any disruption of rail timetables due to implementation of any intervention.
Material Assets	- Ensure appropriate measures are put in place to mitigate any impact associated with the increased maintenance that may result from an increased frequency of train services.
Human Health	- No specific mitigation measures identified.

13.3 Enhancement Opportunities

It is unlikely that the individual options within the packages will result in beneficial effects on the environment. However, when implemented together the resulting effect could be a modal shift from reliance on the private car and reduced congestion having beneficial effects on the environment.

In order to enhance any beneficial effect, options from all three packages should be considered together rather than on a package basis. For example there are a number of options in Package 3 which provide increased walking and cycling routes which could facilitate a modal shift and increased physical fitness. However if these options are implemented with the options in Package 1 which promote walking and cycling this will potentially result in a greater beneficial effect.

13.4 Summary of Residual Effects

The residual effect is the remaining effect on a receptor after the application of mitigation measures. Table 13.2 below provides details the residual effects associated with each of the three proposed packages.

Table 13.2: Residual Effects

Package	Residual Effects
Package 1	No significant environmental effects identified.
Package 2	Potential negative effects on from the proposed on line improvements can be mitigated through appropriate design and siting.
Package 3	It is likely that through appropriate design and siting the potential effects that have been identified can be avoided or reduced so as no significant adverse effects on the environment result. However, whilst this is likely it would be inappropriate to determine a residual effect at this stage without detailed design and further surveys to identify the sensitive receptors.

	The options which propose new infrastructure development will be subject to further surveys and assessment and for those options where a significant adverse effect had been predicted the following has been indentified: **New road between the A55 and A548**: This option will be subject to optioneering to identify the most environmentally sustainable route. The proposed route will then be subject to EIA at which stage a residual effect can be appropriately determined. However, the value of implementing this option should be considered against implementing and not implementing the other options. It may be that the need for this option can be avoided through implementing a number of the other options. **Park and Ride**: Further studies will be undertaken to determine the most appropriate sites. Further environmental assessment (EIA or equivalent) will be undertaken on the detailed design at which stage a residual effect can be appropriately determined. **Increased capacity on A494 crossing:** It is likely that the effect of not implementing this option would be greater than not implementing it. Whilst it crosses a European protected site with sensitive design it is likely that a significant effect could be avoid. This option should be subject to project level HRA and designed in close consultation with CCW and the EA. **New Bridge to Deeside Industrial Park:** Whilst it crosses a European protected site with sensitive design it is likely that a significant effect could be avoid. This option should be subject to project level HRA and designed in close consultation with CCW and the EA. However the value of implementing this option should be considered against implementing and not implementing the other options. It may be that the need for this option can be avoided through implementing a number of the other options. **Dee Costal Footpath:** Depending on the proximity of this footpath to the Estuary it may be that a significant effect on the over-wintering, passage and breeding birds caused by disturbance cannot be mitigated. However the aim of this option to facilitate increased levels of walking and cycling is a positive one. Optionering should be undertaken in consultation with CCW to determine the feasibility for a route through this area which would avoid affecting the integrity of the designation.

The assessment (SEA) has concluded that the NEWABTS and the packages and options included in the plan are unlikely to have any significant adverse effects on the environment. Consequently there have been no suggested changes or amendments to the packages or the individual options. However, the assessment has identified that there is potential for some of the options to have negative effects on the environment during construction. There may also be some residual negative effects. In order to minimise these negative effects, and avoid the potential for the occurrence of significant adverse effects, all infrastructure schemes taken forward/implemented under the NEWABTS will be required to be subject to appropriate environmental assessments/appraisals and would be required to taken into account the scheme and SEA subject specific mitigation measures outlined in the ER and the NTS.

14 Monitoring

14.1 Introduction

This chapter of the Environmental Report presents a proposed monitoring framework for the implementation of the NEWABTS.

14.2 Monitoring

Monitoring is an ongoing process that is undertaken continuously for the duration of the NEWABTS implementation. Monitoring is a means of checking whether the NEWABTS is performing as predicted by measuring how the baseline situation changes following implementation of the NEWABTS.

14.3 Importance of Monitoring

Monitoring allows the actual significant effects of implementation of the NEWABTS to be tested against those predicted in the SEA. In the event that adverse effects are identified then these need to be addressed. WG and TAITH should be able to produce contingency measures to address any adverse effects through implementation of the mitigation measures suggested in Chapter 13 of this Report.

Monitoring helps to ensure that problems which arise during implementation can be identified and future predictions made more accurately. It can also be used to collect baseline information for future LTPs.

14.4 The Monitoring Framework

Monitoring usually involves the use of indicators or targets. An 'indicator' is a measure of how the 'baseline' has changed. SEA indicators are used to monitor whether the NEWABTS is performing as predicted. However there are a number of potential limitations associated with the reliance of certain indicators for the purpose of monitoring these are mainly in relation to:

1) Indicators that are not based on information / data / environments that will be directly affected by the implementation of the plan.
2) Data available is not always kept up to date and therefore will not identify any significant changes.
3) Collection of specific data is often the responsibility of a range of different organisations consequently this can lead to:
    a. Data being collected for different areas over different timescales;
    b. Data collection methods and techniques changing to reflect different requirements for data or availability of funding for data collection; and
    c. Data sets not being updated.
4) Some indicators are only relevant where specific receptors are present.

The monitoring framework present in Table 14.1 includes a number of possible indicators that could be used to monitor the implementation of the NEWABTS. However, taking into account the limitations associated with this approach it is suggested that monitoring is tied into the future reviews of the LTP and is related to monitoring the number and type of schemes that have been implemented during the year. This would include a review of the environmental works / studies and assessments undertaken to support these schemes as suggested as part of the mitigation in Chapter 14.

The monitoring framework set out in Table 14.1 below is preliminary and will be confirmed at the time of the adoption of NEWABTS. During public consultation additional data sources may be indentified which should be incorporated into the monitoring framework.

Table 14.1: Monitoring Framework

SEA Topics	SEA Objective	Indicator	Responsibility/ Source	Suggested Review Timescale
Biodiversity	To protect and enhance the biodiversity and geodiversity and to safeguard protected species within the study area.	% of SSSIs in 'favourable' or 'unfavourable recovering condition	Local Authority/ CCW/ Natural England	Annual.
		- Change in area (ha) of designated biodiversity sites	Local Authority/ CCW/ Natural England	Annual
		Change in area (ha) of BAP Habitat.	Local Authority/ CCW/ Natural England	Annual
		Proportion of local sites where active management is being achieved	Local Authority/ CCW/ Natural England	Annual
		Area of ancient woodland removed due to transport schemes	Local Authority/ CCW/ Natural England	Annual
Landscape	To maintain and enhance the local distinctiveness, character and appearance of the rural and urban land and landscapes, including the public realm, within the study area.	Change in area (ha) of designated landscapes e.g. AONB.	Local Authority/ CCW/ Natural England	Annual
		Number of new/ proposed transport schemes in areas of land designated for its landscape quality or amenity value (AONB), national parks etc.	Local Authorities	Annual
		Number of schemes promoting landscape enhancement in urban fringe landscapes	Local Authorities	Annual
Archaeology and Heritage	To protect and enhance the buildings, sites, areas and features of historic, archaeological and architectural interest and diversity within the study area.	Number of applications for listed building consent (inc demolitions) and scheduled monument consent associated with transport projects	Local Authority/ National Monuments Record/Cadw	Annual
		Number of transport schemes affecting historic parks	Local Authority/ National	Annual

SEA Topics	SEA Objective	Indicator	Responsibility/ Source	Suggested Review Timescale
		and gardens	Monuments Record/Cadw	
		Number of transport schemes located within or affecting conservation areas	Local Authority	Annual
Water	To reduce the risk of flooding. To protect and enhance the quality of ground, river and sea waters within the study area.	Number of new transport infrastructure developments located in Flood Zones 2 & 3.	Local Authority/ CCW/ Natural England	Annual
		% of new transport infrastructure developments incorporating SUDS features	Local Authorities	Annual
		% of new transport infrastructure developments incorporating SUDS features	Local Authorities	Annual
		% river length within Dee River Basin District and North West River Basin District achieving Good Ecological Potential	Local Authority / Environment Agency	Annual
Noise	To reduce transport related noise.	Levels of noise pollution	Local Authorities	Annual
		No. of complaints received/resolved with regard to noise.	Local Authorities	Annual
Air	To ensure good local air quality.	No. of Air Quality Management Areas	Local Authorities	Annual
		European Sites Affected by Air Pollutants (Critical load exceeded)	Local Authority/ CCW/ Natural England	Annual
		Annual average concentration of NO2 (Local Air Quality Management Progress Report)	Local Authorities	Annual
		Annual average concentration of PM10 (Local Air Quality Management Progress Report)	Local Authorities	Annual
		Volume of traffic in billion vehicle kilometres (bvk)	Local Authorities	Annual
Climatic Factors	To reduce the causes of climate change. To adapt to and mitigate for the	Transport related CO2 emissions	Local Authorities	Annual
		Number of buses and Local Authority vehicles with Euro 3 or above	Local Authorities	Annual

SEA Topics	SEA Objective	Indicator	Responsibility/ Source	Suggested Review Timescale
	effects of climate change.	Proportion of people travelling to work by car	Local Authorities / Census data	Annual
		Proportion of people walking/cycling to work	Local Authorities / Census data	Annual
		Proportion of children travelling to school by car	Local Authorities / Census data	Annual
		Distances travelled to work	Local Authorities / Census data	Annual
		Amount of freight using rail	Local Authorities	Annual
		Amount of freight using water	Local Authorities	Annual
Soil	To reduce the amount of waste produced and increase the amount recycled and composted.	Proportion of materials used in transport developments that are from secondary and recycled sources	Local Authority/ Contractor	Annual
		Proportion of construction and demolition waste that is reused and recycled	Local Authority/ Contractor	Annual
Population	- To ensure good accessibility for all to jobs, facilities, goods and services within the study area. - Conserve and enhance opportunities for sustainable public access to the natural environment. - To reduce road traffic and congestion through reducing the need to travel by car and improving travel choice. To increase public involvement in decision-making and civic activity.	The percentage of persons overall economically active	Local Authorities / Census data	Annual
		The percentage of f working population age seeking Job Seekers Allowance	Local Authorities / Census data	Annual
		Bus patronage levels	Local Authorities / Census data	Annual
		Rail patronage	Local Authorities / Census data	Annual
		Ward unemployment levels	Local Authorities / Census data	Annual
		% of schools with Travel Plans.	Local Authority / schools	Annual
		No. of employees working for businesses with Travel Plans.	Local Authority	Annual
		% of people travelling to work in private car involved in	Local Authority	Annual

SEA Topics	SEA Objective	Indicator	Responsibility/ Source	Suggested Review Timescale
		carshare schemes.		
Material Assets	- To increase the vitality of town centres. - To make better use of our resources. - To improve efficiency in land use through the re-use of previously developed land and existing buildings, and encourage urban renaissance. Adopt a strategic approach to planning and provision of multi functional green infrastructure	Amount (ha) of best and most versatile land lost to development	Local Authority/ CCW/ Natural England	Annual
		Number of new developments completed on previously developed land.	Local Authority	Annual
Human Health	- To reduce crime and the fear of crime. - To improve health and reduce inequalities in health. To reduce poverty and social exclusion and close the gap between the most disadvantaged communities and the rest.	% of SOAs in lowest 20% IMD Health Domain.	Communities and Local Government:	Annual or when next Index of Deprivation released 2007
		% of residents feeling 'safe' or 'fairly safe' outside in the local authority area after dark.	Local Authority	Annual

15 Conclusions

15.1 SEA Conclusions

This Environmental Report was prepared as part of the SEA of the NEWABTS. The NEWABTS sets out the long term transportation plans for the area for maintaining and improving transport provision through three packages, managing demand, making best use and capacity enhancements.

An SEA of these options has been undertaken in order to identify likely significant construction, operation and cumulative effects on the environment. An assessment of the alternatives (Do Nothing) was also undertaken.

A number of the NEWABTS options were predicted to have potential temporary negative effects on the environment as a result of construction activities; however, the majority of these effects are temporary in nature and can be avoided or reduced through mitigation. However, in order to ensure that the options taken forward under the NEWABTS do not have any potential significant adverse effects on the environment it will be necessary for the NEWABTS to include specific statements/commitments requiring individual options/schemes to be subject to specific detailed assessments which will identify project level mitigation to be implemented and timed accordingly.

A number of operational negative effects (landscape, biodiversity, noise and water quality/flood risk) have been identified as a result of the assessment of the NEWABTS. The majority of these relate to proposed large scale infrastructure developments.

As the options provided within the NEWABTS are generally very high level policies or options and without site specific proposals it is not practical to identify specific mitigation measures. However, these options will be subject to further environmental assessment (EIA or equivalent) at which stage a residual effect can be appropriately determined

The assessment concluded that provided that the recommended mitigation measures are implemented and additional assessments are undertaken where required, there should be no significant adverse residual effects on the environment, with only two interventions having been assessed as having a residual negative effect associated with disturbance to the wintering, passage and breeding birds from the provision of the Dee Coastal Path and new road bridge over the Dee, however, through appropriate routing of the coastal path and design of the bridge it is likely that this effect can be avoided.

The assessment identified a number of beneficial effects for biodiversity, water, noise, air, climate, population, material assets and human health. The majority of beneficial effects are associated with a modal shift to public and sustainable forms of transport and highway capacity improvements to reduce congestion. Further beneficial effects are possible if some options are combined with other measures to aid a modal shift from reliance on the private car to more sustainable forms of transport without further severing accessibility for rural communities.

Annex A: Assessment Matrixes

Annex B Key Transport Problems identified within the NEWABTS Area

Table B1: Issues within the NEWABTS Area

Problem	Description
Wrexham to Chester	**Cars**
	The main problem is the junction at the A55 / A483, but this is in England
	Peak hour queuing onto A483 from Wrexham is a problem.
	Communities on minor roads parallel to A483 suffer from traffic routing through villages to avoid traffic queue at A483 / A55 junction.
	There is no direct road link between Connah's Quay and Shotton onto the Deeside Industrial Park.
	Congestion on A483 / A55 junction due to problems with the capacity of the junction causing traffic to grind to a halt. Traffic then backs up onto the A483. This is a problem in the morning and the evening but is worse in the AM peak.
	Capability of Chester southerly bypass is seen to be problematic. There is no link between Chester southerly bypass and the A494.
	Pressure on A55 causes the movement of vehicles onto local roads around Flint.
	Volume of traffic on the A55 causes queuing on the slip road and on the inside lane. Vehicles wanting to get to Chester move out into the outside lane from a standstill and then try to move back across. This is seen to be very dangerous.
	Dee crossing bridge is in major need of refurbishment (5-8 year residual life). Replacement of this would result in long-term closure of the carriageway. Or could construct a bridge alongside the existing bridge to avoid major disruption. This section of road is seen to have substandard containment and substandard carriageway widths.
	From Northop to Ewloe there is moderate congestion along the A494.Most of the problems are during the AM and PM peak flows. Resilience is low along the A494 – only need minor shunt or breakdown and whole network grinds to a halt. This is made worse by the lack of hard shoulders and by traffic merging.
	A541 / A483 junction and A525 / A483 junction are both seen to be substandard. They connect Wrexham to the A483.
	Peak flows are a particular problem during the summer due to tourist flows.
	The weaving lengths are insufficient for the volumes of traffic on the A494.
	Severe constriction as vehicles come across the Dee Bridge and south through Aston Hill. Traffic lights used to modulate this traffic flow into Wales but this has now gone. This is where lanes merge.
	Belgrave roundabout is problematic at peak times for car travel.
	Cycling
	No dedicated cycle path in England. Out of Wrexham there is a designated local path that goes through Gresford.
	Lots of people cycle between Chester and Wrexham
	Some safety issues for cyclists on the route to Chester Business Park.
	Bus
	There's a good park and ride but it's on the wrong side of the A55

Problem	Description
	The bus service between Wrexham and Chester is felt to be very good but doesn't serve satellite areas of Chester or Wrexham.
	High frequency bus service. Responsive service – organised from a control room in Mold – ring up and let them know where they want to go and service is optimised to find the best timings and routes to the Deeside Industrial Park.
	There is no direct connection to Wrexham Industrial Estate (via public transport).
	Rail
	Integrated bus and rail is very good.
	There is seen to be a track constraint of single line Saltney junction to Wrexham
	The rail service is hourly as there is only a single line for 10 miles – check the Scott Wilson report (funded by the Shrewsbury / Chester rail partnership).
Wrexham to Deeside	**Car**
	Generally it is felt that the car is needed to travel between Deeside and Wrexham.
	The route choice is between a country road network / villages or the A541 through Hope, which is a poor junction
	Right turning traffic off the A541 (along the route) is seen to be a problem.
	Traffic backing up onto A55 in peak times is seen to be dangerous.
	Route finding from Deeside is difficult, signposts towards Wrexham.
	The A55 / A483 junction suffers from problems at peak times only.
	Queues at peak times – the ease of travel depends upon the time of day.
	A483 / A55 junction roundabout is problematic between 7:15 – 9:15 due to the high volume of traffic and congestion – lots of queues.
	Dobbshill is a nice easy route until you come to Dobbshill just past Penyffordd there are large queues. Pen-y-ffordd suffers from congestion.
	Hope junction and Penymyndd junction are problematic due to the schools.
	Penymynydd roundabout suffers from congestion in the mornings.
	A541 is a mixed bag of speed and carriageway standards. Not a very good route these days. There's a lot of speed restrictions and the speed varies. Lots of roundabouts mean it is quite complicated. It's easier to go to Chester.
	Some peak time junction issues at Hope Garage junction.
	Problem with added congestion at A55 / A483 due to route reassignment through Rossett – safety issues
	Congestion at A483 / A541 junction and A5156 / A483. Displaces traffic trying to get onto the A55 onto local roads.
	Road safety issues
	HGV
	A483 is the best route for HGVs. A541 Cefn-y-bedd contains low bridges and so is not great for HGVs as they keep hitting it.
	Cycling
	Provision for cyclists is not good as the secondary road system is a rambling route i.e. not direct and takes too much time. Certainly too far for commuter route. A525 cycle path seen as an example of good practice.
	There's no designated cycle route – cycling is not safe sue to the levels of traffic. Also the distance is seen to be too great.
	Bus

Problem	Description
	Slow bus routes, via villages on route
	There are no direct bus routes / links between Wrexham and Deeside – have to change, either go through Chester or Mold.
	Public transport – bus links are poor (no direct bus links) and rail is better but only hourly
	Rail
	Limited train services
	Bidston line is only every hourly.
	The location of the rail station to the Deeside Industrial Park is seen to be poor.
	There's no early morning train into Wrexham (08:30 is the earliest).
	Poor parking / access to / from Shotton station
	Rail bridges along A541 are low for freight
Deeside to Chester	**Car**
	Limited parking in Chester but good use of park and ride.
	Some peak hour issues along the route.
	A458 has a poor accident record and there are safety issues.
	Access to west side of Chester in general is easier
	Sealand Road is quite congested at peak times.
	No direct road to Chester – have to divert north or south of the river
	Congestion is primarily at peak times at junction
	Cycling
	Cycling between Deeside and Wrexham is very good – there are three traffic-free routes: the National Cycle Network and either side of the River Dee with access to Broughton.
	Bus
	The bus service was felt to be good and fairly frequent
	The only issue with the bus service was felt to be headroom issues under archways in Chester. Bus services were seen to be good overall.
	Connah's Quay road network constraints – affects bus service
	At the bottom of Sealand Road is a park and ride.
	Chester Business Park not served by rail, but served by bus
	Rail
	The rail service (hourly) is felt to be good.
	The location of the station is felt to be poor making access difficult. Chester station is outside the centre of Chester and so is a way out from the business park.
	Rail 1 train per hour from Shotton but would like to see new stations at Deeside College and Queensferry
Other	**Wrexham**
	Junctions approaching Wrexham are approaching / above capacity
	The road to the south of Wrexham is single carriageway – perceived safety issues

Problem	Description
	Poor overnight parking for HGV parking
	Wrexham to Mold
	Twisty roads are seen to be a problem.
	The lack of rail service is problematic.
	Mold and Buckley to Deeside
	Poor bus service to Deeside Industrial Park
	Only an hourly rail service
	Poor cycle links
	Road congested at peak times
	A494 on Aston Hill is a major problem due to delays and congestion.
	Mold and Buckley to Wrexham
	The amount of residential housing development planned between Mold and Wrexham is seen to be problematic due to the increased pressure caused on the route. This route was originally going to be a duel carriageway but sections have been reduced to a single carriageway and roundabouts have been put in. This is seen to affect the economy of Wrexham as the poor link means people find it easier to go to Chester.
	Cycle links are seen to be poor.
	Issue with slow-moving HGVs at bottom of Gwernymynydd hill.
	Public transport links to Wrexham are poor. This may be particularly problematic when the health care provision is reorganised and patients can no longer go from Wales to Chester.
	General
	Removing traffic from local roads could switch traffic onto the strategic road network
	Substandard road after Mold Bypass before A55 junction.
	Links inland, for example Connah's Quay to Mold and Buckley, have fairly poor public transport links.
	Good bus service between Mold, Buckley, Broughton and Chester – every 7 minutes
	Bus service between Mold and Wrexham is variable (poor).
	Hourly bus service between Mold and Flint.
	North – South public transport links are not great.
	Easy to get to Chester from most places (hub).
	The study area does not show the extent of the Wirral / Liverpool / Manchester commuter belt.
	Housing – people who live in Wales / Flintshire work elsewhere generating traffic movements.
	Broughton has no railway links and a limited bus service
	Bus links to Wirral from Deeside Industrial Park are not good

Annex C Relevant Plans and Programmes

Table C1 International, EU and UK Legislation, Plans, Policies and Programmes

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
Ramsar Convention (1971)	An international framework for the conservation of wetland habitats and the resources therein. Member states are required to designate a minimum of one suitable, wetland site, protect the ecology of any designated wetlands and to include conservation of wetlands within their national land use planning system.	✗	If any of the NEWABTS packages result in the loss of biodiversity, this may oppose the aims of this convention.
Bonn Convention (1979)	To protect and conserve the agreed species of migratory birds through conservation of their habitats and resources.	✗	If any of the NEWABTS packages result in negative effects to migratory birds or their habitat, this may oppose the aims of this convention.
Bern Convention (1979)	▪ To conserve flora, fauna and natural habitats, particularly those which are vulnerable or endangered ▪ To promote co-operation between member states ▪ To ensure that national and regional planning policy takes conservation into account ▪ To promote awareness and education on conservation	✗	If any of the NEWABTS packages result in the loss of wildlife habitat, this may oppose the aims of this convention.
Intergovernmental Panel on Climate Change (IPPC) report 2007	The main activity of the IPCC is to provide in regular intervals Assessment Reports of the state of knowledge on climate change. The latest one is "Climate Change 2007", the Fourth IPCC Assessment Report.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could positively or negatively effect upon the aims of this report.
Johannesburg Summit on Sustainable Development (2002)	- Greater resource efficiency (including decoupling economic growth from environmental degradation); - Support business innovation and take-up of best practice in technology and management; - Work on waste and producer responsibility; - Remove market barriers and create a level playing field for renewable energy and energy efficiency; - New technology development; - Technology demonstration and risk limitation;	✗ / ✓	If any of the NEWABTS packages impact upon sustainability, this could impact upon the aims of this summit.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	- Push on energy efficiency; - Integrated water management plans needed; and - Distributed and decentralised energy; and minimise significant adverse effects on human health and the environment from chemicals by 2020.		
Kyoto Protocol to the UN Framework Convention on Climate Change (1992)	The objective of the Kyoto Protocol is to stabilise and reduce Green House Gas (GHG) emissions, mitigate climate change, and promote sustainable development worldwide.	✗ / ✓	If any of the NEWABTS packages effect climate change or greenhouse gas emissions, this could impact upon this convention.
Local Action 21 (2002)	Action 21 aims to make greener living easier to do in ways which create a better quality of life. Activities centre on food, waste, transport and energy issues.	✗ / ✓	If any of the NEWABTS packages effect quality of life in terms of waste, transport and energy issues, this could impact upon this convention.
The Convention on Biological Diversity (1992)	▪ The conservation of biodiversity. ▪ The sustainable use of its components. ▪ The fair, equitable sharing of the benefits arising out of the utilisation of genetic resources.	✗	If any of the NEWABTS packages result in the loss of biodiversity, this may oppose the aims of this convention.
The UN Millennium Declaration and Millennium Development Goals (2002)	▪ Eradicate extreme poverty and hunger ▪ Achieve universal primary education ▪ Promote gender equality and empower women ▪ Reduce child mortality ▪ Improve maternal health ▪ Combat HIV, AIDs, Malaria and other diseases ▪ Ensure environmental sustainability ▪ Develop a global partnership for development	✗ / ✓	If any of the NEWABTS packages effect the accessibility to services, such as healthcare facilities and employment, this could impact upon the aims of these goals.
UNESCO Convention – Protection of World Cultural Heritage (1972)	Member states recognise that each has a responsibility to preserve, protect and enhance the cultural and natural heritage situated on its territory, belonging primarily to the state. Each will incorporate, as appropriate, protection of the heritage into policy and provide services, training, measures and research, if required, to assist with this.	✗	If any of the NEWABTS packages result in the loss of any heritage assets, this could impact upon this convention.

Table C2: EU Legislation, Plans, Policies and Programmes

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
Convention for the protection of Archaeological Heritage – ratified by the UK in September 2000 (Valetta convention)	- Inventorying and the protection of sites - Reporting of chance finds - High standards of architectural work - Creation of archaeological reserves - Conservation of excavated sites and safe keeping of finds - Protection and recording of archaeology during development - Financial support made available for the maintaining and restoring of	✗	If any of the NEWABTS packages result in the loss of any heritage assets, this could oppose this convention.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	the architectural heritage - Promotion of public awareness and access.		
Convention for the Protection of Architectural Heritage of Europe (Granada 3rd October 1985)	- Protect architectural heritage - Protection of monuments, groups of buildings and sites - Implement appropriate supervision of heritage - Prevent disfigurement, dilapidation or demolition of protected properties - Implement legislation which requires submission to the competent authority which effects (including demolition, erection of new buildings and anything that will impair the character of a building or a site), alters or requires the demolition of any protected heritage. Requires the owner of protected properties to carry out work and allows for compulsory purchase of protected property. - If demolition is unavoidable precautions for dismantling, transfer and reinstatement in a suitable location should be made - Financial support made available for maintaining and restoring the architectural heritage - Encourage private initiatives	✗	If any of the NEWABTS packages result in the loss of any heritage assets, this could oppose this convention.
Directive 1996/62/EC on ambient air quality and management ('The Air Quality Framework Directive')	- To protect the environment as a whole and human health. - To maintain ambient air quality where it is good and improve it in other cases using limit values and/or alert threshold set for ambient air pollution levels. - Preserve best ambient air quality compatible with sustainable development	✗ / ✓	If any of the NEWABTS packages impact upon air quality, this could oppose/would be consistent with the aims of this directive.
Directive 2000/60/EC establishing a framework for the community action in the field of water policy ('The Water Framework Directive')	- To establish a frame work for the protection of inland surface waters, transitional waters, coastal waters and groundwater - To enhance protection and improvement of the aquatic environment and promote sustainable water use.	✗ / ✓	If any of the NEWABTS packages result in negative impacts to water quality, this could oppose this directive.
Environment 2010: Our Future, Our Choice – EU Sixth Environmental Action Programme (2002)	Creates a more stable, environmental policy framework by outlining specific, environmental objectives to 2020 based on 7 strategic themes rather than specific pollutants: Air pollution; prevention and recycling of waste; protection of the marine environment; soil; sustainable use of pesticides; sustainable use of resources and the urban environment.	✗ / ✓	If any of the NEWABTS packages result in effects in terms of air pollution, the marine environment, soil, sustainable use of resources or the urban environment, this could impact upon this programme.
Environmental Liability Directive 2004/35/CE (2004)	The purpose of this Directive is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage.	N/A	It is unlikely that any of the NEWABTS packages will impact on this directive.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
EU Biodiversity Strategy (1998)	This strategy aims to anticipate, prevent and attack the causes of significant reduction or loss of biodiversity at the source. It regards 4 main themes: Agriculture; Fisheries; Conservation of natural resources and Economic cooperation.	✗	If any of the NEWABTS packages result in the loss of biodiversity, this may oppose the aims of this strategy.
EU Directive 2002/49/EC relating to the assessment and management of environmental noise – The Environmental Noise Directive (2002)	EU Member States are required to produce noise maps and action plans for: - Agglomerations with populations greater than 100 000 - Major roads with more than 3 000 000 vehicles a year - Major railways with more than 30 000 trains a year - Major civil airports with more than 50 000 operations year - The general public must be informed and consulted during the process - These actions are due for completion in 2007 - Members are expected to review the results on a 5 year basis	✗ / ✓	If any of the NEWABTS packages result in an increase or reduction in noise, this could impact upon this directive.
EU Directive for the Promotion of Biofuels for Transport 2003/30/EC (2003)	Aims at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes in each Member State, with a view to contributing to objectives such as meeting climate change commitments, environmentally friendly security of supply and promoting renewable energy sources.	N/A	If any of the NEWABTS packages promotes the use of biofuels this could would be consistent with the aims of this directive.
EU Emissions Trading Scheme (2005)	- National Allocation Plans specify caps on greenhouse gas emissions for individual large point sources. - Facilities must respect a maximum emission "allowance" for a particular period. - To comply, facilities can either reduce their emissions or purchase allowances from facilities with an excess of allowances. - Progressively tightening caps are foreseen for each new period, forcing overall reductions in emissions.	✗ / ✓	If any of the NEWABTS packages impact upon greenhouse gas emissions, this could impact upon this scheme.
EU Sustainable Development Strategy (2004)	Sustainable Development stands for meeting the needs of present generations without jeopardizing the ability of futures generations to meet their own needs – in other words, a better quality of life for everyone, now and for generations to come. It offers a vision of progress that integrates immediate and longer term objectives, local and global action, and regards social, economic and environmental issues as inseparable and interdependent components of human progress.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon this strategy.
European Climate Change Programme (2000)	The European Commission has taken many climate-related initiatives since 1991, when it issued the first Community strategy to limit carbon dioxide (CO 2) emissions and improve energy efficiency. These include: a directive to promote electricity from renewable energy, voluntary	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon this programme

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	commitments by car makers to reduce CO2 emissions by 25% and proposals on the taxation of energy products.		
European Commission White Paper on the European Transport Policy (2001)	Key objective areas are: - Revitalising the railways - Improving quality in the road transport sector - Promoting transport by sea and inland waterway - Balance between growth in air transport and the environment - Turning intermodality into reality - Building the trans-European transport network - Improving road safety - Adopting a policy on effective charging for transport - Recognising the rights and obligations of users - Developing high-quality urban transport - Putting research and technology at the service of clean, efficient transport - Managing the effects of globalisation - Developing medium and long-term environmental objectives for a sustainable transport system	✓	If any of the NEWABTS packages improve transport infrastructure or public transport or improve transport safety, this would be consistent with the aims of this policy.
European Landscape Convention (2007)	- Ensure environmental protection and promote sustainable development - Protect the Europeans of life as well as taking into account landscape, cultural and natural values.	✘	If any of the NEWABTS packages impact upon landscape character or quality, this could oppose the aims of this convention.
European Spatial Development Perspective (1999)	- Development of a polycentric and balanced urban system, and strengthening of the partnership between urban and rural areas, so as to create a new urban-rural relationship. - Promotion of integrated transport and communication concepts - Wise management of the natural and cultural heritage - Conservation of regional identities and cultural diversity	✓	If any of the NEWABTS packages in improvements to transport links between urban and rural areas, this would be consistent with the aims of this report.
Pan-European Biological and Landscape Diversity Strategy	The Pan-European Biological and Landscape Diversity Strategy presents an innovative and proactive approach to stop and reverse the degradation of biological and landscape diversity values in Europe. Objectives: 1. Conservation, enhancement and restoration of key ecosystems, habitats, species and features of the landscape through the creation and effective management of the Pan-European Ecological Network. 2. Sustainable management and use of the positive potential of Europe's biological and landscape diversity through making optimum use of the social and economic opportunities on a national and regional level.	✘	If any of the NEWABTS packages impact upon biodiversity or landscape, this could oppose the aims of this this strategy.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	3. Integration of biological and landscape diversity conservation and sustainable use objectives into all sectors managing or affecting such diversity. 4. Improved information on and awareness of biological and landscape diversity issues, and increased public participation in actions to conserve and enhance such diversity. 5. Improved understanding of the state of Europe's biological and landscape diversity and the processes that render them sustainable. 6 Assurance of adequate financial means to implement the Strategy.		
The EC Directive on the conservation of Natural Habitats of Wild Fauna and Flora 92/43/EEC (1992)	- Preservation, protection and improvement of the quality of the environment, including the conservation of natural habitats and of wild fauna and flora. - Maintain and restore natural habitats and of wild fauna and flora, working towards ensuring biodiversity and taking account of economic social and cultural requirements and regional and local characteristics.	✘	If any of the NEWABTS packages impact upon biodiversity, flora or fauna, this could oppose the aims of this directive.
The EC Directive on the Conservation of Wild Birds 79/409/EEC (1979)	- To protect birds occurring in the European territory (birds, eggs, nests and habitats). - To preserve, maintain or re-establish a sufficient diversity and area of habitats. - To maintain populations of species. - Pay particular attention to wetlands, especially those of international importance.	✘	If any of the NEWABTS packages impact upon wild birds or their habitat this could oppose the aims of this directive.
The Renewed EU Sustainable Development Strategy, June 2006	- To limit climate change and its costs and negative effects to society and the environment. - To ensure that our transport systems meet society's economic, social and environmental needs whilst minimising their undesirable impacts on the economy, society and the environment. - To promote sustainable consumption and production patterns. - To improve management and avoid overexploitation of natural resources, recognising the value of ecosystem services. - To promote good public health on equal conditions and improve protection against health threats. - To create a socially inclusive society by taking into account solidarity between and within generations and to secure and increase the quality of life of citizens as a precondition for lasting individual well-being. - To actively promote sustainable development worldwide and ensure that the European Union's internal and external policies are consistent	✘ / ✓	If any of the NEWABTS packages impact upon sustainability, this could impact upon this strategy.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	with global sustainable development and its international commitments.		
The Sixth Environmental Action Program of the European Community 1600/2002/EEC	- Clean Air for Europe (CAFE), Soil Protection, Sustainable use of pesticides, Protect and conserve the marine environment, Waste prevention and recycling and Sustainable use of natural resources and the urban environment. - The Action Program encourages the protection of the marine environment and sustainable use of natural resources and the urban environment.	✗ / ✓	If any of the NEWABTS packages impact upon air quality, soil, the marine environment, waste, use of natural resources or the urban environment, this could impact upon this action program.
UNCED, Earth Summit, Rio (1992) Agenda 21, Chapter 9: Protection of the Atmosphere	- Greater resource efficiency; - Support business innovation and take-up of best practice in technology and management; - Waste reduction and producer responsibility; and - Sustainable consumer consumption and procurement. - Create a level playing field for renewable energy and energy efficiency. - New technology development - Push on energy efficiency - Low-carbon programmes - Reduced impacts on biodiversity	✗ / ✓	If any of the NEWABTS packages impact upon biodiversity, greenhouse gas emissions or resource efficiency, this could impact upon the aims of this summit.

Table C3: UK Legislation, Plans, Policies and Programmes

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
A Better Quality of Life: A Strategy for Sustainable Development for the UK (1999)	- Social progress which recognises the needs of everyone; - Effective protection of the environment; - Prudent use of natural resources; and - Maintenance of high and stable levels of economic growth and employment.	✗ / ✓	If any of the NEWABTS packages impact upon sustainability, this could impact upon this strategy.
A Future for Transport: A Network for 2030 (DFT, 2004)	- Benefit from mobility and access while minimising the impact on other people environment, now and in the future - Network to meet challenges of growing economy and the increasing demand but can also achieve environmental objectives - Making walking and cycling a real alternative for local trips	✓	If any of the NEWABTS packages improve mobility or accessibility to transport or encourage walking or cycling, this would be consistent with this paper.
Active Travel Strategy (2010)	The Government's strategy for getting more people walking and cycling more often and more safely. The Strategy aims to:	✓	If any of the NEWABTS packages improve accessibility to transport, reduce congestion, encourage walking or cycling, improve air quality or reduce green house gas emissions,

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	- Promote better public health and well-being by increasing levels of physical activity, particularly among the most inactive people in our society; - Increase accessibility and reduce congestion; - Improve air quality and reduce carbon emissions.		this would be consistent with this strategy.
Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Clean Air (2000 amended 2003)	Plans to improve and protect ambient air quality in the UK, to protect people's health and the environment without unacceptable economic or social costs. Details of national air quality standards and objectives for nine pollutants.	✗ / ✓	If any of the NEWABTS packages impact upon air quality, this could oppose/be consistent with this strategy.
Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)	The UK Government and the devolved administrations published the latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland in July 2007 - setting out a way forward for work and planning on air quality issues and the air quality standards and objectives to be achieved; introducing new policy framework for tackling fine particles and identifying potential new national policy measures which modelling indicates could give further health benefits and move closer towards meeting the Strategy's objectives.	✗ / ✓	If any of the NEWABTS packages impact upon air quality, this could oppose/be consistent with this strategy.
Ancient Monuments and Archaeological Areas Act 1979 (as amended by the National Heritage Act 1983)	This Act deals with the designation and statutory protection of Scheduled Monuments, which are of national importance. The Secretary of State maintains this schedule of monuments. As work within a Scheduled Monument is illegal without appropriate consent, the Act also deals with the consent process. Consents are applied for to the Department of Culture, Media and Sport (DCMS) under advice from English Heritage.	✗	If any of the NEWABTS packages result in the loss of any heritage assets, this could oppose the aims of this act.
Building for the Future, UK Sustainable Communities Plan (2003)	This Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in the South East, low demand in other parts of the country, and the quality of our public spaces.	✗ / ✓	If any of the NEWABTS packages encourage sustainable development, this would be consistent with the aims of this plan.
Climate Change: The UK Programme (2000)	Aims to improve business use of energy, use renewable sources of electricity, cut emissions from the transport sector, continue cutting emissions from agriculture, improve energy efficiency and to ensure the public sector takes a leading role for example by developing green travel plans.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon this programme.
Climate Change: The UK Programme (2006)	The Climate Change Programme sets out the policies and priorities for action in the UK and internationally. The programme strives to secure global action on the scale needed to tackle it as well as taking further	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	action at home, to meet our commitments and demonstrate that climate change can be tackled without damaging the economy. The programme's aims are designed to make significant progress toward the 2050 reduction target of 60% which the government committed to in the 2003 Energy White Paper.		upon this programme.
Countryside and Rights of Way Act (CroW) (ODPM, 2000)	- Provides new rights of public access to areas of open land and provisions for extending the right to coastal land. - Improves rights of way legislation, by encouraging the creation of new routes and clarifying existing routes. - Increases protection for Sites of Special Scientific Interest. - Strengthens wildlife enforcement legislation. - Provides for better management of Areas of Outstanding Natural Beauty.	✘	If any of the NEWABTS packages result in any negative impacts to wildlife, protected sites, countryside or public rights of way, this would oppose this act.
Department of Health (2004) Choosing Health - White Paper	- This white paper outlines the results of a public consultation and the Government's broad approach to the improvement of public health. The themes of relevance involve the provision of information to the public and the demand of the public for access to resources to improve health. Information includes provision on the effects of personal life choices but will also include information on environmental circumstances, which might affect personal health. - The demand for access to health resources includes the provision of health care facilities but also includes facilities to maintain a healthy lifestyle, e.g. sports fields	✘ / ✓	If any of the NEWABTS packages impact upon health and wellbeing, including access to health services, this could impact upon this paper.
DfT Full Guidance on Local Transport Plans (2004)	Sets out the requirements for developing a good LTP. A good LTP will: - contain evidence of a long term strategy within which the 5 year implementation plan is set; - be a truly corporate document, influenced by, and influencing the whole of local government within the Plan area; - be set in context of regional economic and spatial strategies; - demonstrate effective working across local authority boundaries; - have been developed in partnership with all relevant stakeholders; and - take a realistic view of transport investment.	✓	The development of the NEWABTS takes account of this guidance.
DfT Walking & Cycling: An Action Plan. June 2004	- creating places that people want to walk and cycle in; - providing high quality facilities for safe walking and cycling; - influencing travel behaviour, through education, training, marketing and promotion; - building skills and capacity; and - monitoring success through better targets and indicators.	✓	If any of NEWABTS packages encourage walking or cycling, this would be consistent with this plan.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
Energy White paper, Our energy future – creating a low carbon economy (2003)	To reduce UK's CO2 emissions by some 60% by about 2050.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon this white paper.
Meeting the Energy Challenge, UK Energy White Paper (2007)	This White Paper, published on 23 May 2007, sets out the Government's international and domestic energy strategy to address the long term energy challenges we face and deliver four energy policy goals: - To put ourselves on a path to cutting CO2 emissions by some 60% by about 2050, with real progress by 2020; - To maintain the reliability of energy supplies; - To promote competitive markets in the UK and beyond; - To ensure that every home is adequately and affordably heated.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon this paper.
Part IV Environment Act, 1995 (England and Wales)	- Prepare the national air quality strategy for assessment and management of air quality. - Requirements for local authority air quality reviews. - Designation of air quality management areas. - Reserves powers of the secretary of state.	✗ / ✓	If any of the NEWABTS packages impact upon air quality, this could impact upon this act.
Planning (Listed Buildings and Conservation Areas) Act 1990	This Act deals with work to listed buildings and to areas designated as Conservation Areas. It also deals with required consents. Buildings within Conservation Areas are afforded similar levels of protection to listed buildings, whether they are listed or not. Work to listed buildings and within Conservation Areas is restricted without appropriate consents.	✗	If any of the NEWABTS packages result in negative impacts to any listed buildings, this may oppose the aims of this act.
Planning for a Sustainable Future, UK Planning White Paper (2007)	The Planning White Paper proposes reforms on nationally significant infrastructure projects – including energy, waste, waste-water and transport - responding to the challenges of economic globalisation and climate change.	✗ / ✓	If any of the NEWABTS packages impact upon energy, waste or climate change issues, this could impact upon the aims of this paper.
Draft PPS: Planning for a Natural and Healthy Environment	The Department of Communities and Local Government has published a consultation on a Draft Planning Policy Statement: Planning for a Natural and Healthy Environment. This proposed policy covers, 'biodiversity; geological conservation; landscape and soil protection; heritage coastline; open space; sport; recreation; green infrastructure; and floodlighting of sports and recreational facilities'. The consultation document was published on 9 March 2010 and the consultation period ended on 1 June 2010. This PPS will replace the following existing policy documents: - PPS9: Biodiversity and Geological Conservation; - PPS17: Planning for Open Space, Sport and Recreation;	✗	If any of the NEWABTS packages impact upon biodiversity; geological conservation; landscape and soil resources; or open space, sport, recreation and recreational facilities, this could oppose the aims of this Draft PPS.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	- PPS7: Sustainable Development in Rural Areas – landscape protection (paragraphs 21 to 23), soil and agricultural land quality (paragraphs 28 and 29) and forestry (paragraph 33); and - PPG20: Coastal Planning - coastal access, heritage coast and the undeveloped coast (paragraphs 2.9, 2.10 and 3.9).		
Rural Strategy 2004 (Defra)	- Building on the economic success of the majority of rural areas - Tackling the structural economic weaknesses and accompanying poor social conditions that exist in a minority of rural areas. - Fair access to public services and affordable housing. - Tackle social exclusion wherever it occurs. - Protect and enhance the rural and urban environments. - Enhance the value and natural beauty of the countryside for rural communities and for the benefit of society in general	✓	If any of the NEWABTS packages promote economic growth improve accessibility to services or tackle social exclusion in rural areas, this would be consistent with the aims of this strategy.
Securing the Future – UK Government sustainable Development Strategy (2005)	Overarching aim is to promote sustainable development. The Five Principles are: - Living within environmental limits - Ensuring a strong, healthy and just society - Achieving a sustainable economy - Promoting good government, and - Using sound science responsibly	✓	If any of the NEWABTS packages promote a sustainable development, this would be consistent with the aims of this strategy.
Strategic Environmental Assessment Guidance for Transport Plans and Programmes TAG Unit 2.11 (2004)	Sets out guidance on how to carry out strategic environmental assessment for transport plans and programmes in England in accordance with the SEA Directive.	✓	The SEA has been undertaken with regards to this guidance.
The Conservation of Habitats and Species Regulations (2010)	The Conservation of Habitats and Species Regulations 2010 consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law. The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.	✗	If any of the NEWABTS packages impact upon biodiversity, flora or fauna, this could oppose the aims of these regulations.
The Eddington Transport Study: Transport's Role in Sustaining the UK's Productivity and Competitiveness	This review insisted that the impact of transport intervention be measured across a comprehensive range of social, economic and environmental outcomes.	✓	The SEA assesses the social, economic and environmental outcomes which is further supported by the WelTAG assessment and HRA.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
The Environment Act (1995)	To protect and preserve the environment and guard against pollution to air, land or water. The Act adopts an integrated approach to environmental protection and outlines where authorisation is required from relevant authorities to carry out certain procedures as well as outlining the responsibilities of the relevant authorities.	✗	If any of the NEWABTS packages result in pollution of pollution to air, land or water, this could oppose the aims of this act.
The Environmental Protection Act (1990)	To prevent the pollution from emissions to air, land or water from scheduled processes. The Act adopts the concept of integrated pollution control. Authorisation to operate the relevant processes must be obtained from the relevant enforcing authority. The regulations also place a 'duty of care' on all those involved in the management of waste, be it collecting, disposing or treating Controlled Waste which is subject to licensing.	✗	If any of the NEWABTS packages result in pollution of pollution to air, land or water, this could oppose the aims of this act.
The Future of Transport: White Paper (2004)	This White Paper extends to Wales in so far as it covers UK policy responsibilities for regulation of aviation and shipping, some aspects of road traffic regulation such as vehicle licensing and rail services in Wales. It also covers marine, air and rail safety. It does not cover roads in Wales, transport funding programmes administered by the devolved administrations, or transport services which operate solely within Wales.	✓	If any of the NEWABTS packages promote walking and cycling, improve public transport or reduce congestion, this would be consistent with the aims of this white paper.
The Pitt Review – Lessons Learned from 2007 floods (2008)	The floods of 2007 caused the country's largest peacetime emergency since World War II. The impact of climate change means that the probability of events on a similar scale happening in future is increasing. This Review calls for urgent and fundamental changes in the way the country is adapting to the likelihood of more frequent and intense periods of heavy rainfall. The recommendations are challenging and strong national leadership will be needed to make them a reality.	✗ / ✓	If any of the NEWABTS packages increase flood risk or flooding, this could oppose the aims of this review.
The Pollution Prevention and Control (England and Wales) Regulations (2000)	- Aims to control pollution from industrial sources. It requires the prevention or reduction of emissions from installations and promotes techniques that reduce the amount of waste and releases overall.	✗	If any of the NEWABTS packages result in pollution of pollution to air, land or water, this could oppose the aims of these regulations.
The Stern Review – Review of the Economics of Climate Change (October 2006)	- The Stern Report was published by the Government in October 2006, and discusses the effect of climate change and global warming on the world economy. The key elements of the report were that climate change is a serious global threat and the impacts on the economy could be great, the equivalent of losing 5% of GDP per year. This is in comparison to the cost of tackling climate change, at 1% of global GDP. A key factor in tackling climate change will be the reduction of emissions in greenhouse gases and the Report identifies renewable	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon the aims of this review..

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	energy resources as a key aspect in reducing emissions.		
The UK Government's 10 Year Transport Plan (2000)	- Easier access to jobs through regeneration and land use planning. - Safer and more secure transport - A transport system that makes less impact on the environment.	✓	If any of the NEWABTS packages provide easier access to jobs, safer and more secure transport or a transport system that makes less impact on the environment, this would be consistent with the aims of this plan.
The Water Environment) (England and Wales) Regulations (2003)	- Defines river basin districts and requires an analysis of their character, the impact of human activity on the basin, an economic analysis of water and identification of the use of water for abstraction intended for human consumption. - Production of register of protected areas lying within the river basin district. - Establishes a monitoring programme for determining water status. - Sets objectives and targets to improve water quality. - Production of river basin management plans.	✗	If any of the NEWABTS packages result in negative impacts on surface or groundwater water quality, this may oppose the aims of these regulations.
UK Biodiversity Action Plan (1994)	To conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity through all appropriate mechanisms.	✗	If any of the NEWABTS packages result in the reduction or loss of biodiversity or habitats outlined in the Action Plan, this would oppose this plan.
UK Climate Change Act (2008)	The purposes of the Act are: - To set a target for the year 2050 for the reduction of targeted greenhouse gas emissions; - To provide for a system of carbon budgeting; to establish a Committee on Climate Change; - To confer powers to establish trading schemes for the purpose of limiting greenhouse gas emissions or encouraging activities that reduce such emissions or remove greenhouse gas from the atmosphere; - To make provision about adaptation to climate change; - To confer powers to make schemes for providing financial incentives to produce less domestic waste and to recycle more of what is produced; - To make provision about the collection of household waste; - To confer powers to make provision about charging for single use carrier bags; - To amend the provisions of the Energy Act 2004 about renewable transport fuel obligations; - To make provision about carbon emissions reduction targets; and - To make other provision about climate change.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon the aims of this act.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
UK Climate Change and Sustainable Energy Act (2006)	The Climate Change and Sustainable Energy Act 2006 places an obligation on the UK Government to report to Parliament on greenhouse gas emissions in the UK and action taken by Government to reduce these emissions.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon the aims of this act.
Wildlife and Countryside Act 1981 (as amended)	Protection of wildlife (birds, animals and plants), countryside, national parks, public rights of way and the designation of protected areas such as Sites of Special Scientific Interest or limestone pavement orders.	✗	If any of the NEWABTS packages result in any negative impacts to wildlife, countryside, national parks, public rights of way or protected areas, his would oppose this act.
PPS: Planning and Climate Change - Supplement to Planning Policy Statement 1 (2007)	This Planning Policy Statement (PPS) sets out how planning, in providing for the new homes, jobs and infrastructure needed by communities, should help shape places with lower carbon emissions and resilient to the climate change now accepted as inevitable.	✗	If any of the NEWABTS packages impact upon landscape character or quality, this could oppose the aims of this PPS.
PPS 1: Delivering Sustainable Development (2005)	Planning Policy Statement 1 (PPS1) sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system.	✗ / ✓	If any of the NEWABTS packages impact upon climate change or greenhouse gas emissions, this could impact upon the aims of this PPS.
PPG 2: Green Belts (2001)	PPG2 confirms that the Government attaches great importance to Green Belts. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The most important attribute of Green Belts is their openness. Regional and strategic planning guidance set the framework for Green Belt policy.	✗	If any of the NEWABTS packages result in the reduction or loss of green belt land, this would oppose the aims of this PPS.
PPS 3: Housing (2000)	Planning Policy Statement 3: Housing (PPS3) underpins the delivery of the Government's strategic housing policy objectives and our goal to ensure that everyone has the opportunity to live in a decent home, which they can afford in a community where they want to live. The specific outcomes that the planning system should deliver are: - High quality housing that is well designed and built to a high standard; - A mix of housing, both market and affordable, particularly in terms of tenure and price, to support a wide variety of households in all areas, both urban and rural; - A sufficient quantity of housing taking into account need and demand and seeking to improve choice; - Housing developments in suitable locations, which offer a good range of community facilities and with good access to jobs, key services and - infrastructure; and - A flexible, responsive supply of land – managed in a way that makes efficient and effective use of land, including re-use of previously-	✓	If any of the NEWABTS packages improves the accessibility of public transport or better access to key services and employment from residential areas, this would be consistent with this PPS.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	developed land, where appropriate.		
PPS 4: Planning for Sustainable Economic Growth (2009)	PPS4 sets out the Government's comprehensive policy framework for planning for sustainable economic development in urban and rural areas. It replaces PPS6 Planning for Town Centres. PPS4 includes a number of plan making policies be taken into account by regional planning bodies in the preparation of revisions to regional spatial strategies. PPS4 covers the issues of sustainable economic development, town centre planning and planning for tourism.	✗ / ✓	If any of the NEWABTS packages encourage sustainable economic development in urban and rural areas, this could impact upon the aims of this PPS.
PPS 5: Planning for the Historic Environment (2010)	Planning Policy Statement 5 (PPS5) sets out the Government's planning policies on the conservation of the historic environment. It replaces PPG15: Planning and the Historic Environment and PPG16: Archaeology and Planning. The main aim of PPS5 is that the historic environment and its heritage assets should be conserved.	✗	If any of the NEWABTS packages result in the loss of any heritage assets, this could oppose the aims of this PPS.
PPS 7: Sustainable Development in Rural Areas (2004)	Planning Policy Statement 7 (PPS7) sets out the Government's planning policies for rural areas, including country towns and villages and the wider, largely undeveloped countryside up to the fringes of larger urban areas.	✗	If any of the NEWABTS packages impact upon landscape character or quality, this could oppose the aims of this PPS.
PPS 9: Biodiversity and Geological Conservation (2005)	Planning policies should be based on up-to-date information about the environmental characteristics of the area including the relevant biodiversity and geological resources. Policies should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. Appropriate weight should be attached to designated sites of international, national and local importance and to species protected by law. Works to properties (in Conservation Areas or elsewhere) must not result in damage to protected species, including their breeding sites or resting places. Opportunities to build in beneficial biodiversity or geological features as part of the design of new developments should be maximised.	✗	If any of the NEWABTS packages result in the reduction or loss of biodiversity or impact upon geological conservation, this could oppose the aims of this PPS.
ODPM Circular 06/2005 Biodiversity and Geological Conservation – Statutory Obligations and their impact within the planning system (2005)	This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It complements the expression of national planning policy in PPS9 and Planning for Biodiversity and Geological Conservation: A Guide to Good Practice.	✗	If any of the NEWABTS packages result in the reduction or loss of biodiversity or impact upon geological conservation, this could oppose the aims of this PPS.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
ODPM Guide to Good Practice: Planning for Biodiversity and Geological Conservation (2005)	This guide complements PPS9 and *Circular 06/05* and provides good practice guidance on ways regional planning bodies and local planning authorities can help deliver the national policies in PPS9 and comply with legal requirements set out in the Circular.	✘	If any of the NEWABTS packages result in the reduction or loss of biodiversity or impact upon geological conservation, this could oppose the aims of this PPS.
PPS 12: Local Spatial Planning (2004)	Planning Policy Statement 12 (PPS12) sets out the Government's policy on local spatial planning, which plays a central role in the overall task of place shaping and in the delivery of land uses and associated activities.	✓	If any of the NEWABTS packages promote sustainable development and economic, environmental and social well being, this would be consistent with the aims of this PPS.
PPG 13: Transport (2001)	Land use planning and transport should be integrated to promote more sustainable transport choices for both people and moving freight; to promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling; and reduce the need to travel, especially by car.	✓	If any of the NEWABTS packages promote more sustainable transport choices, promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling or reduce the need to travel by car, this would be consistent with the aims of this PPG.
PPG 17: Planning for Open Space, Sport and Recreation (2002)	PPG17 indicates that open spaces, sport and recreation underpin people's quality of life. Well designed and implemented planning policies for open spaces, sport and recreation can help to deliver a number of objectives including: - The creation of environments that are attractive, clean and safe; - Support for nature conservation and biodiversity; - By acting as green lungs, the improvement of air quality; - By acting as a focal point for community activities they can bring together members of deprived communities and provide opportunities for social interaction; - The promotion of healthy living and prevention of illness; - The promotion of social development of children of all ages through play, sporting activities and interaction with others. Effective planning for open space, sport and recreation should be based on robust assessments of the existing and future needs of communities.	✓	If any of the NEWABTS packages promote sustainable development by ensuring that open space, sports and recreational facilities (particularly in urban areas) are easily accessible by walking and cycling, support rural renewal, social inclusion and health and wellbeing, this would be consistent with the aims of this PPG.
PPG 20: Coastal Planning (1992)	Planning Policy Guidance 20 (PPG20) is currently under review and the policies contained within the PPG have been cancelled, with the exception of paragraphs 2.9, 2.10 and 3.9. Paragraphs 2.9 and 2.10 relate to coastal development and paragraph 3.9 relates to public access to the coast. PPS25 Supplement: Development and Coastal Change replaces the policy on managing the impacts of coastal erosion to development previously set out in PPG20.	✘	If any of the NEWABTS packages require development in a coastal location or restrict public access to the coast, this could oppose the aims of this PPG.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
PPS 23: Planning and Pollution Control (2004)	Planning Policy Statement 23 (PPS23) is intended to complement the pollution control framework under the Pollution Prevention and Control Act 1999 and the PPC Regulations 2000.	✘	If any of the NEWABTS packages result in pollution (of air, water or soil), this could oppose the aims of this PPS.
PPS 24: Planning and Noise (1994)	Planning Policy Guidance 24 (PPG24) guides local authorities in England on the use of their planning powers to minimise the adverse impact of noise. It outlines the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which generate noise.	✘	If any of the NEWABTS packages result in an increase in noise, this could oppose the aims of this PPS.
PPS 25: Development and Flood Risk (2006)	Planning Policy Statement 25 (PPS25) sets out Government policy on development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall.	✘	If any of the NEWABTS packages increase flood risk or flooding, this could oppose the aims of this PPS.
Planning Policy Statement 25 Supplement: Development and Coastal Change (2010)	This PPS Supplement sets out a planning framework for the continuing economic and social viability of coastal communities. The policy aims to strike the right balance between economic prosperity and reducing the consequences of coastal change on communities. This policy supplements PPS25 and replaces the policy on managing the impacts of coastal erosion to development set out in PPG20, Coastal Planning which is cancelled (with the exception of paragraphs 2.9, 2.10 and 3.9).	✘	If any of the NEWABTS packages result in negative impacts to coastal areas, this could oppose the aims of this PPS.

Table C4 Welsh Legislation Plans, Policies and Programmes

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
The Welsh SEA Regulations (Welsh Statutory Instrument No. 1656)	The regulations state that it is the responsibility of the governing authority of an area to carry out or secure the carrying out of an environmental assessment during the preparation of a plan or programme (of determined type) and before its adoption or submission to the legislative procedure leading to adoption. These regulations apply to all plans relevant to areas wholly or partly within Wales.	✓	An SEA (the results of which are presented in this document) has been carried out in the NEWABTS.
The Contaminated Land (Wales) Regulations (2001)	Outline specifically the management, access, responsibility and disposal issues surrounding contaminated land in Wales. Sets out further provisions for the identification and remediation of contaminated land and adds land contaminated by radioactive substances as a 'special site'.	✗	A number of the packages set out options for construction which may require the excavation of contaminated land. This should be further assessed at scheme design.
The Transport (Wales) Act (2006)	Outlines the responsibility of the Welsh Government regarding transport. Broadly, this is to develop policies for the promotion and encouragement of safe, integrated, efficient and economic transport facilities to, from and within Wales and to carry out its functions so as to implement these policies. The WG is also responsible for the production and regular review of a Welsh Transport Strategy.	✓	The main aims of the NEWABTS support the aims of this act.
National Transport Plan (March 2010)	The plan in conjunction with the regional transport plans aims to: reduce greenhouse gas emissions and other environmental impacts; integrate local transport; improve access between key settlements and sites; enhance international connectivity; and increase safety and security.	✓	The main aims of the NEWABTS support the aims of this plan.
Walking and Cycling Strategy for Wales (2003)	- promote sustainable transport - ensure the land-use planning process assists the growth of walking and cycling - increase real and perceived safety on the roads - promote social inclusion by improving access to services on foot and cycle - improve the health of the people of Wales	✓	The NEWABTS sets out a series of options which support the aims of this strategy.
A Walking and Cycling Action Plan for Wales (2008)	Provides key initiatives to support walking and cycling in Wales. Its aim is to promote and encourage these activities as a way of reducing car dependence as well as improving health.	✓	The NEWABTS sets out a series of options which support the aims of this plan.
Road Safety Strategy Wales (2003)	Sets the following targets for casualty reduction by 2010 compared to the average for 1994-1998: - 40% reduction in the total number killed or seriously injured (KSI) casualties;	✓	Whist the NEWABTS dies not have any specific packages / options for road safety a number of the options, if implemented, would result in improved safety and therefore

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	- 50% reduction in the total number of children killed or seriously injured (KSI) casualties; and - 10% reduction in the rate of slight casualties per 100 million vehicle kilometres travelled.		supporting the aims of this strategy.
Environment Strategy for Wales (2006)	Sets the long term strategy for the environment of Wales, establishing the strategic direction for the next 20 years. It has five main environmental themes: - Addressing climate change - Sustainable resource use - Distinctive biodiversity, landscapes and seascapes - Our local environment - Environmental hazards	✗ / ✓	The packages contained within the NEWABTS set out options which look create a modal shift away from the private car onto more sustainable forms of transport, therefore supporting the aims of this Strategy. However a number of the options which set out new highways measures may have adverse effects on biodiversity and landscape if not mitigated.
Wales: A Better Country – The Strategic Agenda of the Welsh Assembly Government (2003)	Vision Sustainable future for Wales where action for social, economic and environmental improvement work together to create positive change: - Promoting a diverse, competitive, high added-value economy, with high quality skills and education, that minimizes demands on the environment; - Action on social justice that tackles poverty and poor health, and provides people and their communities with the means to help themselves and break out of the poverty trap; - Action in our built and natural environment that enhances pride in the community, supports bio-diversity, promotes local employment and helps to minimize waste generation, energy and transport demands; - Strengthening Wales' cultural identity and helping to create a bilingual country; - Ensuring all our children and future generations enjoy better prospects in life, and are not landed with a legacy of problems bequeathed by us; - Supporting people to live healthy and independent lives; - Promoting openness, partnership and participation.	✓	The packages contained within the NEWABTS are aimed at reducing carbon emissions which will support the aims of this Agenda.
The Sustainable Development Action Plan 2004-2007 (Welsh Assembly Government 2004)	10 actions: - By 2010 100% of electricity used in all WG buildings will be supplied from renewable sources or good quality embedded generation; and we shall work towards a similar figure for other public sector buildings. - The Welsh Government, its agencies and the NHS in Wales will report annually on the use of energy in its estates. - From January 2005 we will specify in all contracts for new or refurbished public buildings procured by or for the Welsh Government, that the design achieves as a minimum, the BREEAM 'very good' standard, or equivalent and the BREEAM 'excellent' standard	✓	The packages contained within the NEWABTS are aimed at reducing carbon emissions which will support the aims of this Agenda.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	wherever possible. We will work with Local Authorities to help them achieve similar standards for new and refurbished public buildings for which they are responsible. - By 2006 we will have established pilot projects that explore the potential of using renewable energy solutions in our policies and programmes aimed at tackling fuel poverty amongst low income vulnerable households, particularly those unable to benefit from traditional improvement solutions. - The WG and its agencies will encourage the development of an indigenous microgeneration "renewables" industry in Wales, with a particular focus on opportunities for Small and Medium Enterprises, Welsh Development Agency, Carbon Trust and Energy Savings Trust, and where appropriate, other renewables focused organisations, to work together closely to provide a joined up approach - We will commission a project to investigate the benefits and barriers to promoting the uptake of alternative fuels in Wales, such as biofuels, biogas, natural gas and hydrogen. - We will work with Local Education Authorities and school governing bodies so that, as they come up for renewal, all specifications for contracts for school meals address issues of health and nutrition and food seasonality. - We will introduce a targeted top tier agri-environment scheme to encourage co-operative action, bringing about wider environmental benefits in the countryside across farm boundaries. - With our Advisory Panel we will produce a Wales-wide strategy for Education for Sustainable Development and Global Citizenship by spring 2005. - By Spring 2005 we will also introduce the ECO Homes environmental assessment process and set energy efficiency standards significantly above that currently required by building regulations for all new homes built in Wales by Registered Social Landlords using Social Housing Grant.		
Designed for Life: Creating World Class Health and Social Care in the 21st Century (May, 2005)	- To improve health and reduce, and where possible eliminate, inequalities in health. - To support the role of citizens in promoting their health, individually and collectively. - To develop the role of local communities in creating and sustaining health. - To promote independence, service user involvement and clinical and professional leadership.	✓	The packages contained within the NEWABTS are aimed at reducing travel by car which will aid improvement on local air quality and improve health.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	- To re-cast the role of all elements of health and social care so that the citizen will be seen and treated by high quality staff at home or locally or passed quickly to excellent specialist care, where this is needed. - To provide quality assured clinical treatment and care appropriate to need, and based on evidence. - To strengthen accountability, developing a more corporate approach in NHS Wales so that organisations work together rather than separately. - To ensure full public health engagement at both local and national levels.		
People, Places, Futures – The Wales Spatial Plan (2008)	Vision To create sustainable communities and protect and enhance the environment	✓	Some of the options within the NWEABTS are aimed at making transport more sustainable therefore supporting the vision of this plan.
Planning Policy Wales (March, 2002)	The key objectives for consideration regarding transport developments are as follows. Planning policies and proposals should: ▪ Promote resource-efficient settlement patterns that minimise land-take and urban sprawl. ▪ Locate developments so as to minimise the demand for travel, especially by private car. ▪ Contribute to climate protection by encouraging land uses that result in reduced emissions of greenhouse gases. - Minimise the risks posed by, or to, development on, or adjacent to, unstable or contaminated land and land liable to flooding. - Contribute to the protection and improvement of the environment, so as to improve the quality of life, and protect local and global ecosystems. - Help to ensure the conservation of the historic environment and cultural heritage, acknowledging and fostering local diversity. - Minimise the use of non-renewable resources. - Encourage opportunities to reduce waste and all forms of pollution and promote good environmental management and best environmental practice. - Promote access to employment, services and facilities. - Developments likely to support the achievement of an integrated transport system should be encouraged. - Foster social inclusion by ensuring that full advantage is taken of the opportunities to secure a more accessible environment for everyone.	✗ / ✓	Some of the options within the NWEABTS are aimed at making transport more sustainable and minimising the need to travel by car. However a number of the options which set out new highways measures may have adverse effects on biodiversity and landscape if not mitigated.
Towards Zero Waste – The National Waste Strategy for Wales (2010)	- It sets out how to build on the successes achieved and describes a framework for resource efficiency and waste management until 2050. - It identifies the main challenges that will have to be faced: ○ Sustainability ○ Ecological footprint]	✓	The packages contained within the NEWABTS are aimed at reducing travel by car which will aid improvement on local air quality and improve health.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	○ Climate change ○ Security of resources		
Health, Social Care and Well-being Strategies (Wales) Regulations (2003)	The regulations outline the procedures and requirements of formulating a strategy regarding health, social care or well-being and with whom the associated responsibilities lay. The focus is on liaison and consultation with the general public, social inclusion, sustainability and equality.	✓	The packages contained within the NEWABTS are aimed at reducing travel by car which will aid improvement on local air quality and improve health.
Well Being in Wales (2002)	- Highlights the relevance of health to well being for all policy areas and emphasises the importance of people's health to the economy. - Sets out proposals for action by the Welsh Government to work with the wide range of organisations and groups that can help to reduce the inequalities in health that exist between people in different communities and between different groups within the population. - Asks health, public health and care services to make significant contribution to building strong communities and to the objectives of other policy areas through their day to day roles. - Provides national direction and context for Local Health, Social Care and Well Being Strategies.	✓	The packages contained within the NEWABTS are aimed at reducing travel by car which will aid improvement on local air quality and improve health.
Health Challenge in Wales (2004)	- Aims to improve the health of Welsh citizens by targeting the six main priorities of smoking, obesity, accidents and injuries, alcohol and substance misuse, infections and mental health and well-being. Health Challenge Wales outlines the idea of the Nation's health being a shared responsibility. Health Challenge Wales now offers a national focus for everyone's efforts, with an overall strategy which has two strands: - action to help people take steps to improve their lifestyles; - Wider action across all policy areas to tackle social, economic and environmental factors which can impact on people's health.	✓	The packages contained within the NEWABTS are aimed at reducing travel by car which will aid improvement on local air quality and improve health.
Community First Guidance (Welsh Assembly Government, 2007)	- To build confidence and raise the self-esteem of people living in the community; - To increase the incomes of local people (including reducing costs of food, heat, credit etc.); - To improve health and well-being; - To encourage and improve education and skills training for work; - To create jobs; - To make communities safe, secure and crime free; - To ensure public services are delivered in ways which are more responsive and more locally accountable; - To improve housing and the quality of the environment; - To encourage active citizenship.	✓	The packages contained within the NEWABTS are aimed at reducing travel by car which will aid improvement on local air quality and improve health and supporting the aims of this guidance.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
A Winning Wales: The National Economic Development Strategy of the Welsh Assembly Government (2002 and 2004)	- raising total employment by 135,000; - improving enterprise and innovation; - raising not just skill levels but our learning performance at every level; - ensuring that Wales uses world-class electronic communications to their full potential; - development of a better co-ordinated and well-targeted business support network; - dynamic development of our country's green economy, including sustainable agriculture and energy production; - smarter ways of connecting Wales to international business opportunities; - support for the social business sector which can bring growth and opportunity to disadvantaged communities	✓	The NEWABTS addresses more sustainable ways to reach major cities and international airports, thereby helping to connect Wales to international business opportunities.
Wales: A Vibrant New Economy – Emerging New Strategy, Consultation Document (November, 2005)	- To increase employment still further, so that over time the Welsh employment rate matches the UK average, even as the UK employment rate itself rises and raise the quality of jobs, so that average earnings increase and close the gap with the UK average. - Our key actions for achieving these priorities will be: - Supporting job creation and helping individuals to tackle barriers to participation in the world of work; - Investing to regenerate communities and stimulate economic growth across Wales; - Helping businesses to grow and to increase value-added per job and earnings by investing in our transport networks and other economic infrastructure, attracting more high value-added functions to Wales and supporting businesses and sectors with strong growth potential, further improving our skills base and using the opportunities created by the mergers to deliver more demand-led training tailored to the needs of businesses; and helping businesses to become more competitive by supporting other drivers to business growth: entrepreneurship, innovation, investment and trade; - Ensuring that all economic programmes and policies support sustainable development, in particular by encouraging clean energy generation and resource efficiency. - Our principles to guide us in this work will be: - Ensuring that the mergers of the WDA, WTB and ELWa with the Welsh Government deliver more effective and efficient services to Welsh firms and individuals; - Joining up policy agendas across the Welsh Government and meeting our corporate commitments to social justice, sustainable development,	✓	The NEWABTS address ways in which to improve the resource efficiency of the transport network.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
	equality and the Welsh language; - Working in partnership to deliver improvements across Wales through the Spatial Plan; - Focusing support where it can make most difference; and - Promoting closer working between the public and private sectors on business advice and finance, to ensure that firms in Wales have access to world-class support.		
Achieving Our Potential 2006-2013 Tourism Strategy for Wales Mid Term Review	Vision A Customer Responsive, Innovative, Sustainable and Profitable industry which makes an increasing contribution to the economic, social, cultural and environmental well being of Wales. Strategic aims - Realising the importance of understanding and responding to customer needs - Accepting that there is a value to be gained from doing things differently to our competitors through innovative ways of working - Acknowledging the need to secure a sustainable, long-term future through responsible destination and business management - Seeking to maximise business profitability to drive growth in the tourism economy	✓	The packages contained within the NEWABTS are aimed at reducing travel by car including to airports and the port of Holyhead which would introduce more sustainable ways in which visitors can reach north Wales supporting the aims of this strategy.
TAN 5: Nature Conservation and planning (2009)	Advice on: - The key principles of positive planning for nature conservation - Nature conservation and Local Development Plans - Nature conservation in development management procedures - Development affecting protected internationally and nationally designated sites and habitats - Development affecting protected and priority habitats and species	✗ / ✓	Some of the options within the NWEABTS are aimed at making transport more sustainable and minimising the need to travel by car and potential reducing emissions. This in turn could have a positive effect on nature due to reduced emissions. However a number of the options which set out new highways measures may have adverse effects on nature conservation if not mitigated.
Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology	This document replaces PPG16 as the advisory note regarding the management of archaeological matters, planning policy and planning with regard to archaeological matters. It sets out advice on legislation and guidance for archaeological remains and supplements that guidance.	✗ / ✓	Some of the options within the NWEABTS are aimed at making transport more sustainable and minimising the need to travel by car and potential reducing emissions. This in turn could have a positive effect on some archaeological sites. However a number of the options which set out new highways measures may have adverse effects on archaeology if not mitigated.
Welsh Office Circular 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas	This document replaces PPG16 as the advisory note regarding the management of historic structures and conservation areas and provides the framework for their protection in Wales within the planning process.	✗ / ✓	Some of the options within the NWEABTS are aimed at making transport more sustainable and minimising the need to travel by car and potential reducing emissions. This in turn could have a positive effect on some historic buildings. However a number of the options which set out new highways measures may have adverse effects the historic environment if not mitigated.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
CCW Priority Habitats	An outline of habitats which are protected under a set of agreed priorities: - For which the UK has international obligations; - Which are at risk, such as those with a high rate of decline or which are rare; - Which are important for organisms inhabiting a wider set of ecosystems; - Which are important for key species	✗ / ✓	Some of the options within the NWEABTS are aimed at making transport more sustainable and minimising the need to travel by car and potential reducing emissions. This in turn could have a positive effect on protected sites and priority habitat due to reduced emissions. However a number of the options which set out new highways measures may have adverse effects on protected sites and priority habitat if not mitigated.
TAN 11: Noise (1997)	Advice on: - Development plan - Noise exposure categories - Development control	✗ / ✓	Some of the options within the NWEABTS are aimed at making transport more sustainable and minimising the need to travel by car which could reduce road noise in some areas. However a number of the options which set out new highways measures including new roads may have adverse effects noise by introducing new road traffic noise or increased noise in some areas.
TAN 12: Design (2009)	Advice on: - Promoting sustainability through good design - Preparation and validation of mandatory design and access statements	✓	Environmental assessment has been included at the early stages of the development of NEWABTS which will also be carried through to the detailed design stage.
TAN 14:Coastal Planning (1998)	Advice on: - Planning the coastal zone - Recreation - Heritage coasts and non statutory coastal groupings - Shoreline management plans	✗ / ✓	There could be an interaction where the options propose new infrastructure along the coast.
TAN 15: Development and Flood Risk (2004)	Advice on: - Development advice maps - Nature of development or land use - Justifying the location of built development - Assessing flooding consequences - Surface water run-off from new development - Action through Development Plans - Development control	✗ / ✓	Where options introduce new infrastructure and increased impermeable surfaces this could have an adverse effect on flood risk. However where the options proposed look at improved infrastructure which introduce new drainage measures to mitigate the effects of climate change.
TAN 18: Transport (2007)	Advice on: - Integration between Land Use Planning and Transport - Location of Development - Parking - Design of Development - Walking and Cycling - Public Transport - Planning for Transport Infrastructure - Assessing Impacts and Managing Implementation	✓	The NEWABTS supports advise set out within this Technical Advise Note.

Plans & programs	Objectives or requirement of plan/programme	Potential for interaction of the NEWABTS on the plan / programme.	Justification
TAN 21: Waste (2001)	Advice on: - Planning framework in Wales - Regional co-ordination in Wales - Principles and techniques - Planning considerations in waste issues - Unitary development plans - Development control - Types of waste	✘	It is likely that a number of the options could generate a significant amount of waste. This will be addressed at scheme design.
Minerals Technical Advice Note (MTAN)1: Aggregates (2004)	- providing mineral resources to meet society's needs, current Aggregates production, future demand , future supply - protect areas of importance - reduce the impact of aggregates production - restoration and aftercare - efficiency of use/recycling - annexes on RAWPs, Reclamation to Agriculture, Soil, Planting and seeding	✘	It is likely that a number of the options which involve new infrastructure will require use of resources. Every effort should be taken to re-use where possible. This will be further addressed at scheme design.

Table C5 Regional Plans, Policies and Programmes

Plans & programs	Objectives or requirement of plan/programme		
Taith Regional Public Transport Strategy	- To be compatible with other LA objectives for transport including best value. - To overcome social exclusion and deprivation - To contribute to the economic development of the area - To remove barriers to travel, including modal interchange - To be sustainable - To offer quality throughout the journey - To be as safe as possible - To be cost effective - To make best use of private and public sector resources - To achieve minimum levels of accessibility - To work in partnership - To be realistic in terms of delivery - To build on existing high skills - To provide an integrated solution - To develop more efficient structures and mechanisms for delivery	✓	The NEWABTS supports the aims of this strategy
Taith North Wales Rail Strategy, (2009)	- Develop schemes to upgrade the existing rail network - Appraise the potential for new stations - Assess how non-car access could be improved to principal stations and develop the principal of Station Travel Plans - Identify locations where station car parking needs to be expanded	✓	The NEWABTS supports the aims of this strategy
North Wales Regional Tourism Strategy 2010-2015)	Vision 'There is scope to strengthen and expand tourism and the contribution it makes to regional prosperit'	✓	Improved transport services will also contribute to strengthening and expanding tourism.
North Wales Regional Waste Plan 2003 – 2013	- Provide a land use planning framework to enable individual Authorities in the Region to allocate sites in their Unitary Development Plans for new waste management facilities. - Treat waste as a resource by contributing to the re-use, recycling and composting opportunities for waste generated in the Region and to allocate sites for disposal of waste which is not or cannot be re-used, recycled or composted. - Reduce the amount of waste that is land filled. - Ensure that waste issues are considered in the assessment and determination of planning applications for all types of development. - Reduce the rate of growth of waste generated in the Region. - As a minimum, meet targets set by Europe and the Welsh - Government for managing waste. - Raise public awareness on waste issues.	✘	It is likely that a number of the options could generate a significant amount of waste. This will be addressed at scheme design.

North Wales Development Strategy	A technologically advanced and innovative region; - A region with well connected and inclusive communities in both rural and urban areas; - A region with an adaptable and appropriately skilled workforce; - A region where business and individuals capitalise on the distinct environment to deliver competitive advantage; - A region where history, language, culture and strength of identity reinforce a unique quality of life; - A region where all stakeholders and agencies work effectively together across to a common agenda to deliver shared priorities	✓	The NEWABTS will address ways to further sustainably connect both urban and rural settlements.

Table C6 Local Plans, Policies and Programmes

Plans & programs	Objectives or requirement of plan/programme		
The Flintshire Unitary Development Plan, Ensuring a Sustainable Future for Flintshire 2000-2015	- Sets a single set of planning guidelines that can be applied across the whole County - Provides a Framework which promotes and delivers sustainable development in the County up to 2015 in terms of housing, retail, tourism, sport, recreation, community facilities, and an efficient transport system - Seeks to protect and enhance the rich and varied built, cultural and natural environment in Flintshire.	✓	The NEWABTS supports the aims of this plan.
The Flintshire Local Transport Plan, 2001 – 2006, (2000) (including the Local Bus Strategy, and Walking Strategy, 2003)	- To reduce the number of road accident casualties. - To improve the actual and perceived safety for pedestrians and cyclists. - Reduce Crime and fear of crime affecting transport users. - Ensure that new development is located, designed and constructed to maximise use of transport modes other than the private car. - To reduce distance travelled for every day journeys. - Ensure better co-ordination between all modes of travel. - Ensure better co-ordination of transport with essential services and facilities. - Strategy B2: A quality bus service that can be trusted. - Strategy B3: Accessibility for all: Demand responsive transport. - Strategy B4: Accessibility for all: Community transport. - Strategy B5: Investment in education transport - Strategy B6: Improve standards of taxis and private hire vehicles. - Strategy B7: Consistent and forward looking fares policies. - Strategy C1: Co-ordinate modes and services. - Strategy C2: Integrated ticketing systems. - Strategy D2: Meet minimum standards for bus infrastructure. - Strategy D3: To provide more priorities for buses and taxis.	✓	The NEWABTS supports the aims of this plan.

	- Strategy E1: Public transport information in partnership with providers - Strategy E2: Public transport promotion. - Reverse the decline in walking for necessary journeys. - Improve health and well being. - Improve local economies.		
Wrexham County Borough Council Local Development Plan 2006-2021	- Policy framework within which provision is made for the development and conservation needs of the County Borough - Guide and control development - Safeguard areas for environmental protection and enhancement	✓	The NEWABTS supports the aims of this plan.
Wrexham Community Strategy 2009 -2020	Vision 'To improve the quality of life for all in Wrexham County Borough'	✓	THE NEWABTS will seek to improve sustainable and public transport which in turn will improve accessibility, thus potentially helping to improve the quality of life for some.
Wrexham Refreshed: A Vision for Wrexham County Borough, 2004 - 2020	- There are 6 strategic priorities: - Creating a safe place - Creating a place that values learning - Creating a place that cares for the environment - Creating an economically prosperous place - Creating a place where children and young people are valued - Creating a healthy, caring place	✓	The NEWABTS seeks to improve health through facilitating increased levels of walking and cycling.
Wrexham Local Transport Plan, July 2000 (including the Public Transport and Walking and Cycling Strategies)	- The Council aims to encourage and develop the existing transport system in order to achieve a high quality public transport, cycling and walking network, whilst recognising that there may still have to be selective road improvements. - The Council aims to substantially reduce the number of road traffic accidents in the County Borough through the implementation of its Road Safety Plan. - The Council is committed to the principles of Local Agenda 21 and to safeguarding the environment - The Council aims to provide a transport infrastructure which will support the County Borough's economy and local employment and support sustainable economic growth in the urban and rural areas. - The Council aims to improve personal security for transport passengers and pedestrians - The Council aims to tackle poverty and social exclusion and promote accessibility to everyday facilities for all, especially the most vulnerable members of society and those without access to a car. - The Council aims to improve the health of its residents by reducing pollution and encouraging healthier forms of transport such as walking and cycling. - The Council aims to make transport accessible to all with every member of the population having the opportunity for independent mobility.	✓	The NEWABTS supports the aims of this plan.

Chester City Local Plan 1996-2011	- Reflects national and regional strategic polices - Provides the strategy framework within which decisions on planning applications are made	✓	The NEWABTS supports the aims of this plan.
Cheshire County Council – County Structure Plan 2016 Alteration	- Sets out policies for the provision of housing, employment, commercial facilities and leisure facilities - Sets out to protect and enhance Cheshire natural environment - Sets out to improve the transport network	✓	The NEWABTS supports the aims of this plan.
Cheshire's Local Transport Plan 2006-2011	- Sets out objectives to progress Cheshire County Council's vision for local transport by the end of the LTP period - Outlines a longer term strategy and drivers that can impact this - Sets out an analysis of local transport problems and opportunities linked to a series of policies and principles - Sets out five year implementation programme - Sets out a set of targets and performance indicators that will be used to monitor progress - Sets out to enhance the quality of life for those who live, work and visit Cheshire - Promote social inclusion and accessibility to everyday services for all, especially those without a car - Improve safety for all travellers - Promote the integration for all forms of transport and land-use planning, leading to a better, more efficient transport system - Contribute to an efficient economy and to support sustainable economic growth and regeneration in appropriate locations - Protect and enhance the built and natural environment - Manage a well maintained and efficient transport network.	✓	The NEWABTS supports the aims of this plan.
Cheshire West and Chester Local Transport Plan (2001-2026) Draft Plan	This plan will set out ways to address the following: - dealing with increased levels of traffic growth; - improving accessibility to employment opportunities and key services especially for those without access to a car; - ensuring that our roads and bridges are well maintained; - tackling climate change and reducing the level of carbon dioxide emissions from transport; - improving and encouraging the use of more sustainable modes of transport; - improving air quality and the environment; - improving safety and reducing the number of casualties on our roads; - supporting economic growth, regeneration and new development; - improving links to neighbouring areas, particularly Liverpool, Manchester, North East Wales and Warrington; and - dealing with the mobility needs of an ageing population	✓	The NEWABTS supports the aims of this plan.

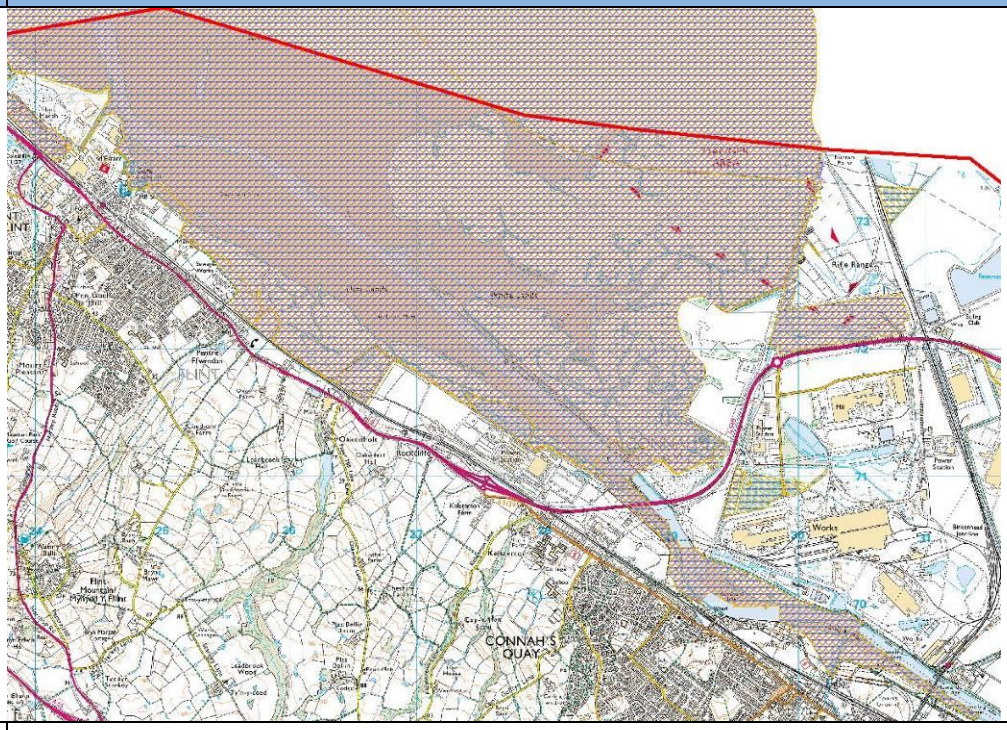
Ellesmere Port and Neston Local Plan	- Sets a policy framework for planning in area of Elsmere Port and Neston, in particular for housing, employment, the green belt, the natural and built environment, hazard and pollution, recreation and tourism, town centres and shopping and transport	✓	The NEWABTS supports the aims of this plan.

Annex D: Additional Baseline Information

Biodiversity, Flora and Fauna

There are a number of International, European, National and locally protected sites and species located within and adjacent to the study area. The Natura 2000 sites located within the study area are illustrated on Figure 1 Environmental Constraints. Located within the north east of the study areas is the Dee Estuary / Aber Dyfrdwy Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site. The qualifying features for these designations are presented in Table D1.

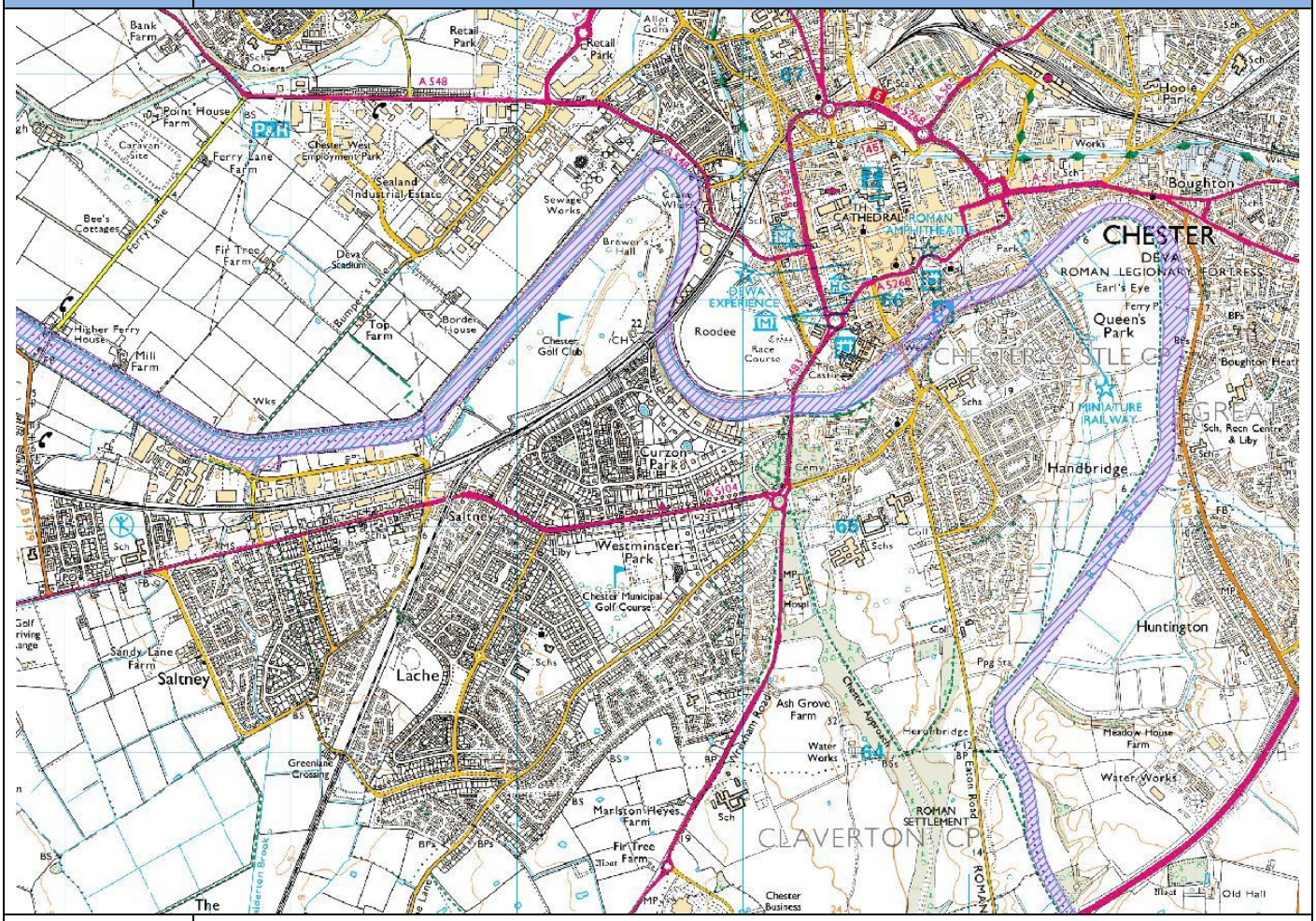
Table D1: Dee Estuary / Aber Dyfrdwy Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site

Designation	Qualifying Features
	
SAC	**Annex I habitat that are a primary reason for selection of this site**
	- 1140 Mudflats and sandflats not covered by seawater at low tide - 1310 Salicornia and other annuals colonising mud and sand - 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site
	- 1130 Estuaries - 1210 Annual vegetation of drift lines - 1230 vegetated sea cliffs of the Atlantic and Baltic coats - 2110 Embryonic shifting dunes - 2120 Shifting dunes along the shoreline with *Ammophila areneria* ('white dunes') - 2130 Fixed dunes with herbaceous vegetation ('grey dunes') - 2190 Humid dune slacks
	Annex II species that are a primary reason for selection of this site
	N/A

Designation	Qualifying Features
	Annex II species present as a qualifying feature, but not a primary reason for site selection
	- 1095 Sea lamprey *Petromyzon marinus* - 1099 River Lamprey *lampetra fluviatilis* - 1395 Petalwort *Petalophyllum ralfsii*
SPA	**Qualifying species under Article 4.1 of the Directive (79/409/EEC) for supporting species listed on Annex I of the Directive**
	During the breeding season - Common Tern (Sterna hirundo) - Little Tern (Sterna albifrons)
	On Passage - Sandwich Tern (Sterna sandvicensis)
	Over Winter - Bar-tailed Godwit (Limosa lapponica)
	Qualifications under Article 4.2 for supposting populations of European importance migratory species
	On Passage - Redshank (tringa tetanus) - Over Winter - Black-tailed Godwit (Limosa limosa islansica - Curlew (Numenius arquata - Dunlin (Calidris alpina alpine) - Grey Plova (Pluvialis squatarola) - Knot (Calidris canutus) - Oystercatcher (Haematopus ostralegus) - Pintail (Anus acuta) - Redshank (Tringa tetanus) - Shelduck (Tadorna tadorna) - Teal (Anus crecca)
Ramsar	The estuary is one of the top five estuaries in the UK for wintering and passage of internationally important waterfowl populations. The estuary is accreting and the extent of the saltmarsh continues to expand as it seeks to achieve a new equilibrium situation following large-scale historical land claim at the head of the estuary in the 1730's.
Source: Joint Nature Conservation Committee (JNCC) (http://www.jncc.gov.uk/)	

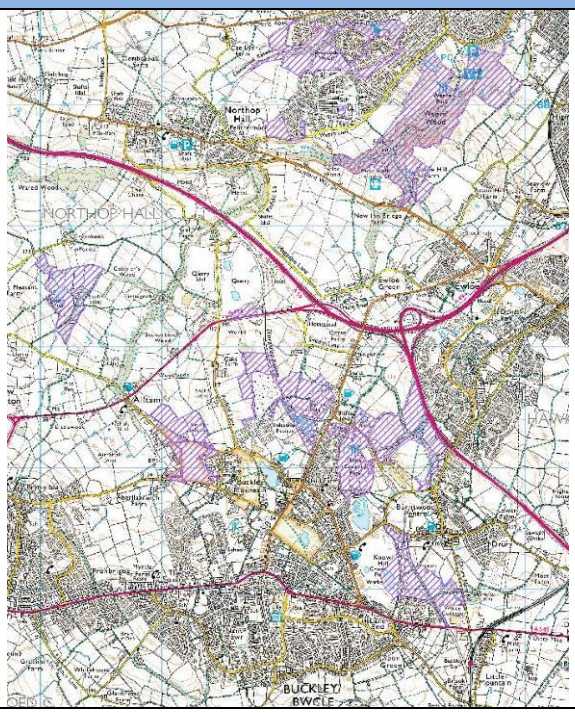
From Queensferry to Chester and beyond the Dee Estuary / Aber Dyfdwy designation changes to become the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC which is designated for watercourses of plain montain levels, Atlantic salmon and Floating water-plantain. The qualifying features for this designation are presented in Table D2.

Table D2: River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC

Designation	Qualifying Features
	
SAC	**Annex I habitat that are a primary reason for selection of this site**
	- 3260 Water courses of plain to montain levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site
	N/A
	Annex II species that are a primary reason for selection of this site
	- 1160 Atlantic Salmon (Salmo salar) - 1831 Floating water-plamtain (Luronium natans)
	Annex II species present as a qualifying feature, but not a primary reason for site selection
	- 1095 Sea lamprey (*Petromyzon marinus)* - 1096 Brook Lamprey (Lampetra planeri) - 1099 River Lamprey *lampetra fluviatilis* - 1163 Bullhead (*Cottus gobio*) - 1355 Otter (*Lutra lutra*)
Source: Joint Nature Conservation Committee (JNCC) (http://www.jncc.gov.uk/)	

To the south of Connah's Quay and the north of Buckley are located Deeside and Buckley Newt Sites SAC these support one of the largest populations of great crested newt in Great Britain. The waterbodies within the site have been formed by the extraction of clay, sand and coal during the industrial revolution and some more recent creations for nature conservation. The sites are located either side of the A55 A494 road junction on the coastal slopes that overlook the Dee Estuary. The qualifying features for this designation are presented in Table D3.

Table D3: Deeside and Buckley Newt Sites SAC

Designation	Qualifying Features
	
SAC	**Annex I habitat that are a primary reason for selection of this site**
	N/A
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site
	- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
	Annex II species that are a primary reason for selection of this site
	- 1166 Great crested newt *Triturus cristatus*
	Annex II species present as a qualifying feature, but not a primary reason for site selection
	N/A
Source: Joint Nature Conservation Committee (JNCC) (http://www.jncc.gov.uk/)	

The Midlands Meres and Mosses Phase 2 Ramsar is located to the north east of Wrexham and is one in a series of 18 lowland open water and peatland sites in the north west midlands of England and north east Wales. This site is crossed or located adjacent to any strategic transport links within the study area. A site description for this designation is detailed in Table D4.

Table D4: Midlands Meres and Mosses Phase 2 Ramsar

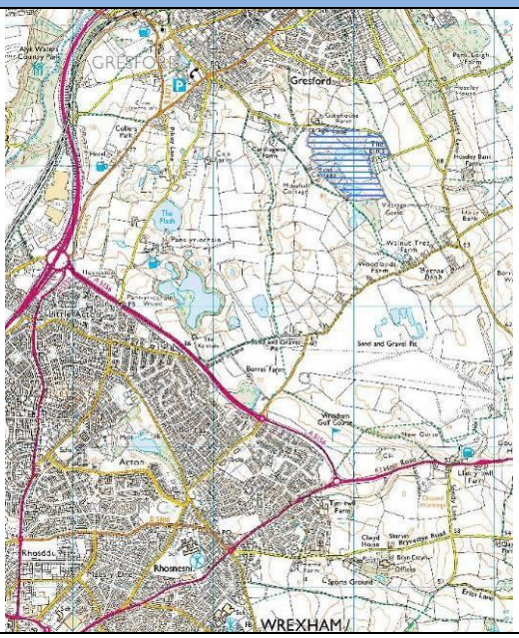
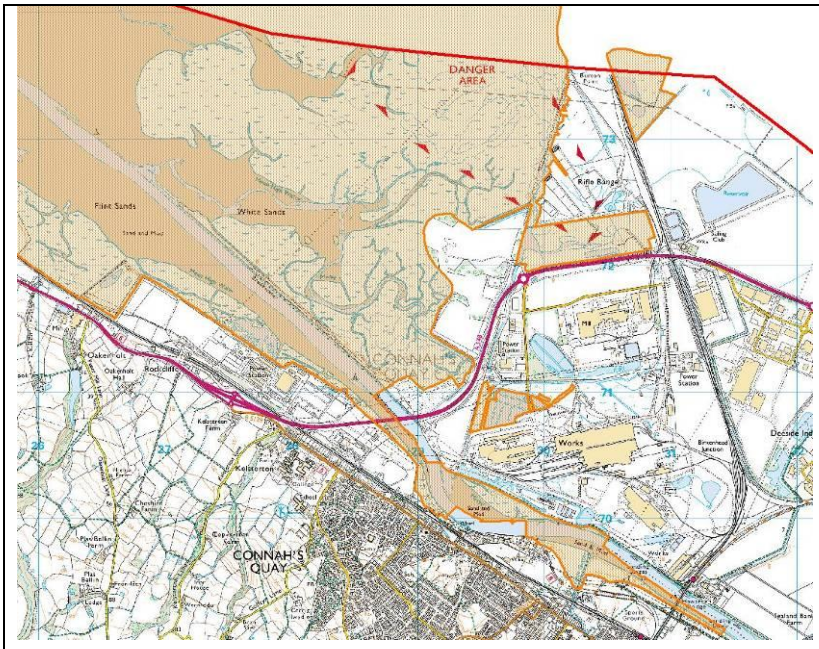
Designation	Site Description
	
Ramsar	The Midland Meres and Mosses form a geologically discrete sites of lowland open water and peatland sites in the north-west Midlands of England. These sites have developed in Natural depressions in the glacial drift by receding ice sheets which formerly covered the Cheshire/Shropshire Plain. There are 18 sites within the Shropshire / Cheshire Plain which include open water bodies (meres), and nutrient poor peat bogs (mosses) forming in some sites in the fringes of meres or completely infilling basins. Ina few cases the result is a floating quaking bog or schwingmoor.
Source: Joint Nature Conservation Committee (JNCC) (http://www.jncc.gov.uk/)	

Table D5: Inner Marsh Farm, Dee Estuary and Shotton Lagoons and Reedbeds SSSIs



Inner Marsh Farm SSSI

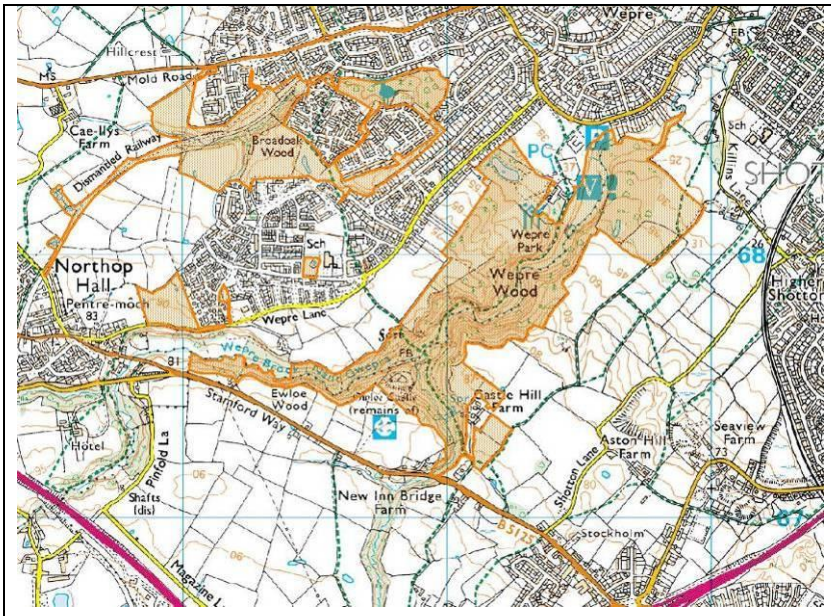
This site is notified for the ornithological interest as it supports, particularly its wintering bird populations. The site is located on the former estuarine flats which are reclaimed from the Dee Estuary in the late 19th century due to the construction of the Bidston to Wrexham railway.
The site consists of a complex of open water bodies which were excavated in the late 1980s and wetland habitat.

Dee Estuary SSSI
This site has been designated for its total populations of internationally important wintering waterfowl, intertidal mud and sandflats and saltmarsh and transitional habitats. The estuary continues to accrete and further saltmarshes are developing on the English shoreline. Locally the Welsh shoreline, saltmarsh continues to erode, particularly between Greenfield and Flint.

Shotton Lagoons and Reedbeds SSSI

This site has been designated for its breeding population of common tern *Sterna hirundo* and the reedswamp which is characterised by *Phragmites australis*. The site contains the largest common tern colony in Wales.

Table D6: Connah's Quay Ponds and Woodlands SSSI



Connah's Quay Ponds and Woodlands SSSI

This site is designated for its population of great crested newt *Triturus cristatus*, its assemblage of widespread amphibian species and for its semi-natural broadleaved woodland. The water bodies within the site in total support one of the largest known breeding populations of the great crested newt in Britain.

Table D7: Maes Y Grug SSSI

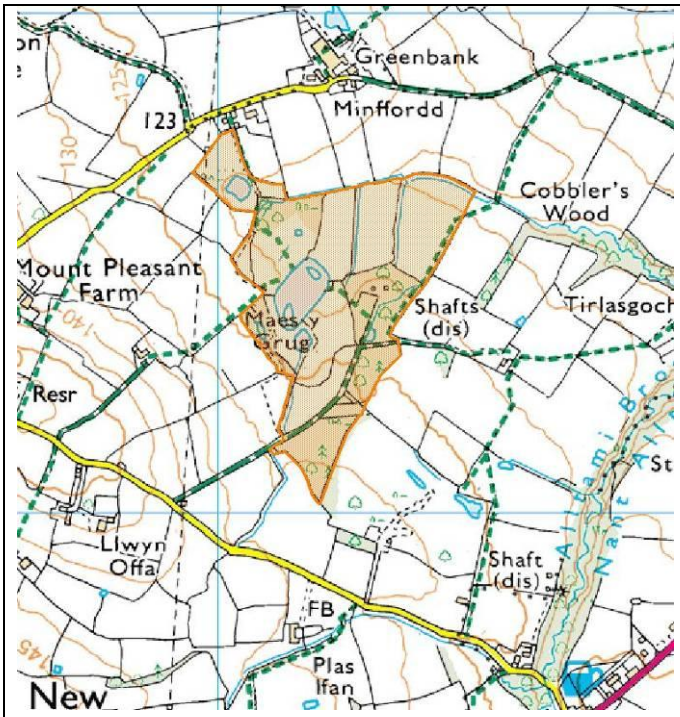
	**Maes Y Grug SSSI** This site is of special interest for its large population of the great crested newt *Triturus cristatus*. The water bodies within the site support one of the largest known populations in north east Wales. The mosaic of grasslands and shrubs that surround the water bodies form important foraging and over wintering areas of adult and juvenile amphibians.

Table D8: Llay Bog SSSI

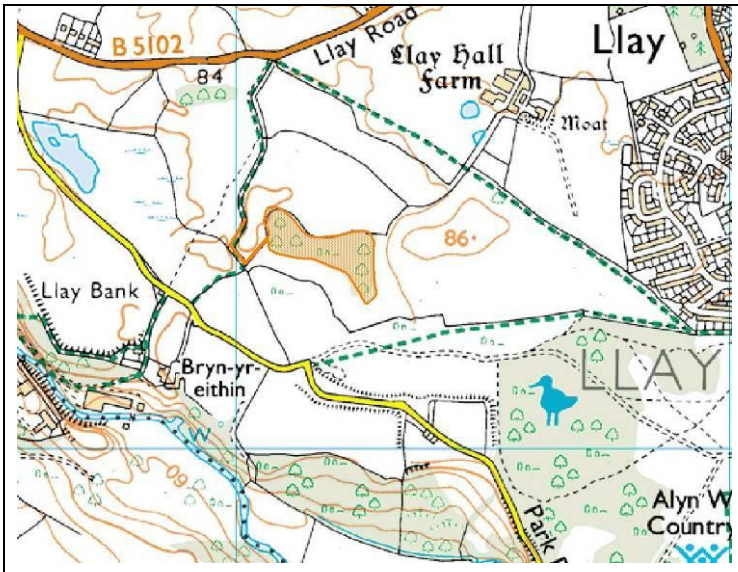
	**Llay Bog SSSI** This site is a small peat bog in an ice hollow in the glacial drift deposits. The fringes contain species such as Marsh Cinquefoil *Potentilla palustris*, Marsh pennywort *Hydrocotyle vulgaris*, Marsh Violet *Viola palustris* and Soft Rush *Juncus effusus*. The central part of the site contain a lawn of Bog Moss Sphagnum spp. With *Eriophorum angustifolium* and Cotton Grasses *E. Vaginatum*, Cranberry *Vaccinium oxycocus*, Bottle Sedge *Carex rostrata*, Sundew *Drosera rotundifolia* and *Calluna vulgaris* and heaths *Erica tetralix*.

Table D9: Gatewen Marsh SSSI

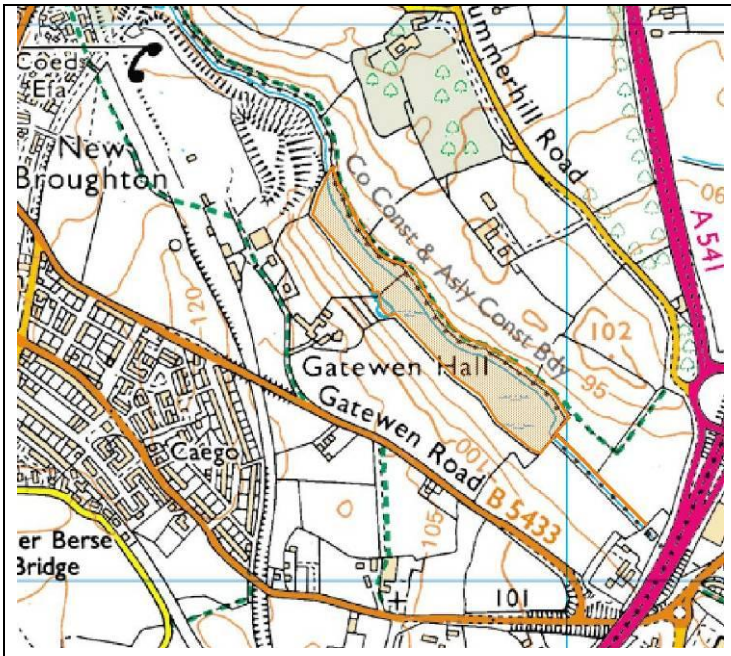
	**Gatewen Marsh** This site is one of only three examples in the former county of Clwyd of the “southern mesotrophic mires” wetland type. This type is more characteristic of the south-west Wales and, in North Wales, is largely restricted to Ynya Mon and Dwyfor. The closure of the former colliery that once occupied this site has been a major factor in creating suitable conditions for the development of wetland vegetation.

Table D10: Marford Quarry SSSI

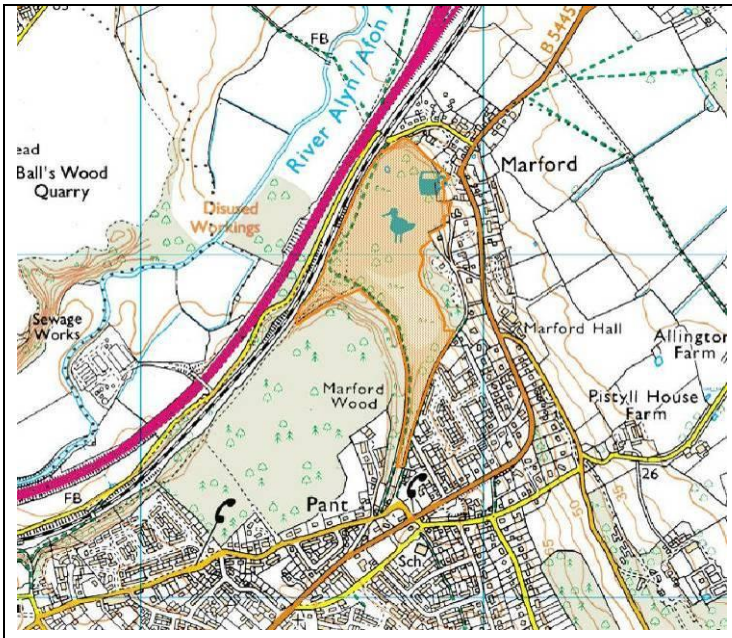
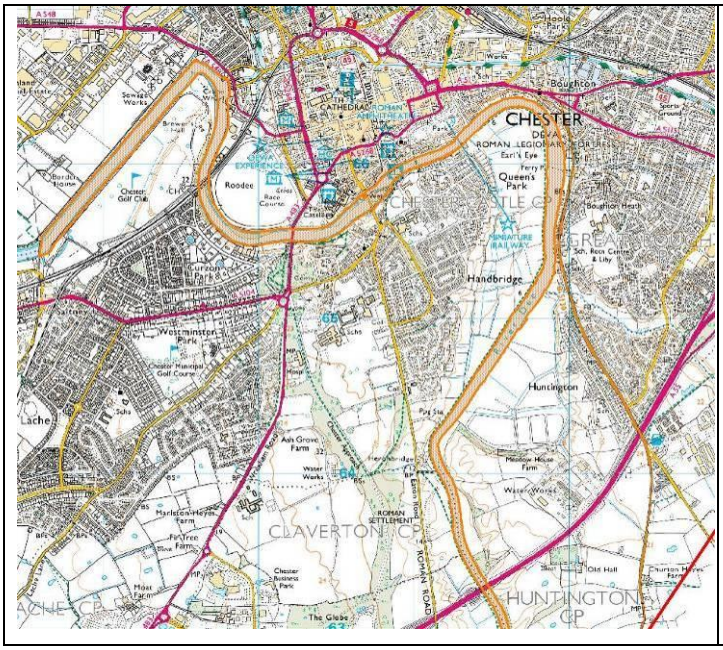
	**Marford Quarry SSSI** This site is a disused sand and gravel workings. A large diversity of lepidopteran species have been recorded including many notable species. The butterfly list is particularly diverse with around thirty individual species being recoded and is significant in a county context.

Table D11: Vicarage Moss SSSI

	**Vicarage Moss SSSI** This site is one of the best-developed examples of kettle hole complex in Wales comprising one very large and several smaller subsidiary kettle holes. The kettle holes are representative of many developed through the Wrexham area in the sands and gravels of the famous 'Wrexham Delta Terrace' and this site is site of outstanding interest to the Quaternary geomorphologist and is the largest example of a basin mire in Clwyd.

Table D12: River Dee SSSI

	**River Dee SSSI** The River Dee is notified for its nationally important transition through a range of river types from the mesotrophic to eutrophic. It is also an important habitat for Atlantic salmon, club-tailed dragonfly and it is also a fluvial geomorphology site.

The area also contains a number of species on the National and Local Biodiversity Action Plans. Some of the key habitats and species include coastal floodplain and grazing marsh, lowland calcareous grassland, lowland raised bogs, water vole and otter. A full list of the habitats with actions in Flintshire, Wrexham and Cheshire is provided in Table D13 and species with actions for three authorities in Table D14. Those habitats and species highlighted in blue in both tables represent those that have been assigned actions over the three authorities.

Table D13: Habitats with actions in Flintshire, Wrexham and Cheshire

Flintshire	Wrexham	Cheshire
		Acid grassland
Aquifer fed naturally fluctuating water bodies		
Arable and horticulture	Arable and horticulture	Arable and horticulture
		Arable field margins
		Blanket Bog
		Bogs
		Boundary and linear features
Broadleaved, Mixed and Yew woodland	Broadleaved, Mixed and Yew woodland	Broadleaved, Mixed and Yew woodland
		Built up areas and gardens
		Calcareous grassland
Churchyards, cemeteries and burial grounds		
Coastal and floodplain grazing marsh		Coastal and floodplain grazing marsh
Coastal Saltmarsh		Coastal Saltmarsh
Coastal sand dunes		Coastal sand dunes
Coastal vegetated shingle		
		Coniferous woodland
		Drainage ditches
Dwarf shrub heath		Dwarf shrub heath
Eutrophic standing waters	Eutrophic standing waters	Eutrophic standing waters
Fen, Marsh and Swamp		
Gardens and allotments		Gardens and allotments
Hedgerows	Hedgerows	Hedgerows
Improved grassland		Improved grassland
Intertidal Mudflats		Intertidal Mudflats
Littoral sediment		Littoral sediment
Lowland beach and yew woodland		Lowland beach and yew woodland
Lowland calcareous grassland	Lowland calcareous grassland	Lowland calcareous grassland
	Lowland dry acidic grassland	Lowland dry acidic grassland
Lowland Fens		Lowland Fens
Lowland Heathland	Lowland Heathland	Lowland Heathland
Lowland meadows	Lowland meadows	Lowland meadows
Lowland mixed deciduous woodland	Lowland mixed deciduous woodland	Lowland mixed deciduous woodland
	Lowland raised bog	Lowland raised bog
		Machair
Mesotrophic lakes	Mesotrophic lakes	Mesotrophic lakes
Mountain heaths and Willow Scrub		
Neutral grassland	Neutral grassland	Neutral grassland
Oligotrophic and Dystrphic Lakes	Oligotrophic and Dystrphic Lakes	
	Open Mosaic Habitats on Previously Developed Land	
Ponds	Ponds	Ponds
	Purple moor grass and rush pastures	Purple moor grass and rush pastures
Reedbeds		Reedbeds
Rivers and streams	Rivers and streams	Rivers and streams
Saline Lagoons		Saline Lagoons
School grounds		
Standing open water and canals	Standing open water and canals	Standing open water and canals
Traditional Orchards	Traditional Orchards	Traditional Orchards
Transport corridors (incl. Road verges/railways linesides / green lanes / cycleways)		Transport corridors (incl. Road verges/railways linesides / green lanes / cycleways)
	Upland calcareous grassland	
	Upland hay meadows	Upland hay meadows

Flintshire	Wrexham	Cheshire
Upland heathland Upland mixed ashwoods Upland oakwood		Upland heathland Upland mixed ashwoods Upland oakwood
Urban – brownfield /wastelands /derelict sites	Urban – brownfield /wastelands /derelict	Urban – brownfield /wastelands /derelict
	Veteran and street trees	Urban – managed greenspace Veteran and street trees
Wet woodland		Wet woodland
Wood-pasture and parkland	Wood-pasture and parkland	Wood-pasture and parkland
Source: http://www.ukbap-reporting.org.uk		

Table D14: Species with actions in Flintshire, Wrexham and Cheshire

Flintshire	Wrexham	Cheshire
		Sparrowhawk Accipiter nisus Long-tailed Tit Aegithalos caudatus
A ground beetle Agonum (Europhilus) scitulum		
Skylark Alauda arvensis	Skylark Alauda arvensis	Skylark Alauda arvensis
		Ramsons Allium ursinum Alder Alnus glutinosa
Allis Shad Alosa alosa Twaite Shad Alosa fallax		
		Sea-fan Anemone Amphianthus dohrnii
Pyramidial Orchid Anacamptis pyramidalis		
		Scarlet Pimpernal Anagallis arvensis Shoveler Anas clypeata Mallard *Anas platyrhynchos*
A solitary bee *Andrena (Andrena) clarkella*		
		Wood Anemone *Anemone nemorosa*
Eel *Anguilla anguilla* Slow Worm *Anguis fragilis*		
		Slow Worm *Anguis fragilis* Tree Pipit *Anthus trivialis* Ringlet *Aphantopus hyperantus*
	Common Swift *Apus apus*	Common Swift *Apus apus* Lesser Burdock *Arctium minus* Grey Heron *Ardea cinerea*
Water Vole *Arvicola terrestris*	Water Vole *Arvicola terrestris*	Water Vole *Arvicola terrestris*
		Fan Mussel Atrina fragilis
White-clawed Freshwater Crayfish *Austropotamobius pallipes* Barbastelle Bat *Barbastella barbastellus* Pale Pin-palp *Bembidion (Ocydromus) testaceum*		White-clawed Freshwater Crayfish *Austropotamobius pallipes* Barbastelle Bat *Barbastella barbastellus*
		Silver Birch Betula pendula Downy Birch Betula pubescens
Minuest Diving Beetle *Bidessus minutissimus*		
		Small Pearl-bordered Fritillary Boloria selene
	Large Garden Bumble Bee *Bombus (Megabombus) ruderatus* Brown-banded Carder Bumblebee *Bombus (Thoracombus) humilis*	Large Garden Bumble Bee *Bombus (Megabombus) ruderatus* Brown-banded Carder Bumblebee *Bombus (Thoracombus) humilis*
Common Toad *Bufo bufo*	Common Toad *Bufo bufo*	Common Toad *Bufo bufo*
		Buzzard *Buteo buteo* Green Hairstreak Marsh Marigold *Caltha palustris*

Flintshire	Wrexham	Cheshire
Linnet *Carduelis cannabina*	Linnet *Carduelis cannabina*	Linnet *Carduelis cannabina*
		Goldfinch *Carduelis carduelis*
		Greenfinch *Carduelis chloris*
		Twite *Carduelis flavirostris*
		Siskin *Carduelis spinus*
		Loggerhead turtle *Caretta caretta*
		Wood-sedge *Carex sylvatica*
		Sweet Chestnut *Castanea sativa*
European beaver *Castor fiber*	European beaver *Castor fiber*	
		Cornflower centaurea cyanus
		Treecreeper certhia familiaris
Basking Shark *Cetorhinus maximus*		Basking Shark Cetorhinus maximus
		Lesser Bearded Stonewort Chara curta
	Latticed Health *Chiasmia clathrata*	
		Violet Coral *Clavaria zollingeri*
		Southern Silver Stiletto-fly *Cliorismia rustica*
		A cuckoo bee *Coelioxys (Coelioxys*) *mandibularis*
	Small Heath Coenonympha pamphilus	
	Large heath Coenonympha tullia	
		Variable Damselfly *Coenagrion pulchellum*
		Isle of Man Cabbage *Conicya monensis subsp.monensis*
		Vernal Colletes *Colletes (Pachycolletes) cunicularius*
		Stock pigeon *Columba oenas*
		Woodpigeon *Columba palumbus*
		Downy Emerald *Cordulia aenea*
		Dogwood *Cornus sanguine*
		Raven *Corvus corax*
		Carrion / Hooded Crow *Corvus corone*
		Jackdaw *Corvus monedula*
		Hazel *Corylus avellana*
		Hawthorn *Crataegus monogyna*
		Ten-spotted Pot Beetle *Cryptocephalus decemmaculatus*
		Blue Tit *Cyanistes caeruleus*
		Mute Swan *Cygnua olor*
Common Spotted-orchid *Dactylorhiza fuchsii*		
	Southern Marsh-orchid *Dactylorhiza praetermissa*	Southern Marsh-orchid *Dactylorhiza praetermissa*
	House Martin *Delichon urbicum*	House Martin *Delichon urbicum*
		Common Dolphin *Delphinus delphis*
		Great Spotted Woodpecker *Dendrocopos major*
		Leatherback Turtle Sermochelys coriacea
Deptford Pink *Dianthus armeria*		
		Foxglove *Digitalis purpurea*
		Corn Bunting *Emberiza calandra*
		Yellowhammer *Emberiza citrinella*
Common skate *Dipturus batis*		
Two-tone Reed Beetle *Donacia bicolora*		
Reed Bunting *Emberiza schoeniclus*	Reed Bunting *Emberiza schoeniclus*	Reed Bunting *Emberiza schoeniclus*
		Big Blue Pinkgill *Entoloma bloxamii*
Natterjack Toad Epidalae calamita		Natterjack Toad *Epidalae calamita*

Flintshire	Wrexham	Cheshire
		Broad-leaved *Willowherb Epilobium montanum*
Serotine Bat *Eptesicus serotinus*	Serotine Bat *Eptesicus serotinus*	Serotine Bat *Eptesicus serotinus*
		Mackay's Horsetail
		Hawksbill Turtle *Eretmochelys imbricata*
Hedgehog *Erinaceus europaeus*		Hedgehog *Erinaceus europaeus*
		Robin *Erithacus rubecula*
Dingy skipper *Erynnis tages*		Dingy skipper *Erynnis tages*
		Beech *Fagus sylvatica*
	Kestral *Falco tinnunculus*	Kestral *Falco tinnunculus*
		Pied Flycatcher *Ficedula hypoleuca*
Pitted Frillwort *Fossombronia foveolata*		
		Ash *Fraxinus excelsior*
		Chaffinch *Fringilla coelebs*
		Brambling *Frincilla montifringilla*
		Coot *Fulica atra*
Tope *Galeorhinus galeus*		
		Moorhen *Gallinula chloropus*
	Snipe *Gallinago gallinago*	
		Jay *Garrulus glandarius*
		Herb-Robot *Geranium robertianum*
		Wood Avens *Geum urbanum*
		Club-tailed Dragonfly *Gomphus vulgatissimus*
		Risso's Dolphin *Grampus griseus*
		Ivy *Hedera helix*
	Swallow *Hirundo rustica*	Swallow *Hirundo rustica*
		Water-Violet *Hottonia palustris*
		Bluebell *Hyacinthoides non-scripta*
Lesser Silver Water Beetle *Hydrochara caraboides*	Lesser Silver Water Beetle *Hydrochara caraboides*	Lesser Silver Water Beetle *Hydrochara carabodies*
Oxbow Diving Beetle *Hydroporus rufifrons*		
		Grey Waxcap *Hydrocybe lacmus*
Sand Lizard *Lacerta agilis*		
Porbeagle shank *Lamna nasus*		
River lamprey *Lampetra fluviatilis*	River lamprey *Lampetra fluviatilis*	
Brown Hare *Lepus natans*		
		Holly *Ilex aquifolium*
		White-beaked Dolphin *Lagenorhynchus albirostris*
		Yellow Archangel *Lamiastrum galeobdolon*
		Yellow Archangel *Lamiastrum galeobdolon subsp.montanum*
		Black-headed Gull *Larus ridbundus*
		Yellow vetchling *Lathyrus aphaca*
		Kemp's Ridley Turtle *Lepidochelys kempii*
		Brown Hare *Lepus europaeus*
		Mountain Hare *Lepus timidus*
	White-faced Darter *Leucorrhinia Dubia*	
		Rock sea-lavender *Limonium britannicum subsp.celticum*
		Palmate Newt *Lissotriton helveticus*
		Smooth Newt *Lissotriton helveticua*
		Honeysuckle *Lonicera periclymenum*
Sandhill Rustic *Luperina nickerlii subsp.gueneei*		Sandhill Rustic *Luperina nickerlii subsp.gueneei*
Floating Water-plantain *Luronium natans*		

Flintshire	Wrexham	Cheshire
Otter *Lutra lutra*	Otter *Lutra lutra*	Otter *Lutra lutra*
		Ragged Robin *Lychnis flos-cuculi*
		Belted Beauty *Lycia zonaria subsp.britannica*
Marsh Clubmoss *Lycopodiella inundata*		
		Yellow Loosestrife Lysimachia vulgaris
Freshwater Pearl *Mussel Margaritifera (Margaritifera) margaritifera*	Freshwater Pearl Mussel *Margaritifera (Margaritifera) margaritifera*	
		Gog's Mercy Mercurialis perennis
Pine Marten *Martes martes*	Pine Marten *Martes martes*	
Badger *Meles meles*	Badger *Meles meles*	
Shingle Rove Beetle *Meotica anglica*		
		Harvest Mouse *Micromys minutes*
		White/Pied Wagtail *Motacilla flava*
Yellow Wagtail *Motacilla flava*		
Dormouse *Muscardinus avellanarius*	Dormouse *Muscardinus avellanarius*	Dormouse *Muscardinus avellanarius*
		Spotted Flycatcher *Muscicapa striata*
		Polecat *Mustela putorius*
American Mink *Mustela vison*	American Mink *Mustela vison*	American Mink *Mustela vison*
Bechstein's bat *Myotis bechsteinii*		
Branst's bat *Myotis brandtii*		Branst's bat Myotis brandtii
Daubenton's Bat *Myotis daubentonii*	Daubenton's Bat *Myotis daubentonii*	Daubenton's Bat *Myotis daubentonii*
Whiskered bat *Myotis mystacinus*	Whiskered bat *Myotis mystacinus*	Whiskered bat *Myotis mystacinus*
Natterer's Bat *Myotis nattereri*	Natterer's Bat *Myotis nattereri*	Natterer's Bat *Myotis nattereri*
Glutinous Snail *Myaxas glutinosa*		
Grass Snake *Natrix natrix*		
Iron Blue Mayfly *Nigrobaetis niger*		
Slender Stonewort *Nitella gracilis*		
		Luna Yellow Underwing *Noctua orbona*
		Curlew *Numenis arquata*
		Leisler's bat *Nyctalus leisleri*
Noctule bat *Nyctalus noctula*	Noctule bat *Nyctalus noctula*	Noctule bat *Nyctalus noctula*
		Mud Pond Snail *Omphiscola glabra*
	Green-winged Orchid *Orchis morio*	Green-winged Orchid *Orchis morio*
Smelt *Osmerus eperlanus*		
		Wood-sorrel *Oxalis acetosella*
		Common Poppy *Papaver rhoeas*
		Great Tit *Parus major*
		House Sparrow *Passer domesticus*
		Tree Sparrow *Passer montanus*
		Grey Partridge *Perdix perdix*
		Coal Tit *Periparus ater*
Sea Lamprey *Petromyzon marinus*		
Harbour Porpoise *Phocoena phocoena*		Harbour Porpoise *Phocoena phocoena*
		Willow Warbler *Phylloscopus trochilus*
		Magpie *Pica p*ica
		Green Woodpecker *Picus viridis*
Pillwort *Pilularia globulifera*	Pillwort *Pilularia globulifera*	
		Scots Pine *Pinus sylvestris*
		Nathusius's Pipistrelle *Pipistrellus nathusii*
Pipistrelle bat *Pipistrellus pipistrellus*	Pipistrelle bat *Pipistrellus pipistrellus*	Pipistrelle bat *Pipistrellus pipistrellus*
Soprano Pipistrelle *Pipistrellus pygmaeus*	Soprano Pipistrelle *Pipistrellus pygmaeus*	Soprano Pipistrelle *Pipistrellus pygmaeus*
Freshwater Peal Mussel *Pisidium tenuilineatum*		
		Greater Plantain *Plantago major*
		Silver-studded Blue *Plebejus argus*
Brown Long-eared bat *Plecotus auritus*	Brown Long-eared bat *Plecotus auritus*	Brown Long-eared bat *Plecotus auritus*

Flintshire	Wrexham	Cheshire
		Sand Wasp *Podalonia Affinis*
		Black-necked Grebe *Podiceps nigricollis*
		Willow Tit *Poecile montanus*
		Marsh Tit *Poecile palustris*
Black-poplar *Populous nigra*		Black-poplar *Populous nigra*
Yellow mayfly *Potamanthus luteus*		
Grass-wrack Pondweed *Potamogeton complanata*		
		Cowslip *Primula veris*
		Primrose *Primula vulgaris*
		Dunnock *Prunella modularis*
		Wild Cherry *Prunus avium*
		Bird Cherry *Prunus padus*
Depressed River Mussel *Pseudanodonta complanata*		Depressed River Mussel *Pseudanodonta complanata*
		Bracken *Pteridium aquilinum*
Bullfinch *Pyrrhula pyrrhula*	Bullfinch *Pyrrhula pyrrhula*	Bullfinch *Pyrrhula pyrrhula*
		Turkey Oak *Quercus cerris*
		Sessile Oak *Quercus petraea*
White skate *Raja alba*		
		Common Frog *Rana temporaria*
		Lesser Celandine *Ranunculus ficaria*
		River Water-crowfoot *Ranunculus fluitans*
		Ivy-leaved Crowfoot *Ranunculus hederaceus*
		Creeping Buttercup *Ranunculus repens*
Three-lobed Water-crowfoot *Ranunculus tripartitus*		
		Firecrest *Regulus ignicapilla*
		Goldcrest *Regulus regulus*
	Argent and sable *Rheumaptera hastata*	Argent and sable *Rheumaptera hastata*
Greater Horseshoe Bat *Rhinolophus ferrumequinum*	Greater Horseshoe Bat *Rhinolophus ferrumequinum*	
Lesser Horseshoe Bat *Rhinolophus hipposideros*	Lesser Horseshoe Bat *Rhinolophus hipposideros*	
		Rhododendron *Rhododendron ponticum*
	Sand Martin *Riparia riparia*	Sand Martin *Riparia riparia*
		Dog Rose *Rosa cannina*
		Bramble *Rubus fruticosus agg*
Atlantic Salmon *Salmo salar*		
Brown Trout *Salmo trutta*		
Arctic Charr *Salvelinus alpinus*		
		Elder *Sambucus nigra*
		Whaite-letter hairstreak *Satyrium w-album*
		Shining Ramshorn *Segmentina nitida*
		Rowan *Sorbus aucuparia*
		A bog moss *Spagnum recurvum*
	Autum Lady's-tresses *Spiranthes spiralis*	
Spurdog *Squalus acanthias*		
Monkfish *Squatina squatina*		
		Field Woundwort *Stachya arvensis*
		Turtle Dove *Streptopelia turtur*
Little Tern *Sterna albifrons*		
		Tawny Ole *Strix aluco*
		Starling *Sturnus vulgaris*
	Welsh Clearwing *Synanthedon scoliaeformis*	
Black Grouse *Tetrao tetrix*	Black Grouse *Tetrao tetrix*	

Flintshire	Wrexham	Cheshire
Newbery's Rover Beetle *Thinobius newberyi*		Wood Sage *Teucrium scorodonia* Derbyshire Feather-moss *Thamnobryum angustifolium*
Great Crested Newt *Triturus cristatus*	Great Crested Newt *Triturus cristatus*	Great Crested Newt *Triturus cristatus*
Song Thrush *Turdus philomelos*		Wren *Troglodytes troglodytes* Redwing *Turdus iliacus* Blackbird *Turdus merula* Song Thrush *Turdus philomelos* Mistle Thrush *Turdus viscivorus* Bottle-nosed Dolphin *Tursiops truncates*
Barn Owl *Tyto alba*	Barn Owl *Tyto alba*	Barn Owl *Tyto alba*
Mud snail *Ventrosia ventrosa* Desmoulin's Whorl Snail *Vertigo (Vertigo) moulinsiana*		Common Nettle *Urtica diocia* Lapwing *Vanellus vanellus* Guelder-Rose *Viburnum opulus*
Adder *Vipera berus*	Adder *Vipera berus*	Adder *Vipera berus*
Common Lizard *Zootoca vivipara*		Common Lizard *Zootoca vivipara*
Source: http://www.ukbap-reporting.org.uk		

Soil

Table D15: Active Landfill Sites within the Study Area

Active Landfill	General Location
Castle Park Landfill Site	Castle park Industrial Estate, Flint
Maes Y Grug Landfill	Maes Y Grug, Alltami Road, Alltami, Mold
British Steel No1	Works Jetty to Work, Broken Bank Pump House, Shotton Works, Deeside, Flintshire
Sea View Farm 1	Old Aston Hill, Ewloe
Sea View Farm 2	Old Aston Hill, Ewloe
Brookhill Landfill Site	Brookhill Way, Pinfold Industrial Estate, Buckley
Standard Landfill Site	Standard Road, Spences Industrial Estate, Buckley
Padeswood Landfill	Castle Cement, Padeswood Ltd, Padeswood, Mold
Bryn Y Gare Quarry	Bryn Y Gaer, Cresford Road, Hope
Astbury Landfill (Rossett)	Astbury Landfill, Park Lane, Burton, Wrexham
Cefn Mawr Quarry Landfill	Cefn Mawr Quarry, Cadole Road, Cwernaffield, Mold
Source: Environment Agency http://maps.environment-agency.gov.uk	

Table D16 Historical Landfill Sites within the Study Area

Historical Landfill Name	General location
Castle landfill Phase 1-3	Flint
Castle Works No1	Flint
Castle Works No2	Flint
Connah's Quay Power Station 3	Ash Lagoon
Connah's Quay Power Station	Connah's Quay
Flint Foreshore	Oakenholt
J. and J. Martin	Oakenholt
Bryn Farm	Flint
Old Reservoir	Old London Road, Flint

Historical Landfill Name	General location
Land off A5119 Near Flint Mountain	Near Flint Mountain
Plas-Y-Mynydd Farm	Northop Road, Flint
Northop Bypass A55 Tip No 5	Gaeau Gleision Lane, Holywell, Halkyn, Flint
Northop Bypass A55 Tip No 6	Plasnewydd Farm, Bryn-y-Garreg Lane, Northop
Northop Bypass A55 Tip No 4	Bryn-y-Garreg, Flint
Northop Bypass A55 Tip No 1	Swndwr Farm, Mold
Northop Bypass A55 Tip No 2	Swndwr Farm, Mold
Middle Hill	Northop
Sandhole	Sychdyn, Near Mold
Land adjacent to 2 Mynydd Bychan	Mynydd Bychan, Mold
Rear of Sharps Car Hire	New Brighton
Maes-y-Grug	Alltami, near Mold
Maes-y-Grug Quarry	Alltami, near Mold
Old railway line	Village Road, Northop Hall, Mold
Greenacres	Northop Hall
Colomendy Farm	Off Wepre Lane, Connah's Quay
New Bridge Farm	Robin Hood Lane, Ewloe
Golfyn Lane	Connah's Quay
Top-Y-Fron Farmyard No 1	Kelsterton Lane, Connah's Quay
Top-Y-Fron Farmyard No 2	Kelsterton Lane, Connah's Quay
Broad Oak Farm	Mold Road, Connah's Quay
McKeown Close	Llevyni Drive Connah's Quay
Wepre Park	Connah's Quay
Pine Wood Avenue	Deeside, Flint
Prince's Pit	Connah's Quay
Reneys Pit	Connah's Quay
Works Yard	Dock Road Connah's Quay
Alkali Works Tip	Docks Road Connah's Quay
River Bank	Docks Road Connah's Quay
Shotton Works	Deeside
Shotton Works No 1	Deeside
Connah's Quay PS No 1	Deeside
Broken Bank	Shotton Steelworks, Connah's Quay
Former British Steel Site Shotton	Deeside Industrial Estate, Weighbridge Road, Shotton
Shotton Works	Broken Bank Tip, Deeside Industrial Estate, Flintshire
Land at Ryeland Street	Shotton
Killins Lane	Shotton
Killins Lane Tip	Killins Lane
Shotton Lane	Shotton
Land at the rear of the Transport Yard	Old Aston Hill, Ewloe
Sea View Farm	Old Aston Hill, Ewloe
Land off Gladstone Way	Hawarden
Upper Aston Hill Lane	Ewloe
Land adjacent to Ewloe	Ewloe
C D School	Mold Road Ewloe
Ewloe Barn Clayhole	Buckley
Former Calheralls Brickworks	Buckley
Belmont Yard	Alltami Road Buckley
Etna Tip	Buckley
Mrs Fennah's Clay Pit	Off Etna Road, Buckley
Standard Clay Pit	Mountpleasant
Disused Clayhole	Drury Lane, Buckley
Mount Pool	Drury Lane, Buckley

Historical Landfill Name	General location
Fields Adjavnet to Moat Farm	Pentrobin
Moat Farm	Pentrobin
Dirty Mile Tip	Buckley
Manor Lane	Hawarden
Station Road	Sandy Croft
The Dingle	Sandycroft, Deeside
Bretton Landfill	The pumphouse, Mills Road, Asltney
British Aerospace	Broughton
Land on the westerly side of Broughton Mills Road	Broughton
Broughton Mills Road	Broughton
Land on the easterly side of Broughton Mills Road	Broughton
Mold Junction	Saltney Ferry
Nant Mawr Road	Buckley
Rose Lane	Buckley
Elfed Park Mine Shafts	Buckley
Argoed Old Sewage Works	Mold
Leadmills	Mold
Bromfield	Bromfield Lane
Rhyd Y Coley	Mold
Ty Draw	Rhydygoleu, Mold
Rhual Controlled Refuse Tip	Cwenaffield Road
Rhydymwyn MOD Site No 2	Rhydymwyn
Station Road	Mellington, Cheshire
Deva Tip	West Cheshire Hospital, Upper Chester, Chester
Parson's Lane	Upper-by-Chester, Chester
Littlers Playing Fields	Chester College
Cheyney Road	Chester
Ferry Lane	Sealand
Bumpers Lane	Sealand
Bolder House Farm	Bumpers Lane, Chester
Chemistry Locks	Land adjacent to Shropshire Union Canal
Old Pearl Lane	Chester
Land on Church Farm	East of the new A41 and south of Pearl Lane, Christleton
Upper Grange Farm	Upton, Chester
Palm Valley	Greenfield Lane
Castle Cement	Padeswood, Mold
Chester Road	Pennyffordd
Land at Leicester Lane	Mold Road, Broughton
Pennyffordd Station	Pennyffordd
Rhos-Y-Bryniau Farm	Pennyffordd
Railway Line between main Road and Bramley Lane	Higher Kinnerton
Kinnerton Bank Quarry	Higher Kinnerton
Land off Stryt Isla	Hope Pennyffordd
Plas Newydd Farm	Hartsheath, Pontyblyddyn
Dingle Wood	Leeswood
Cloddia Smallholding	Coed-Talon, Mold
Plas Pawer Industrial Estate	Southsea
Fagl Lane	Hope, Near Wrexham
Land at Bryn Alyn	Fagl Lane, Hope
Willow Park Tip	Hope, Near Wrexham
Waen Farm	Waen Farm, Near Clwys, Mold
Astbury Quarry	Dark lane, Llay
Gwersyllt Park	Wrexham

Historical Landfill Name	General location
New Road	Llay
Gwersyllt Park Quarry	Brodley, Wrexham
Chester Road	Cresford, Wrexham
Pont-Y-Chapel Lane	Gresford, Wrexham
Singet Quarry	Rossett, Wrexham
Borras Airfield	Hold Road, Wrexham
Land off West Lane	Llan-Y-Pwll
Parciau	Wrexham
The Dunks	Rear of Benjamin Road, Queens Park
The Dunks 2	Rear of Benjamin Road, Queens Park
Bala Road	Wrexham
BICC Cables Limited	Bowling bank, Wrexham
WDA Farmerly Erie Electronic 1	Marborough Road, Wrexham
WDA Farmerly Erie Electronic 2	Marborough Road, Wrexham
Land off West Lane	Llan-y-Pwll, Wrexham
Berse Drelincourt	Berse Road, Wrexham
Moss Tip	Petre Broughton
Bryn Malley	Brymbo
Works Bank	Brymbo Lodge
Cambrian Quarry	Cernymynnydd, Mold
Cernymynnydd, No 1	Cambrian Quarries
Cernymynnydd, No 1	Cambrian Quarries
Rhual Controlled Refuse Tip	Gwenaffield Road, Mold
Rhydymwyn MOD Site 2	Rhydymwyn
Rhydymwyn MOD Site 1	Rhydymwyn
Cefn Mawr Quarry	Cadole Road, Mold
Coed Deborah	Cadole, Mold
Cefn Mawr	Gwernaffield Road, Cadole, Mold
Source: Environment Agency http://maps.environment-agency.gov.uk	

Air Quality

Table D17 Dee Estuary / Aber Dyfdwy SAC and SPA

	Sensitive to nutrient nitrogen?	Exceeds minimum critical load for nutrient nitrogen (2010)?	Exceeds maximum critical load for nutrient nitrogen (2010)?	**Sensitive to acidification?**	Exceeds minimum critical load for acidity (2010)?	Exceeds maximum critical load for acidity (2010)?	Predicted nitrogen deposition in 2010 (% source)		Predicted sulphur deposition in 2010 (% source)
							Road transport	Other transport	Other transport
SAC Feature	No data available for the SAC features								
SPA Feature									
Tadorna tadorna	✓	Does not exceed critical load		×	No critical loads for these features		6	3	5
Anus acuta (north-western Europe)	✓			×			6	3	5
Haematopus ostralegus	✓			×			6	3	5

(Europe and Northern / Western Africa)							
Calidris canutus (North-eastern Canada/Greenland/Iceland /North-western Europe)	✓		×		6	3	5
Limosa lapponica (Western Palearctic – wintering)	✓		×		6	3	5
Tringa tetanus (Eastern Atlantic	✓		×		6	3	5
Waterfowl assemblage (wintering)	×	No critical load for this feature	×				

Table D18: River Dee and Bala Lake SAC

SAC Feature	Sensitive to nutrient nitrogen?	Exceeds minimum critical load for nutrient nitrogen?	Exceeds maximum critical load for nutrient nitrogen	Sensitive to acidification ?	Exceeds minimum critical load for acidity?	Exceeds maximum critical load for acidity?	Predicted nitrogen deposition in 2010 (% source)		Predicted sulphur deposition in 2010 (% source)
							Road transport	Other transport	Other transport
Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	✓	No critical loads for this features		✓	No critical loads for this features		6	3	3
Petromyzon marinus	✓			✓			6	3	3
Lampetra planeri	✓			✓			6	3	3
Lampetra fluviatilis	✓			✓			6	3	3
Salmo salar	✓			✓			6	3	3
Cottis gobio	✓			✓			6	3	3
Lutra Lutra	✓			✓			6	3	3
Luronium natans	✓	✓	✓	✓			6	3	3

Table D19: Deeside and Buckley Newt Sites

SAC Feature	Sensitive to nutrient nitrogen ?	Exceeds minimum critical load for nutrient nitrogen (2010)?	Exceeds maximum critical load for nutrient nitrogen (2010)?	Sensitive to acidification?	Exceeds minimum critical load for acidity (2010)?	Exceeds maximum critical load for acidity (2010)?	Predicted nitrogen deposition in 2010 (% source)		Predicted sulphur deposition in 2010 (% source)
							Road transport	Other transport	Other transport
Old sessile oak wood swith Ilex and Blechnum in the British Isles	✓	✓	✓	✓	✓	×	10	3	3
Triturus cristatus	✓	No critical load for this feature		✓	No critical load for this feature		7	3	3

Archaeology and Heritage

Table D20: Scheduled Monuments within the Study Area

Monument Reference	Name	Eastings	Northings
13462	Belgrave moated site and medieval garden	339031	360518
25722	Roman camp at Upton Heath, beside the water tower north of Long Lane	341755	369505
22591	Motte and associated earthworks east of old rectory	341418	362774
CH25	Heronbridge Roman site	341066	363692
CH85	Roman amphitheatre (southern part)	340832	366147
13452	Shotwick castle motte and bailey and late medieval garden remains	334935	370464
CH103	Abbey Green Roman site	340559	366647
25723	Roman camp at Upton, 400m east of the water tower north of Long Lane	342096	369560
13451	Moated site 180m of fir tree farm	339295	363490
13416	Huntington Hall moated site	341965	363467
27582	Roman quarry including Edgar's cave and the rock-cut figure of minerva on Edgar's field, 150m south of Dee Bridge	340673	365613
25724	Roman camp at Upton, 350m north east of the water tower north of Long Lane	341935	369854
13501	Dodleston motte and Bailey castle	336134	360858
25726	Roman camp 300m west of Upton Grange farm	342028	369119
CH7	The walls, tower, gates and posterns of the City of Chester	340436	366223
CH36	The Little Abbey Gateway, Northgate Street	340466	366561
CH38	St John's Church (ruined portions)	340935	366144
CH35	St Nicholas' Chapel	340551	36638
CH24	Chester Castle (part)	340459	365786
25726	Roman camp 300m west of Upton Grange farm	342005	369200
13455	Dodleston hall moated site	336130	361460
13418	Moated site north west of Mill Hill House farm	340087	362550
27596	Part of a roman camp at Hoole 200m south of Hoole Hall	342979	367820
13419	Pulford Motte and Bailey Castle	337517	358701
CH17	Dee Bridge	340716	365741
13415	Moated site at Upton Grange, Upton	342397	369150
DE286	Wat's Dyke at Crispin Lane, Wrexham	332990	351170
FL207	Carreg-y-llech standing stone	324870	358351
FL203	Plas Maen Cottage round barrow	330141	355880
DE290	Gatewen Hall round barrow	331700	351350
DE191	Wat's Dyke: Section SSW of Wrexham Station, 130m Long	332885	350664
FL030	Trueman's Hill motte	331262	365975
FL002	Ewloe Castle	328805	367518
FL003	Flint Castle	324697	373275
FL086	Wat's Dyke: Section from Bod Offa to Whitehouse Farm	326473	363484
FL121	Wat's Dyke: Sections S of Bryn y Bal	325876	364517
FL087	Wat's Dyke: Section W of Garreg-Lwyd	327251	362528
FL166	Pinfold Lane Pottery, Site of	327519	365526
FL165	Taylor's Pottery	326903	365334
FL082	Wat's Dyke: Section from Coed Llys to Chester-Holywell Road	323220	369356
FL185	Bretton Hall Moated Site	336594	363726
FL193	Spon Chapel	328312	362727
FL020	Caergwrle Castle	330699	357211
FL066	Caer Estyn Hill Fort	331402	357482
FL133	Caergwrle Packhorse Bridge	330625	357617
FL119	Wat's Dyke: Section N of Rhydyn Farm	331149	357868
FL120	Wat's Dyke: Section E of Hope	331077	358285

Monument Reference	Name	Eastings	Northings
FL118	Wat's Dyke: Section N of Bryn Estyn	330948	358775
FL172	Wat's Dyke: Section N of Carlton Grange	330855	358965
FL051	Round Barrow at Pentrehobin	324777	362510
FL016	Hawarden Castle	331926	365375
FL078	The 'Lock-Up', Hawarden	331746	365719
FL126	Tyddyn Castle Mound	325279	363287
FL176	Green Lane Farm Moated Site	333384	363821
FL171	Wat's Dyke: Section N of the Rectory, Hope	331030	358482
FL023	Llys Edwin Medieval Fortified House Site	323686	369350
FL083	Wat's Dyke: Section from Chester-Holywell Road to Soughton Farm	323443	368051
FL180	Kelsterton Brewery	327756	370584
FL181	Industrial Tramway, Near Buckley	328992	364228
FL064	Bryn y Cwm Mound & Bailey Castle	323816	371425
FL052	Rhual-Isaf Round Barrow	322545	364964
FL091	Wat's Dyke: Two sections between Clawdd Offa & Pigeon House Farm	330316	359801
FL089	Wat's Dyke: Section E and SE of Dyke Farm	329076	361554
DE158	Wrexham Churchyard Ornamental Wrought Iron Gates and Screen	333525	350168
DE165	Wat's Dyke : Section South of Ruthin Road	332729	349951
DE202	Brymbo Ironworks: Early Blast Furnace, Cast House & Foundry	329458	353521
DE057	Bryn Alyn Camp	333151	353679
DE059	Bryn Alyn Round Barrow	333302	354125
DE151	Wat's Dyke: Section W of Ty-Gwyn	333314	352833
FL178	Wolvesacre Hall Moated Site	350659	342421
FL084	Wat's Dyke: Section SE of Clawdd Offa	324370	366901
FL090	Wat's Dyke: Section NW of Clawdd Offa	329879	360624
DE221	Wat's Dyke: Garden Village Section	333265	352289
FL085	Wat's Dyke: Section N & E of New Brighton	325252	365794
FL131	Pentre Bridge Roman Site	325480	372083
FL088	Wat's Dyke: Section NE of Hen-Dy Farm	328243	362168
FL014	The Bailey Hill, Mold	323521	364337
DE286	Wat's Dyke at Crispin Lane, Wrexham	332990	351170
FL207	Carreg-y-llech standing stone	324870	358351
FL203	Plas Maen Cottage round barrow	330141	355880
DE290	Gatewen Hall round barrow	331700	351350
DE191	Wat's Dyke: Section SSW of Wrexham Station, 130m Long	332885	350664
FL030	Trueman's Hill motte	331262	365975
FL002	Ewloe Castle	328805	367518
FL003	Flint Castle	324697	373275
FL086	Wat's Dyke: Section from Bod Offa to Whitehouse Farm	326473	363484
FL121	Wat's Dyke: Sections S of Bryn y Bal	325876	364517
FL087	Wat's Dyke: Section W of Garreg-Lwyd	327251	362528
FL166	Pinfold Lane Pottery, Site of	327519	365526
FL165	Taylor's Pottery	326903	365334
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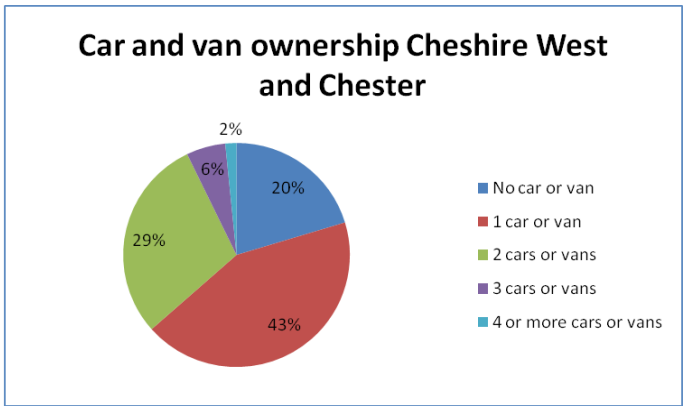
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Population and Human Health

Table D21: Population and Human Health Statistics for Cheshire West and Chester

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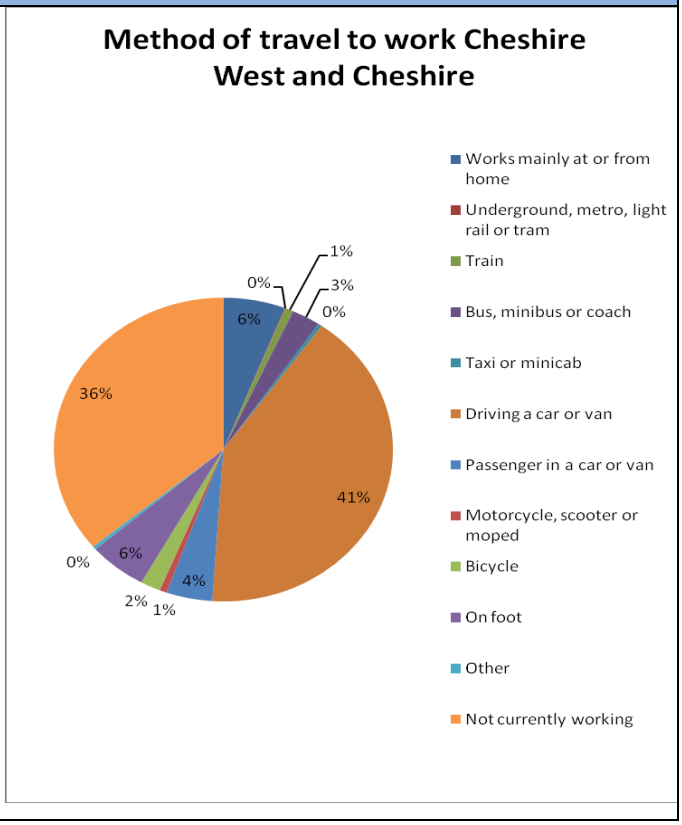
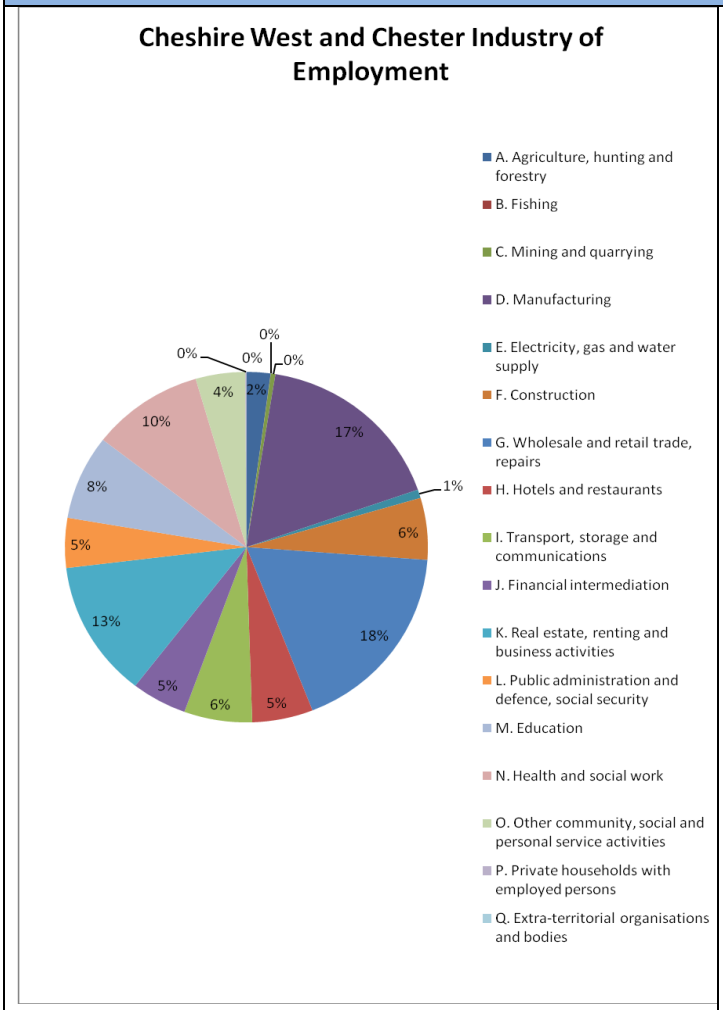
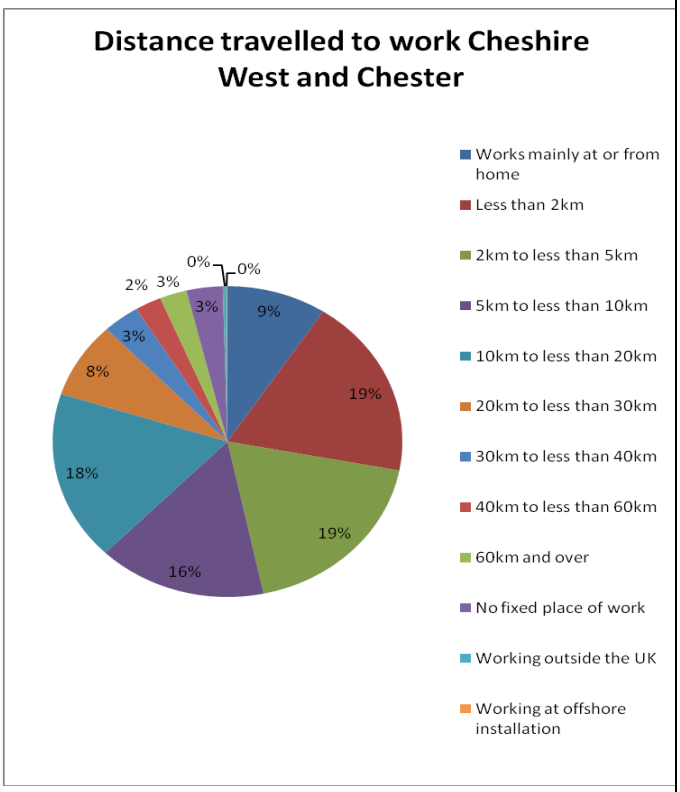
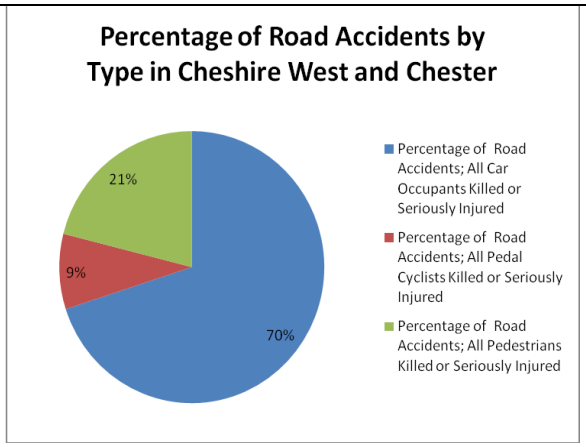
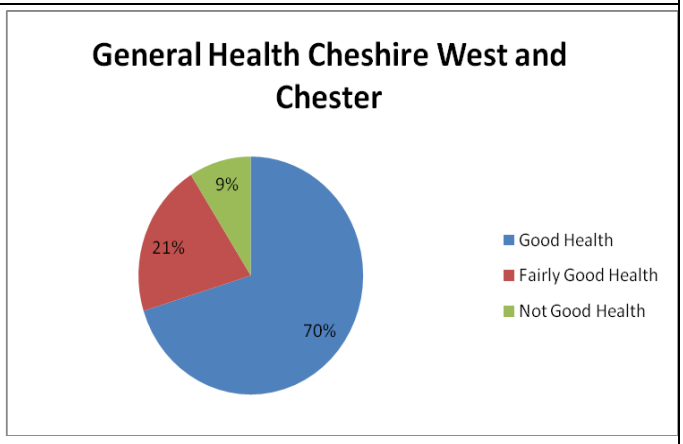


Table D21: Population and Human Health Statistics for Cheshire West and Chester



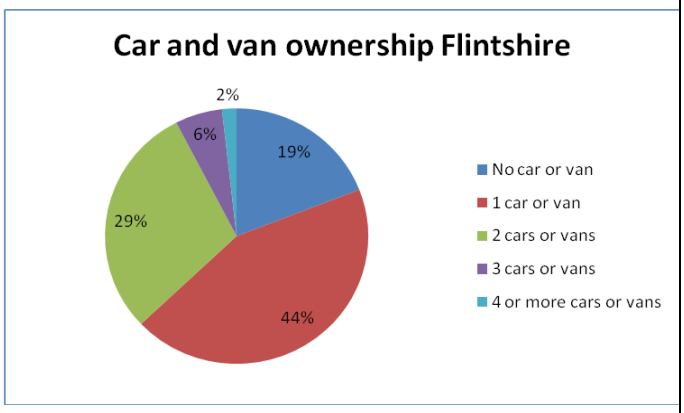


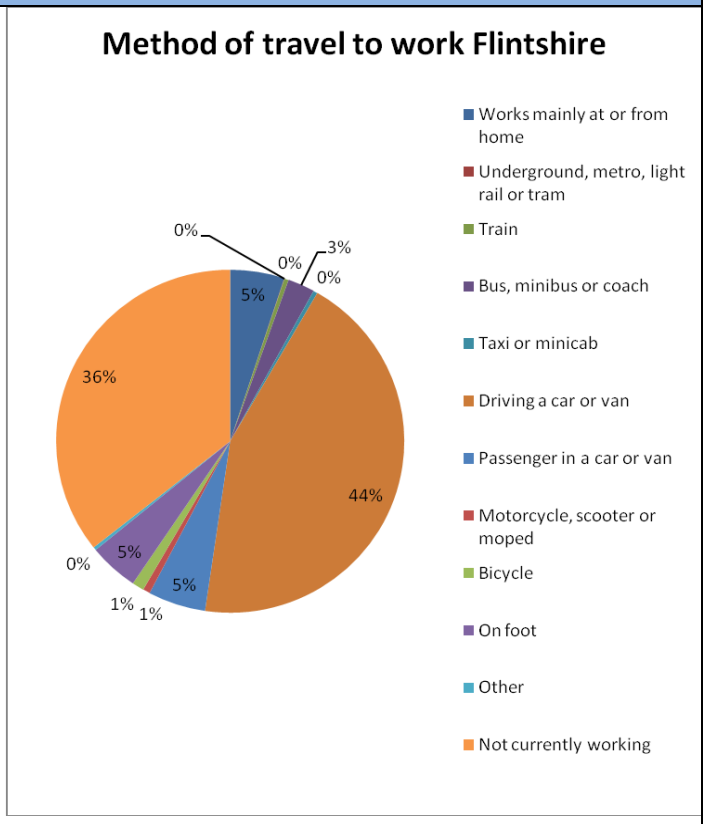


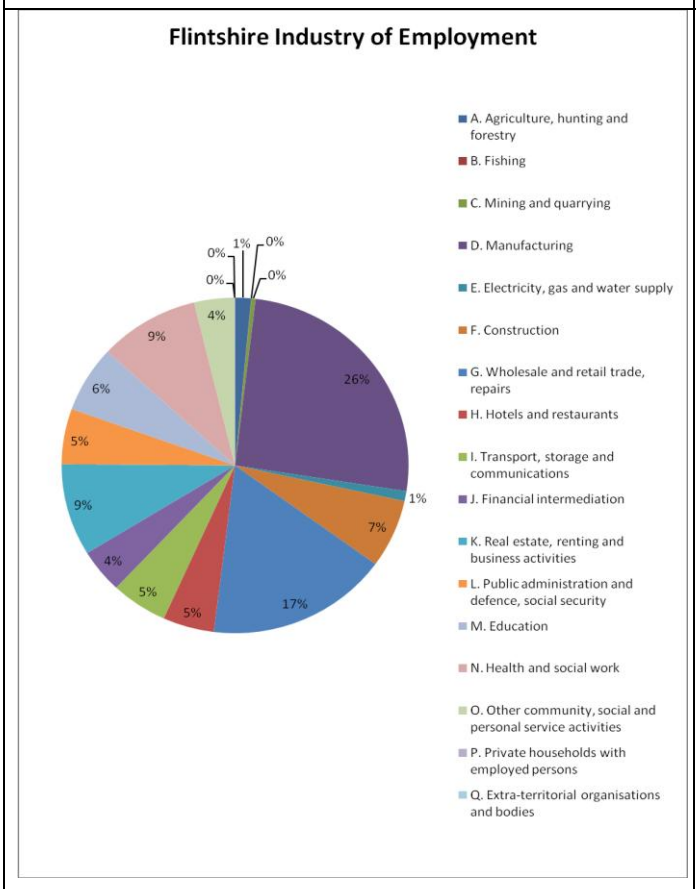


Source: http://www.clickanduse.hmso.gov.uk.Last upeded 1st Match 2007

Table D22: Population and Human Health Statistics for Flintshire







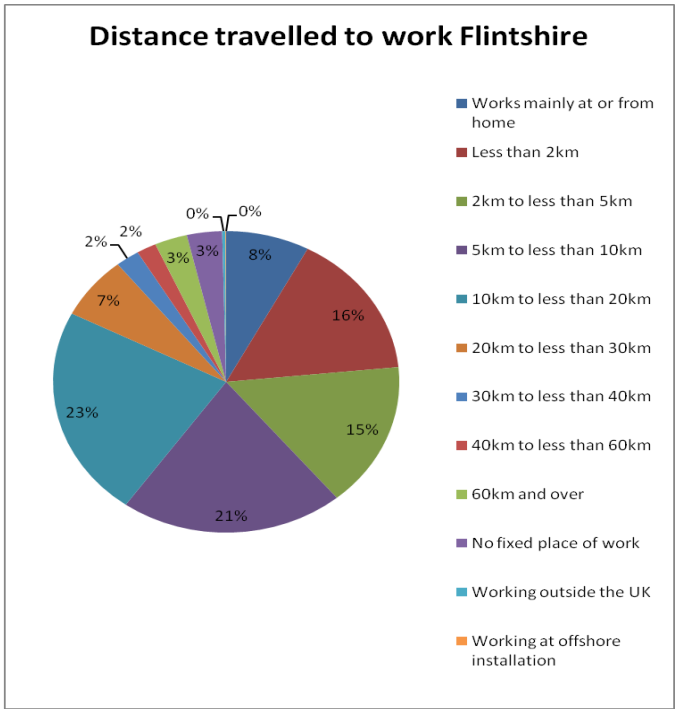
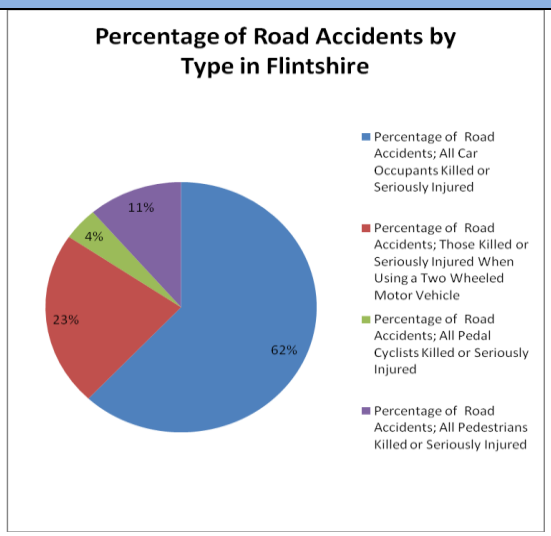
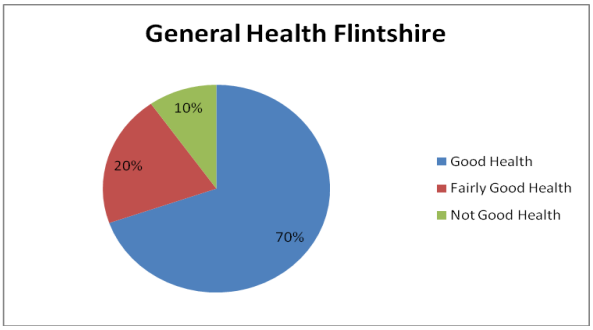


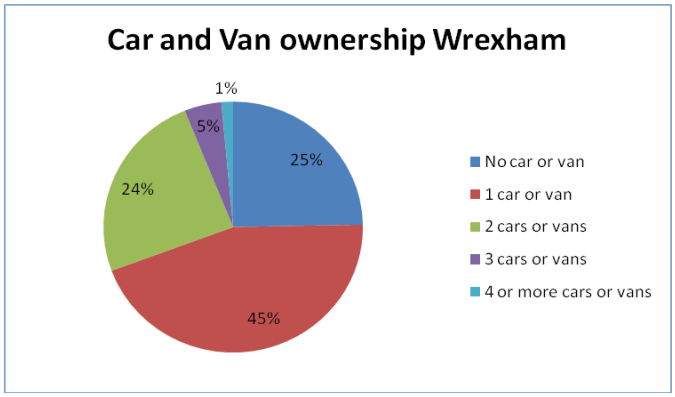
Table D22: Population and Human Health Statistics for Flintshire

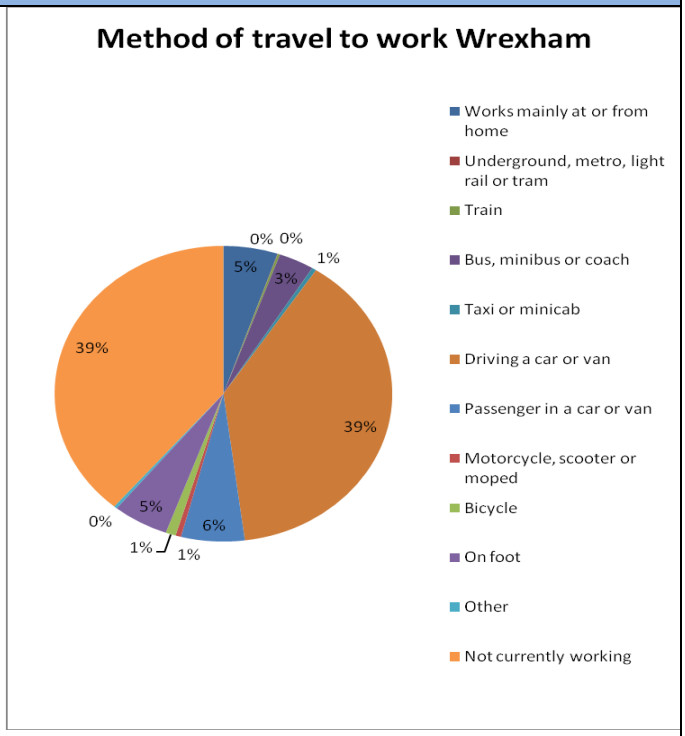


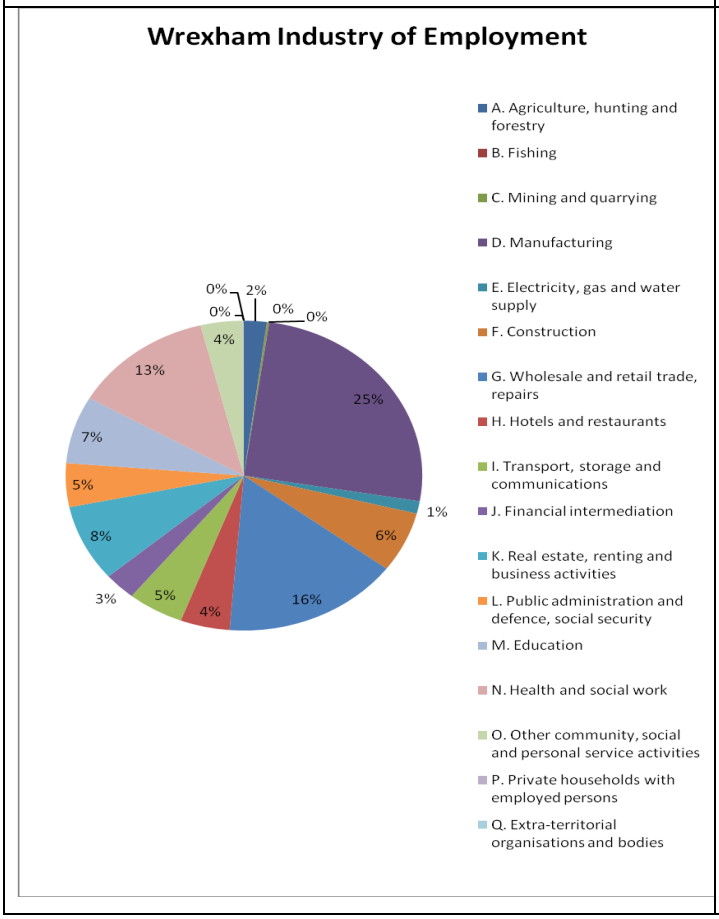


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Table D23: Population and Human Health Statistics for Flintshire







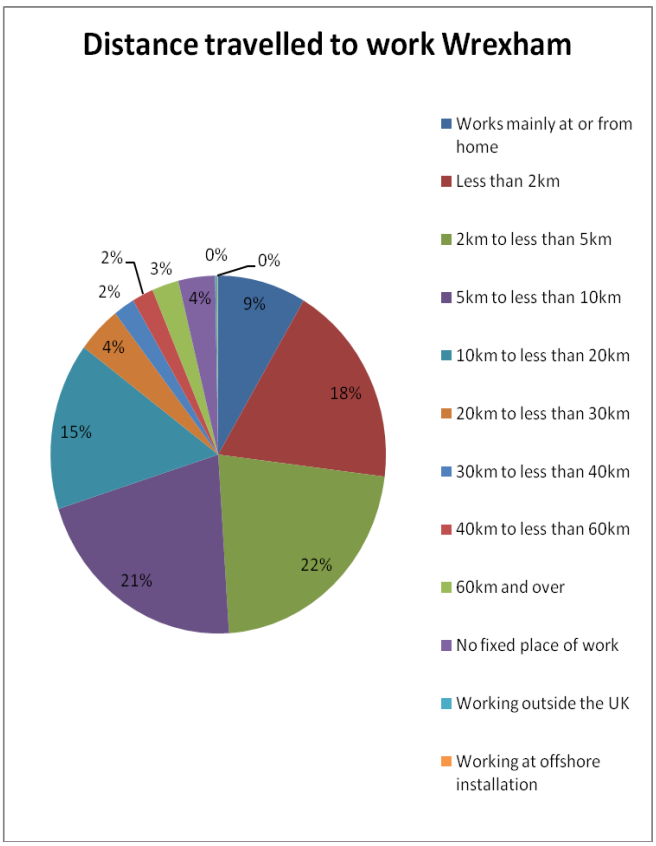
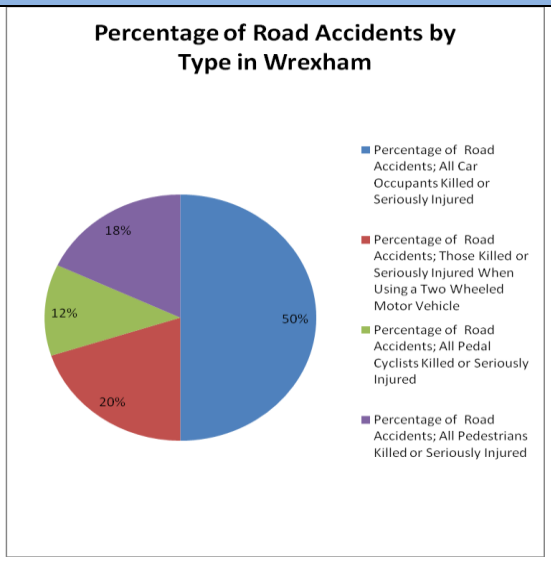
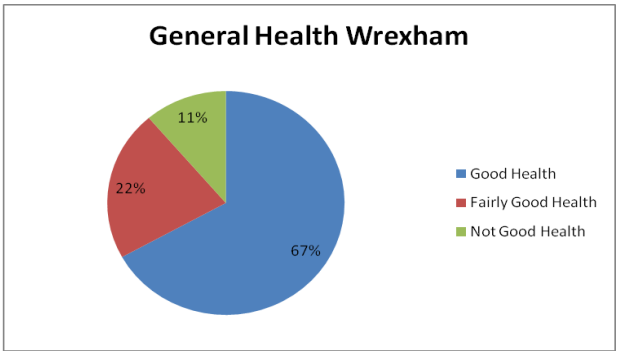


Table D23: Population and Human Health Statistics for Flintshire





Source: http://www.clickanduse.hmso.gov.uk Last upeded 1st Match 2007

Figures

NEWABTS Stage 1 Appendix G: Health Impact Assessment



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NEWABTS Stage 1 Appendix G: Health Impact Assessment

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1 Introduction

This appendix outlines the methodology and results of the Health Impact Assessment (HIA) completed for the North East Wales Area Based Transport Study (NEWABTS).

As part of the Welsh Transport Planning and Appraisal Guidance (WelTAG), a mandatory HIA must be completed. The HIA seeks to consider how policies and initiatives may affect people's health and wellbeing. It is defined with WelTAG as:

'A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population. In other words it is a process that considers the wider effects of local and national policies or initiatives and how they, in turn, may affect people's health'

This appendix covers the following:

- Description of packages
- Assessment of packages against the criteria defined within WelTAG
- Summary of results
- Conclusions

1.1 Baseline Conditions

This section will briefly discuss the current baseline conditions for health within the study area. Wales currently has the greatest number of people in all age groups reporting some form of limiting long term illness (LLTI) in the UK. LLTI is defined as a measure of long-term illness, health problems or disability that limits a person's daily activities or the work they do. It includes problems related to old age based on self-report ill-health, rather than officially diagnosed ill health. This currently stands at 23% for Wales, compared to 18% within England. For Flintshire, the percentage of population with a LLTI is 19%, with Wrexham having a figure close to 21.5%. (National Public Health Services for Wales, 2009). In the urban areas of Chester it is shown that 18.4% have LLTI, compared to 15.3% in rural areas.

It has been demonstrated in various studies that increasing levels of physical fitness can have a positive benefit on health levels. People who are physical actively cut their risk of coronary heart disease by 50%, and are less likely to suffer from Type 2 Diabetes and strokes. Within Wales, it is thought that currently only around 30% of the population is currently completing the recommended minimum levels of physical activity, which is the worst in Europe (National Public Health Services for Wales, 2006).

2 Option Descriptions

This section of the appendix will briefly outline the definition of the packages which will be used later in the Health Impact Assessment.

2.1 Package 1 Managing Demand – Area Wide

This package consists of a number of measures targeting demand management, walking and cycling, freight and other transport issues.

Measures to manage demand include the promotion of car clubs and car sharing, establish workplace travel planning and to devise parking management strategies.

Walking and cycling measures comprise providing funds for businesses to invest in walking and cycling facilities, encourage employers to increase cycling within its work force, as well as developing a local publicity campaign to promote walking and cycling.

Additionally, it is proposed to promote the use of rail freight and internet based freight exchanges.

Finally, this package also proposes measures to ensure that future developments mitigate any adverse impacts of the transport network, and to improve linkages between economic development plans and transportation plans.

2.2 Package 2 Making Best Use - Flint/Mold-Chester

There are a number of proposed measures aimed at making more efficient use of the existing transport facilities and infrastructure along the combined corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Estate or Buckley and Broughton.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions (e.g. along the B5129 through the Connah's Quay/Shotton area), improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, improvements in the accessibility of a number of stations are proposed and in the connectivity between rail and bus services at Shotton stations.

Highway transport measures include improvements of the traffic signal arrangements at Alltami, as well as some minor on-line highway improvements to reduce congestion along the B5129 between Connah's Quay and Queensferry, and on the A5104 between Broughton and Saltney.

2.3 Package 3 Capacity Enhancement - Flint/Mold-Chester

There are a number of proposed measures involving the provision of new infrastructure along the combined corridor between Flint/Mold and Chester, via Connah's Quay, Shotton, Queensferry and Deeside Industrial Estate or Buckley and Broughton.

Walking and cycling is promoted by providing safe walking and cycling routes from local communities to public transport interchanges and new walking and cycling links to key employment sites. This package proposes the provision of a number of new cycling and walking links including those from Chester to Denbigh and Wrexham, from Mold to Saltney, and along the Dee Coast (Dee Coastal Path in Flintshire).

In terms of bus transport, this package includes the provision of a new cross Dee bus route connecting Holywell, Flint, Deeside Industrial Estate and Chester, and new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to incorporate a Rhyl to Chester local shuttle service (with possible extension to Crewe), and new stations at Queensferry on the North Wales Main Line and at Deeside Park on the Borderlands line. A new rail service between Borderlands Line and Chester is also proposed as part of this Package.

In addition, demand management is proposed to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include a series of road improvements to improve the ease of accessing the Deeside Industrial Estate and in the Broughton area.

2.4 Package 4 Making Best Use - Wrexham-Deeside (via Mold/Buckley)

There are a number of proposed options aimed at making more efficient use of the existing transport facilities and infrastructure along the corridor between Wrexham and Deeside, via Mold and Buckley.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions, improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, improvements in the accessibility of a number of stations and in the connectivity between rail and bus services at Shotton stations.

Finally, four measures are proposed for the existing road network. These include considering a signage strategy for traffic travelling between the A55 and Wrexham, together with a series of minor improvements to the A541/A550 route between the A55 and Wrexham, in the Hope/Caergwrle area and on the A541 between Mold and Wrexham.

2.5 Package 5 Capacity Enhancements Wrexham-Deeside (via Mold/Buckley)

The proposed measures involving the provision of new infrastructure along the corridor between Wrexham and Deeside, via Mold and Buckley, are presented below.

Walking and cycling is promoted by providing safe walking and cycling routes from local communities to public transport interchanges, new walking and cycling links to key employment sites and a new cycling route between Mold and Deeside.

In terms of bus transport, this package proposes the creation of a multi-modal hub at Wrexham General station and the provision of a new cross Dee bus route between Mold and Ellesmere Port, as well as new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to increase the service frequency on the Borderlands Line (from hourly to half-hourly). Furthermore, additional parking provision at key stations along the Wrexham-Bidston Line, a new station at Deeside Park on the Borderlands Line and a new rail service between Borderlands Line and Chester are measures proposed as part of this package.

In addition, demand management is proposed to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include a series of improvements to improve the ease of accessing the Deeside Industrial Estate and the construction of a new road bridge between Connah's Quay and Deeside Park.

Proposed freight measures consist of the construction of crawler lanes on key trunk roads and other single carriageways roads.

2.6 Package 6 Making Best Use - Chester-Wrexham

There are a number of proposed measures aimed at making more efficient use of the existing transport facilities and infrastructure along the corridor between Chester and Wrexham.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions (e.g. A483/B5445 junction), improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, improvements in the accessibility of a number of stations are proposed.

2.7 Package 7: Capacity Enhancements - Chester-Wrexham

There are a number of proposed measures involving the provision of new infrastructure along the corridor between Chester and Wrexham.

Walking and cycling is promoted by providing safe walking and cycling routes from local communities to public transport interchanges, a new cycling and walking link connected to the existing national cycle route 5 from Chester to Denbigh and Wrexham, together with new walking and cycling links to key employment sites.

In terms of bus transport, this package includes the creation of a multi-modal hub at Wrexham General station and the provision of new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to provide a shuttle service between Chester and Wrexham (with possible extension to Shrewsbury) and the construction of a new station at Rossett on the Wrexham to Chester line.

In addition, demand management is proposed to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include improvements at the A483/A55 junction and to the key junctions along the A483.

2.8 Package 8 Making Best Use - Strategic Trips

There are a number of proposed interventions aimed at making more efficient use of the existing transport facilities and infrastructure along the trunk roads in the study area.

Walking and cycling is promoted by encouraging secure cycling parking at public transport interchanges, integrating cycling with other passenger transport services, improving the safety and security of existing walking and cycling routes and ensuring they are maintained to a high standard, as well a providing additional signage for walkers and cyclists.

This package also includes measures to better use the existing bus transport. These embrace measures to provide bus priority along key routes and junctions, improve the integration of rail and bus services, establish an integrated area ticketing and provide real time information at bus stops.

With regards to rail transport, it is proposed an extension of Llandudno-Manchester service to Manchester Airport and improvements in the accessibility of a number of stations.

Freight measures consist of publicising the whereabouts and services from possible rail and inland rail terminals so they can be used to their full potential and suspending non essential maintenance programs at peak periods.

In terms of measures in the existing road network, it is proposed to reduce local access roads onto the strategic road network. The accesses to be closed include the A55 Westbound / Pinfold Lane – J33a (Eastbound access will be retained), A494 Northbound / Old Aston Hill, A494 Northbound / Plough Lane (southbound access will be retained) and A494 Southbound / Clay Hill Lane. Additionally, it is also proposed to consider a signage strategy for traffic travelling to/from the Midlands and to/from North England and to incorporate variable messaging signs.

2.9 Package 9 Capacity Enhancements – Strategic Trips

There are a number of proposed measures involving the provision of new infrastructure along the trunk roads in the study area.

Walking and cycling is promoted by providing walking and cycling crossing facilities on trunk roads and associated junctions, safe walking and cycling routes from local communities to public transport interchanges, and new walking and cycling links to key

employment sites. This package proposes the provision of a number of new cycling and walking links including those from Chester to Denbigh and Wrexham, from Mold to Saltney, along the Dee Coast, and between Mold and Deeside.

In terms of bus transport, this package includes the provision of express coach services operation between Holyhead and Manchester Airport with stops in the study area and new or revised bus routes from train stations to key employment sites.

With regards to rail transport, it is proposed to double the service frequency between Wrexham and Bidston. Additionally, a fast service between Llandudno and Manchester Airport is proposed, as well as the extension of London-Chester services to Bangor/Holyhead and the provision of a Rhyl-Chester (with possible extension to Crewe) local shuttle service.

Proposed freight actions consist of measures such as the provision of freight consolidation centres including one at Deeside, truck parking facilities and an open access rail freight terminal. It is also proposed the construction of crawler lanes on key trunk roads and other single carriageways roads and the replacement of diesel freight trains by electric ones.

In addition, demand management is intended to be addressed by the provision and promotion of a park and car share scheme throughout the study area, and by introducing park and ride facilities.

Highway measures include applying managed motorway concepts (e.g. ITS technology could be deployed on key routes to vary speed limits according to traffic levels determined through traffic loops and CCTV), providing hard shoulders on dual carriageway trunk roads and enhancing the A548 route between Flint and the A550.

Additional highway improvements comprise those to the A483/A55 junction and other key junctions on the A483 and the Ewloe Interchange. This package includes the widening of the A55 between Ewloe and Northop, the A494 between Ewloe and Drome Corner and the A494 River Dee crossing. A new road is also part of the proposed Package ST3, connecting the A55 and the A548.

2.10 Methodology

Guidance provided by the Welsh Health Impact Support Unit provides information on how to complete a HIA. There is no specific guideline on the scale of a HIA which needs to be completed, and it is up to the assessor to quantify how in-depth the assessment should be. In view of this, a desktop study has been completed, which draws on literature and the assessment completed for the wider Stage 1 assessment. The results have been presented in tabulated format, which is based on Table 9.2 from page 171 of the WelTAG guidance.

3 Results of Impact Assessment for each package

Package Description: 1. Managing Demand – Area Wide			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	Improvements at major employment areas will encourage increase in walking and cycling amongst commuters improving physical fitness	Throughout study area, focussing on major employment areas	Slight Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	There area contains several key cultural heritage sites, and it is likely that there will be net gains towards cultural sites through a reduction in traffic. This is likely to improve the culture and historical identity of the area, improving health and wellbeing.	Across the study area	Slight Benefit
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	The modal shift away from use of cars and improvements in freight logistics, could cause a reduction in the noise levels from road traffic which would have positive impacts on health of people living near busy corridors. However this is generally considered to be neutral overall. Slight beneficial towards local air quality achieved through a modal shift, although unlikely to be significant in terms of pollutant concentrations locally. This reduction is not deemed significant enough to have any major impact on health, specifically respiratory disorders and is therefore considered neutral.	Communities near busy roads	Neutral
Working Conditions: Employment, workplace conditions, occupation, income	Increased productivity will see improvements to local economic activity. There is likely to be a slight associated increase to employee's health, and increased local community interaction. Improvements such as this will improve working conditions, and are likely to have a slight benefit on health.	Major employment areas in the study area	Slight Benefit

Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	The package is likely to remove some of the barriers preventing accessibility, so will improve access to services for large parts of the community.	Across the study area	Slight Benefit
Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	A reduction in traffic with this package is likely to improve the environment, through the reduction of emissions and pollutions, have a positive effect on biodiversity.	Across the study area	Slight Benefit
Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 2. Making Best Use – Flint/Mold – Chester (via Deeside / Broughton)			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	Measures are likely to improve the take up of physical activity, especially walking and cycling. Adequate provision already exist, so encouraging a modal shift towards more physically active modes will be relatively straight forward. This will have slight benefits on health.		Slight Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	Measures could have a physical and visual impact on listed buildings within the study area, depending on final designs. However, this could be mitigated against and is therefore unlikely to have a significant impact on the local community.	Across the study area	Neutral – slight adverse
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	It is likely this package will reduce congestion on the B5129, which could cause increases in noise due to speeding vehicles. Conversely, a reduction in vehicle numbers could also reduce noise pollution along this corridor, therefore improving living conditions for local residents. Reductions in congestion will improve air quality locally, and will result in a slight benefit to living conditions. Minor road improvements in the urban areas between Broughton and Saltney could impact the settings of listing buildings, impacting the landscape. This however could be mitigated and is unlikely to significantly impact living conditions.	Communities near busy roads	Slight Beneficial
Working Conditions: Employment, workplace conditions, occupation, income	Improvements to accessibility due to multi modal shifts could stimulate economic activity, and increases in economic productivity. This would have a localised improvement to occupations and possibly income, improving working conditions in this area.		Slight Beneficial
Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	Improvements to existing routes should make key services more accessible to more members of the public, especially those without access to private vehicles.	Across the study area	Slight Beneficial

Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	As the option will reduce traffic levels, there will be reduction in vehicle emissions and pollution. It is likely this will have a positive impact on biodiversity, as well as cleaner water runoff from road surfaces. This will create a better environment, leading to improvements to health.	Across the study area	Slight Beneficial
Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 3. Capacity Enhancements – Flint/Mold – Chester			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	The provision of new direct walking and cycling links to major employment areas will encourage a modal shift towards walking and cycling, which will improve physical fitness and the health of people in the study area.	Around major employment areas	Slight Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	Final design of new schemes could impact heritage sites, both physically and visually. This could have a slight adverse impact on the historical identity of the area, which would negative effect the community.	Across the study area	Slight Adverse
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	The improvements to roads could lead to changes in traffic, which could lead to some areas experiencing increased noise levels. However, it is likely that new road schemes will ease congestion, which should have benefits to local air quality issues. This will improve living conditions within this area.	Communities near busy roads	Slight Benefit
Working Conditions: Employment, workplace conditions, occupation, income	This package is likely to considerably improve accessibility to local employment opportunities, and will improve economic productivity in the corridor. This will therefore improve working conditions, and help towards improving health	Focussed around major employment areas	Moderate Benefit
Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	The package will substantially improve access to employment centres, as well as access to local services. Social inclusion will be promoted for those without access to private vehicles.	Across the study area	Moderate Benefit
Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	This option poses a significant risk to biological diversity, as they are likely to disturb a number of wildlife habitats. New road connections could increase vehicle levels, leading to increases in pollutions affecting the environment	Across the study area	Slight to Moderate adverse.

Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 4. Making Best Use – Wrexham – Deeside (via Mold / Buckley)			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	Measures such as increased levels of cycle parking at key employment areas should encourage more people to cycle to work. Improvements to existing links will also encourage modal shift to walking and cycling, which will improve physical fitness and general health.		Slight Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	A number of the improvement measures could have an adverse impact on existing heritage sites, such as listed buildings. This would have an adverse impact on the historical identity, and therefore effect the community as a whole. However, the measures will also increase accessibility, which would remove feelings of isolation. This will improve mental wellbeing, and improve health.	Across the study area	Neutral
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	Reductions in congestion could see new vehicles attracted to routes at increased speeds, leading to negative effects on noise pollution. However, a general reduction in congestion will improve noise conditions The options are likely to improve local air quality issues, improving living conditions for those close to the highway network.	Communities close to busy road networks	Slight Benefit
Working Conditions: Employment, workplace conditions, occupation, income	Potential improvements to economic activity could lead to improvements at the Wrexham Industrial estate could lead to improvements in working conditions at this location.	Area around Wrexham Industrial estate	Neutral/Slight Benefit
Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	This package should improve accessibility, which will allow better accesses to key services, such as medical and carer facilities. These improvements will also include improving accessibility to transport links, including public transport.	Across the study area	Slight Benefit

Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	Although the options pose some risk to ecology in the area, it is likely that the reduction in traffic levels will maintain bio diversity, as well as improving other environmental aspects such as reductions from vehicle emissions and cleaner runoff from road surfaces.	Across the study area	Slight Benefit
Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 5. Capacity Enhancements – Wrexham – Deeside (via Mold / Buckley)			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	The provision of new links to employment areas should encourage walking and cycling to the workplace which will increase physical fitness. This will have benefits on the health of the workforce.	Across study area	Moderate Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	There is the potential for schemes to effect historical buildings, resulting in impacts on the community. However, improvements to accessibility for the major employment areas are likely to reduce community divisions.	Across study area	Neutral
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	The changes in traffic due to improved road conditions could cause a reduction in traffic, improving noise issues. However, this could result in additional speeding, increase noise pollution. The package is likely to have a positive impact on air quality, due to reductions in congestion. However, should vehicle volumes increase because of road improvements, there could be adverse impacts in localised areas. Overall, this package is likely to have slight benefit on living conditions for those close to congested roads	Communities close to congested road network	Slight Benefit
Working Conditions: Employment, workplace conditions, occupation, income	Rail enhancements are likely to substantially improve connections to key employment sites, focussed around the Deeside area. This is likely to encourage economic activity and employment.	Deeside and Wrexham Industrial estate	Slight Benefit
Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	The proposals will increase accessibility for work and other services within the area, particularly the rail enhancements which will aid those who do not have access to private vehicles.	Across study area	Slight Benefit

Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	This package presents an ecological risk, particularly as new infrastructure could	Across study area	
Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 6. Making Best Use – Chester – Wrexham			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	Improvements to existing infrastructure should encourage a modal shift to walking and cycling. This will improve physical fitness and positively impact individual health.	Across the study area	Slight Benefit.
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	There could be some degree of impact on heritage sites, both physical and visually. This could impact historical identity and affect the community. However, it is thought that this impact will be relatively minor in this case as no substantial new infrastructure is required.	Across study area	Neutral
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	Local air quality is likely to be improved through reductions in congestion. This will improve living conditions for those living in close proximity to the road network.	Communities close to congested roads	Slight Benefit
Working Conditions: Employment, workplace conditions, occupation, income	There is likely to be a minor improvement to working conditions, through improvements to bus services serving the major employment areas.	Employment areas throughout the study area	Neutral/Slight Benefit
Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	The measures will improve accessibility to all modes, including public transport. This will improve access to key services. This will have a slight benefit on Services.	Across study area	Slight Benefit
Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	The options are likely to reduce congestion, which has benefits for the environment. There is some ecological risk with the proposals, through the improvement to existing links.	Across study area	Neutral
Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 7. Capacity Enhancements – Chester – Wrexham			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	The provision of new walking and cycling links will provide direct routes through this study corridor. This will encourage more people to walk and cycle, which will increase their physical fitness. This will have positive benefits on health.	Across the Chester / Wrexham Corridor	Moderate Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	There is the potential for the historical identity to be affected with this package, depending on final designs of the schemes. This could have both a physical and visual impact on key heritage sites, affecting the community. However, improvements to links should reduce any community division, and reduce isolation.	Across study area	Neutral
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	Reductions in congestion are generally likely to improve noise and air quality within the area, improving living conditions. There is a danger than reducing congestion increases vehicle speeds which would have an adverse effect. Improvements to key junctions are likely to improve road safety, and reduce road hazards.	Across the study area, benefits focussed on Chester and Wrexham	Moderate Benefit
Working Conditions: Employment, workplace conditions, occupation, income	This package is likely to lead to potential substantial increases in economic activity in the Wrexham – Chester corridor. This will encourage new employment opportunities, as well as improving accessibility for the existing workforce. This will positively impact working conditions.	Wrexham industrial estate	Moderate Benefit
Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	This package will improve accessibility to not only employment opportunities, but also major services such as medical facilities. Improvements to the transport network will also be beneficial.	Across study area	Slight Benefit
Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	Potential environmental impacts with this package, mainly the loss of bio diversity through removal of habitats.	Across study area	Slight Adverse

Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 8. Making Best Use - Strategic Trips			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	Whilst improved links may encourage walking and cycling locally, it is unlikely to have a significant impact on strategic trips due to their length. There may be some increases to physical fitness, which will improve health but this is likely to be minimal.	Across study area	Neutral / Slight Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	Potential impact on heritage sites, which could reduce the historical idenitiy of the area and reduce wellbeing. However, this is unlikely to be a significant impact, and will be offset by accessibility improvements which reduce isolation and community divisions.	Across study area	Neutral
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	There is likely to be both beneficial and adverse impacts to the living conditions at the strategic level. The re-routing of vehicles from one area to another is likely to improve the situation in one location, but could potential cause issues elsewhere on the network. Variable speeds on the A55/A494 could reduce the noise impact, and improvements to congestion will bring improvements to local air quality. Installation of VMS could have significant issues on the built environment, but should be localised to major routes. Mitigation is possible.	Communities close to the A55/A494	Slight Benefit
Working Conditions: Employment, workplace conditions, occupation, income	Benefits to working conditions are likely to be focussed in the Wrexham and Deeside areas, for local users. Improvements to economic activity in this area will have slight improvements to working conditions due to improved accessibility and slight economic activity, providing new employment opportunities.	Wrexham and Deeside areas	Slight Benefit

Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	Improvements to transport links should improve accessibility to the major services.	Across study area	Slight Benefit
Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	The reduction of traffic across the study area should yield positive benefits for the bio diversity.	Across study area	Neutral
Macro-economic factors: Political climate, GDP, economic development, policy climate			

Package Description: 9. Capacity Enhancements – Strategic Trips			
Appraisal Criteria	Assessment	Distribution	Significance
Health Impact Assessment			
Individuals Lifestyle / capacities affecting health: Smoking, nutrition and healthy eating, physical activity, alcohol / drug misuse, sexual health Propensity to use health and care services Skills and knowledge, training and education	The provision of the new walking and cycling infrastructure throughout the study area will help facilitate new strategic walking and cycling trips, most likely when combined with other modes. This will encourage a modal shift towards walking and cycling, improving physical fitness levels. This will improve the general health of Individuals.	Benefits across the whole study area	Slight Benefit
Social and Community influences affecting health: Family: Structure and function, parenting Community: social support mechanisms, social networks, neighbourliness, peer pressure, community divisions, degree of isolation, historical identity-, cultural and spiritual ethos.	Potential to impact on listed buildings, both physically and visually. This could have adverse impacts on the historical identity of the area, resulting in adverse wellbeing and health implications on the community. However, increased accessibility is likely to reduce the feeling of isolation, particularly in rural areas, and has the potential to remove community divisions.	Across the study area	Neutral
Living Conditions: Built environment, civic design and planning, housing, noise, smell, air and water quality, physical view and outlook, public safety, waste disposal, road hazards, injury hazards, safe play spaces	Trunk road improvements and management are likely to have slight benefits on the levels of noise through reduced congestion levels, improving living conditions. This would be offset through the provision of a new route between the A55 and A458, which would have adverse health impacts. The general reductions in congestion levels are likely to improve air quality locally, which is beneficial to living conditions.	Communities close to the A55/A494	Slight Benefit
Working Conditions: Employment, workplace conditions, occupation, income	The measures have the potential to substantially increase economic activity and productivity, which will have positive benefits to the working conditions in the study area.	Focussed around Wrexham and Deeside industrial estates	Slight Benefit

Services: (access to and quality of) Medical services, caring services, careers advice and counselling, shops and commercial services, public amenities, transport, education and other services, access to information technology	The packages should aid accessibility for those without access to private vehicles, which will improve their access to key services.	Across the study area	Slight Benefit
Socio-economic, cultural and environmental and sustainability factors; Biological diversity, efficient use of resources, pollution, diversity / local distinctiveness, climate.	There is the potential for a reduction in bio diversity, through the loss of habitats and wildlife with the construction of new infrastructure. This could be managed with effective mitigation	Across the study area	Neutral.
Macro-economic factors: Political climate, GDP, economic development, policy climate			

4 Summary of Assessment

4.1 Package Description: 1. Managing Demand – Area Wide

It is likely that this package will have a **Slight Benefit** on the health of the population within the study area. The improved accessibility should improve access to key health services, and improvements to the economy will have further benefits on health and wellbeing. The package will encourage improvements to walking and cycling, which in turn will improve the physical fitness of people within the study area. Furthermore, a reduction in traffic levels will have benefits on the levels of noise and air quality in the study area, which has benefits on both mental health and also suffers of respiratory disorders.

4.2 Package Description: 2. Making Best Use – Flint/Mold – Chester (via Deeside / Broughton)

It is likely that overall this package will have **Slight Benefit** on health within the area. Making best use of existing infrastructure will reduce congestion levels, which has tangible benefits on living conditions through the reductions of noise and air pollution. Furthermore, encouraging more people to walk and cycle to their destinations using existing infrastructure will improve physical fitness, and general health.

4.3 Package Description: 3. Capacity Enhancements – Flint/Mold – Chester

This package is likely to be **Slight to Moderate Benefit** to health in the Flint/Mold to Chester area. New infrastructure is likely to have environmental consequences, notably the loss of habitats, as well as the potential to impact heritage sites removing historical identity. However, the reductions in congestion and traffic levels will have positive impacts on health, notably the reduction in noise and air pollution improving the quality of life for residents near major routes. Furthermore, new walking and cycling links will encourage the uptake of this mode to travel to work, having considerable health benefits through increasing levels of physical activity.

4.4 Package Description: 4. Making Best Use – Wrexham – Deeside (via Mold / Buckley)

This package will have a **Slight Benefit** on health in the area. Improvements to existing routes will not only encourage a modal shift to walking and cycling, improving physical fitness and health, but also improve access to key services. Furthermore, the measures are unlikely to have a significant impact on the landscape or to the heritage of the area. The measures are also likely to improve noise levels and local air quality issues, which will improve the living conditions for residents near major roads. This will have a positive impact on health.

4.5 Package Description: 5. Capacity Enhancements – Wrexham – Deeside (via Mold / Buckley)

Overall this package will have **slight benefit** to health in the area. Improvements to congestion are likely to positively impact noise and air pollution levels, which will improve the living conditions around major roads. Furthermore, the provision of new walking and cycling links will encourage a modal shift to this mode, improving the health of the workforce through increased levels of physical activity.

4.6 Package Description: 6. Making Best Use – Chester – Wrexham

Overall, this option package will have a **Slight Benefit** on health. The improvements to existing walking and cycling links will improve individual health through the promotion of physical fitness. Furthermore, as this package makes use of existing infrastructure, the impact on the environment is reduced, therefore not significantly impacting health. Reductions in congestion will also have a positive benefit on living conditions in the area, through the reduction of air and noise pollution.

4.7 Package Description: 7. Capacity Enhancements – Chester – Wrexham

This package is likely have a **Moderate Benefit** on health, due to the positive benefits of improving the physical fitness, and improvements to living conditions. The new infrastructure will improve access to key services, such medical and carer services.

Furthermore, there are likely to be improvements to road hazards as well as improvements to working conditions, all which will improve health.

4.8 Package Description: 8. Making Best Use - Strategic Trips

Overall, this package will provide a **Slight Benefit** for health. This is due to the improvements to accessibility for local residents accessing key services, as well as improvements to the environment and bio diversity through the reduction of traffic levels. Furthermore, the reductions in congestion levels is likely to have positive benefits on living conditions through a reduction in both air and noise pollution. Finally, there are likely to be small improvements to physical fitness levels, through improvements to walking and cycling links. This will encourage improvements to individual health levels.

4.9 Package Description: 9. Capacity Enhancements – Strategic Trips

Overall, this package is likely to have a **Slight Benefit** on health in this area. This is largely due to the improvements of Working Conditions through the additional economic activity proposed. Furthermore, there are likely to be improvements to individual health, through increased levels of physical fitness. Health will be further improved by improvements to local living conditions with reductions in noise and air pollution.

5 Conclusions

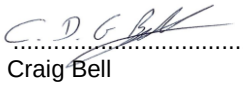
This health impact assessment has considered the health implications of the nine proposed packages within the North East Wales Transport Based Study. It has demonstrated that none of the packages will have a detrimental impact on the health of people within the study area. Furthermore, it is predicted that Option 7 – the capacity enhancements between Chester to Wrexham will have moderate benefits on health, mainly through the improvements to physical fitness levels and living conditions. Package 3 which considers capacity enhancements to the Flint/Mold to Chester route, has slight/moderate benefits to health, which is mainly accounted for by improvements to Working Conditions, and access to key services. The remaining 7 Packages are all considered to have Slight Benefit on health.

NEWABTS Stage 1 Appendix H: Equalities Impact Assessment



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NEWABTS Stage 1 Appendix H: Equalities Impact Assessment

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Introduction

1 Introduction

1.1 Scope of this Report

This appendix outlines the work undertaken to complete an Equality Impact Assessment (EqIA) as part of the North East Wales Area Based Transport Study (NEWABTS).

As part of the Welsh Transport Planning and Appraisal Guidance (WelTAG), an EqIA must be completed where impacts are anticipated on any equality group as a result of a developed strategy or scheme. This appendix therefore seeks to consider the potential impacts of the developing NEWABTS strategy on these groups and identify potential means of overcoming these issues to ensure that the final strategy meets the needs of everyone.

This report is structures as follows; Section 2 of this report contains some analysis of publically available demographic data to help increase the understanding of the scale, distribution and composition of the various equality impact groups within the study area. Section 3 then discusses any sources of publically available research on the likely ways in which the identified groups may suffer from specific issues relating to their use of transport. Section 4 will then outline the results of a consultation exercise with bodies representing the various equalities impact groups. Section 5 will discuss the findings of the above research in relation to the proposed NEWABTS strategy, with section 6 discussing how the needs of these groups can be successfully catered for in the implementation of the strategy going forward. Section 7 provides an overview of this process and concluding remarks.

1.2 What is an Equality Impact Assessment?

An Equality Impact Assessment is a way of assessing the potential impacts of any developed policies, strategies or proposals on certain groups or individuals who may have specific requirements or be at risk of unequal treatment in their use of the identified proposals. As well as seeking to ensure that any proposals meet the necessary statutory equalities duties an Equality Impact Assessment is also a means of identifying improvements which can benefit everyone. This is achieved through the review of relevant evidence and consultation with relevant groups and individuals.

1.3 Statutory Equalities Duties

The WelTAG guidance highlights the following statutory duties placed upon the WG and Taith relating to equalities:

Race

• To promote equality of opportunity

• To eliminate race discrimination

• To promote good race relations

Disability

• To promote equality of opportunity between disabled people and other people

• To eliminate discrimination that is unlawful under the Disability Discrimination Act

• To eliminate harassment of disabled people that is related to their disability

• To promote positive attitudes towards disabled people

• To encourage participation by disabled people in public life

• To take steps to meet disabled people's needs, even if this requires more favourable treatment

Gender

• To eliminate discrimination and harassment

• To promote equality of opportunity between men and women

Data Analysis

2 Data Analysis

2.1 Introduction

Analysis of a number of attributes contained within the 2001 census has been undertaken to seek to establish the scale and likely distribution of the various equality impact groups within the study area.

It is important to recognise that whilst the 2001 census does represent an excellent and extremely detailed source of demographic data (and is the only viable data source with sufficient spatial detail for this analysis) the age of this data source does mean that some more recent patterns of demographic change will not be captured in this analysis and care should be taken not to over emphasise the importance of any findings.

2.2 Methodology

The initial task undertaken has been the analysis of publically available data sets to help increase the understanding of the spatial characteristics and scale of various potential equality impact groups within the study area. Datasets from the 2001 census have been identified which cover each of the different equalities impact groups considered of particular importance within the WelTAG guidance. Table 2.1 illustrates these groups alongside the census attributes used to investigate them and the outputs produced; discussed later in this section.

Table 2.1: Data sources used in this analysis

Equality Impact Group	Dataset used	Output Produced
Race, ethnicity, colour or nationality	2001 Census Ethnic Group (UV09) Country of Birth (UV08)	• Map of distribution of ethnic minorities within the study area. • Table showing major ethnic minorities within the study area and comparison to Welsh average. • Pie charts of origin country of birth, with comparisons.
Sex or marital status	Sex and age by method of travel to work (Table S119)	• Gender profile of the study area population by travel to work mode and comparison to Welsh average.
	Marital Status (KS04)	• Marital Status of the study area population and comparison to Welsh average.
Disability; physical, sensory or mental	Limiting Long-term Illness (UV22)	• Limiting Long-term illness and comparison to Welsh average.
Age	Age (UV04)	• Age profile of the study area population and comparison to Welsh average.
Religion or belief	Religion (UV15)	• Religious breakdown of the study area population and comparison to Welsh average.
Sexual orientation		• No suitably disaggregated data available.
Welsh Language	Knowledge of Welsh (UV13)	• Knowledge of Welsh in the study area and comparison to Welsh average.
Other: Lone parent, economic inactivity, social and multiple deprivation	S031 Family composition and number of dependent children by sex and economic activity	• Lone parent households and comparison to Welsh average.
		• Economic Inactivity and comparison to Welsh average.
	2007 IMD (England) 2008 WIMD (Wales)	• Index of Multiple Deprivation and comparison to Welsh average.

Maps and graphs have been produced to assess the spatial distribution of these groups and to assess their scale against Welsh and UK averages. This analysis will then shape the choice of organisations to be approached to discuss the potential impacts of the proposed NEWABTS Strategy with. The findings from this consultation exercise are summarised in section 4.

2.3 Race, ethnicity, colour or nationality

Figure 2.1 shows the locations within the study area with the highest concentrations of ethnic minorities at the time of the 2001 census; defined for the purposes of this assessment as those who identify their ethnicity as anything other than White British. This shows that ethnic minority populations are concentrated in the urban locations of Chester and Wrexham shown in red. Ethnic minority populations are particularly high in the west of Wrexham, representing ca.9-10% of the population of this area.

Figure 2.2 looks at the nationality of the population of the study area. This shows that the study area contains a higher percentage of English people and lower levels of Welsh people than the Welsh average; as would be expected for an area on the English border. 95% of the population of the study area come from England or Wales, with only 2% of the population coming from outside of Europe.

Table 2.2 shows the ethnic minority groups which represent the highest proportions of the population within the study area compared with the rest of Wales and the UK. Overall there is a higher proportion of ethnic minority groups in the UK in general than in Wales, and a higher proportion in Wales than in the study area. Within the ethnic minority groups, in the study area the highest proportion are Other White (1.33%) and this is also true for all of Wales (1.28%). In the UK however the highest proportion of ethnic minorities are Asian or Asian British (4.37%) followed by Other White (2.59%). There is a very small proportion of Black or Black British people living in the study area compared to the UK (0.13% compared to 2.19%).

Figure 2.1: Percentage of the population from an ethnic minority (non white British)

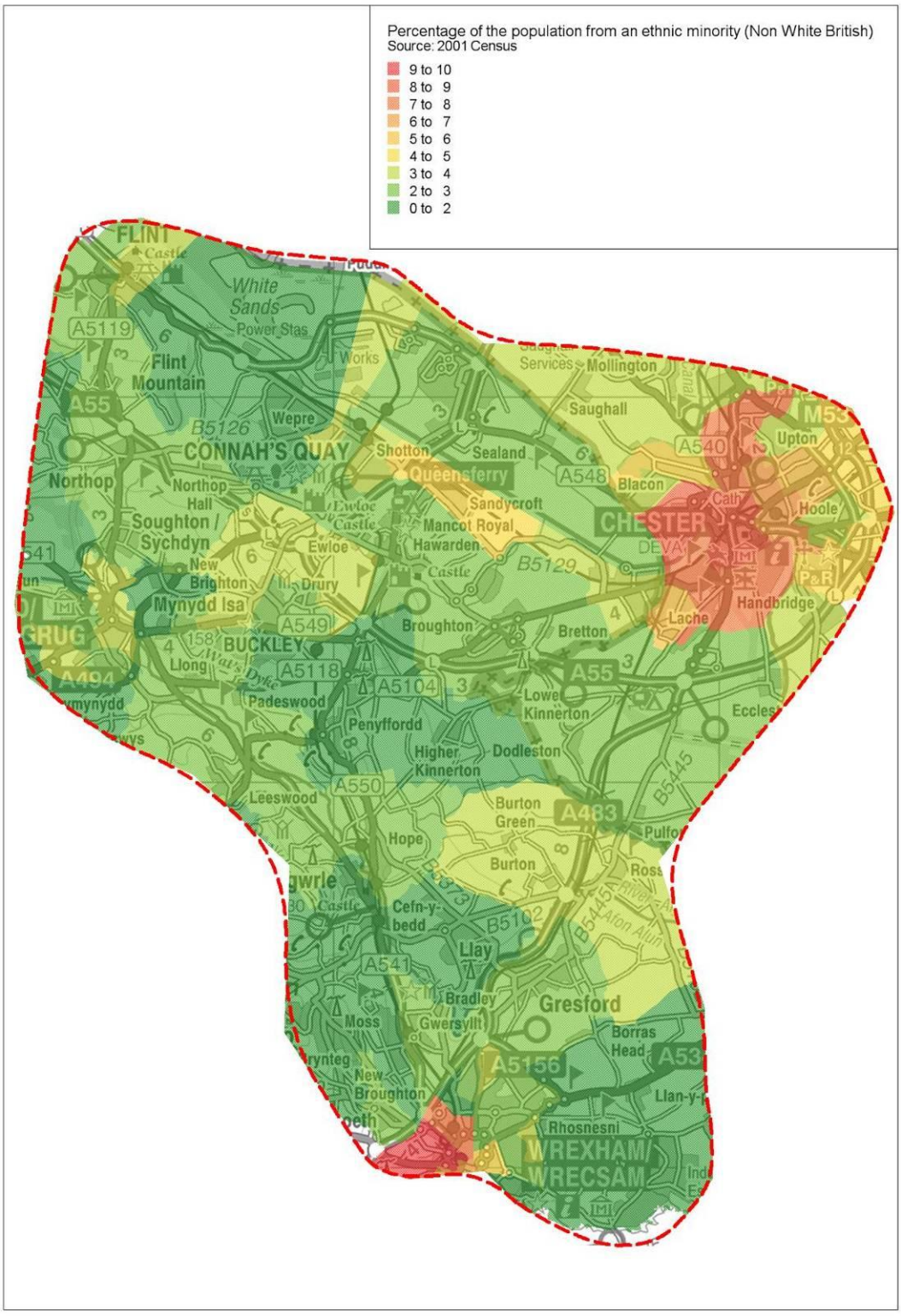


Figure 2.2: Analysis of the nationality of the study area population and comparison to Wales

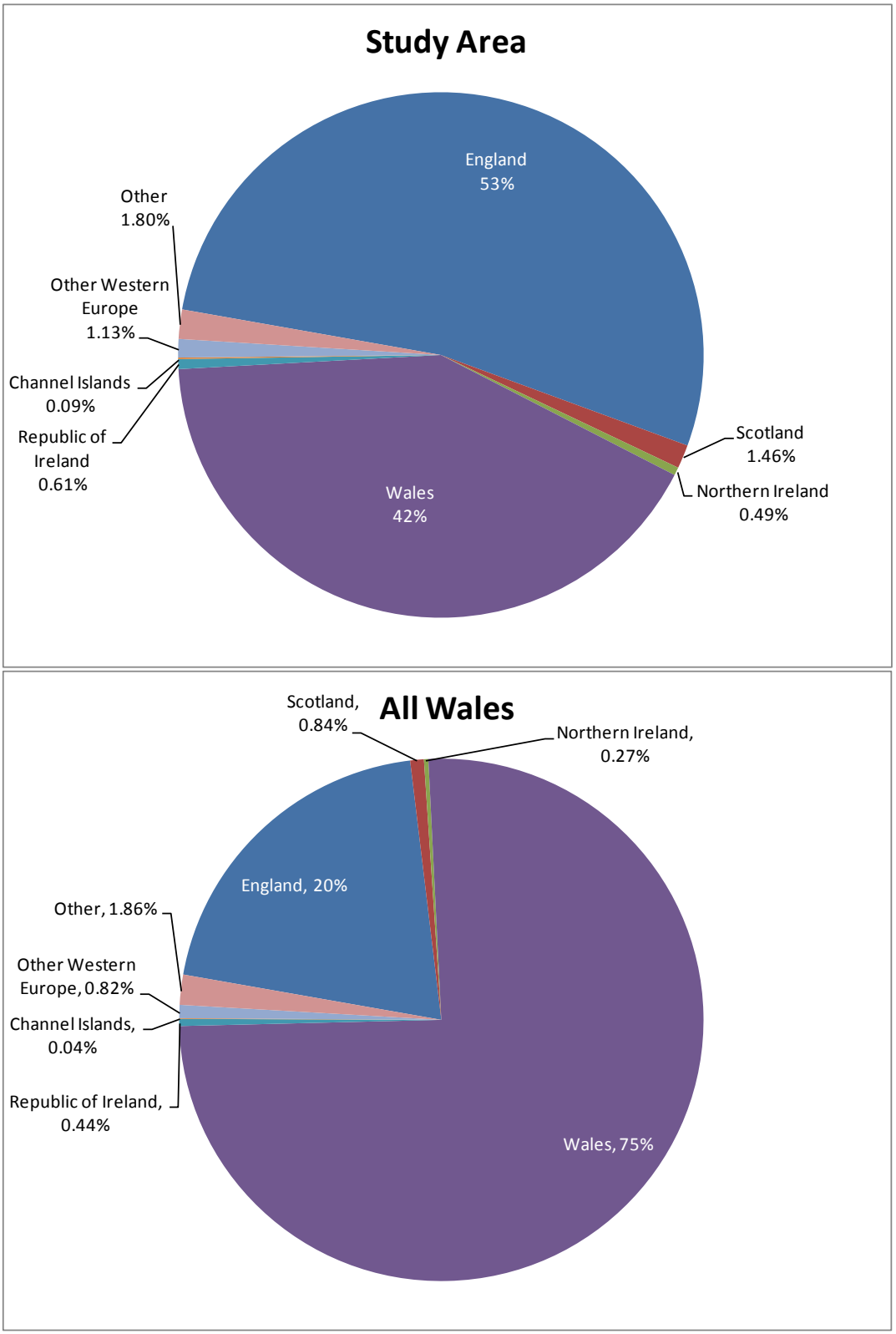


Table 2.2: Percentage of the population made up of ethnic minority groups

Rank	Study Area		All Wales		UK	
1	1.33%	White: Other White	1.28%	White: Other White	4.37%	Asian or Asian British
2	0.79%	White: Irish	0.88%	Asian or Asian British	2.59%	White: Other White
3	0.48%	Asian or Asian British	0.61%	White: Irish	2.19%	Black or Black British
4	0.48%	Mixed	0.61%	Mixed	1.99%	Indian
5	0.35%	Chinese or Other Ethnic Group	0.39%	Chinese or Other Ethnic Group	1.37%	Pakistani
6	0.21%	Indian	0.29%	Pakistani	1.27%	Mixed
7	0.18%	Chinese	0.28%	Indian	1.23%	White: Irish
8	0.17%	Other Ethnic Group	0.24%	Black or Black British	1.08%	Caribbean
9	0.17%	Mixed: White and Asian	0.22%	Chinese	0.92%	African
10	0.13%	Mixed: White and Black Caribbean	0.21%	Mixed: White and Black Caribbean	0.86%	Chinese or Other Ethnic Group
11	0.13%	Black or Black British	0.19%	Bangladeshi	0.54%	Bangladeshi
12	0.13%	Mixed: Other Mixed	0.18%	Other Ethnic Group	0.46%	Other Asian
13	0.12%	Bangladeshi	0.17%	Mixed: White and Asian	0.46%	Mixed: White and Black Caribbean
14	0.09%	Pakistani	0.15%	Mixed: Other Mixed	0.44%	Chinese
15	0.07%	African	0.13%	African	0.42%	Other Ethnic Group
16	0.06%	Other Asian	0.12%	Other Asian	0.36%	Mixed: White and Asian
17	0.05%	Mixed: White and Black African	0.09%	Caribbean	0.30%	Mixed: Other Mixed
18	0.05%	Caribbean	0.08%	Mixed: White and Black African	0.18%	Other Black
19	0.01%	Other Black	0.03%	Other Black	0.15%	Mixed: White and Black African

Note: table does not include White British majority

2.4 Sex or marital status

Figure 2.3 compares the travel habits of men and women through analysis of the travel to work mode for both genders within the study area, Wales and the UK in general.

Analysis of this data shows that the study area closely reflects patterns seen in all of Wales and in the UK. The data shows that the most popular travel mode is driving a car or van, with on average 65-68% of the males choosing this option and 57-58% of females. Males are more likely to travel to work as a driver of a car or van than females and females are more likely to be a passenger in a car or van than males. A higher proportion of males (around 3%) cycle to work than females (around 1%) but a higher proportion of females (14%) walk to work than males (6-7%).

This analysis indicates that there may be specific reasons preventing higher levels of cycling amongst women. The higher levels of bus use amongst women also indicates that any improvements to public transport must meet the requirements of women. There may also be perceived issues relating to bus use preventing higher take up of this mode amongst men.

Figure 2.4 shows the proportion splits for marital status within the study area compared with all of Wales and the UK. Marital status within the study area appears fairly consistent with the Wales and UK averages, with around 45% of people married and 28-30% of people single having never been married.

Figure 2.3: Mode of travel to work by gender in the study area, all of Wales and the UK

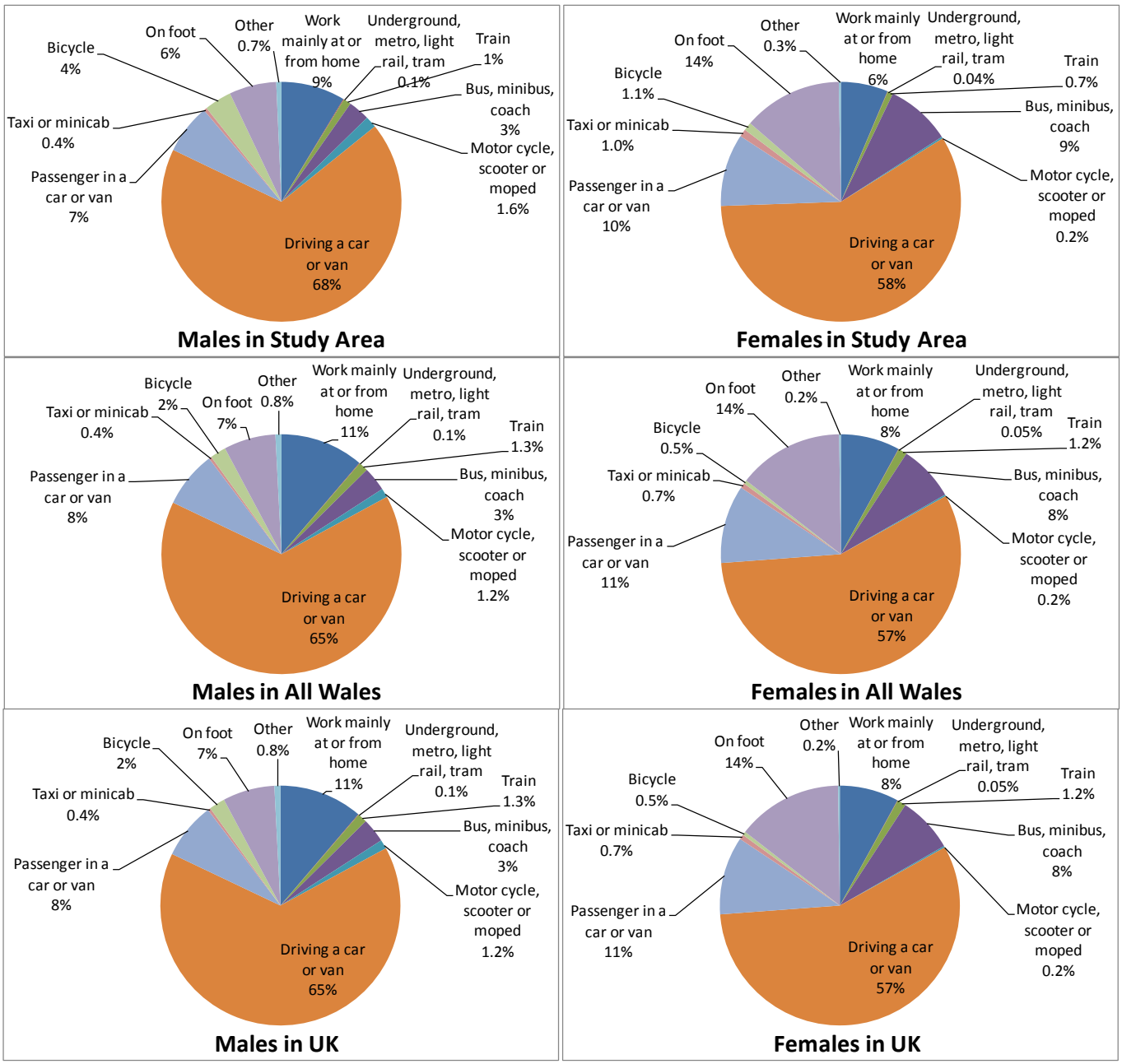
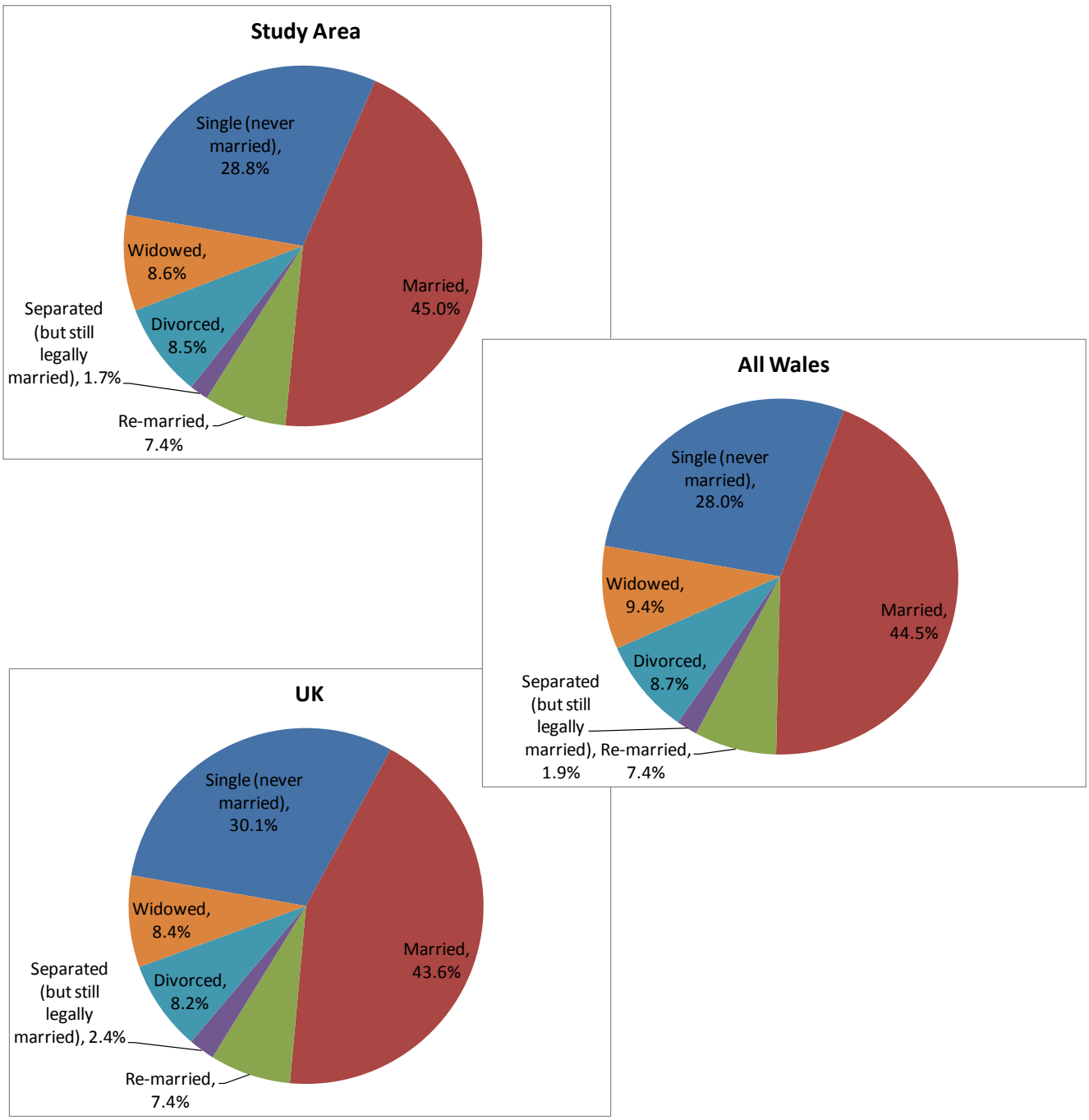


Figure 2.4: Marital status in the study area, all of Wales and the UK

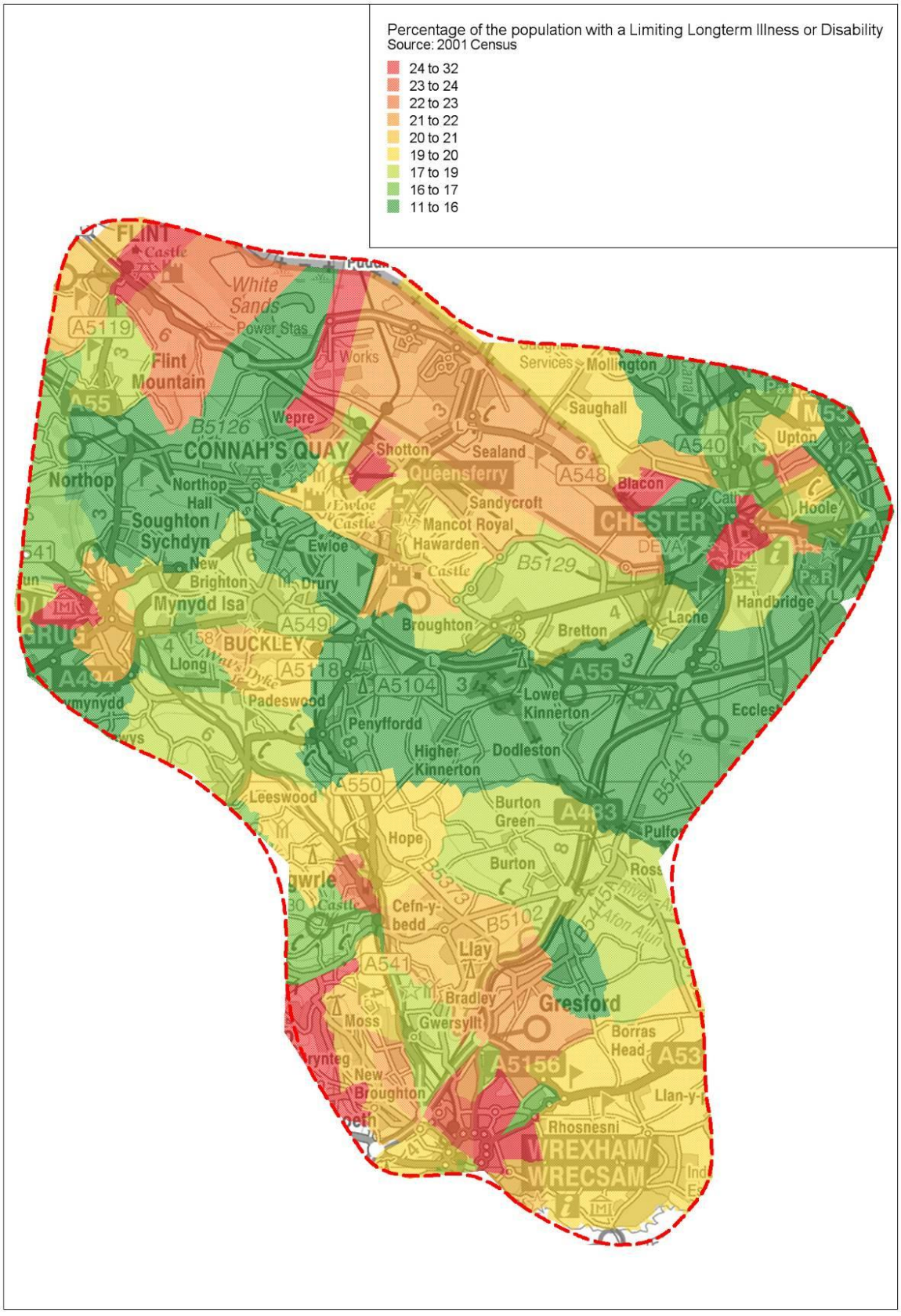


2.5 Disability; physical, sensory or mental

Figure 2.5 shows the percentage of the population in the study area with a limiting longer illness or disability. Urban parts of the study area appear to have a higher proportion of people with a limiting long term illness (shown in red) than rural areas; particularly in Chester, Wrexham, Flint and Connah's Quay, where ca. 24-32% of the population in 2001 reported a limiting longterm illness or disability. Rural areas such as Penyffordd and Higher Kinnerton in contrast tend have a smaller proportion, in some areas 11-16% (shown in green).

This indicates that whilst it is important to consider the needs of disabled people when considering improvements in all areas of the study area (the issues affecting disabled people in remote rural areas may be particularly acute) it is important to give particular consideration to disability issues in the more urban parts of the study area where a significant proportion of the population may be suffering from a disability or limiting longterm illness.

Figure 2.5: Percentage of the population with a limiting long term illness or disability



2.6 Age

Figure 2.6 is a graph of the age profile in the study area, all of Wales and the UK. The overall age profile of people in the study area is similar to that in Wales and the UK average. There is a higher proportion of people aged 20-40 in the study area compared to Wales, with over 15% (very close to UK average) of the population aged 30-39 compared with 14% in Wales. There is a higher proportion of people aged 50-60 in the study area and in Wales (13.5%) compared to the UK average (13%). Wales has a higher proportion of people aged 70 or over compared to the study area and the UK average.

Figure 2.7 shows the percentage of the population of the study area aged 70 or over. The locations with the highest proportion of people aged 70 and over (shown in red) tend to be in urban areas such as Chester, Wrexham and Flint (16-20%). Hawarden and Mold are also popular locations for elderly people. Only a small proportion of the population in rural areas such as Penyfordd and Higher Kinnerton are aged 70 and over (4-9%), shown in green.

Figure 2.8 shows the percentage of the population of the study area aged 19 or under. Locations with the highest proportions of younger people (shown in red) tend to be suburban areas such as outer Chester and outer Connah's Quay (29-37%). Central Chester has the smallest proportion of people aged 19 or under, as well as Hawarden and some Wrexham locations (11-22%), shown in green.

This information highlights the importance of consulting with young and old people, particularly in locations with high concentrations of these age groups, as they are likely to have differing needs to the wider population and higher levels of reliance on non-motorised transport modes.

Figure 2.6: Age profile in the study area, all of Wales and the UK

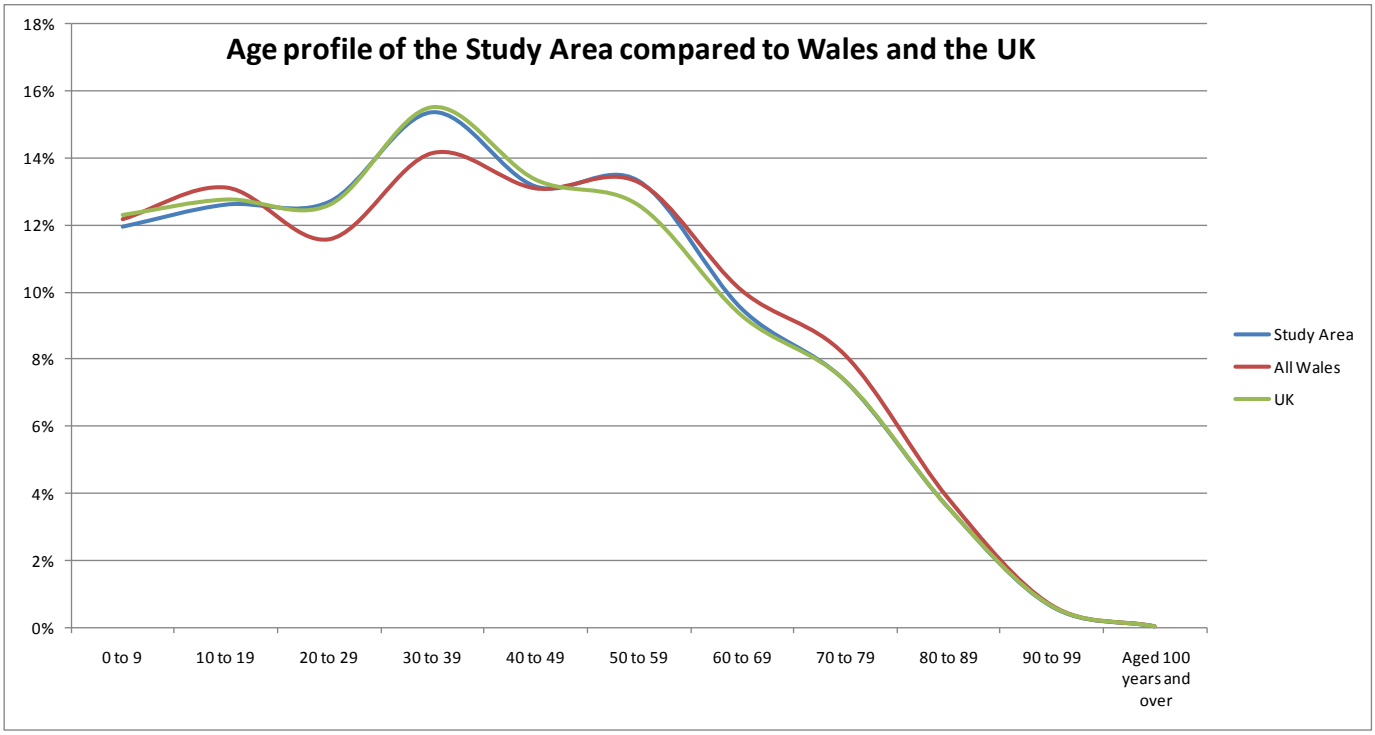


Figure 2.7: Percentage of the population aged 70 or over

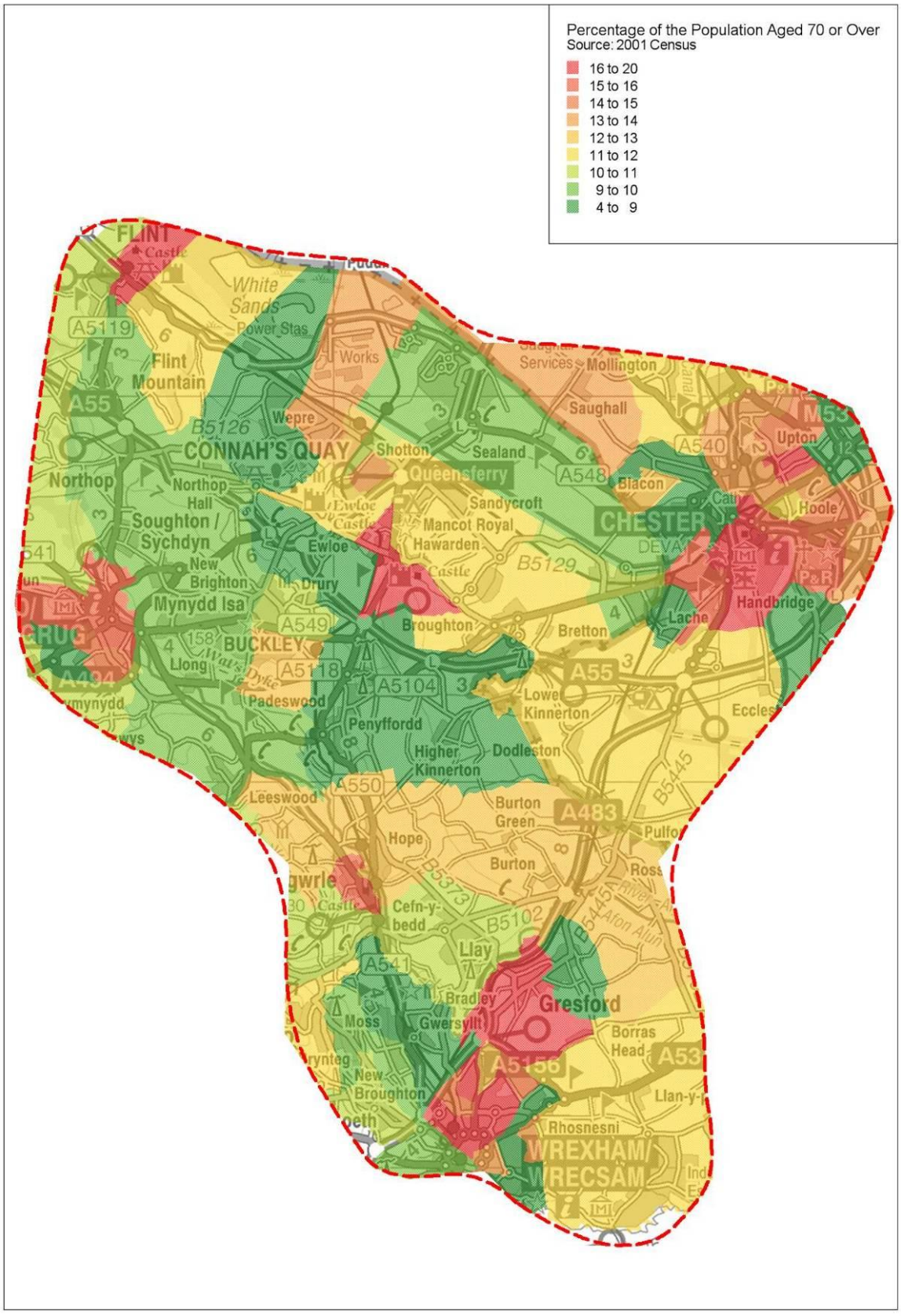
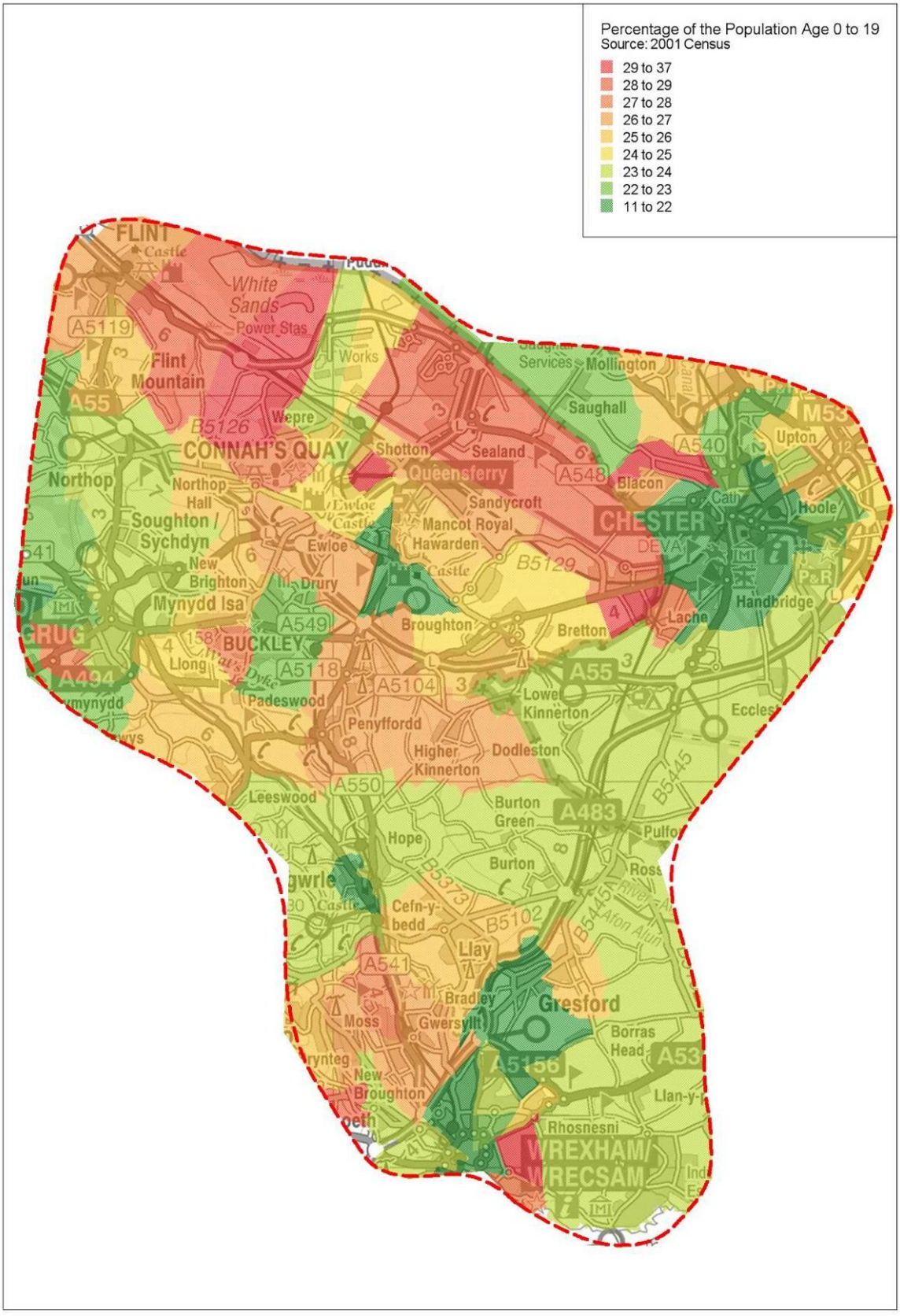


Figure 2.8: Percentage of the population aged 19 or under

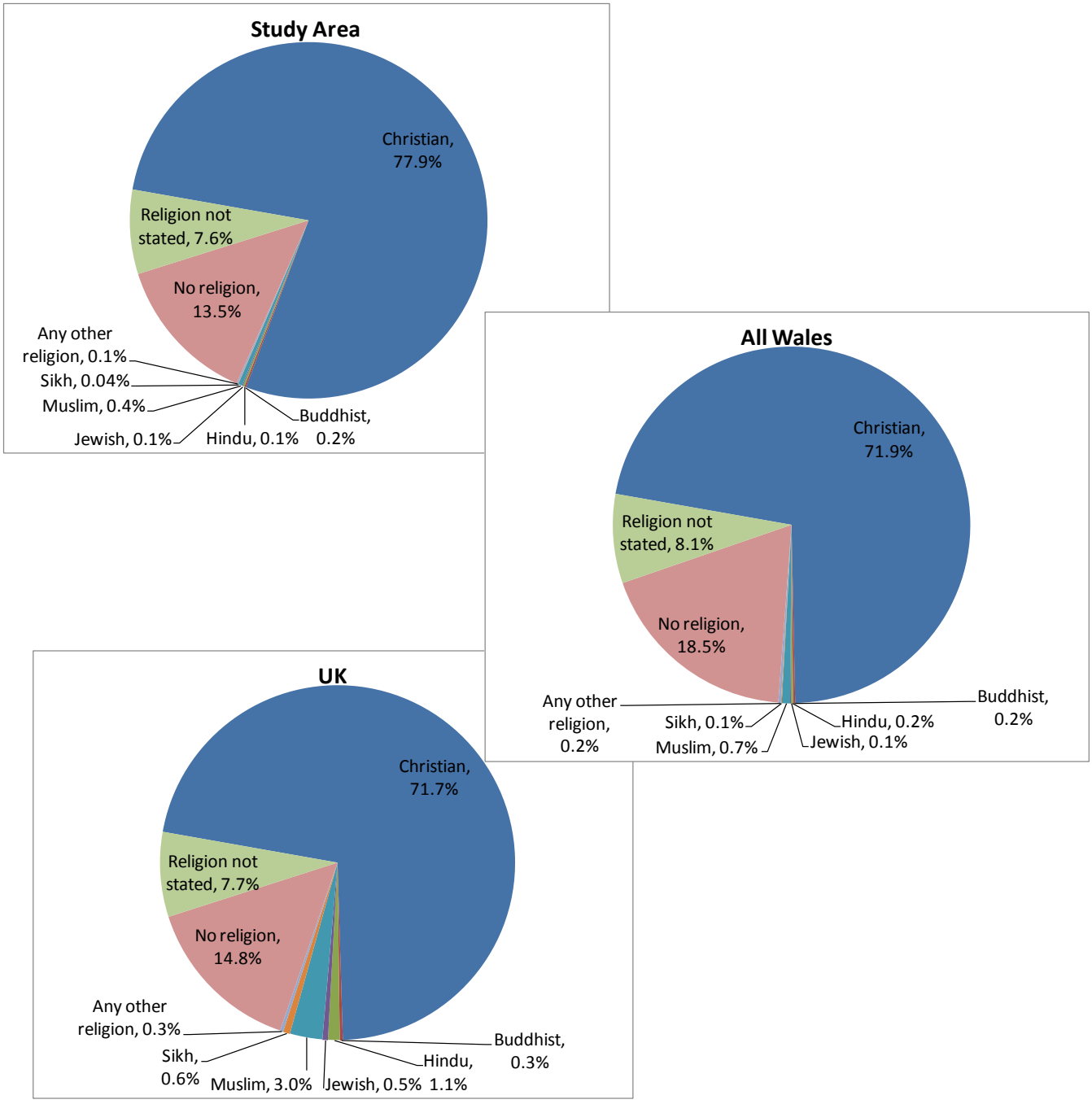


2.7 Religion or belief

Figure 2.9 shows the religion reported by the population of the study area, all of Wales and the UK in the 2001 census. Christianity is the most common religion in the UK and in Wales with around 72% of the population Christians. The study area has more than the UK average of Christians with 78%. 13.5% of people in the study area have no religion, which is less than the UK average of 14.8% and the Wales average of 18.5%. A very small proportion of people in the study area are Muslims compare to the UK average (0.4% compared with 3%).

Minority religions are therefore underrepresented in the study area compared to elsewhere in the UK.

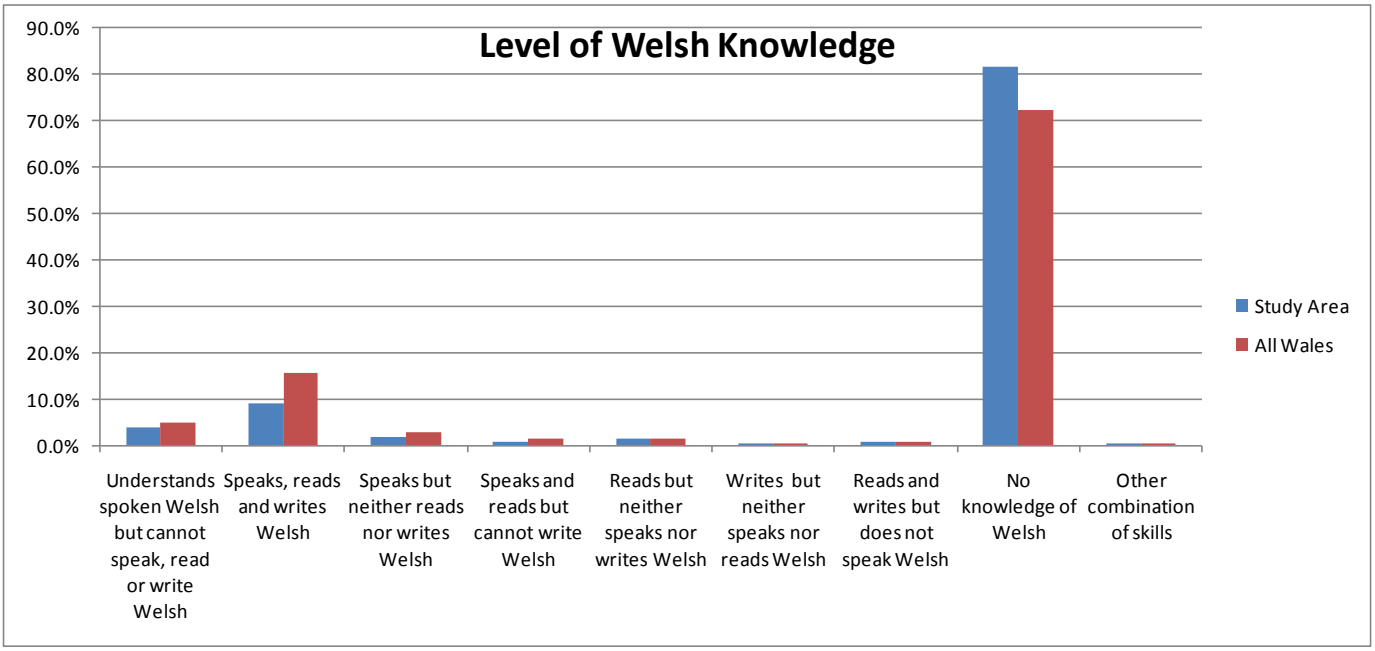
Figure 2.9: Religion or belief in the study area, all of Wales and the UK



2.8 Welsh Language

Figure 2.10 shows the level of Welsh language knowledge of people in the study area and people in all of Wales. The majority of people in both the study area and in Wales have no knowledge of the Welsh language (82% of the population in the study area and 72% in Wales). 10 to 15% in the study area and in Wales are able to speak, read and write the Welsh language and the remaining people have some knowledge of the language a combination of speaking, reading and writing skills. This indicates that use of Welsh may be less of an equalities issue in the study area than elsewhere in Wales, but still important to consider none the less.

Figure 2.10: Level of Welsh language knowledge of people in the study area and people in all of Wales



2.9 Other: Lone parent, economic inactivity, social and multiple deprivation

Figure 2.11 indicates the distribution of lone parent families within the study area. This indicates that these families tend to be located in the urban parts of the study area (shown in red); focusing on the west of Chester, suburban parts of Wrexham and the Connah's Quay/Deeside area.

Figure 2.12 shows the level of economic inactivity amongst residents of the study area compared to the Welsh and UK average. Economic Inactivity has been broken down to look at the rationale behind this economic inactivity. Within the study area 33% of the population were economically inactive in 2001. Of these people the largest proportion were retired, with a smaller number permanently sick or disabled or looking after the home or family. The study area has a similar pattern of economic inactivity to the rest of the UK, but has a higher proportion of people economically active than the Welsh average (67% compared to 61%). This is largely due to a lower number of people permanently sick or disabled in the study area compared to the Welsh average.

Figure 2.13 shows the Index of Multiple Deprivation Score of the wards in the study area. The most deprived areas with the study area (shown in red) are in the urban centres of Wrexham and Flint, with an Index score of 40-90. Chester, Connah's Quay, Shotton and Queensferry also have elevated Index scores compared with more rural locations within the study area such as Penyffordd and Higher Kinnerton (shown in green). There are a number of targeted regeneration areas within the study area in Wrexham, Flint and Connah's Quay.

Areas where deprivation is high are more likely to rely on public transport and are likely to have reduced transport horizons and a lower level of knowledge of the transport opportunities that are available. It is therefore particularly important to engage with the communities in these areas when publicising any improvements to public transport and walking and cycling provision.

Figure 2.14 shows the Index of Multiple Deprivation Score for the Access to Services domain in the study area. The most deprived areas in terms of access to services (shown in red) are in the rural areas to the east of Wrexham and around Northop, where a score of around 40-90 is seen. Chester and the surrounding area has a much lower score (0-5) indicating that access to services in this location is good (shown in green). Areas where access to services are poor are likely to have relatively poor levels of public transport provision and few local facilities, leading to potential social exclusion issues for those without access to a car.

Figure 2.11: Number of Lone Parent Families

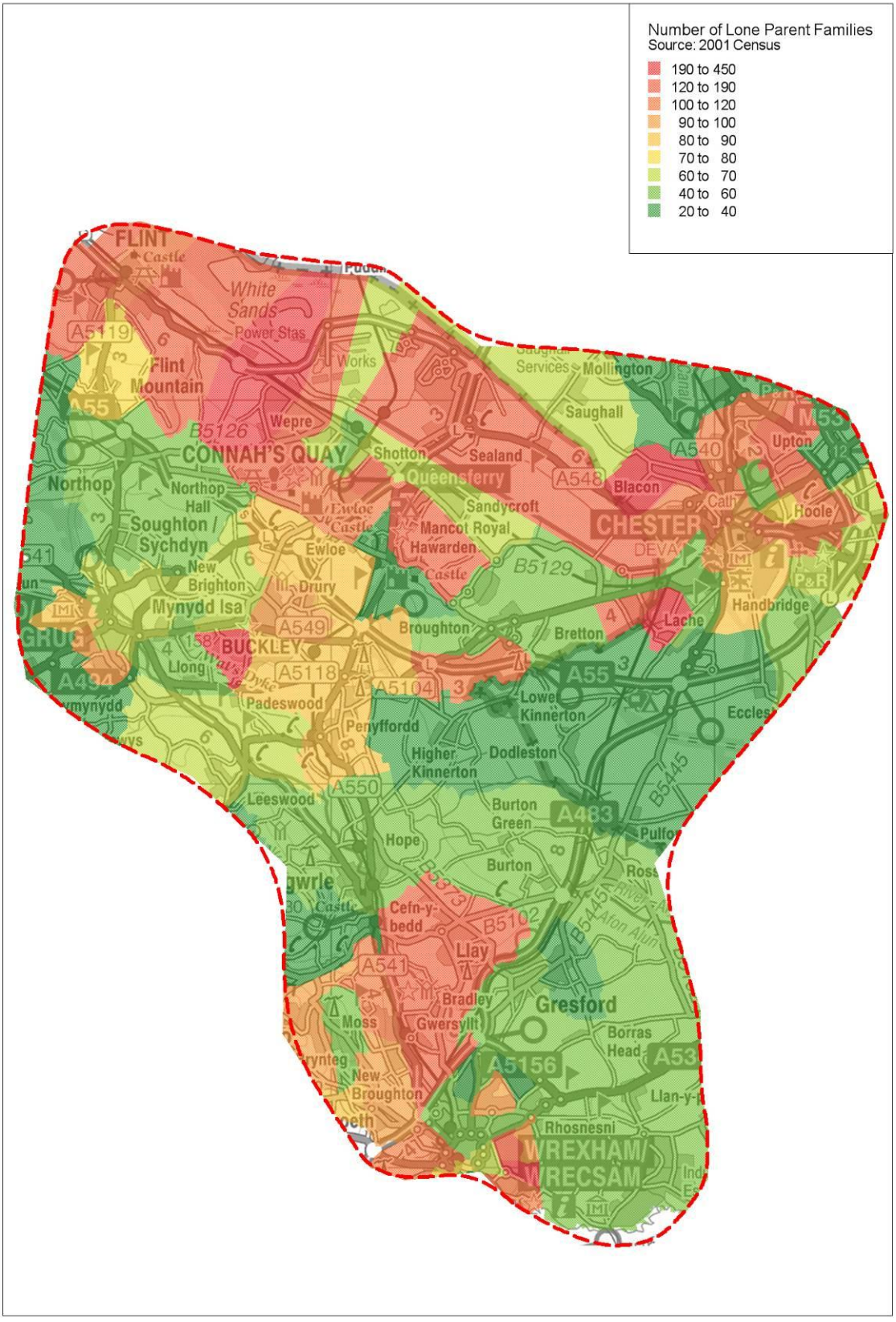


Figure 2.12: Levels of economic inactivity in the study area, Wales and the UK.

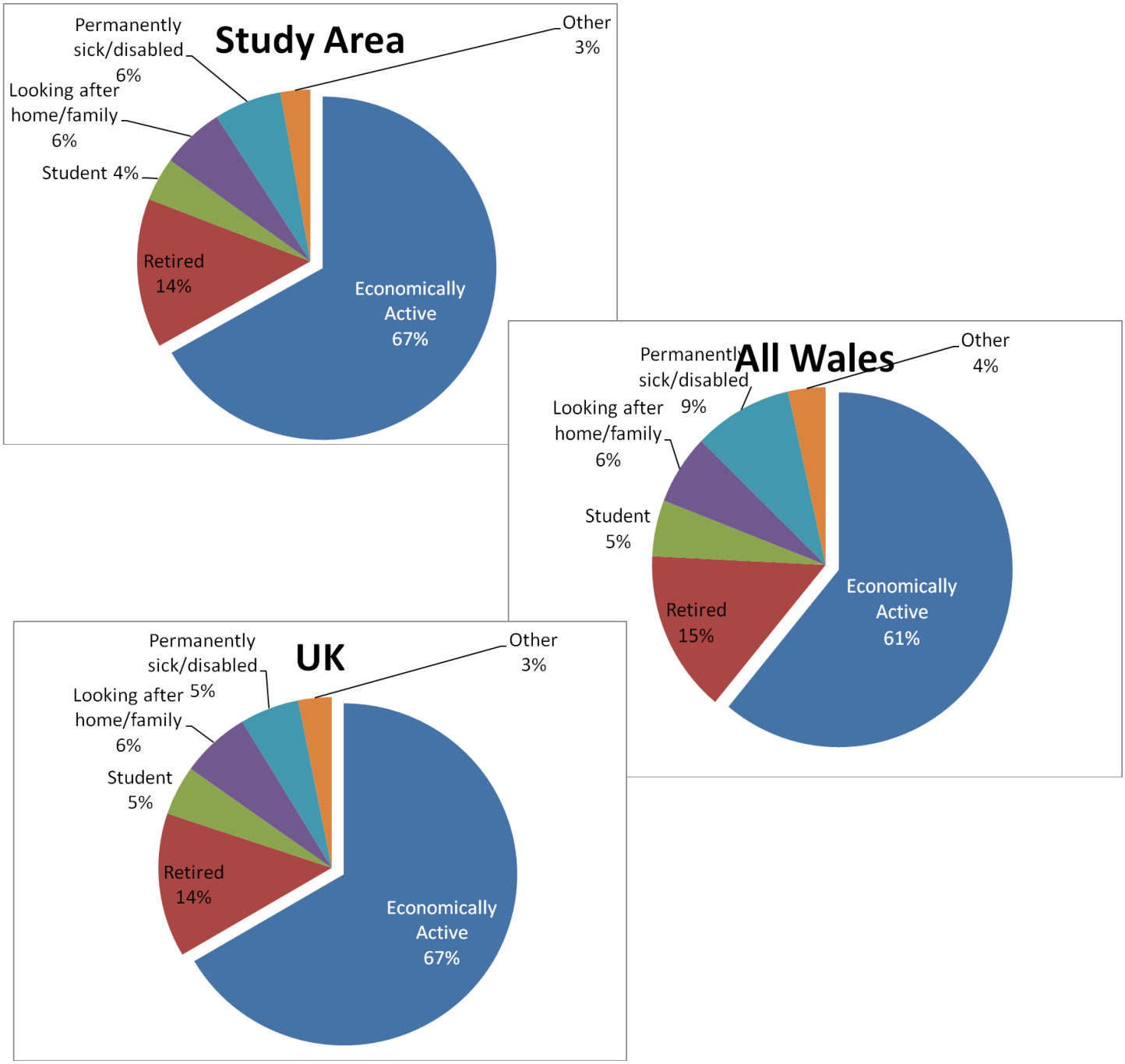


Figure 2.13: Index of Multiple Deprivation Score in study area

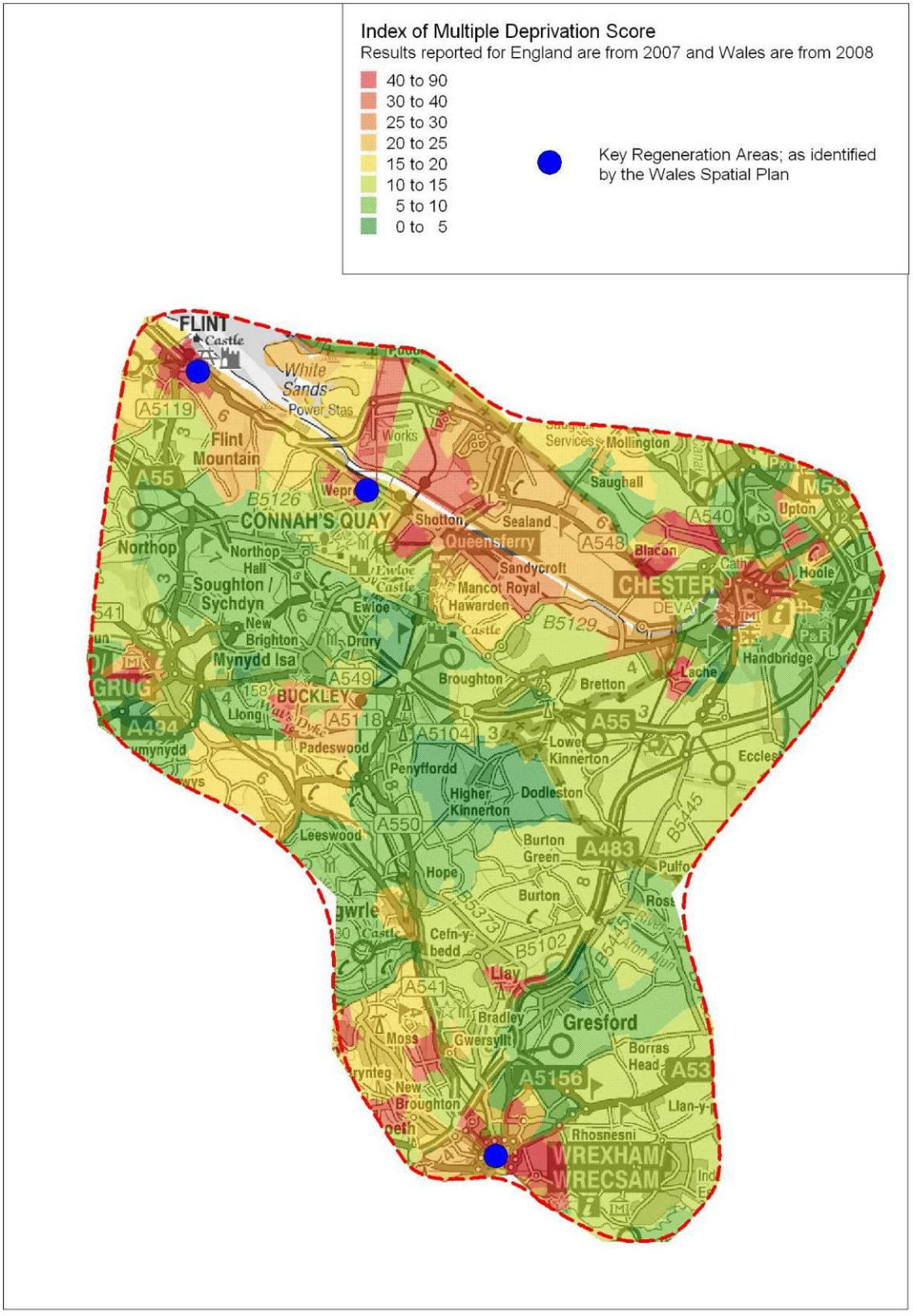
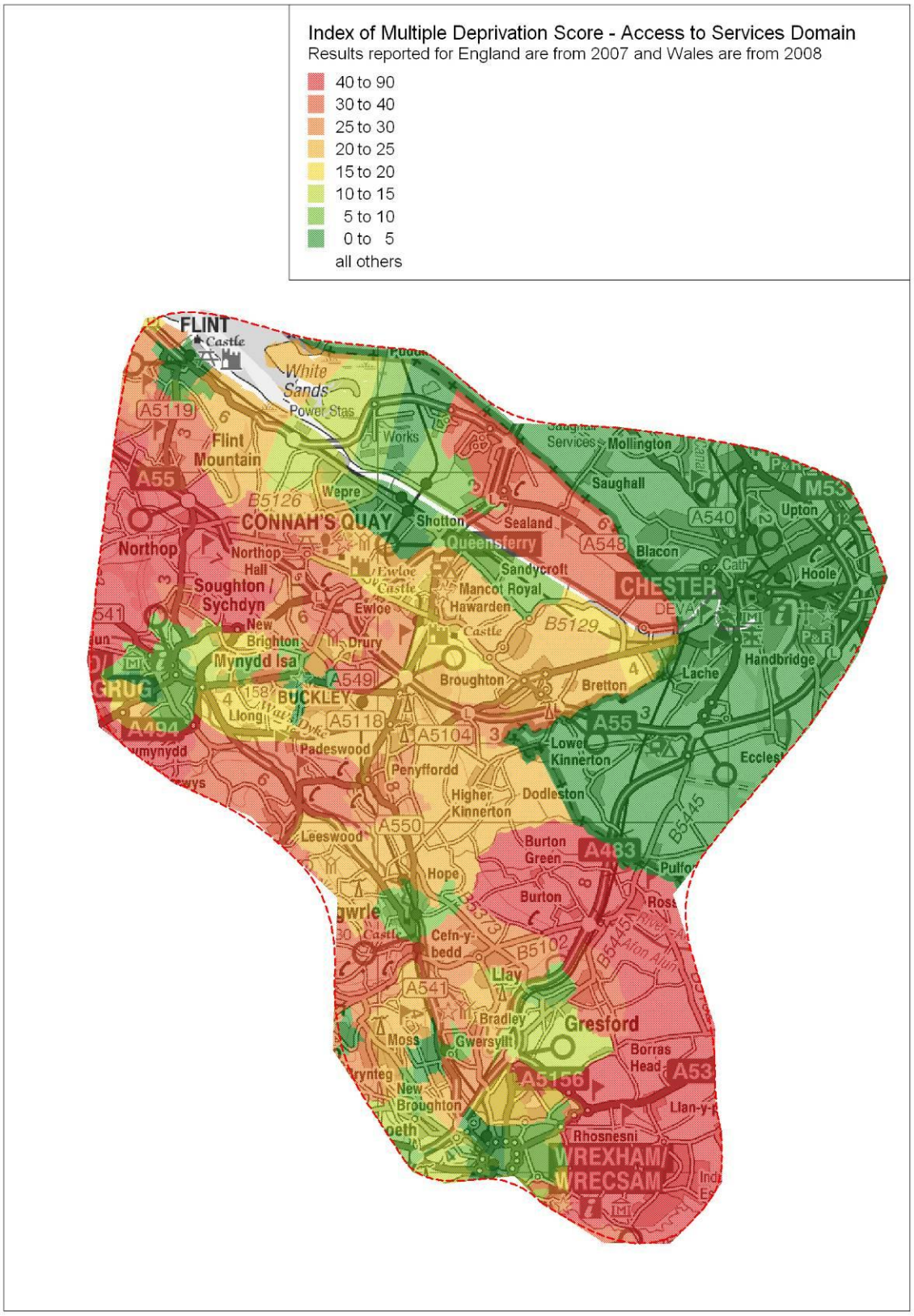


Figure 2.14: Index of Multiple Deprivation Score - Access to Services Domain in study area



2.10 Conclusion of Data Analysis

Mapping and analysis has been undertaken of a number of attributes of the 2001 census to help increase the understanding of the size and spatial characteristics of the various equalities impact groups in the study area. This analysis has indicated the following key trends:

- There are few ethnic minorities and people from other nationalities in the study area, but those that are present are likely to be concentrated in the urban parts of Chester and Wrexham.
- Men and women in the study area make use of differing transport modes, with women more likely than men to rely on lifts, public transport and walking and men more likely to drive themselves or cycle than women.
- People with a limiting long-term illness or disability are more likely to live in the urban parts of the study area, such as Chester, Wrexham, Flint and Connah's Quay, however for the lower concentrations of disabled people living in remote rural areas the transport problems experienced may be most severe.
- Older people tend to be focussed in the urban parts of the study area including Chester, Wrexham and Flint. Young people tend to be focussed in suburban locations, such as outer Chester and the outskirts of Connah's Quay. The age profile of the study area includes higher levels of people of working age than the Welsh average, reflecting the important function of the area as an employment hub.
- The study area has a higher percentage of people reporting their religion as Christian, but fewer people of other minority religious beliefs than the UK average.
- Levels of Welsh knowledge within the study area are lower than the Welsh average.
- Lone parents tend to be located in the urban and suburban parts of the study area.
- The study area has lower than Welsh average levels of economic inactivity due to fewer people there having a disability or long term sickness.
- In terms of multiple deprivation locations in Wrexham, Connah's Quay and Flint experience the most problems. However, there are rural parts of the study area which experience significant potential deprivation due to a lack of access to services.

Because the 2001 census is now ten years old it is important to understand that the trends identified above may not accurately reflect current patterns.

Anticipated Impacts

3 Anticipated Impacts

3.1 Introduction

This section of the report considers the likely transport issues faced by the various equalities impact groups based upon a review of previous equalities impact research relating to transport, focusing on the work undertaken as part of the Welsh Assembly Government National Transport Plan; Equality Impact Assessment (2009). This review will help in setting a framework for discussions with organisations representing the various equalities impact groups and to allow the nature of the issues likely to be present in the North East Wales study area to be better understood. Each of the equalities impact groups will be discussed in turn.

3.2 Race, ethnicity, colour or nationality

- Language can be a barrier to knowledge of services. Choice of language used in signage and literature is important to ensure adequate understanding amongst non native English speakers.
- High levels of fear of crime, abuse or attack when travelling are found amongst minority groups.
- Car ownership in the UK is lowest amongst Black ethnic groups and highest amongst Asian households.

3.3 Sex or marital status

- There are higher levels of public transport use amongst women, partly due to lower levels of car availability and fewer drivers licences held by women.
- Women are more likely to make trips with complex itineraries (e.g. a trip to work via school and shops).
- Women are more likely to work part time – requiring sufficient public transport coverage at times other than the commuter peaks.
- Men tend to be less familiar with public transport use and some perceive a certain amount of stigma around using these modes.
- Men are more likely to cycle and women more likely to walk.
- Public transport vehicles may not be suitable to shopping trips or accompanying children.

3.4 Disability; physical, sensory or mental

- Higher level of reliance on public transport and taxi use amongst those with disabilities.
- Impacts of inaccessible transport on social inclusion and accessibility to key opportunities and services.
- The quality of pedestrian routes to public transport interchanges can affect the ability of people with disabilities to access public transport.
- Need for fully accessible public transport fleet (Disability Discrimination Act 2005).

- Timetables and other written material need to be in large clear fonts and not displayed too high.
- Current methods of presenting transport information can be difficult for some people with mental disabilities to understand.
- There is currently widespread abuse and a lack of enforcement of parking facilities provided for disabled drivers and passengers.
- Online transport information is not always provided in a format accessible to the blind and partially sighted.

3.5 Age

Elderly

- Impacts on mobility caused by the potential loss of drivers' license for those over 70.
- Free off-peak bus travel is currently available for the over 60s – there is a potential lack of awareness of this opportunity amongst some groups.
- Older people are less likely to be able to access internet resources – e.g. car sharing websites or online transport information.
- Timetables and other written material need to be written in large clear fonts.

Young

- Lack of car availability leads to higher levels of reliance upon lifts, public transport, walking and cycling.
- Availability of concessionary fares for young people (limited for those over 16).
- Public transport usage can broaden the horizons of young people.
- Lack of knowledge about transport availability amongst the young.
- Cost of travel is a significant barrier for young people.
- Lack of access to leisure activities can lead to anti-social behaviour.

3.6 Religion or belief

- Since religions are dominated by certain ethnic groups (90% of Pakistan/Bangladesh population are Muslim, and nearly 75 per cent of the Indian population are either Hindu or Sikh) racial impacts also apply here (National Transport Plan EIA pg 29).
- Fear of crime, abuse or attack when travelling could be a factor.
- Issues of identification when using a bus pass for Muslim women wearing veils.
- Difficulty in getting a driving licence – language barriers with driving test and also identification for Muslim women wearing veils.

3.7 Sexual orientation

- Lesbian, Gay and Bisexual (LGB) people fear abuse, attack and disorderly or threatening behaviour from other passengers and also from staff (TfL Sexual Orientation Equality Scheme pgs13-14).
- Lots of LGB people may alter their mode or time of travel to avoid large groups and overcrowding, particularly around school leaving time (TfL Sexual Orientation Equality Scheme pg 20).
- Cycling is often preferable to LGB people to avoid confrontation and harassment as well as preserve a sense of privacy and anonymity. (TfL Sexual Orientation Equality Scheme pg 26).
- Safety and security on the route to/from public transport stops as well as lighting etc. at the stops is also a concern.
- LGB people in rural districts may access social activities and support groups by public transport and as a result many of these services may be unavailable to them (National Transport Plan EIA pg 29).

3.8 Welsh Language

- Easy access to Welsh language translations is required for all signage and written material.
- The Traveline website is nearly entirely bilingual.
- Few officers and civilian staff in the British Transport Police are currently able to speak Welsh so in emergencies initial contact may be with a non-Welsh-speaking officer (British Transport Police THE WELSH LANGUAGE SCHEME ch.3.2).

3.9 Other: Lone parent, economic inactivity, social and multiple deprivation

- Cost of transport provision is a significant barrier for low income households.
- Deprived groups tend to have lower car ownership so are more reliant on public transport.
- Less likely to have access to internet resources.
- Lone parents may struggle to access public transport with a pram/buggy, shopping etc.
- Personal safety and security are a concern in deprived areas where crime levels tend to be higher than average.
- Deprived areas are at greater risk of social exclusion resulting from a lack of suitable transport provision to access opportunities.
- People suffering multiple deprivation issues may be more likely to have limited travel horizons.

3.10 Conclusions

This review of previous research has indicated a number of issues affecting the usage of various transport modes amongst the various equalities impact groups. Whilst many of the issues are specific to each group there are a number of issues which are experienced by many of the groups, such as the need for clear written information, the need for environments which reduce the fear of crime and intimidation and a greater level of reliance on public transport than the public at large. It is important that elements of the strategy which focus on improving these issues are done correctly as this can be particularly beneficial to all groups of society.

Consultation with Equalities Bodies

4 Consultation with Equalities Bodies

4.1 Introduction

Consultation has been attempted with a number of organisations considered appropriate to represent the needs, views and concerns of the differing equality impact groups. This has initially been undertaken through email correspondence followed by telephone interviews where possible. Topics discussed focused upon the general issues felt by the various groups and the issues identified in the previous section. Table 4.1 indicates the organisations that were approached, the equalities impact groups that these organisations represent and whether any feedback was received. The responses received from these organisations are discussed overleaf.

Table 4.1: Organisations approached for feedback and the equalities impact groups each organisation covers.

	Equalities Impact Groups								
Organisation	Race, ethnicity, colour or nationality	Sex or marital status	Disability; physical, sensory or mental	Age	Religion or belief	Sexual orientation	Welsh Language	Other: Lone parent, economic inactivity, social and multiple deprivation	Response Received
North Wales Race Equality Network	✓								
Disability Wales			✓						✓
RNIB			✓						✓
RNID			✓						✓
Age Cymru				✓					
National Youth Agency				✓					✓
Interfaith Council for Wales					✓				
Stonewall Cymru						✓			
Welsh Language Board							✓		✓
Equality and Human Rights Commission (EHRC)								✓	✓
Awema (All Wales Ethic Minority Association)	✓								
Chwarae Teg (women's economic development)		✓						✓	

4.2 Individual Feedback

4.2.1 Disability Wales

Disability Wales is an independent, not for profit organisation made up of disability groups and allies from across Wales. It is involved with championing the rights, equality and independence of all disabled people regardless of physical or sensory impairment, learning difficulty or mental health condition, recognising that many disabled people have many identities and can face multiple-discrimination issues.

The Policy Officer (Access and Transport) from Disability Wales provided some feedback relating to the transport issues likely to be experienced in the study area. Two previous inquiry reports produced by the National Assembly for Wales Equalities of Opportunity Committee were recommended to provide some background of the issues experienced by disabled people in Wales.

The *Inquiry into the impact of Welsh Government policy on the accessibility of transport services for disabled people in Wales* (February, 2011) had the following points of interest to this study;

- Transport related dialogue between local authorities, transport providers and disability groups should be enhanced and mainstreamed.
- There is the potential to make better use of existing community transport resources.
- Need to work with disability groups to better understand their needs in relation to the provision of transport information.
- Need to engage with disabled people when developing shared spaces and schemes involving dropped kerbs.
- Disabled people rely on public transport to enable them to live independently in the community. This is particularly true of people with learning disabilities, who are far more likely to be dependent on public transport or taxis.
- Poor public transport can have the affect of compounding existing disadvantages.
- Need to advertise public consultation events through day centres, local disability groups and other third sector channels to better engage disabled people.
- Need to more clearly outline what the outcomes of any proposals will be for disabled people.
- There are examples of how disability groups have been actively and effectively involved in the design of transport projects, such as Swansea High Street Station.
- Important to protect existing public transport concessions that exist for the disabled and elderly.
- Public transport staff need to be better aware of the needs of people with differing disabilities.
- Low floor vehicles tend to be less common in rural areas.
- The majority of buses only have space for one wheelchair, preventing two people in wheelchairs from travelling together.
- Many disabled people are heavily reliant on taxis. These can be very costly and the quality of vehicles is varied.
- Information on the accessibility of bus and taxi services would be valuable, particularly when travelling to unfamiliar destinations.
- Timetabling information for both trains and bus services is often in a format that is not accessible for people with learning disabilities or visual impairments.
- Online timetabling information is often published on websites without adequate accessibility features.
- Information in bus stops needs to be at a height where it can easily be read by someone in a wheelchair.
- There are non-physical issues relating to public transport use, including difficulty using money, fear of bullying and a lack of life experience.
- Shared spaces are difficult for people with sensory disabilities to navigate. The lack of separating kerbs means that the visually impaired are unable to distinguish areas for pedestrians from areas for cyclists, leading to potential accidents.

Deaf people are unable to hear approaching cyclists. Differing textures could be applied to cycle and walking areas to try to better distinguish these areas.

- Current use of drop kerbs is inconsistent. There may be a drop kerb on one side of the street, but not one directly opposite, requiring people to travel along the road itself to access the adjacent pavement.

The *Inquiry into the Accessibility of Railway Stations in Wales* (October, 2010) contains the following information relevant to the proposed station improvements contained within the NEWABTS Strategy;

- Better integration is needed between the rail network and other modes of transport. This would potentially assist disabled people to transfer from one type of transport to another.
- There is a perceived lack of information, such as posters and leaflets in stations relating to accessibility issues.
- Some stations only have footbridge access to the platform. Staff are not always available to help overcome this barrier. Hawarden and Wrexham stations were mentioned in relation to this issue.
- Disabled parking at some stations is limited or lacking.
- Accessibility improvements can benefit other passengers as well as those with disabilities. For example improved lighting can help with safety issues and improved platform and train accessibility can also benefit people with prams or pushchairs.

The following additional comments were made relating to the proposed NEWABTS Strategy:

- Accessibility between bus and rail is of paramount importance. Consideration should be given to where bus stops are situated in relation to train stations. Interchange between modes can be a particular problem in rural areas.
- It is difficult to see how integrated ticketing would benefit disabled people, who can currently receive either a concessionary bus pass entitling them to free bus travel or 1/3 off their rail tickets. It is not obvious how these existing discounts/concessions could be applied to an integrated ticket.
- Disability Wales welcomes the implementation of real time information displays because inaccessibility to travel information can be a barrier for many disabled people. These displays need to be accessible to both the visually and hearing impaired, utilising large clear fonts, audio readouts and be at a height accessible to wheelchair users.

4.2.2 Equality and Human Rights Commission (EHRC)

The Equality and Human Rights Commission has a statutory remit to promote and monitor human rights; and to protect, enforce and promote equality across the nine "protected" grounds - age, disability, gender, race, religion and belief, pregnancy and maternity, marriage and civil partnership, sexual orientation and gender reassignment.

The organisations representatives highlighted the available online resources of interest to this study and the completion of an EqIA;

Equality impact assessment guidance A step-by-step guide to integrating equality impact assessment into policymaking and review. This document recommends that an EqIA should focus on policies that are most likely to have an equalities impact, with the amount of attention given to each policy proportionate to the level of impact.

4.2.3 RNID

The Royal National Institute for Deaf People (RNID) is a charitable organisation which works on behalf of deaf people and the hard of hearing. The organisation offers a range of services for deaf people as well as providing information on all aspects of hearing loss, campaigning, undertaking technical research and providing training.

The RNID highlighted the following issues relating to public transport provision;

- Need for audiovisual equipment on trains, buses and stations to visually support any information provided through spoken announcements.

- Need for driver training on the specific needs of people with disabilities.
- RTI signs are particularly beneficial to deaf people in giving an indication of when a bus will arrive, preventing the need to constantly look out for an approaching bus.

4.2.4 RNIB

The Royal National Institute of Blind People (RNIB) is a UK charity providing information, support and advice to those with sight loss. In terms of transport the organisation provides disability awareness training for transport staff which can help them in ensuring the needs of blind people when travelling are met. The organisation also provides access consultancy services providing access audits, design appraisals and signage assessments to help ensure that transport infrastructure is accessible to blind and partially sighted people. The organisation has developed a system called 'RNIB react'. This is a talking sign system that can link in with real-time information signs to help people decide which bus or train to catch. The user carries a fob which triggers audible messages as the user approaches these signs.

RNIB, alongside the University of Birmingham produced a report entitled '*Travel, Transport , and Mobility of people who are blind and partially sighted in the UK*' (2009). Issues identified included:

- Difficulty navigating obstacles on pavements and issues relating to poorly maintained pathways.
- Lack of confidence travelling to unfamiliar places and a fear of crime.
- Lack of awareness amongst the general public.
- Loss of opportunity due to inability to drive.
- Lack of audible announcements about bus services.
- Mixed experiences relating to the helpfulness of transport staff.
- Lack of awareness about the availability of free/reduced cost travel passes and inconsistent application across the country.
- Quality of public transport is varied (particularly poor in rural areas).

4.2.5 The National Youth Agency

The National Youth Agency (NYA) is an independent charity which works alongside the government, local authorities and the third sector providing advice and support in the development of programmes and policies for young people.

Feedback received from the agency indicates that problems with transport in the Northeast Wales region were not an issue regularly brought up by the young people that the agency is in contact with in the area. They indicated that young people in the area regularly travel between the main towns in the area, such as Flint, Wrexham and Chester using the bus and find these services to be adequate. Young people in and around Wrexham also use the bus to get to school. They indicated that train travel amongst young people is less common, which may be a result of the longer distance nature of most train journeys, but could also be due to unfamiliarity with train travel. Where public transport is not available or suitable the young people that the agency works with would be provided with a taxi or given lifts to their required destination.

The agency also recommended a number of reports:

Transport Guidance: Supporting Access to Positive Activities (2009)

This report discusses how to plan transport provision so that young people are able to access positive activities. It identified the following key barriers to the use of public transport amongst young people:

- Prohibitive cost of public transport.
- Lack of availability of public transport, particularly at evenings and weekends.
- Accessibility, in terms of disabled access.

- Perceived lack of safety and security at stops and on services including fear of intimidation and bullying.
- Rurality, reducing the availability of public transport and increasing costs.
- Lack of travel information targeted towards young people.
- Attitudes of public transport staff and other users.

It identifies the following good practice in response to these barriers:

- Involvement of young people in the planning and delivery of services.
- Collaborative working across disciplines.
- Provision of concessions and fair subsidies for young people.
- Provision of scooter and moped loan schemes.
- Taxi schemes.
- Demand-responsive transport.
- Minibus provision.
- Targeted signposting.
- Youth services.
- Community transport initiatives.
- Travel training and buddy schemes.
- Training to improve attitudes and behaviour between young people and transport staff/public.

Accessing Positive Activities: Innovative solutions for young people's bus travel (2007)

This report covered similar issues to the above report, highlighting research into the nature of the barriers to public transport use for young people, but also making the following points in relation to overcoming these issues based upon a review of case study evidence:

- Marketing through schools, websites and local media can be effective and relatively low cost way of publicising transport improvements to young people. Word of mouth is also important.
- Schemes need to be simple for young people to understand and use.
- Young people have a role to play in identifying particular problems, raising awareness and participating in the planning and design of specific initiatives.
- Young people have pre-conceived negative views about public transport and an aspiration to drive when old enough. This leads to a reliance on being escorted to and from places by car in the short term. Overcoming this negative image at a young age can lead to more sustainable travel behaviour in both the short and long term.

4.2.6 Welsh Language Board

The Welsh Language Board highlighted the need to consider the language used particularly when contacting local groups as part of any future consultation exercises undertaken during the delivery of the NEWABTS Strategy measures. Any contact should be undertaken in accordance with the Welsh Assembly Governments Welsh language policy and be available in both English and Welsh.

Assessment of the NEWABTS Strategy

5 Assessment of the NEWABTS Strategy

5.1 Introduction

The previous sections of this report have outlined the ways in which different groups within society use transport and the issues they face. This section will discuss how successful the identified NEWABTS Strategy measures are at meeting the needs of these groups. Please see the main NEWABTS report for a list and description of the package elements and how these have been applied across the different study corridors.

Good practice on the completion of EqIA's (provided by the Equalities and Human Rights Commission) indicates that an EqIA should focus on the policies considered to have the greatest impact upon equalities impact groups, with the level of consideration given comparable to the scale of anticipated impacts. It has been identified that the proposed freight and highway elements of the strategy are unlikely to have an identifiable impact upon any equality impact groups. This assessment will therefore focus on the walking, cycling and public transport elements of the strategy, which are more likely to have a bearing on the lives of these groups as identified in the previous research. Assessment of the existing strategy elements is shown in black, with any recommendations relating to specific measures or modes shown in blue.

5.1.1 Demand Management

A local authority demand management strategy is proposed which will seek to identify ways of reducing car use and encouraging use of sustainable travel modes. It will include elements promoting existing public transport, walking and cycle resources as well as working with employers to seek to overcome barriers preventing greater use of sustainable travel measures. These improvements can help to overcome barriers preventing people from deprived backgrounds who do not have access to a car from being able to take up work opportunities. Publicity material, if well designed can also increase awareness amongst people with disabilities as well as other equality impact groups of the availability of suitable pedestrian and public transport routes which are accessible to their needs. It is important that publicity material uses simple English, is available in alternative languages/braille and uses suitably large fonts and simple design to ensure it is accessible to as wide an audience as possible.

A Park and Ride/Park and Car Share Study is proposed to identify suitable locations for and the potential benefits of these facilities in improving connections between the key centres in the study area. Park and Ride typically requires the availability of a car to access the park and ride facility. Many of the equality impact groups discussed do not have access to a car, so are unlikely to be able to benefit from this opportunity. Disabled people who have access to a car are likely to qualify for disabled parking at their destination, so would be unlikely to benefit from park and ride. Park and car share does however offer the potential for cost savings for people with low incomes but who do have access to a car.

5.1.2 Walking and cycling

Improved walking and cycling links to public transport interchanges are proposed as well as new leisure routes. These (if sufficiently well designed) offer the potential for disabled people to safely access public transport services and provide a valued leisure resource. It is important that the design of these routes considers the needs of people with mobility issues and blind, partially sights and deaf people. Additionally the research undertaken has indicated that many of the equalities impact groups are likely to perceive the use of walking and cycling routes as a risk of crime or persecution. The development of a walking and cycling strategy therefore needs to address these fears through completion of a walking and cycling audit to address and overcome safety and security concerns on the existing network and on new proposed routes.

5.1.3 Bus

Bus priority improvements are proposed to help improve journey time reliability. This will benefit all bus users, with many of the equality impact groups identified as particularly reliant on bus travel and particularly concerned about bus punctuality and reliability. It is important that these improvements are beneficial to all bus users, including those using community transport services; used heavily by older people and those with disabilities. It is recommended that consideration is given to opening up any bus priority improvements and other bus infrastructure to community transport operators where there is a potential demand.

It is recognised that a number of the identified equalities impact groups are particularly reliant on public transport due to an inability to drive or the prohibitive cost of car ownership. The proposals for new and improved Cross Dee and rail link bus routes offer the potential to improve accessibility to work and other opportunities for these groups; especially beneficial to those currently economically inactive through opening up access to work. It is important that careful thought is given to the precise routes and stops of these services to make sure that they are useful to groups reliant on public transport. Additionally it is important that suitable accessible vehicles are used on these routes, with accessibility upgrades to stops as required.

Real-time passenger information is proposed along the key bus corridors in the study area. Feedback from consultees has indicated that this would be particularly beneficial for deaf people. This technology also offers the potential to include audible updates which (if included) would be highly beneficial to blind passengers. Real-time information can also reduce anxieties amongst all passengers in relation to likely wait times, which will particularly benefit vulnerable groups concerned about their security whilst waiting. It is proposed that real-time information displays which offer the ability to provide audible updates are utilised where viable.

People with mobility issues as well as those with sensory disabilities are particularly reliant on the ability to interchange conveniently between public transport modes. They require as short an interchange distance as possible with few obstacles and clear signage / routing. Improvements to interchange arrangements between bus and rail are also proposed as part of the strategy. It is important that the design of these improvements incorporates the specific needs of these users. Additionally the creation of a multi-modal hub at Wrexham General Station will seek to improve interchange facilities. The improvements also need to consider taxi provision, as many disabled people are highly reliant on taxi use.

Integrated area ticketing if proposed to improve the ease of travel within the study area by bus and rail. This will benefit equality groups who are more reliant on public transport and may also make it easier for the young, those with limited knowledge of English or mental disabilities to travel via public transport unsupervised.

The Taith Express coach service (if taken forward subsequent to the identified study) has the potential to improve public transport provision to destinations in North West Wales and England. However, it is important that suitable local feeder services are also identified and are of suitable accessibility standards to ensure that people living in the study area with disabilities or without access to a car can also make use of the Taith express services and the opportunities this presents.

5.1.4 Rail

Improved non-car accessibility is proposed at key stations in the study area. Current accessibility arrangements can be difficult for people with disabilities due to the distances between drop off points and the platform. Additionally many stations lack suitable ramps, with obstructions making it particularly difficult for blind and partially sighted people and those with mobility problems. It is important that the proposed non-car accessibility improvements seek to overcome these issues and do so in consultation with disability groups to ensure the improvements address their needs. Additionally, new rail stations are proposed at Deeside and Rossett. These stations offer the potential to improve the applicability of rail services to new trip patterns; particularly benefiting people working or looking for work opportunities at Deeside or wanting to travel to Chester from the areas surrounding Rossett. It is important that these stations are fully accessible to all types of user, so that everyone can benefit from these new opportunities. It is important that people with different needs and disabilities are consulted at the early stages of the design process for these stations to ensure that the station designs meet their needs and requirements.

A number of rail service improvements are proposed to enhance and extend services along the Wrexham- Bidston, Chester to Wrexham and North Wales coastal lines. These service improvements will particularly benefit equality impact groups, who

typically are heavily reliant on public transport, as well as benefiting the general public. It is important that suitably accessible rolling stock are used on these services, as well as ensuring that train staff are well educated as to the needs of people with disabilities.

5.2 Conclusions of Assessment

It has been identified that the NEWABTS Strategy contains no elements which are considered to be fundamentally inequitable to any of the equality impact groups under considerations. The strategy also contains a number of measures, such as walking and cycling and public transport improvements which, if well designed and implemented will be particularly beneficial to the various equalities impact groups, due to the identified higher levels of reliance on these modes of transport amongst equalities impact groups who are less likely to be able to or afford to drive a car. There are however, a number of ways in which the identified policies and measures can be modified or additional clarification provided to help ensure the benefits to equalities impact groups are maximised. These have been outlined in this section, but the next section will summarise the general principals which can be applied across the strategy to maximise the benefits of the strategy to all users.

Recommendations

6 Recommendations

6.1 Introduction

Following on from the previous sections which have discussed the issues faced by equalities impact groups in relation to transport and the assessment of the identified NEWABTS Strategy in relation to the needs of these groups this section outlines the proposed recommendations to be included in the delivery of the NEWABTS Strategy. These recommendations seek to achieve the requirements of the various equalities impact groups and in doing so ensure that the identified policies and measures meet the needs of all element of society.

6.2 Elements to consider in the delivery of the NEWABTS strategy

The following recommendations are made for the delivery of the NEWABTS strategy:

- The development of a walking and cycling strategy and new leisure routes should address the safety and security concerns of different groups within the community through completion of a walking and cycling audit and incorporating the findings into future improvements.
- Give consideration to the needs of community transport and taxi operators in the design of any proposed public transport infrastructure improvements or interchange facilities.
- Involve potential users with a range of disabilities and requirements in the detailed design of public transport and pedestrian schemes from the outset to ensure designs meet their needs.
- Ensure that all transport infrastructure is of good design to promote perceived safety and security amongst all users, incorporating security measures, such as CCTV where necessary.
- Any real-time information boards should be able to provide audible updates and be displayed at a height viewable by those in a wheelchair.
- Interchange between transport modes was highlighted as being of particular importance to people with disabilities. It is recommended that the needs of disabled people are given particular attention in the design of such improvements. Taxi facilities located close to interchange facilities will also be particularly beneficial to people with disabilities.
- It is recommended that careful thought is given to the precise routes and stop locations/designs of the proposed bus service improvements to make sure that they are useful to groups reliant on public transport.
- It is important that high quality accessible public transport vehicles are used as part of any new or improved services.
- It is recommended that suitable local feeder services are identified to allow local access to the Taith express service so that local people with disabilities or without access to a car can also make use of the Taith express services and the opportunities this presents.
- It is recommended that staff associated with any of the proposed public transport improvements are given suitable training in the needs of different groups within society, particularly those with disabilities.
- Publicise any implemented public transport, walking and cycling improvements to a wide range of potential users; highlighting the specific benefits they will provide to different types of user. Make sure that any publicity material produced uses simple English and is available in alternative languages/Braille, using suitably large fonts and simple designs to ensure it is understandable by as wide an audience as possible. Make use of pre-existing groups and forums to distribute this material.

- Include sufficient disabled parking at new stations and as part of Park and Ride developments. Provide parking that can be converted to disabled parking if demand increases and undertake regular surveys of disabled parking demand.
- Further investigation into integrated area ticketing technology should consider how existing or potential concessions for the young, elderly and disabled might be included.
- It is proposed that further EqIA's are undertaken at the stage of WelTAG scheme development for the interventions identified within this strategy which are anticipated to have equalities impacts. These assessments can make use of the baseline information contained within this report where applicable, but should focus on engaging with local equality impact groups.

Conclusions

7 Conclusions

This report has outlined the Equalities Impact Assessment process that has been undertaken as part of the development of the North East Wales Area Based Transport Study (NEWABTS). This EqIA report is an important part of the wider study as it has highlighted the ways in which the identified strategy can seek to meet the needs of the groups within society who may have specific requirements or be at risk of unequal treatment. Through ensuring the needs of these groups are met it is anticipated that the identified strategy should meet the needs of all elements of society.

This report has included analysis of existing demographic data sources. This has highlighted the scale and distribution of the different equality impact groups within the study area. A review of previous research into the issues faced by the various equality impact groups was also included. This highlighted the differing needs of the different equality impact groups, but also that a number of common issues were faced by all or many of these groups. Making use of this information to help inform discussions a number of stakeholder organisations representing the various equality impact groups were approached for their views on the transport issues of concern to the groups they represent. This exercise, although leading to a limited response rate, did help identify a number of additional areas for consideration within the strategy. The next section of the report included the assessment of the individual elements contained within the NEWABTS strategy, making use of the information obtained in the previous sections to inform the assessment. This process identified that the NEWABTS strategy broadly meets the requirements of the various equalities impact groups, but a number of improvements could be made to increase the benefits for the various equality impact groups. Stemming from this assessment the next section of the report outlined a series of recommendations to be considered in the delivery of the NEWABTS strategy as this is taken forward.

It is hoped that through this EqIA process the identified NEWABTS strategy has been refined and improved to make it more effective at meeting the differing needs of those who may have specific requirements or be at risk of unequal treatment. However, further work is required at the stage of delivering the individual strategy elements, through close consultation with local individuals and organisations representing the needs of equality impact groups to ensure that the needs of all groups within society are met.