Llywodraeth Cymru
Welsh Government

A55 A494 WelTAG Study – Stage 1 Appraisal

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A55 A494 WelTAG Study

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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.

To deliver the NTP commitment two WelTAG transport studies have been undertaken in parallel in North East Wales – the North East Wales Area Based Transport Study (NEWABTS) and the A55/A494 WelTAG Stage 1 Study. The A55/A494 study focuses on the trunk road and identifies preliminary options for addressing the transport issues, considering all modes, and consistent with the wider NEWABTS study.

A WelTAG Stage 1 study does not include detailed consideration of designs and design standards. Some comparison between potential options has been carried out as part of the study and to enable this, it has been necessary to make some assumptions about possible design standards and costs. These assumptions should not be interpreted as a determination of the final design. The next WelTAG stage will develop options in more detail and replace the assumptions with fully scoped proposals suitable to the location and traffic volume. It will also assess the options to be taken forward through a more quantitative evidence based appraisal of the packages of options selected for further development. The process will include engaging with stakeholders and the general public to seek their views on the options under consideration.

Introduction

1 Introduction

1.1 Study Overview

The Welsh Government (WG) have commissioned AECOM to undertake a transport study on the A55 / A494 Corridor in North East Wales. The study will focus on the A55 / A494 trunk road and will follow the Welsh Transport Planning and Appraisal Guidance (WelTAG) to identify a strategy for improving transport provision in the area considering all modes of transport.

Alongside this study WG and the regional transport consortium for North Wales, TAITH, have commissioned AECOM to undertake a wider transport study in the North East Wales area (the North East Wales Area Based Transport Study, NEWABTS), focusing on the connectivity between the key settlements of Wrexham, Chester and Deeside and considering all viable modes of transport. This study follows on from the commitment made in the National Transport Plan (NTP) published in March 2010 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"

This study on the A55/A494 can therefore be considered as a sub set of the wider NEWABTS study; the problems on the A55/A494 having already been recognised as a significant issue in the north east Wales area. This study will therefore seek to maintain consistency with the aims and objectives of the wider NEWABTS study.

The location of the A55/A494 study corridor in relation to the wider road and rail network is shown on Figure 1.1, whilst the focus of the study is shown on Figure 1.2. 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 corridor.

Figure 1.1: Location of the A55 A494 Study Area

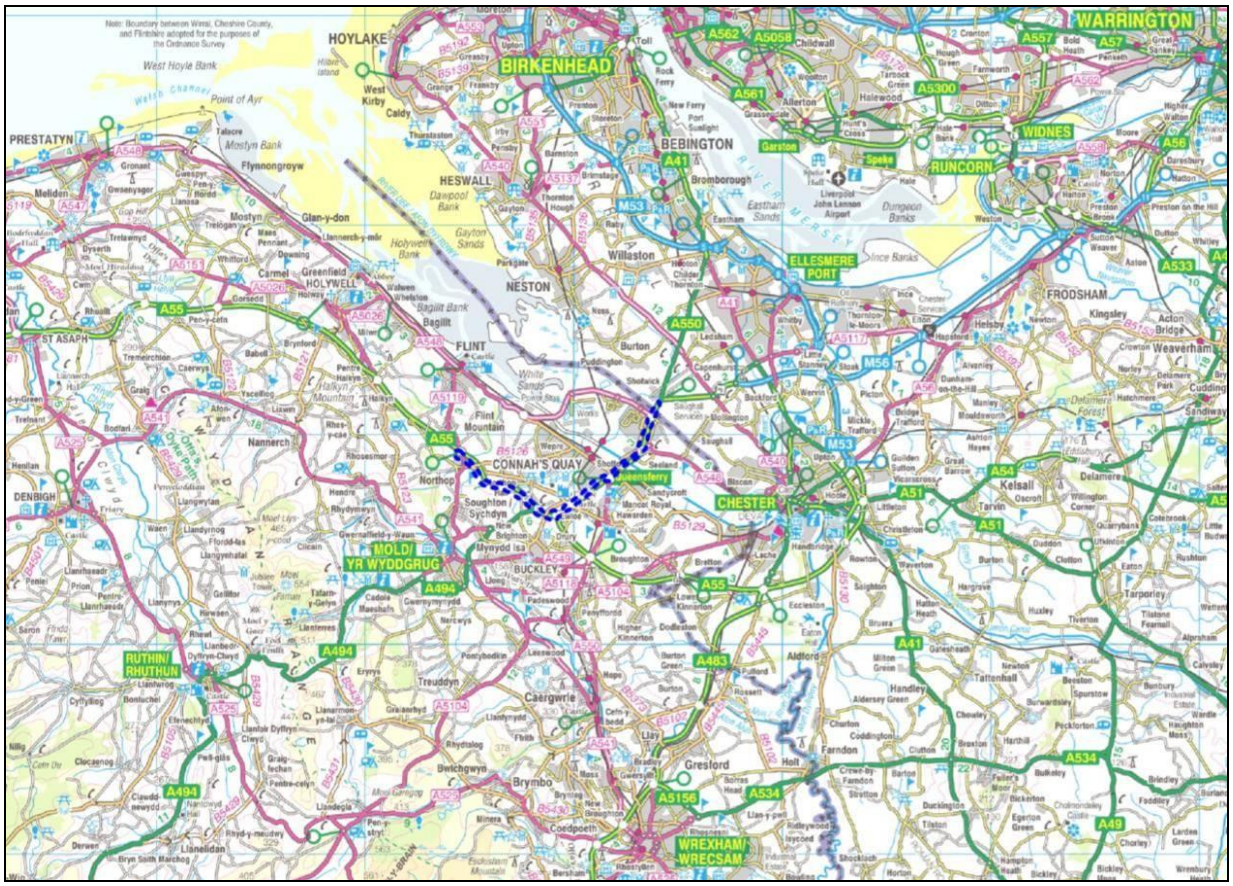
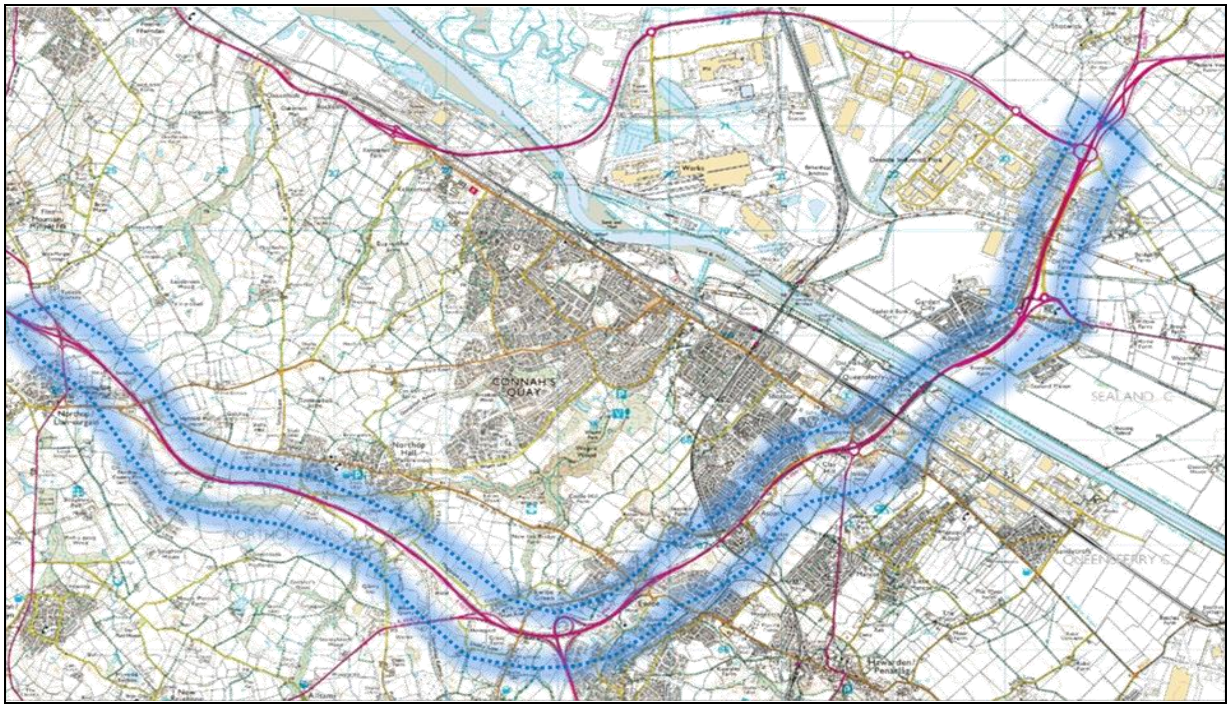


Figure 1.2: Focus of the A55 A494 Study



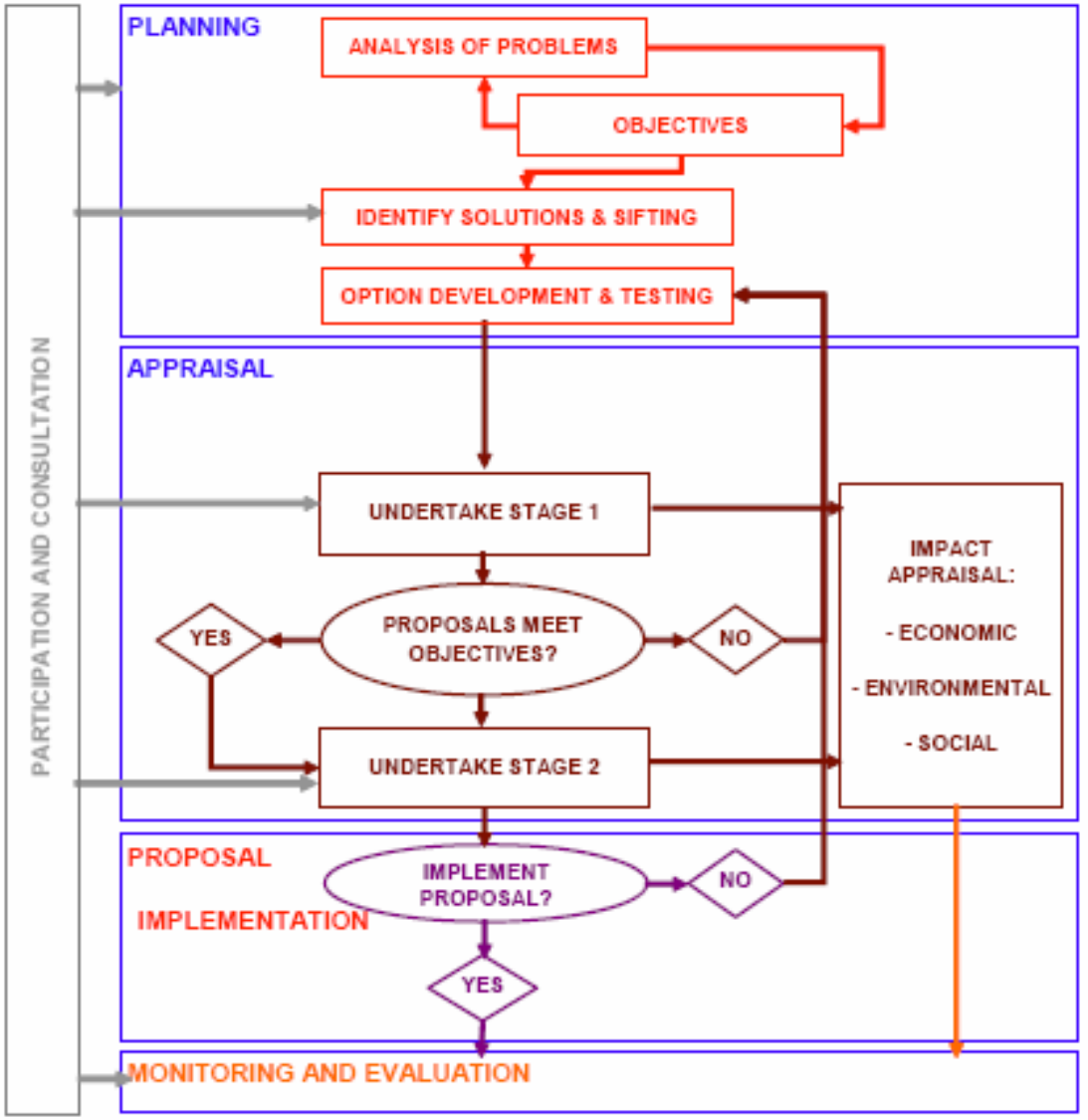
1.2 Objective of this report

"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 1.3 below outlines the WelTAG process at the scheme level. This report contains the secondary element of the WelTAG assessment process for the A554-A494 Study; the Stage 1 Appraisal report. This takes the options identified by the Planning Stage as meriting further investigation and appraises 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 aim of this report is to establish a small number of preferred packages for further assessment as part of the next stage of appraisal; WelTAG Stage 2

Figure 1.3: The Structure of WelTAG at the Scheme 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 these packages.
- Section 5 discusses the stakeholder consultation exercise that forms an integral part of this stage of work.
- Section 6 then provides the appraisal of each individual package of options.
- Section 7 establishes a set of preferred packages to take forward as part of the next stage of the study.
- Section 8 provides concluding remarks on the findings of this stage of 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: Model Development Report
- Appendix C: Economic Assessment Report
- Appendix D: Economic Activity and Location Impacts (EALI) Report
- Appendix E: Environment Report
- Appendix F: Health Impact Assessment (HIA)

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 packages meets the needs of Wales and the local area.

Table 2.1: Proposed Transport Planning Objectives

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 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 • Select link analysis indicates the strategic nature of many of the trips using the study corridor. • The corridor exhibits high levels of seasonal congestion due to tourist trips to/from North Wales. • Congestion is affecting strategic function of the trunk road • Key objectives in the Wales Transport Strategy and North Wales Regional Transport Plan.
Journey Times & Network Resilience	***TPO***	***To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.***
	Justification	• This was raised a key issue during the officer and stakeholder consultation events. • The existing corridor suffers from congestion during periods of high demand. • The existing corridor has very poor levels of network resilience. There are no suitable route alternatives to the current corridor. Additionally maintenance can only be undertaken within a short time period in the evening. Any planned lane closures require the re-routing of HGVs. These factors and the width of the road mean that incidents, periods of high demand and maintenance cause significant delays. • The existing A494 River Dee Crossing is in urgent need of repair, with significant consequences for the future resilience of the transport network.
Carbon Emissions	***TPO***	***To reduce carbon emissions from transport along the A55 A494 study corridor.***
	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.
Business Transport	***TPO***	***To improve transport connections for businesses within the study area to key economic centres and employment sites.***

Connections	Justification	• Significant number of employment sites and freight generators within the study area who need to utilise the transport network to access 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. The economic loss experience by HGVs being at a standstill in congested traffic is often £30/hour.
Travel to Work	***TPO***	***To improve access between employment sites and workforce catchment areas.***
	Justification	• Significant volume of employment opportunities within the study area but often located outside of densely populated areas. • Large amounts of traffic are using the A494 to access Deeside Industrial Park at peak periods. • The A55/A494 corridor currently functions as a connection for local traffic during the commuter peak, with 50% of the traffic joining or leaving the route between Ewloe Interchange and Sealand Rd. • 21% of households do not have access to a car.
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. • There are a number of receptors within the study corridor where noise levels are high.
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.
Safety and Security	***TPO***	***To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.***
	Justification	• Safety of road users 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.
Efficient Use	***TPO***	***To maintain and make more efficient use of the existing transport infrastructure along the A55 A494 study corridor.***
	Justification	• This was raised as a key issue during the stakeholder consultation event. • The study area has two existing rail corridors, which could be used more efficiently. • Making best use of existing infrastructure may provide lower cost alternatives, providing value for money, with lower environmental

		impact. • The existing A494 River Dee Crossing is in urgent need of repair.
Severance	***TPO***	**To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.**
	Justification	• This was raised a key issue during the stakeholder and officer consultation events. • Analysis of current crossing points has identified locations where permeability is poor.

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. Around 80 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 schemes 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 WelTAG Stage 1 Assessment Process

3.1 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) to produce a set of preferred packages which will then undergo a more rigorous assessment process as part of the next stage of work (WelTAG Stage 2).

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

3.2 Packaging methodology

Rather than assessing each of the individual options, of which there are over 80, 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 and significant service enhancements

Additionally these packages have then been divided into highway and non-highway packages to allow an assessment of what can be achieved with and without improvements to the highway.

Some of the highway options identified at the Planning Stage involved improvements to the A548 corridor rather than the A55/A494 corridor, with a view to the A548 corridor becoming the strategic route through the Deeside area. The highway capacity improvements identified have therefore been split into those relating to the existing A55/A494 corridor and those relating to the alternative A548 corridor to allow the benefits of improvements to each corridor to be assessed independently.

An additional conflict was identified between improving the existing corridor along its existing alignment and choosing an alternative alignment through the Queensferry area (the orange route). For this reason the highway capacity improvements package identified for the A55/A494 corridor has been split into a package using the existing corridor alignment and a package utilising an alternative alignment.

In summary, Figure 3.1 shows the eight packages have therefore been identified for assessment at WelTAG Stage 1:

Figure 3.1: A55/A494 Option Packages

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

This 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.

The elements of this package are outlined in Table 4.1

Table 4.1: Package 1 (Managing Demand)

Theme	Name	Description	Reference
Walking and Cycling	Encourage employers to increase cycling within its work force	Provide support to employers to help encourage walking and cycling to work.	25
	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.	26
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.	62
	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.	66
Demand Management	Workplace travel planning at employers Deeside Industrial Park	Work with employers on the Deeside Industrial Park to reduce car travel to work and promote alternative modes.	77
	Shotton/Connah's Quay 'Sustainable Travel Community'	A package of options including smarter choices options to encourage sustainable travel choices within the Shotton/Connah's Quay area.	78
	Parking management strategy	Devise a parking management strategy to reduce demand for car travel during peak periods and incentivise travel by alternative means.	79
	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.	80

4.2 Package 2A: Making Best Use – Non-Highway Options

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 non-highway services, facilities and infrastructure.

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 priority is proposed on the B5129 through Connah's Quay (Ref.36) as well as integrated area ticketing.

The rail elements of the package include extending Llandudno to Manchester services as far as Manchester Airport, as well as improved station accessibility for buses, walkers and cyclists.

The package also includes additional publicity of existing rail freight opportunities.

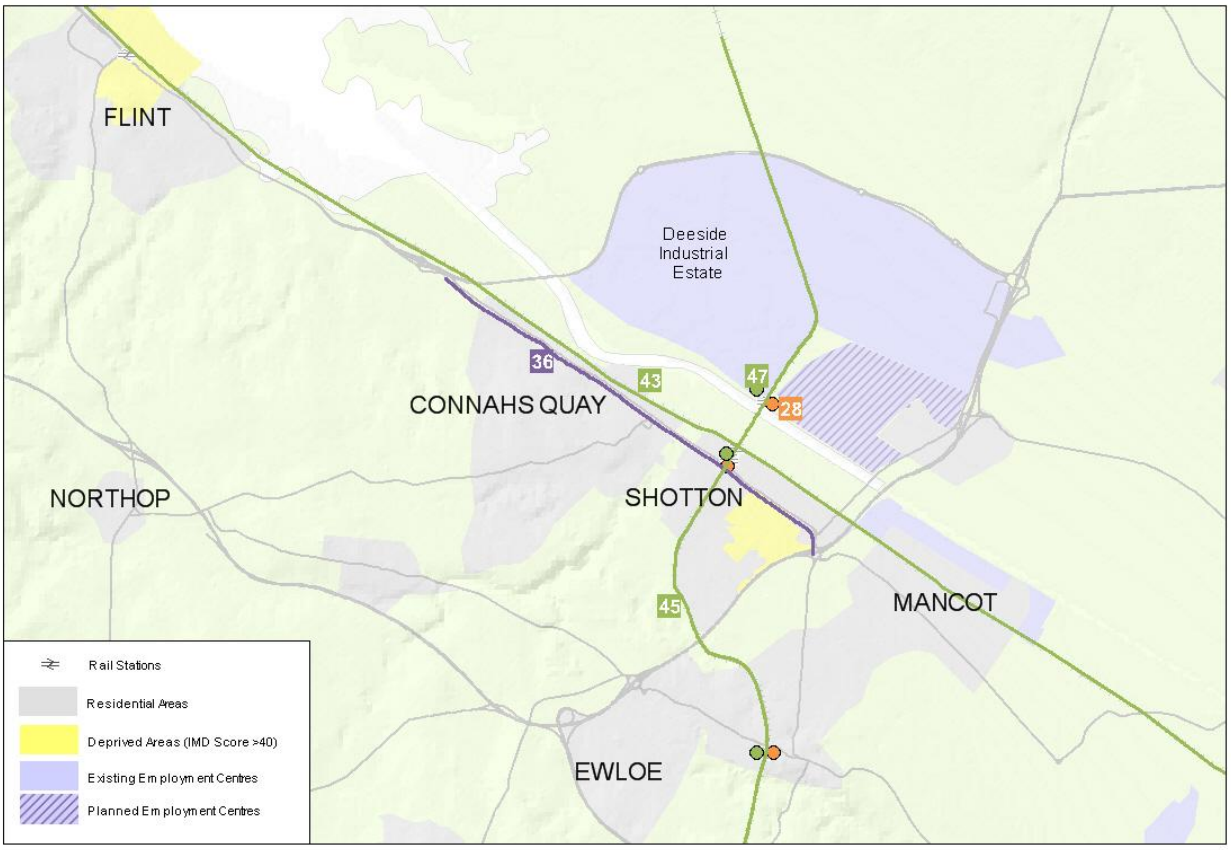
The options contained within this package are summarised in Table 4.2, whilst the elements which can be mapped are shown on Figure 4.1.

Table 4.2: Package 2A - Making Best Use – Non-Highway Options

Theme	Name	Description	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	Improve the security of cycle parking arrangements at public transport interchanges.	28
	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.	29
	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.	30
	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.	31
Bus	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.	36
	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.	37
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.	43
	Improved station accessibility (non-car station access)	NWRS study highlighted a number of stations in the study area where improvements can be made.	47
	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.	83
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.	64

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 2A - Making Best Use – Non-Highway Options



4.3 Package 2B: Making Best Use – Highway Options

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

Overview

Package 2B contains a set of options which seek to make more efficient use of existing highway infrastructure.

This package seeks to establish how far innovative options, such as variable messaging signs, ramp metering and reduced local access onto the A494, alongside maintenance and safety improvements made where feasible within the existing highway boundary can resolve the issues identified on the A55/A494.

These options are considered alongside revised signage for traffic travelling to and from the North of England and improvements made to the B5129 through Connah's Quay (Ref.10).

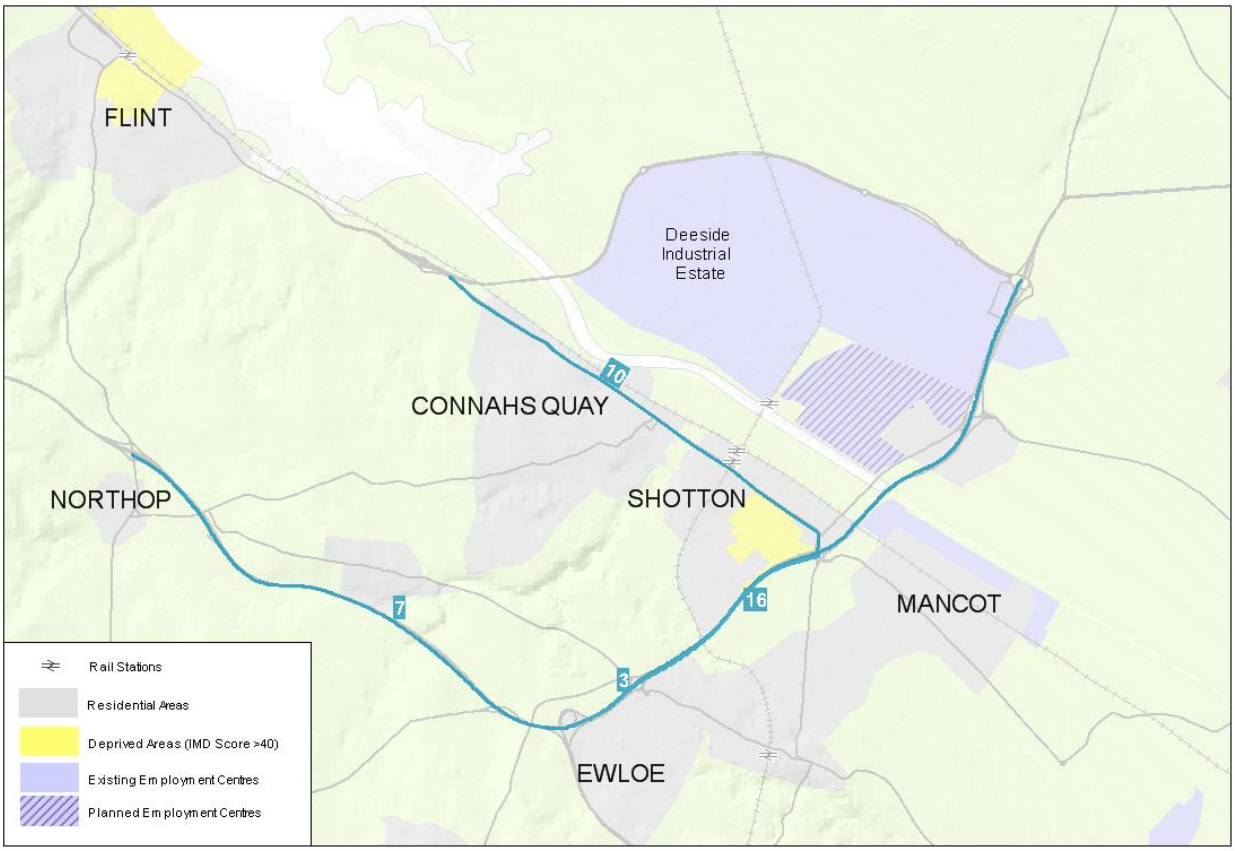
The elements included in the package are summarised in Table 4.3, whilst the elements which can be mapped are shown on Figure 4.2.

Table 4.3: Package 2B - Making Best Use – Highway Options

Theme	Name	Description	Reference
Highway	Variable Messaging Signs	Variable messaging signs on the A55/A494 corridor to allow reduced speed limits and re-routing of traffic onto the A55 when there are problems on the A494.	2
	Undertake necessary maintenance on the existing A55/A494 route	Undertake road maintenance work in-line with 'Making Best Use' along the existing A55/A494 corridor.	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.	4
	Ramp metering on some junctions	Use on-slip traffic signals to limit access onto the A55/A494 corridor at peak periods to reduce congestion on this route.	6
	Improve the resilience and safety of the corridor	Improve the resilience and safety of the corridor through for example widening narrow lanes and providing concrete safety barriers.	7
	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.	10
	Reduce the number of slip roads on the A494 – strategic junctions. Reduce local distributer road access.	Reduce local access roads onto the A494 (e.g. Clay Hill) to improve the safety of this road and reduce its use by local traffic.	16
Freight	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.	70

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 2B - Making Best Use –Highway Options



4.4 Package 3A: Capacity Enhancements - Non-Highway Options

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

Overview

This package includes a number of major non-highway capacity enhancements which seek to improve connections through the study corridor.

The walking and cycling elements of the package include new walking and cycling routes parallel to the highway, new crossing points of the A55/A494 corridor and River Dee as well as new links to transport interchanges, and from Deeside to Neston (Ref.84).

From a bus perspective the package includes two new or improved cross Dee routes going from Holywell to Chester and Mold to Ellesmere Port as well as links to rail stations and new express coach services, facilitated by bus lanes along the A55/A494.

The rail elements of the package include a number of service improvements for the Borderlands and North Wales Coast lines as well new stations at Deeside Park and Queensferry. The service improvements proposed are likely to require significant additional rail infrastructure, which may be outside of the study area.

Rail electrification and an open access rail terminal are proposed to facilitate greater levels of rail freight.

A strategic park and ride site is also proposed for the A55 (Ref.81).

The elements of this package are summarised in Table 4.4, whilst the elements that are able to be displayed on a map are indicated in Figure 4.3.

Table 4.4: Package 3A - Capacity Enhancements - Non-Highway Options

Theme	Name	Description	Reference
Walking & Cycling	Provide parallel provision and alternative routes for pedestrians and cyclists	Alternative walking and cycling routes following the A55/A494 corridor.	24
	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.	32
	Provide walking and cycling crossing facilities on the A55/A494 corridor and associated junctions at key points of desire	Identify demands for walking and cycling crossing facilities along the A55/A494 corridor and provide suitable crossing facilities.	33
	Provide additional opportunities for walkers and cyclists to cross the River Dee	Provide additional river crossings between Connah's Quay/Shotton and the Deeside Industrial Park.	35
	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	84
Bus	Bus lanes along the A55/A494 corridor	Provide bus only lanes along the A55/A494 corridor to improve journey time reliability for public transport users.	38
	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.	39
	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.	40
	Taith express coach services	Express coach services operating between Holyhead and Manchester Airport with stops in the study area.	41
	Rail link bus routes from Hawarden bridge station to Deeside Industrial Park employers	New or revised bus routes to connect Hawarden Bridge Station to employment sites in Deeside Industrial Park.	42

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)	45
	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.	46
	New rail station at Deeside Industrial Park	Provide a new rail station on the Wrexham – Bidston line to serve Deeside Industrial Park.	49
	Fast Llandudno-Manchester Airport service	Removal of intermediate stops between Chester & Manchester (except Warrington). New hourly stopping service between Manchester & Chester	50
	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.	51
	Extension of London-Chester services to Bangor/Holyhead	This creates an hourly service between N Wales and London.	54
	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.	55
	Linespeed improvements and gauge enhancements on North Wales coast line	Improvements to the North Wales Coastal Line to allow larger freight loads to be transported by rail. NWRS investigated what level of capital expenditure would be required to reduce journey times by 10% and generate a BCR of 1.5.	56
	New station at Queensferry on the North Wales Main Line	New stations have been assessed as part of the NWRS study for Taith.	57
Freight	Freight train electrification	Electric freight trains can accelerate quicker and depending on the locomotive have the potential to pull a heavier train than a diesel. Would need to be delivered in Tandem with line electrification	75
	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	82
Demand Management	Strategic Park and Ride site on the A55 at Northop	Introduce a park and ride facility on the A55 at Northop to reduce car travel along the A55/A494 corridor.	81

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.

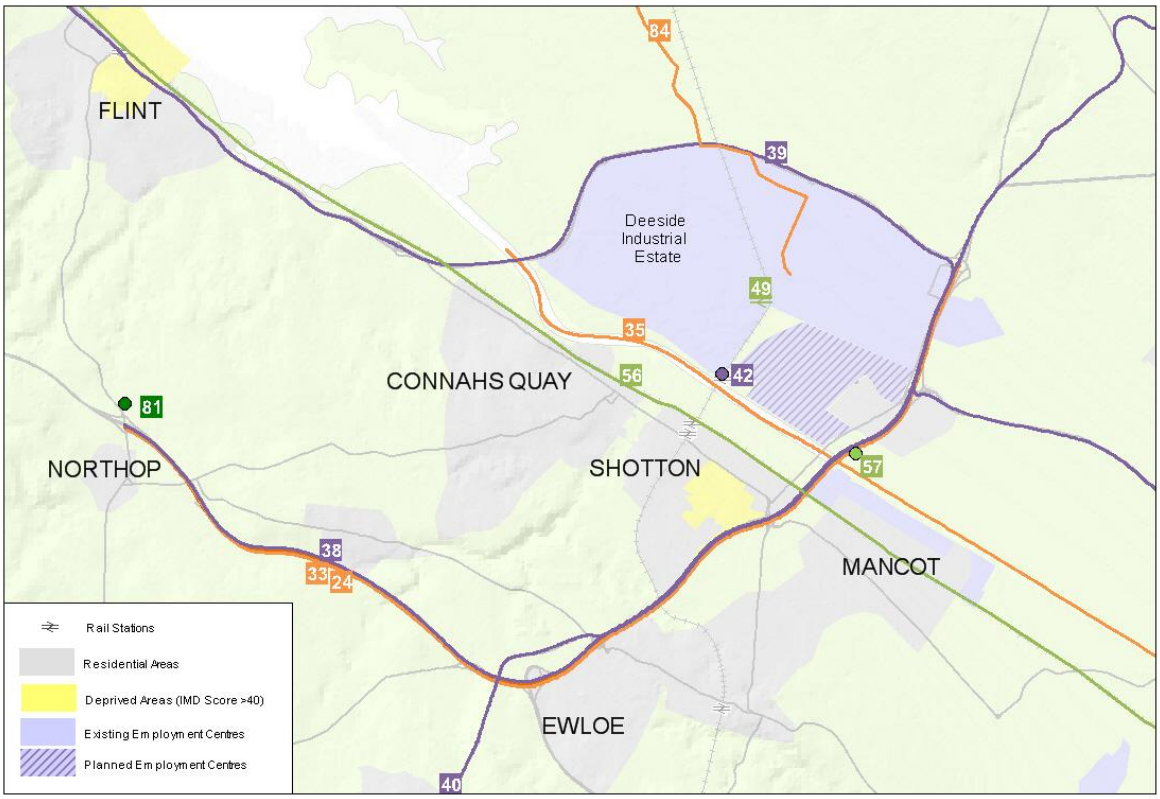
The longer term rail options are:

Reference 46: Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool. This is a longer-term version of 'Reference 45' 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 51: Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion. This is a longer-term version of 'Reference 50' 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 4.3: Package 3A - Capacity Enhancements - Non-Highway Options



4.5 Package 3B.1.1: Capacity Enhancements - Highway Options – A55/A494 Corridor – Existing Alignment

This package comprises of options involving the provision of new highway infrastructure.

Overview

This package is made up of a number of major highway capacity enhancements which seek to improve road connections through the study corridor utilising the existing highway alignment.

This package includes improvements to the A494 between Drome Corner and Queensferry, Queensferry and Ewloe. It also includes improvements at Ewloe Interchange and on the A55 from Ewloe to Northop. It has been assumed that these improvements go beyond just widening the existing road and will involve the re-building of the road along the existing A55/A494 corridor alignment. These improvements would include carriage-way reconstruction, new structures and re-aligned on/off slips to enable safety enhancements and increased highway capacity to be provided. The key elements of the highway capacity enhancements are shown in Table 4.5.

Proposals are at the early stages and are not yet at the stage of establishing engineering detail. For the purposes of this assessment it is assumed that all road improvement proposals are to a three lane standard. However, subsequent work will be required to determine the most suitable road width and use (the requirement for hard shoulders, use of managed motorway concepts etc).

In addition to these highway infrastructure improvements a number of freight based improvement are included, such as a Freight Consolidation Centre at Deeside and the provision of truckstops. The potential benefits of a park and car share scheme will also be considered as part of this package.

The package elements are summarised in Table 4.5, whilst the elements which can be mapped are shown on Figure 4.4.

Table 4.5: Package 3B.1.1 - Capacity Enhancements - Highway Options – A55/A494 Corridor – Existing Alignment

Theme	Name	Description	Reference
Highway	Drome Corner to Queensferry Improvements	Improve the capacity of the A494 River Dee crossing, providing 3 lanes in each direction.	19
	A494 Queensferry to Ewloe Improvements	On-line improvements to the highway between Queensferry and Ewloe, providing 3 lanes in each direction.	18
	Ewloe Interchange Improvements	Current preferred option for the Ewloe Interchange which reduces congestion and improves safety issues at this location.	14
	A55 Ewloe to Northop Improvements	On-line improvements to the highway between Ewloe and Northop, providing 3 lanes in each direction.	22
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.	61
	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.	71
	HGV Only Lanes (Study)	Investigate the benefits of providing HGV only lanes. Could be linked to VMS with HGV lane allocation linked to port sailings.	72
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	76

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

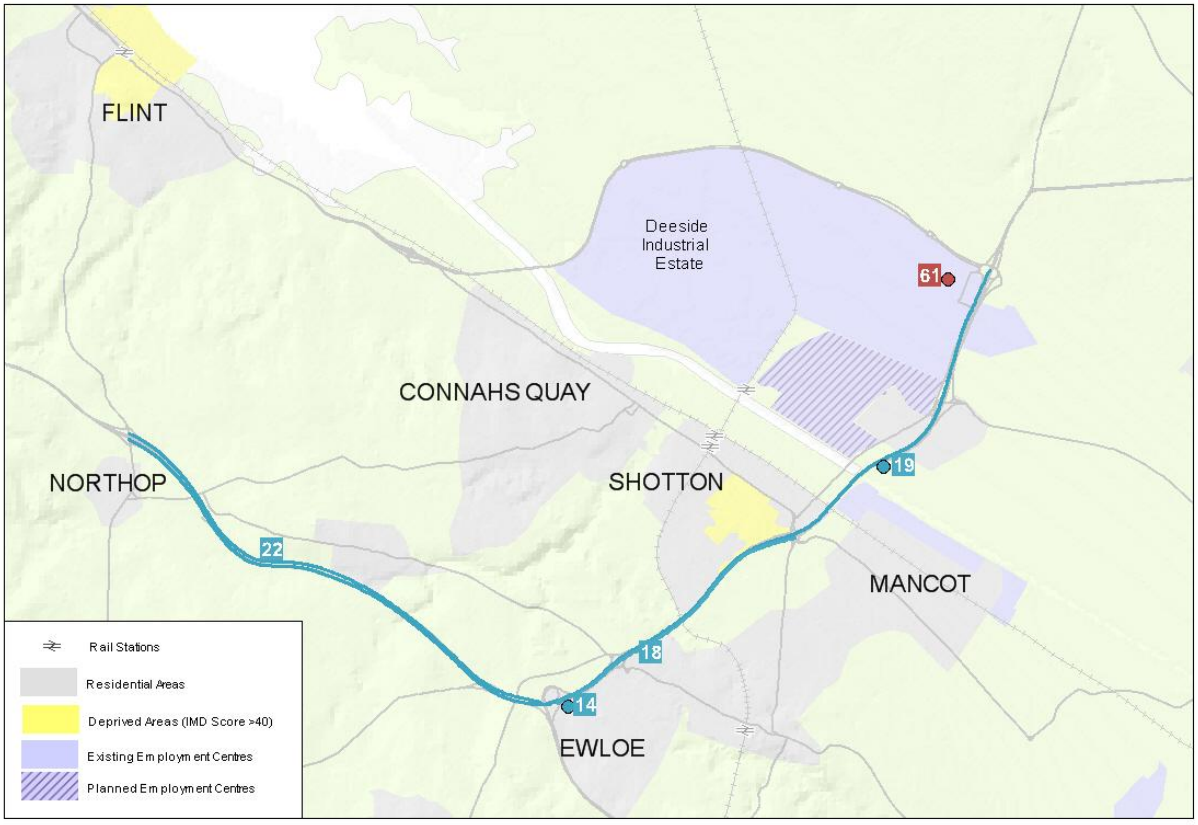
Variations

There are structural maintenance issues with the River Dee bridge. Should a decision be made by the Welsh Government to take forward a structural maintenance scheme at this location this may impact on the consideration of elements within the package. If a decision is made by the Welsh Government that the improvements to the River Dee bridge should be included as part of the do minimum scenario, the option 'Drome Corner to Queensferry Improvements' will be removed from this package.

Other highway elements such as those listed below can be considered as part of a Stage 2 Appraisal where more detailed scheme appraisal will be undertaken:

- Apply managed motorway concepts to A55/A494 corridor;
- Provide hard shoulders along the A55/A494 route;
- Provide crawler lanes at key points on the corridor;
- Redesign and improve slip roads on the A55/A494 corridor.

Figure 4.4: Appraisal Package 3B.1.1 - Capacity Enhancements - Highway Options – A55/A494 Corridor – Existing Alignment



4.6 Package 3B.1.2: Capacity Enhancements - Highway Options – A55/A494 Corridor – Orange Route Alignment

This package comprises of options involving the provision of new highway infrastructure.

Overview

As with the previous package (3B 1.1) this package is made up of a number of major highway capacity enhancements which seek to improve road connections through the study corridor through utilising the existing highway alignment.

The key difference between this package and the previous one is that this package would seek to utilise an alternative alignment between Ewloe and Queensferry (the orange route) as shown on the map (Ref.82).

Other highway elements such as managed motorway concepts, crawler lanes and slip road improvements can be considered as part of a Stage 2 Appraisal where more detailed scheme appraisal will be undertaken.

The package elements are summarised in Table 4.6, with those elements which can be mapped shown on Figure 4.5.

Table 4.6: Package 3B.1.2 - Capacity Enhancements - Highway Options – A55/A494 Corridor – Orange Route Alignment

Theme	Name	Description	Reference
Highway	Drome Corner to Queensferry Improvements	Improve the capacity of the A494 River Dee crossing, providing 3 lanes in each direction.	19
	Parallel link running east of the A494 between Ewloe and Queensferry	Orange route option identified from the 1992 Welsh Office public consultation document.	82
	Ewloe Interchange Improvements	Current preferred option for the Ewloe Interchange which reduces congestion and improves safety issues at this location.	14
	A55 Ewloe to Northop Improvements	On-line improvements to the highway between Ewloe and Northop, providing 3 lanes in each direction.	22
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.	61
	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.	71
	HGV Only Lanes (Study)	Investigate the benefits of providing HGV only lanes. Could be linked to VMS with HGV lane allocation linked to port sailings.	72
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	76

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

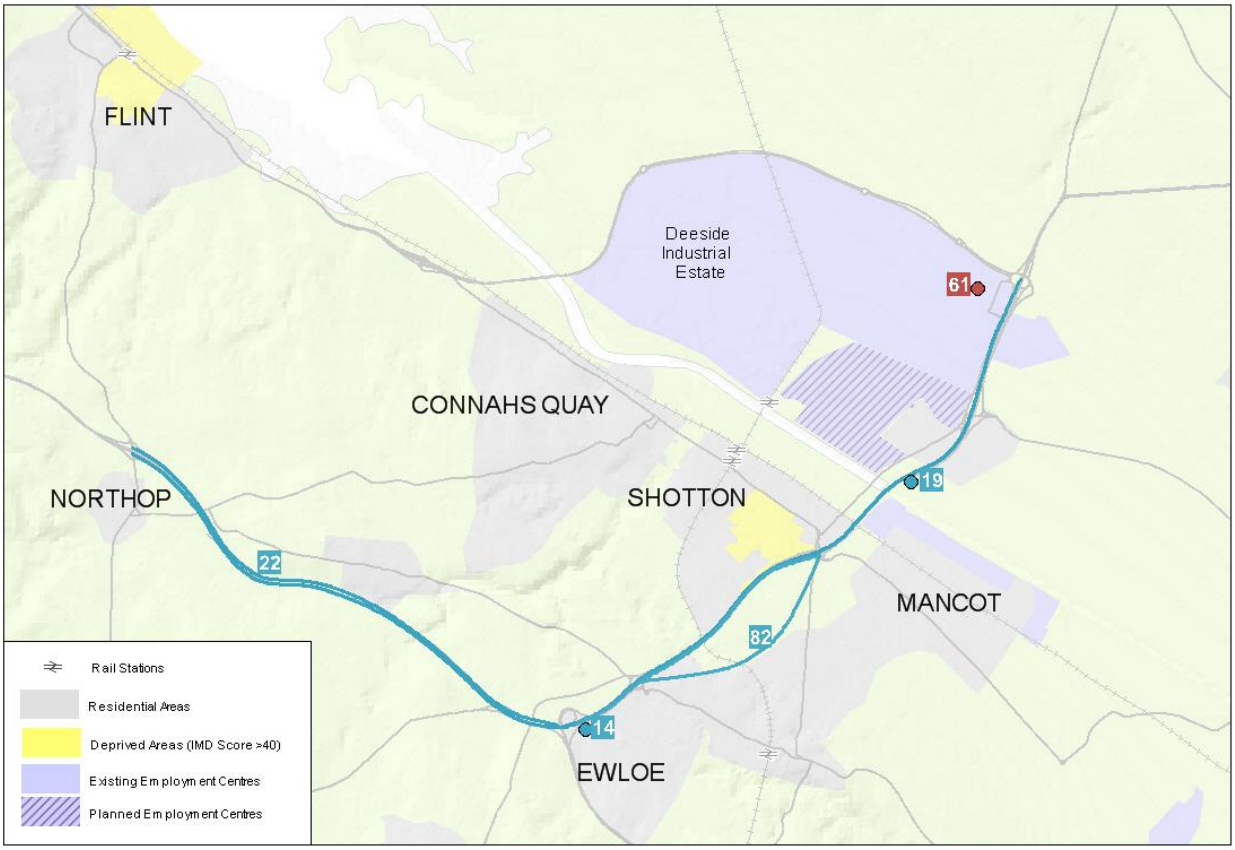
Variations

There are structural maintenance issues with the River Dee bridge. Should a decision be made by the Welsh Government to take forward a structural maintenance scheme at this location this may impact on the consideration of elements within the package. If a decision is made by the Welsh Government that the improvements to the River Dee bridge should be included as part of the do minimum, the option 'Drome Corner to Queensferry Improvements' will be removed from this package.

Other highway elements such as those listed below can be considered as part of a Stage 2 Appraisal where more detailed scheme appraisal will be undertaken:

- Apply managed motorway concepts to A55/A494 corridor;
- Provide hard shoulders along the A55/A494 route;
- Provide crawler lanes at key points on the corridor;
- Redesign and improve slip roads on the A55/A494 corridor.

Figure 4.5: Appraisal Package 3B.1.2 - Capacity Enhancements - Highway Options – A55/A494 Corridor –Orange Route Alignment



4.7 Package 3B.2: Capacity Enhancements - Highway Options – A548 Corridor

This package comprises of options involving the provision of new highway infrastructure.

Overview

As with the previous two options package 3B.2 seeks to improve the capacity of road connections through the study area.

This option investigates the benefits of providing a new road connection between the A55 and A548 (Ref.11) and then enhancing the A548 between Flint and the A550 (Ref.8) so that this route becomes the main strategic route through the study area (the existing A55/A494 would then only be used for local traffic). Significant new infrastructure would be required to achieve this.

As with the previous packages a series of freight and demand management elements also form part of this package.

The package contents are summarised in Table 4.7, with those elements which can be mapped shown on Figure 4.8.

Table 4.7: Package 3B.2 - Capacity Enhancements - Highway Options – A548 Corridor

Theme	Name	Description	Reference
Highway	Enhance the A548 route between Flint and the A550	On-line improvements 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. Grade separated junctions and 2-lane dual-carriageway with dedicated north-facing slip-roads from the A550 onto the A548	8
	New road connecting the A55 and A548	A new 2-lane dual carriageway 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. New grade-separated junction at Northop to allow free-flow between the new link and the A55.	11
	Flint Bypass	A bypass around Flint to reduce delays that occur on the A548 route when travelling through Flint.	17
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.	61
	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.	71
	HGV Only Lanes (Study)	Investigate the benefits of providing HGV only lanes. Could be linked to VMS with HGV lane allocation linked to port sailings.	72
Demand Management	Park and Car Share scheme	Provide and promote a study area wide scheme to promote park and car share arrangements.	76

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

Variations

Flint Bypass

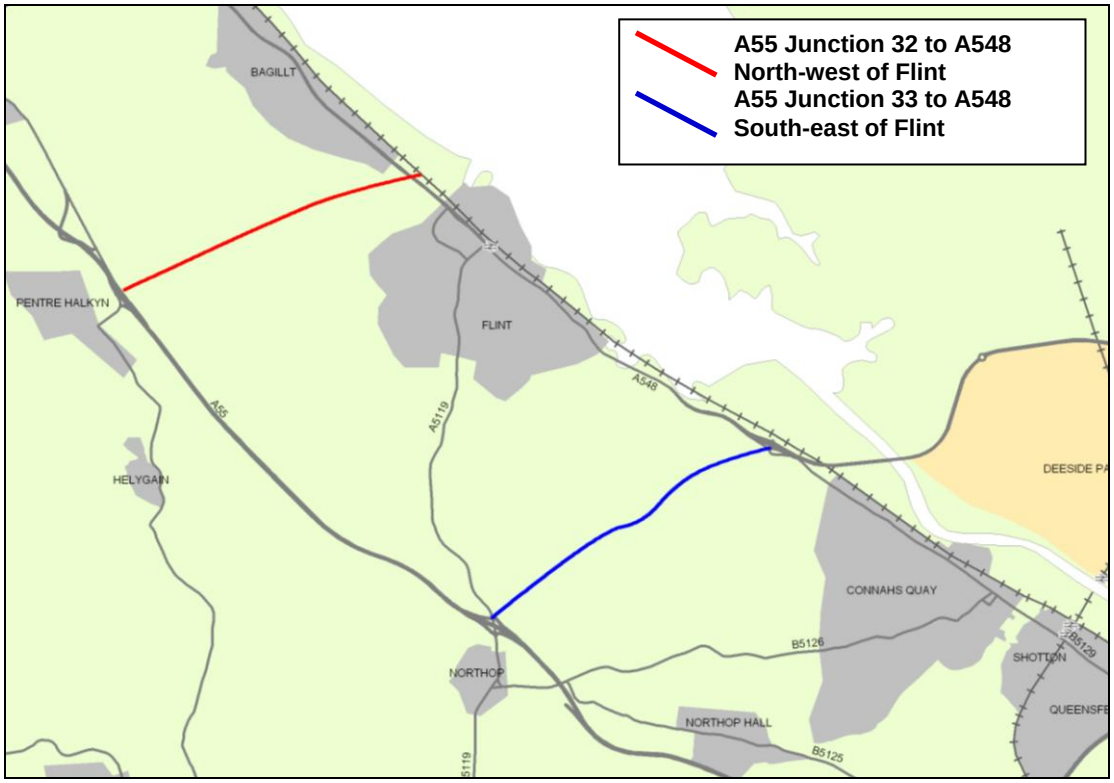
Various alignments have previously been proposed for a Flint Bypass, these include an 'Inland and Coastal Route' alternatives.

There are numerous deliverability and environmental issues associated with the proposed routes for the Flint Bypass. In addition the scheme does not score well against the majority of the Transport Planning Objectives that have been set for the A55 A494 WelTAG Study.

Alternative Alignment for new road connecting the A55 and A548

An alternative alignment for a new road connecting the A55 and A548 has also been considered. This could provide a link from the A55 at Pentre Halkyn (Junction 32/32a) to the A548 to the north-west of Flint as shown in Figure 4.6. This alternative route would need to be provided in conjunction with the Flint Bypass.

Figure 4.6: Appraisal Package 3B.2 – Capacity Enhancements – Highway Options A548 Corridor

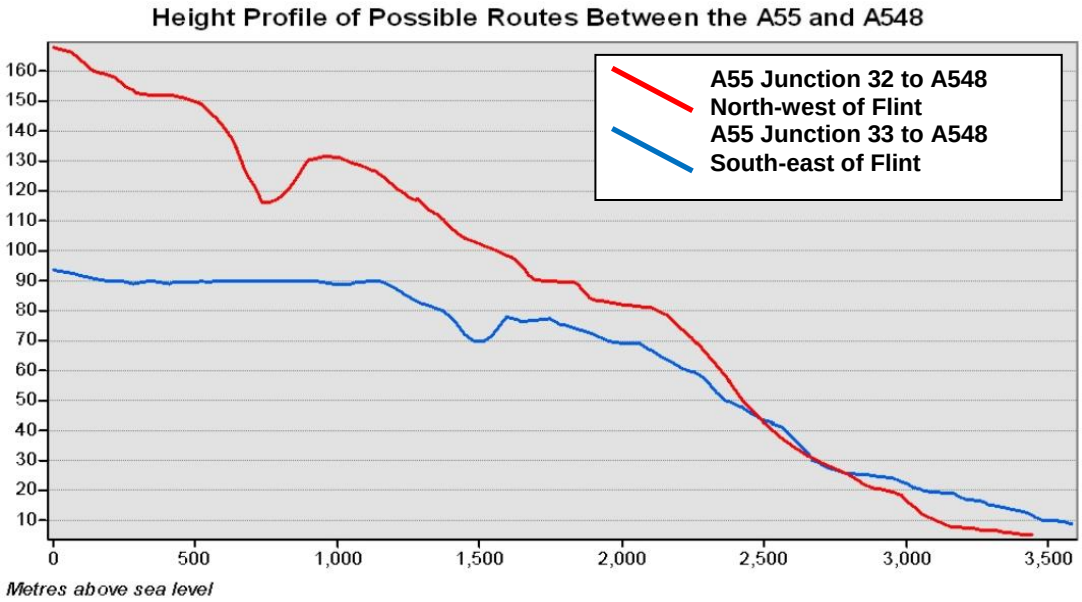


Route 1 – A55 Junction 32 to A548 North-west of Flint
Shown in red on the map and topography graph, this option would also need a Flint bypass to become a suitable strategic route.

Route 2 – A55 Junction 33 to A548 South-east of Flint
Shown in blue on the map and topography graph; this option links into the A548 Flint Bridge.

To assist in route choice of a link between the A55 and A548 for the Stage 1 WelTAG appraisal, the potential alignments have been plotted using ArcGIS 3D Analyst and Ordnance Survey topographic information. Graphs have been created to show the difference in inclines between the two main route choices, these are shown in Figure 4.7.

Figure 4.7: Topography graphs – A55 to A548 link road options



Route 1 – A55 Junction 32 to A548 North-west of Flint (Red)
Height rise = 170m; Distance 3500m; Average gradient. 1in20 or 4.9%

Route 2 – A55 Junction 33 to A548 South-east of Flint (Blue)
Height rise = 95m; Distance 3600m; Average gradient. 1in38 or 2.6%

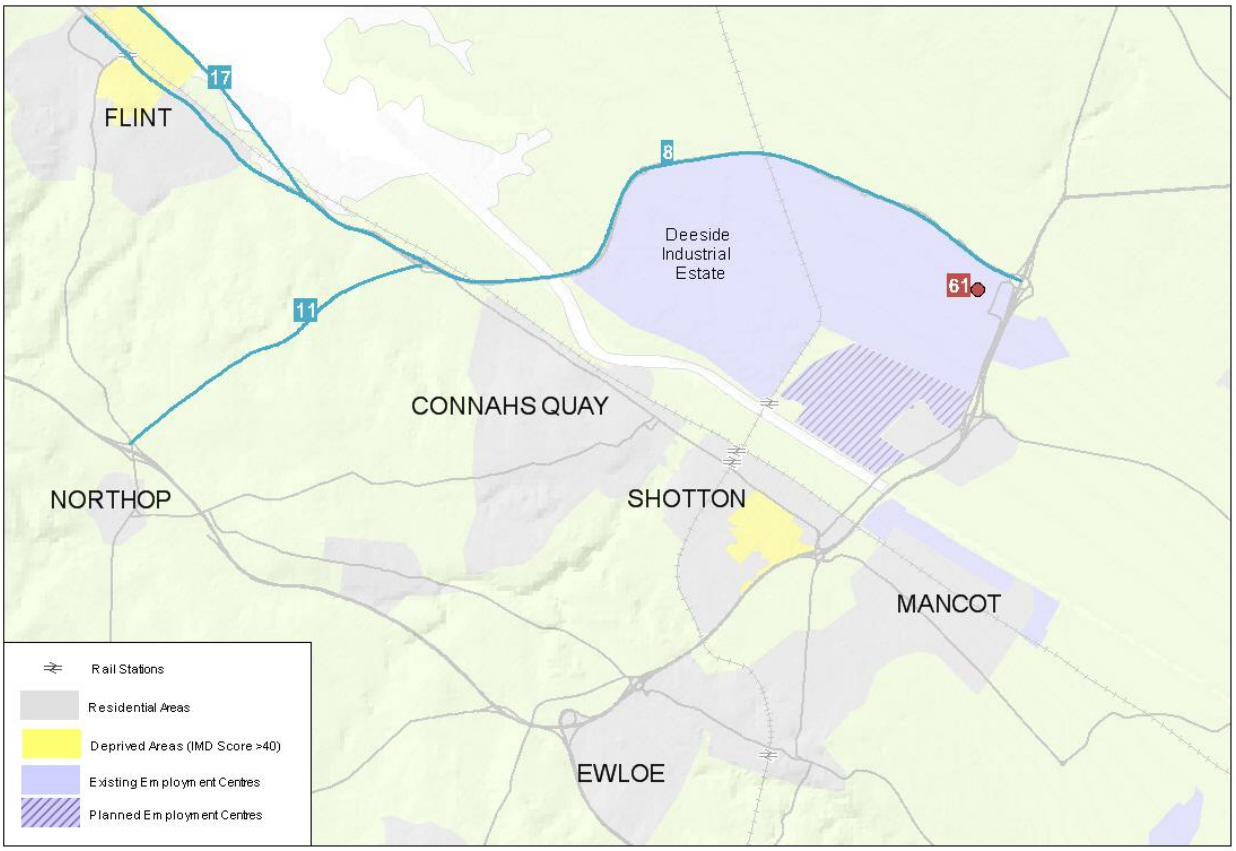
The topography graphs show:

- Both routes between the A55 and A548 are approximately 3.5km in length.
- Steeper gradient for the route between A55 at Pentre Halkyn (Junction 32/32a) and the A548 north-west of Flint

The cost of providing this alternative alignment in conjunction with a Flint Bypass would be substantially higher than the cost of providing a route between the A55 at Northop and the A548 to the east of Flint.

For the reasons described above the Stage 1 Appraisal of this package has been assessed without the Flint Bypass. However, this route element can be re-evaluated at WelTAG Stage 2 if the A548 corridor option appears viable at this stage.

Figure 4.8: Package 3B.2 - Capacity Enhancements - Highway Options – A548 Corridor



4.8 Package 3B.3: Capacity Enhancements – Local Highway Schemes

This package includes options involving the provision of new infrastructure.

Overview

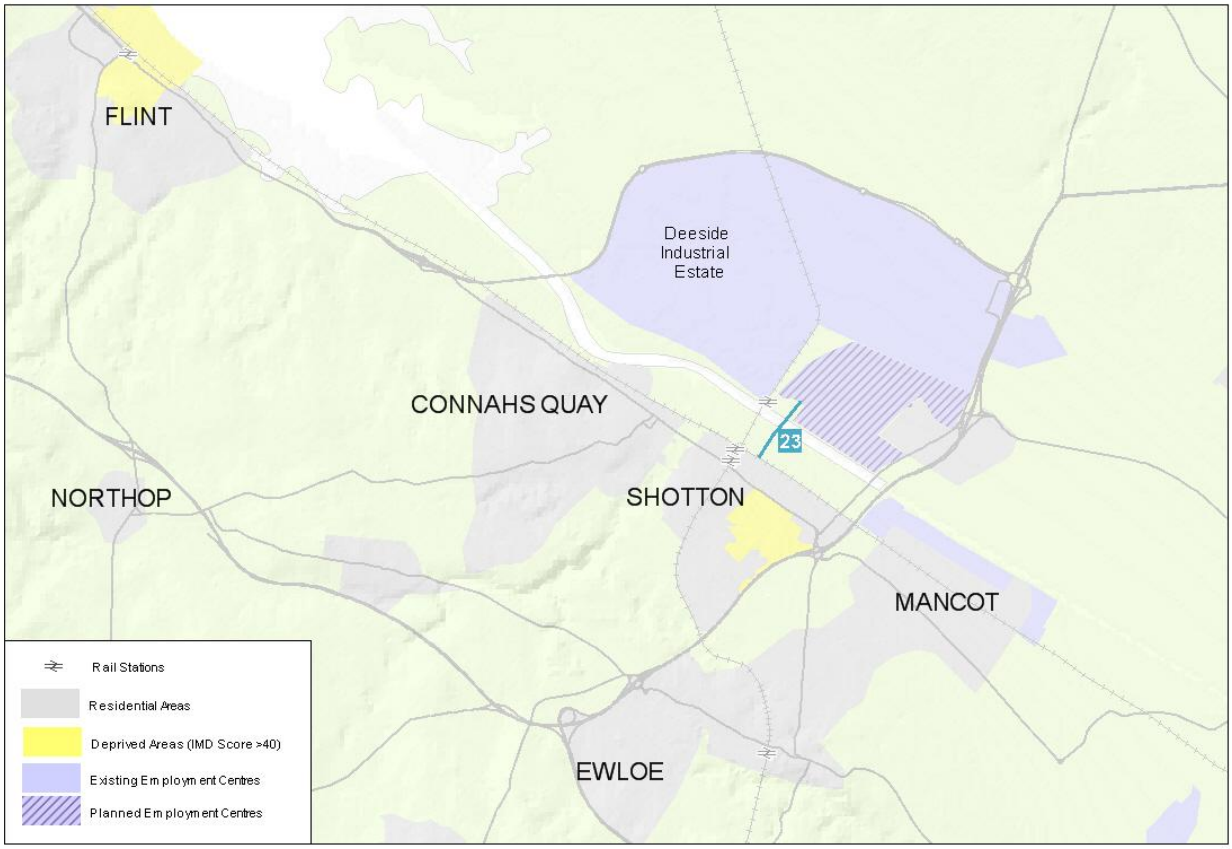
This final package seeks to provide additional capacity for local traffic travelling between Connah's Quay and Deeside Park through the provision of a local road bridge (Ref.23).

These elements are summarised in Table 4.8 and have been mapped on Figure 4.9.

Table 4.8: Package 3B.3 - Capacity Enhancements – Local Highway Schemes

Theme	Name	Description	Reference
Highway	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

Figure 4.9: Package 3B.3 - Capacity Enhancements - Local Highway Schemes



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 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 morning of Monday 29th November 2010 at St David's Park Hotel, Ewloe. The client, WG, with the assistance of AECOM compiled a stakeholder list of 65 representatives. These representatives included County Council officers, the Highways Agency, 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. Following the presentation, groups were formed of five or six delegates. Each group was facilitated by a trained moderator working from a discussion guide; all groups worked from the same discussion guide. Initially, delegates reviewed and scored each package against a range of transport planning objectives. Delegates discussed the acceptability of the packages along with any aspects of the packages that were of particular concern. Once each package had been discussed and reviewed, delegates were asked to rank the eight 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 organisations who were represented at the event and the number of delegates attending is shown in table 5.1 below. Delegates included representatives from train, freight and trunk road operators and environment, emergency services and local, regional and national Government also sent representatives. The list of all organisations who were invited to the event can be found in Annex A of the Stakeholder Consultation Report in Appendix 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. Local businesses and health representatives did not attend the event.

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	1
Highways Agency	1
North Wales Police Force	1
North Wales Trunk Road Agency	1
Regional Ambulance Officer	1
Sustrans	1
Taith	1
Welsh Government	4

5.2 Summary of the Event

Full details of the comments for each package and the scoring system can be found in the Stakeholder Consultation Report. This was a useful exercise in establishing local views on the impacts and benefits of the proposed option options. This information has been used in the assessments of public and stakeholder acceptability. In addition to this the stakeholders were asked to score the various option packages against the transport planning objectives of the study.

There were four packages which scored most positively against the TPO's. These packages were:

- Package 1: Managing Demand
- Package 2A Making Best Use – Non Highway Options
- Package 2B: Making Best Use – Highway Options
- Package 3A: Capacity Enhancements – Non Highway Options

Considering all eight packages, these performed against the TPO's as follows:

Package 1: Managing Demand: This slightly contributes to the TPO, with the exception of safety and security, and severance where it was considered to neither detract nor contribute.

Package 2A Making Best Use – Non Highway Options: this slightly contributes to the TPO's, with the exception of business transport connections, safety and security and severance, where it was considered to neither detract nor contribute.

Package 2B: Making Best Use – Highway Options: this slightly contributes to the TPO's, with the except of severance and the environmental TPO's, where it was considered to neither contributes or detracts from the TPO.

Package 3A: Capacity Enhancements – Non Highway Options: this slightly contributes to all the TPO's, with the exception of safety and security, where it is considered to neither contributes nor detracts.

Package 3B 1.1: Capacity Enhancements – Highway Options A55/A494 corridor existing alignment: this package contributes to all TPO's except for the environment TPO's, where it moderately to strongly detracts from the TPO

Package 3B 1.2: Capacity Enhancements – Highway Options – A55/A494 Corridor – Orange Route Alignment): this contributes to all the TPO's, aside from severance, natural environment and human environment where it strongly detracts.

Package 3B.2: Capacity Enhancements – Highway Options: this contributes to all the TPO's aside from the natural environment and human environment TPO's, where it will moderately detract from.

Package 3B.3: Capacity Enhancements – Local Highway Schemes: this package neither contributes nor detracts from any of the TPO's.

The scores from the package prioritisation exercises have indicated that the top three packages were as follows:

- Package 2B: Making Best Use – Highway Options
- Package 1: Managing Demand
- Package 2A: Making Best Use – Non Highway Options

The highest ranked capacity enhancement package was 3B.1.1 (Capacity Enhancements Highway measures – A55/A494 corridor existing alignment), indicating a preference to make best use of the existing corridor if possible.

Whilst the stakeholders were asked to score the packages in order of preference that they thought should be taken forward, there was significant reluctance to place a high score against the more expensive capacity enhancement packages.

It was appreciated that the prioritised packages do not score as well against the study TPO's as other capacity based options, however it was felt that these may be deliverable in the short term given current funding restraints. To score better against the study TPO's it was acknowledged that additional capacity provision was likely to be required, however an underlying principle which came across strongly from stakeholders was that Managing Demand and Making Best Use concepts should be delivered as part of these capacity options.

Significantly, it was considered that packages 1, 2A and 2B did not detract from any of the transport planning objectives, as shown in Table 2 'Average Scores from Stakeholder Consultation Event', thus increasing acceptability.

Assessment of Packages

6 Assessment of Packages

6.1 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 - 1 Managing Demand

Option Description: 1. Managing Demand			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £0.64m (2010 prices) The capital cost is comparably small, as there is no transport infrastructure included 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.	All road users across the study area.	Slight Beneficial
EALI	Potential minor increase in GVA within localised areas, such as the Deeside Industrial Park and Shotton/Connah's Quay 'Sustainable Travel Community', through improved employee health/productivity and increased 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	Small changes in traffic causing small increases and decreases noise. Both slight adverse and beneficial impacts in the opening year. Slight adverse impact in future year.	Generally urban areas across the study area	Neutral
Local Air Quality	Increase in vehicle-km on road network in opening year with a resultant increase in pollutant emissions. Small decrease in vehicle-km in design year. Predicted decrease in total pollutant emissions.	Deterioration in air quality near road links with increased traffic volumes but there may be slight improvement near road links where traffic volumes are reduced and/or congestion is relieved.	Slight Adverse in opening year Slight Beneficial in design year
Greenhouse Gas Emissions	Overall decrease in carbon (CO_2) emissions predicted	Network-wide	Slight Beneficial
Landscape and Townscape	Options have no direct physical effect on landscape/townscape resource or designated areas or features.	Throughout	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 potential wildlife/vehicle collisions, although these are not considered to be significant.	Across the study area	Neutral NB – Some unmapped options cannot be fully considered at this stage.
Heritage		This package will not result in any impacts to cultural heritage. 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 as a result the implementation of this package. During the operation phase of Package 1 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	Construction: This package would not involve any major construction activities. Therefore, no construction impacts are expected. Operation: During the operation phase of Package 1 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 planned for this Package, 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.	Across the study area.	Neutral
Social				
Transport Safety		Slight reduction in single occupancy car use should improve safety. Freight transfer to rail should also reduce number of accidents involving HGVs.	Across the study area.	Slight Benefit
Personal Security		Increased levels of walking and cycling should increase informal surveillance. Improvements to facilities at employers should reduce incidence of cycle theft. Parking management may force	Benefits across the study area. Disbenefits for areas of greater parking restriction.	Neutral

	certain trips to be made by alternatives to the car, with perceived personal security impacts.		
Permeability	Limited impacts due to lack of changes to infrastructure. Publicity elements may increase awareness of existing opportunities.	Across the study area.	Slight Benefit
Physical Fitness	Potential to encourage more walking and cycling within workforce, improving physical fitness for commuters	Benefits spread throughout study corridor	Moderately Benefit
Social Inclusion	Travel planning options could identify and overcome existing accessibility barriers. The parking management element of this package may reduce accessibility for those reliant on their cars.	Benefits across the study area. Disbenefits for areas of greater parking restriction.	Neutral
Equality, Diversity & Human Rights	Limited impact, but potential benefits for those less likely to have access to a car.	Benefits for areas with low car ownership.	Neutral
Public Acceptability: Possible opposition to parking management.			
Acceptability to other Stakeholders: Consultation indicates cautious stakeholder support. Need for additional disincentives to private car use and infrastructure improvements.			
Technical and Operational Feasibility: Feasible, but requires an ongoing staff resource.			
Financial Affordability and Deliverability: Considered to represent good value for money. All elements have been delivered elsewhere.			
Risks: Potential lack of a suitable staff resource and requirement for third party involvement.			

Table 6.2 – AST - 2A Making Best Use: Non-Highway Options

Option Description: 2A. Making Best Use: Non-Highway Options			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £3m (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 operator revenues. Reduction in indirect fuel taxes.	All road users on the A55/A494 corridor and B5129	Slight Beneficial
EALI	Potential minor localised economic responses in GVA and jobs within Shotton, due to increased rail station utilisation and interaction with local amenities. Additional potential increase in tourism within Llandudno.	Potential economic benefits will be restricted within the study area to Shotton. Broader benefits maybe experienced within Llandudno.	Slight Beneficial
Environment			
Noise	Small changes in traffic causing small increases and decreases noise. Both slight adverse and beneficial impacts in the opening year. Slight adverse impact in future year.	Generally urban areas across the study area.	Neutral
Local Air Quality	Increase in vehicle-km on road network in opening year with a resultant increase in pollutant emissions. Small decrease in vehicle-km in design year. Predicted decrease in total pollutant emissions.	Deterioration in air quality near road links with increased traffic volumes but there may be slight improvement near road links where traffic volumes are reduced and/or congestion is relieved.	Slight Adverse in opening year Slight Beneficial in design year
Greenhouse Gas Emissions	Overall decrease in carbon (CO_2) emissions predicted	Network-wide	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.	Throughout	Neutral
Bio-diversity	Options may help reduce traffic within the study area, thereby potentially having some 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, although these are not considered to be significant. The option poses slight ecological risk through a minor loss of vegetation to allow the installation of new signage, works to create/improve walking and cycling facilities could potentially have impacts, depending upon the extent and location of the	Across the study area.	Neutral NB – Some unmapped options cannot be fully considered at this stage.

		route.		
	Heritage	This package will result in an impact to the setting of built heritage assets at identified transport interchanges and stations. Dependant on possible design mitigation, the significance of this may vary. There is potential for previously unrecorded archaeological remains.	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**	This package would only involve minor construction activities. Assuming that the scale of works to be undertaken is very small, it is predicted that the potential for this package to affect surface water bodies is very low. Therefore, no construction impacts are expected as a result the implementation of this package. 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 as a result of this package. 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	Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.	Impacts could occur across the study area	Slight Adverse[1]-Neutral[2]
	Flood Risk	Construction: Some minor construction work may be required to improve station accessibility. Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: During the operation phase impacts are all assessed to be neutral, assuming further	Impacts could occur around Hawarden Bridge rail station to which accessibility improvements are proposed	Moderate Adverse[1]-Neutral[2]

		assessment will be carried out and / or mitigation options implemented where required. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided, and SUDS should be used where practicable. Effective groundwater mitigation should be employed if necessary.		
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. Additionally, the operation of the scheme has the potential to create new pollution, both through incidents and through the day-to-day running of the 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 due to walking and cycling improvements, a switch from car use to safer public transport and reduction in HGV trips.	Benefits distributed throughout the study corridor.	Slight Beneficial
Personal Security		Improved personal security due to improved walking and cycling links and secure cycle parking. A general shift to sustainable modes should increase informal surveillance.	Benefits distributed throughout the study corridor.	Slight Beneficial
Permeability		No new transport opportunities, but improvements to existing walking and cycling links and rail stations may facilitate improved permeability.	Benefits for existing walking and cycling links and rail stations.	Slight Beneficial
Physical Fitness		Improved links to public transport interchanges likely to encourage modal shift towards walking and cycling, improving physical fitness	Benefits distributed throughout the study corridor	Slight Beneficial
Social Inclusion		Improved bus access to opportunities in Deeside and Chester and improved access to Manchester airport for the socially excluded without access to a car.	Benefits particularly for deprived areas where car availability is low	Slight Beneficial
Equality, Diversity & Human Rights		Improved access to walking and cycling routes and stations for disability groups, as well as benefits for women, the old and young and deprived groups who are less likely to have access to a car.	Benefits for disability groups, women, the old and young and deprived parts of the study area.	Slight Beneficial
Public Acceptability: No consultation has been undertaken, but broad support is anticipated.				
Acceptability to other Stakeholders: Consultation indicated that stakeholders would support this package, but a number of additional options were proposed. Stakeholders were concerned about the impact of bus priority options on general traffic.				
Technical and Operational Feasibility: Majority of options in this package are feasible, however bus priority and integrating cycling with passenger transport services could be more difficult to implement.				
Financial Affordability and Deliverability: The relatively low cost of this making best use package mean that it is considered to be financially affordable. The majority of the options contained in this package are deliverable.				
Risks: The main risks associated with this package are the deliverability issues associated with the bus priority along the B5129 and providing the additional facilities required to integrate cycling with passenger transport services.				

Table 6.3 – AST - 2B. Making Best Use: Highway Options

Option Description: 2B. Making Best Use: Highway Options			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £22m (2010 prices) £16m associated with undertaking necessary maintenance, improving resilience and safety on the A55/A494.Reduction in travel times of long distance/through trips. Increased congestion on local roads has a negative impact on travel times of local short distance trips. VOCs increase.	A55/A494 corridor and local roads throughout study area.	Slight Adverse
EALI	Potential localised economic responses in GVA and jobs, due to improved highway accessibility within the A55/A494 corridor for strategic and local users, generating an increase in productivity.	Potential economic benefits will be experienced throughout the A55/A494 corridor, due to improved productivity. Enhancing this corridor is likely to result in a minor displacement of GVA and jobs.	Slight Beneficial
Environment			
Noise	Small changes in traffic causing small increases and decreases noise. Both moderate adverse and beneficial impacts in the opening year. Moderate adverse to major beneficial in future year. Impacts at noise sensitive receptors near to ramp metering sites may not have been fully assessed.	Along A55/A494 corridor and B5129	Slight Adverse
Local Air Quality	Increase in vehicle-km on road network in initial forecast year with a resultant increase in pollutant emissions. Very small decrease in vehicle-km in design year. Predicted decrease in total pollutant emissions.	Deterioration in air quality near road links with increased traffic volumes but there may be slight improvement near road links where traffic volumes are reduced and/or congestion is relieved.	Slight Adverse in initial forecast year. Slight Beneficial in design year
Greenhouse Gas Emissions	Overall increase in carbon (CO_2) emissions predicted	Network-wide	Slight Adverse
Landscape and Townscape	A number 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. Widening options along the A55 could have the potential for adverse effects due to a combination of the removal of semi mature screening planting associated with the road and increased width to the corridor after improvement. Replacement planting and possibly an increase in planting where/if adverse impacts are increased could	A55 Corridor	Slight Adverse[1]-Neutral[2]

		completely mitigate this over time.		
Bio-diversity		Potential works within 200 m of the River Dee and Dee Estuary Internationally protected sites. Options within this package pose ecological risk through 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 including; GCN, otter, badger, reptiles and bats. A slight adverse effect will apply if signage, and lane widening etc is positioned outside of the highway (tarmac and pavement), this would include grass verges, hedgerows etc and are not mitigation for. 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		Package 2B may cause an impact to previously recorded archaeological remains in close proximity to the A55/A494. Road improvements may also have a knock-on effect on the built heritage. Dependant on possible design mitigation, the significance of this may vary. There is potential for previously unrecorded archaeological remains.	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**	Some of the interventions proposed in Package 2B would require construction works to take place within the study area. These construction activities involve some minor improvements on the road network. Assuming good practice is followed during construction including options to prevent and control silt-laden runoff and spillages It is unlikely that this package would result in significant changes in the loading of highway pollutants and spillage risk. No morphological changes are likely to occur as a result of this package. During the operation phase of the proposed scheme impacts are all assessed to be negligible.	No impacts are predicted	Neutral
	Groundwater	Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction	Impacts could occur across the study area	Slight Adverse[1]-Neutral[2]

		effect and as neutral due to operation.		
	Flood Risk	Construction: Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: 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. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided and SUDS should be used where practicable.	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. Additionally, 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	Slight Adverse[1]-Neutral [2]
Social				
Transport Safety		Maintenance, concrete safety barriers, variable messaging signs and widening narrow lanes will all contribute to safety benefits. Other options will restrict access onto the A55/A494 improving safety here, but potentially making safety worse on local roads.	Benefits along the A55/A494, but potential disbenefits on local roads.	Moderate Benefit
Personal Security		No impact anticipated.		Neutral
Permeability		No impact anticipated.		Neutral
Physical Fitness		Unlikely to encourage a modal shift towards or away from walking and cycling due to focus on highway links.	Settlements either side of the A55/A494	Neutral

Social Inclusion	Improved journey times on the B5129 and strategic highway improving accessibility to work opportunities at Chester and Deeside Park from Connah's Quay and the west. Highway access restrictions may reduce accessibility for some local journeys.	Benefits for journeys utilising the B5129 or A55/A494, but potential disbenefits for some local movements.	Neutral
Equality, Diversity & Human Rights	No positive or negative discriminatory impact on any individual equality impact group		Neutral
Public Acceptability: Potential public opposition to loss of slip road access.			
Acceptability to other Stakeholders: Stakeholder consultation indicated support, but differing views on the benefits/impacts of ramp metering/reducing slip roads.			
Technical and Operational Feasibility: Lack of route alternatives will mean that construction of improvements will have significant impacts operational impacts on traffic. Improvements to local roads may be required to cope with rerouting.			
Financial Affordability and Deliverability: Majority of the package is affordable and deliverable.			
Risks: Potential lack of funding for the A55/A494 maintenance, resilience and safety options.			

Table 6.4 – AST - 3A Capacity Improvements: Non-Highway Options

Option Description: 3A. Capacity Improvements: Non-Highway Options			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £94m (2010 prices), including long-term rail options would increase the Estimated Total Capital Cost to £317m (2010 prices. 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 particularly buses. Freight, Bus and Rail Operator revenues should increase. Improved journey reliability in peak times.	All road users on the A55/A494 corridor and across study area.	Slight Beneficial
EALI	Potential substantial economic responses in GVA and jobs, due to improved local accessibility for sustainable modes within the A55/A494 corridor, increasing the level of productivity within the study area.	Potential economic benefits will be experienced throughout the A55/A494 corridor, due to improved multi modal accessibility between local labour market locations and employment centres. Displacement responses are likely to be limited.	Moderate Beneficial
Environment			
Noise	Small changes in traffic causing small increases and decreases noise. Both slight adverse and beneficial impacts in the opening year. Slight beneficial to neutral impacts in future year	Generally urban areas across the study area	Neutral
Local Air Quality	Non-highway options to improve road capacity leading to an increase in vehicle-km in initial forecast year. Slight reduction in total vehicle-km in design year	Deterioration in air quality near road links with increased traffic volumes but there may be slight improvement near road links where traffic volumes are reduced and/or congestion is relieved.	Slight Adverse in initial forecast year. Slight Beneficial in design year
Greenhouse Gas Emissions	Overall decrease in carbon (CO_2) emissions predicted	Network-wide	Slight Beneficial in terms of C emissions. Slight Adverse in terms of NPV of C emissions
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	A55 corridor at Northrop	Slight Adverse/Neutral

		unquantifiable in landscape/townscape terms. Proposals to improve pedestrian and cycle links could have a potentially beneficial effect on the amenity value of the landscape/townscape resource. A new Park and Ride facility at Northop, even allowing for successful mitigation could potentially result in residual minor adverse impacts due to its scale or micro location. The proposed rail freight terminal also has potential to give rise to adverse effects, depending upon location.		
	Bio-diversity	Potential works within or close to a number of Internationally and nationally protected sites. Options within this package pose ecological risk through the loss of woodland, mature trees, scrub/hedgerows and estuarine habitat. Likely disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species including; GCN, otter, badger, reptiles and bats. Large adverse effects will occur if appropriate mitigation is not implemented, in particular for the Dee crossing. The significance of effect could be reduced following mitigation to neutral/slight adverse.	Across the study area.	Large Adverse[1]– Neutral/Slight Adverse [2] NB – Some unmapped options cannot be fully considered at this stage.
	Heritage	Package 3A may impact upon both built heritage and buried archaeological remains. This is particularly the case in Northop, Deeside and Queensferry. The park and ride at Northop is considered to have the highest potential for impacting on cultural heritage. Dependant on possible design mitigation, the significance of this may vary.	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**	Some of the interventions proposed in Package 3A would require construction works to take place within the study area. These construction activities involve minor construction works along walking and cycling routes, some improvements to the rail network (i.e. provision of a new stations, improvements to the North Wales Coastal Line and rail electrification) and the provision of a park and ride facility on the A55 at Northop. Assuming good practice is implemented during construction including options to prevent and control silt-laden runoff and spillages, the impacts can be effectively mitigated. Temporary discharge consents will be obtained where necessary from the EAW. Chemicals and fuels will be stored appropriately on site away from watercourses and in fuel storage bunded areas with isolated drainage	No impacts are predicted	Neutral

		systems, in accordance with good site practice. Vehicles will be inspected before and regularly during their use. Emergency plans in the event of spillage will be developed. None of the interventions would have the potential to significantly modify the runoff content from roads or to significantly influence the spillage risk along the routes. Additionally, no morphological changes are expected. During the operation phase of the proposed scheme impacts are all assessed to be negligible, assuming further assessment will be carried out and / or mitigation options implemented where required.		
	Groundwater	Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.	Impacts could occur across the study area	Slight Adverse[1]-Neutral[2]
	Flood Risk	Construction: Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: 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. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided, SUDS should be used where practicable, and appropriate foul drainage should be provided. Watercourse crossings should be	Impacts could occur across the study area	Large Adverse[1]-Neutral[2]

		designed to allow the unrestricted passage of watercourse flows and effective groundwater mitigation should be employed if necessary.		
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, the new rail station at Deeside Industrial Park has the potential to present challenges with respect to contaminated land. Additionally, the operation of the scheme has the potential to create new pollution, both through Incidents and through the day-to-day running of the roadways. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be neutral.	Moderate Adverse at the new rail station at Deeside Industrial Park.	Moderate Adverse[1]- Neutral [2]
Social				
Transport Safety		Provision of parallel walking and cycling facilities and crossings should reduce accidents involving pedestrians. Bus and rail improvements will encourage mode shift to these safer modes.	Benefits across study corridor.	Moderate Benefit
Personal Security		New links and crossings built to modern standards should reduce perceived security risks associated with using these modes. Direct PT opportunities will reduce perceived personal security risks associated with walking to destinations. Greater safety for sustainable travel modes associated with increased informal surveillance.	Benefits across study corridor.	Moderate Benefit
Permeability		Parallel walking and cycling provision and crossing opportunities of the A55/A494 and river Dee should significantly increase permeability.	Benefits particularly to those wishing to cross the A55/A494 or River Dee.	Large Benefit
Physical Fitness		New walking and cycling links will encourage a shift towards this mode, improving physical fitness. In particular new links to employment areas.	Throughout the study corridor	Moderate Benefit
Social Inclusion		Improved public transport access to key destinations, such as work opportunities at Chester and Deeside Park. Rail and coach improvements will improve accessibility to/from northwest Wales and England, promoting wider social inclusion.	Benefits particularly for deprived areas such as Holywell, Flint, Connah's Quay and Ellesmere Port where unemployment is high and car ownership is low.	Large Benefit
Equality, Diversity & Human Rights		Improved accessibility for disability groups. Benefits for those without access to a car, particularly deprived groups, woman, the young and old.	Benefits for areas with low car ownership.	Slight Benefit
Public Acceptability: Public consultation has not been undertaken, but this package is anticipated to be considered acceptable.				
Acceptability to other Stakeholders: Stakeholder consultation has indicated a lack of support for bus lanes on the A55/A494 and mixed views on the benefits of park and ride.				
Technical and Operational Feasibility: Bus lanes on the A55/A494, bus priority on the B5129 and pedestrian crossing points would have operational impacts for general traffic. Extension of trains to Birkenhead would lead to several issues limiting feasibility. Other rail improvements would require additional rolling stock and turnback facilities.				
Financial Affordability and Deliverability: There is a significant financial cost associated with elements of this package and hence the package as a whole is considered not financially affordable.				
Risks: The largest risks associated with package is the deliverability of the rail schemes.				

Table 6.5 – AST - 3B.1.1. Capacity Improvements: Highway Options: A55-A494 Corridor: Existing A55-A494 Alignment

Option Description: 3B.1.1. Capacity Improvements: Highway Options: A55-A494 Corridor: Existing A55-A494 Alignment			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost= £199m (2010 prices) The majority of this cost is associated with on-line highway improvements on the A55/A494 and interchanges. Modelling indicates increases to VOCs of £18.4m primarily from increases in fuel costs. Moderate travel time savings for consumers and businesses equating to £128m benefit. Indirect tax revenues increase by £10.6m.	All road users on the A55/A494 corridor and across study area.	Significant Beneficial
EALI	Potential significant economic responses in GVA and jobs, due to improved strategic and local accessibility within the A55/A494 corridor through targeted highway infrastructure, significantly increasing the level of productivity within the study area.	Potential economic benefits will be experienced throughout the A55/A494 corridor, due to alleviation of key highway congestion. This is likely to increase the competitive status of the corridor leading to a displacement effect.	Significant Beneficial
Environment			
Noise	Reduced congestion with resultant increase in speeds have provided some increases in noise. Both moderate adverse and beneficial impacts in opening year and future year.	Increases in the vicinity of the Ewloe interchange.	Neutral
Local Air Quality	Large increase in vehicle-km travelled and pollutant emissions in initial forecast year. Moderate increase in vehicle-km travelled and pollutant emissions in design year.	Deterioration in local air quality should be expected near to road links where traffic flows increase significantly. Some areas may experience slight improvements in air quality through the redistribution of traffic on the network.	Slight Adverse in initial forecast year and Moderate Adverse in design year.
Greenhouse Gas Emissions	Overall increase in carbon (CO_2) emissions predicted	Network-wide	Moderate Adverse in terms of C emissions and NPV of C emissions
Landscape and Townscape	The highway options to widen the route to three lanes along the A55 at Northop to Drome Corner on the A494 would constitute an increase in the scale of the route corridor though the impact of this would vary due to local variability in setting. Ewloe Interchange has been identified as particularly susceptible to potential adverse change due to restricted opportunities to reinstate a similar degree of mitigation as is currently the case. Assuming appropriate mitigation is put in	A55/A494 corridor	Moderate Adverse[1]- Slight Adverse[2]

		place, impacts can be reduced to slight adverse. Other options proposed would not have an effect on the landscape/townscape resource or features, or are unquantifiable in landscape/townscape terms.		
Bio-diversity		Potential works within or close to a number of internationally and nationally protected sites. Options within this package pose ecological risk through 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 including GCN, otter, badger, reptiles and bats. Large adverse effects will occur if appropriate mitigation is not implemented, in particular for the Dee crossing. The significance of effect could be reduced following mitigation to neutral/slight adverse.	Across the study area.	Large Adverse[1]– Neutral/Slight Adverse [2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage		This package will result in possible impacts to previously recorded archaeological remains adjacent to roads and there may be setting issues for nearby built heritage assets. Dependant on possible design mitigation, the significance of this may vary. There is potential for previously unrecorded archaeological remains.	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 including options to prevent and control silt-laden runoff and spillages, construction impacts can be effectively mitigated. Temporary discharge consents will be obtained where necessary from the EAW. Chemicals and fuels will be stored appropriately on site away from watercourses and in bunded areas with isolated drainage systems, in accordance with good site practice. Vehicles will be inspected before and regularly during their use. Emergency plans in the event of spillage will be developed. Any works close to or within a watercourse (Controlled Water) will need to be strictly controlled to prevent adverse impacts on water quality or through physical changes. All work will be controlled by good practice guidance including the EAW's PPGs as set out in Section 9.2.1. Such works will require Flood Defence Consent from the EAW, and where necessary diversions will be used. As a result of these options, temporary impacts on the morphology of watercourses can be reduced to minor adverse. Assuming new treatment and containment facilities are installed as part of the new drainage		Moderate Adverse[1]-Neutral[2]

		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 (i.e. assuming that no appropriate treatment existed in the do-minimum scenario). Further assessment will be required during the design of stream crossings, particularly the River Dee crossing. 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 moderate adverse magnitude may occur.		
	Groundwater	Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.		Slight Adverse[1]- Neutral[2]
	Flood Risk	Construction: Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: 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. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided, SUDS should be used where practicable, and appropriate foul drainage should be provided. Watercourse crossings should be	Impacts could occur across the study area	Large Adverse[1]- Neutral[2]

		designed to allow the unrestricted passage of watercourse flows and effective groundwater mitigation should be employed if necessary.		
Soils		Without mitigation, this package has the potential to disturb pre-existing mineworkings and create instabilities; similarily, pathways to pre-existing contamination may be created. The A55 Ewloe to Northop improvements in particular have the potential to create instabilities. Additionally, 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.	Moderate adverse associated with the A55 Ewloe to Northop Improvements,	Moderate Adverse[1]- Neutral [2]
Social				
Transport Safety		Improved safety for road users due to new sections of highway and junctions built to modern safety standards. Likely reductions in accidents involving HGVs resulting from freight options.	Benefits especially for areas with high accident potential including Ewloe Interchange and the A494 between Drome Corner and Ewloe	Large Beneficial
Personal Security		Truck stops may improve personal security for HGV drivers, park and car share may be perceived as a personal security risk.	Benefits for HGV drivers travelling through the study area	Neutral
Permeability		Potential for improvements to existing crossings of the A55/A494 as part of the highway works.	Benefits for nearby communities needing to cross the A55/A494 corridor.	Slight Beneficial
Physical Fitness		Improvements to crossing facilities could encourage modal shift to walking and cycling improving physical fitness,	Benefits for communities needing to cross the A55/A494 corridor	Neutral
Social Inclusion		Improved accessibility by car and for public transport routes using the strategic highway. This will only have a negligible impact upon deprived groups.	Benefits for trips using the strategic highway only.	Neutral
Equality, Diversity & Human Rights		No positive or negative discriminatory impact on any individual equality impact group		Neutral
Public Acceptability: Possible opposition from those who opposed the previous Drome Corner to Ewloe scheme.				
Acceptability to other Stakeholders: Stakeholder consultation indicates mixed levels of support, indicating that elements of other packages – e.g. demand management and reducing local access onto the A55/A494 would impact upon scheme requirements.				
Technical and Operational Feasibility: Would require significant land-take outside of the existing highway boundary, the Government already own some of the land, but additional land will be required. During construction there will be disruption to traffic flow on the A55 and A494. HGV only lanes would need to be combined with highway capacity improvements and VMS.				
Financial Affordability and Deliverability: The high cost of this package means that funding will need to be sought from the delivery agencies that have been identified. TENS funding may be available for the Freight Consolidation Centres. The majority of the options contained in this package are deliverable. They will be subject to the successful completion of statutory procedures and the availability of funding from budgets approved by the WG.				
Risks: The main risk associated with this package is the availability of funding from the key delivery agencies.				

Table 6.6 – AST - 3B.1.2. Capacity Improvements: Highway Options: A55-A494 Corridor: Orange Route

Option Description: 3B.1.2. Capacity Improvements: Highway Options: A55-A494 Corridor: Orange Route			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £205m (2010 prices) The majority of this cost is associated with provision of a new highway link parallel to the A494, on-line highway improvements on the A55/A494 and interchanges. Modelling indicates increases to VOCs of £23m primarily from increases in fuel costs. Moderate travel time savings for consumers and businesses equating to £107m benefit. Indirect tax revenues increase by £12.5m.	All road users on the A55/A494 corridor and across study area.	Moderate Beneficial
EALI	Potential significant economic responses in GVA and jobs, due to improved highway accessibility within the A55/A494 corridor for strategic and local users, increasing the level of productivity within the study area.	Potential economic benefits will be experienced throughout the A55/A494 corridor, due to alleviation of key highway congestion. This is likely to increase the competitive status of the corridor leading to a displacement effect.	Significant Beneficial
Environment			
Noise	Some increase in noise where traffic was previously congested. Noise reduction where road is by-passed. Moderate adverse impacts in opening and final year. Large beneficial impacts indicated for sites by-passed by the Orange Route along the A494. However, no assessment of the impact of the new Orange Route Alignment has been included – the large benefits indicated along the A494 may be off-set by the noise from traffic on the Orange Route. Noise from traffic on this road may have a large adverse impact on noise sensitive receptors that were not affected by noise along the A494.	Increases in the vicinity of the Ewloe interchange. Reduction along A494 due to parallel route removing traffic.	Slight adverse
Local Air Quality	Large increase in vehicle-km travelled and pollutant emissions in initial forecast year. Moderate increase in vehicle-km travelled and pollutant emissions in design year.	Deterioration in local air quality should be expected near to road links where traffic flows increase significantly. Some areas may experience slight improvements in air quality through the redistribution of traffic on the network.	Moderate Adverse in initial forecast year and Moderate Adverse in design year.
Greenhouse Gas Emissions	Overall increase in carbon (CO_2) emissions predicted	Network-wide	Moderate Adverse in terms of C emissions and NPV of C emissions

Landscape and Townscape	The highway options to widen the route to three lanes along the A55 at Northop to Drome Corner on the A494, would constitute an increase in the scale of the route corridor though the impact of this would vary. Ewloe Interchange has been identified as particularly susceptible to potential adverse change due to restricted opportunities to reinstate a similar degree of mitigation as is currently the case. The new parallel route between Ewloe Interchange and Shotton (orange route) could affect a Listed Building, and have an urbanising effect on landscape/townscape character of a wide area, and visual amenity the combined effect of which could be significant a combination of careful routing (where choice is possible) extensive native planting mitigation provision and screening earthworks could minimise it's adverse impacts. Assuming appropriate mitigation options are put in place, impacts can be reduced to moderate/slight adverse. Other options proposed would not have an effect on the landscape/townscape resource or features, or are unquantifiable in landscape/townscape terms.	A55/A494 corridor	Large /Moderate Adverse[1]- Moderate/Slight Adverse[2]
Bio-diversity	Potential works within or close to a number of internationally and nationally protected sites. Options within this package pose ecological risk through the loss of woodland, mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species including GCN, otter, badger, reptiles and bats. Large adverse effects will occur if appropriate mitigation is not implemented, in particular for the Dee crossing. The significance of effect could be reduced following mitigation to neutral/slight adverse.	Across the study area.	Large Adverse[1]– Neutral/Slight Adverse [2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage	This package will result in possible impacts to previously recorded archaeological remains adjacent to roads and there may be setting issues for nearby built heritage assets. Dependant on possible design mitigation, the significance of this may vary. There is potential for previously unrecorded archaeological remains.	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 including options to prevent and control silt-laden runoff and spillages, construction impacts can be effectively mitigated. Temporary discharge consents will be obtained where	Impacts could occur across the study area	Moderate Adverse[1]- Neutral[2]

		necessary from the EAW. Chemicals and fuels will be stored appropriately on site away from watercourses and in bunded areas with isolated drainage systems, in accordance with good site practice. Vehicles will be inspected before and regularly during their use. Emergency plans in the event of spillage will be developed. Any works close to or within a watercourse (Controlled Water) will need to be strictly controlled to prevent adverse impacts on water quality or through physical changes. All work will be controlled by good practice guidance including the EAW's PPGs as set out in Section 9.2.1. Such works will require Flood Defence Consent from the EAW, and where necessary diversions will be used. As a result of these options, temporary impacts on the morphology of watercourses can be reduced to minor adverse. 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 no appropriate treatment existed in the do-minimum scenario). Further assessment will be required during the design of stream crossings, particularly the River Dee crossing. 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 moderate adverse magnitude may occur.		
	Groundwater	Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.		Slight Adverse[1]-Neutral[2]
	Flood Risk	Construction: Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage,	Impacts could occur across the study area	Large Adverse[1]-Neutral[2]

		and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: 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. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided, SUDS should be used where practicable, and appropriate foul drainage should be provided. Watercourse crossings should be designed to allow the unrestricted passage of watercourse flows and effective groundwater mitigation should be employed if necessary.		
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. The A55 Ewloe to Northop Improvements and the Parallel link east of the A494 in particular have the potential to create pollution linkages and/or instabilities. Additionally, 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	Moderate Adverse[1]-Neutral [2]
Social				
Transport Safety		Safety benefits from improving current substandard section of the A494. Downgrading of existing A494 alignment could improve safety of pedestrians crossing this road. Reduced incidence of accidents involving HGVs	Benefits particularly for the currently substandard sections of the A494.	Large Benefit
Personal Security		Reduced personal security for pedestrians due to the requirement to cross an additional highway. Truck stops should reduce the incidence of HGV crime.	Benefits for freight. Disbenefits for those needing to cross the A494 corridor.	Slight Adverse
Permeability		This package would involve an additional stretch of highway acting as a severance barrier to pedestrian movement.	Disbenefit for the communities of Aston and Hawarden.	Moderate Adverse
Physical Fitness		Improvements to crossing facilities could encourage more walking and cycling, but unlikely to be substantial modal shift	Settlements either side of the A55 / A494 corridor	Neutral

Social Inclusion	Improved journey times for transport modes utilising the strategic highway, but limited benefits for the socially excluded without access to a car.		Neutral
Equality, Diversity & Human Rights	No positive or negative discriminatory impact on any individual equality impact group		Neutral
Public Acceptability: Opposition likely from those living near to the orange route alignment, potential support from those living near to existing A494 who may benefit from local environmental improvements.			
Acceptability to other Stakeholders: Not supported by stakeholders on environmental and severance grounds, but recognised potentially reduced impacts of construction compared to alternatives.			
Technical and Operational Feasibility: Would require significant land take, demolition and environmental mitigation. Impacts of construction on existing traffic would be more limited with this option.			
Financial Affordability and Deliverability: The high cost of this package means that funding will need to be sought from the delivery agencies that have been identified. TENS funding may be available for the Freight Consolidation Centres. The majority of the options contained in this package are deliverable. They will be subject to the successful completion of statutory procedures and the availability of funding from budgets approved by the WG.			
Risks: The main risk associated with this package is the availability of funding from the key delivery agencies.			

Table 6.7 - 3B.2 Capacity Improvements: Highway Options: A548 Corridor

Option Description: 3B.2. Capacity Improvements: Highway Options: A548 Corridor			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £159m (2010 prices) £153m associated with the enhancement of the A548 route between Flint and the A550, and a new road connecting the A55 and A548. Modelling indicates overall reductions in VOCs of £2m Fuel costs increase slightly, however this is offset by reductions in Non-fuel costs. Moderate travel time savings for consumers and businesses equating to £121m benefit. Indirect tax revenues decrease by £2.3m.	All road users on the A55/A494 corridor and across study area.	Significant Beneficial
EALI	Potential significant economic responses in GVA and jobs, due to improved strategic and local highway accessibility within the A548 corridor, increasing the level of productivity within the west of the study area.	The potential transfer of economic growth to the west of the study area within the A548 corridor is likely to result in a displacement effect from the east, where highway congestion constraints remain.	Significant Beneficial
Environment			
Noise	Reduction in noise due to new road diverting some traffic. Increase in noise due to increase in traffic due to A548 improvements Large adverse impacts to moderate beneficial impacts both in the opening and future year. No assessment of the noise impact of the new road connecting the A55 and A548 has been included. The exact location of the road was not known when this assessment was carried out. The noise impact of the traffic from this road is likely to be large due to the rural location.	Reductions along the A55/A494. Increase in noise along approach road to Deeside Industrial Park.	Moderate Adverse
Local Air Quality	Moderate increase in vehicle-km and total pollutant emissions in initial forecast year Moderate reduction in vehicle-km in design year Total pollutant emissions are anticipated to increase in design year	Deterioration in local air quality should be expected near to road links where traffic flows increase significantly. Construction of new road link will introduce traffic to a new area and air quality near to the new link will need to be assessed. Some areas may experience slight improvements in air quality through the redistribution of traffic on the network.	Slight Adverse in initial forecast year and design year.
Greenhouse Gas Emissions	Overall increase in carbon (CO_2) emissions predicted	Network-wide	Moderate Adverse in terms of C emissions and

			NPV of C emissions
Landscape and Townscape	An additional lane on the A548 corridor could be accommodated on the new, modern section of highway between the B5129 interchange and the A550 as mitigation could be achieved throughout. The adjoining section, not increased in capacity as far as Flint, which would be relieved of through traffic, would possibly, with enhancement, gain in landscape and visual terms by this. A new 2 lane dual carriageway connecting Northop and the A548 at Kersterton could directly impact Ancient Woodland and listed buildings and wide spread adverse visual impacts With suitable mitigation and sensitive design could minimise the adverse effects to moderate adverse. Other options proposed would not have an effect on the landscape/townscape resource or features, or are unquantifiable in landscape/townscape terms.	Land between Northop and Connah's Quay as well as wider area from where proposals could be visible i.e. South West Wirral	Large Adverse[1]- Moderate Adverse[2]
Bio-diversity	Potential works within or close to a number of Internationally and nationally protected sites. 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, which are likely to be important for a number of protected species including GCN, otter, water vole, badger, reptiles and bats. Moderate adverse effects will occur if appropriate mitigation is not implemented, in particular for the new road. The significance of effect could be reduced following mitigation to neutral.	Across the study area.	Moderate Adverse[1] – Neutral [2] NB – Some unmapped options cannot be fully considered at this stage.
Heritage	This package may result in impacts to the setting of built heritage assets within urban centres. It has the potential to disturb buried archaeological remains. Dependant on possible design mitigation, the significance of this may vary.	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 including options to prevent and control silt-laden runoff and spillagesx construction impacts can be effectively mitigated. Temporary discharge consents will be obtained where necessary from the EAW. Chemicals and fuels will be stored appropriately on site away from watercourses and in fuel storage bunded areas with isolated drainage systems, in accordance with good site practice. Vehicles will be inspected	Impacts could occur across the study area	Neutral

		before and regularly during their use. Emergency plans in the event of spillage will be developed. During the operation phase it is likely that a beneficial impact (but not significant will result) in terms of routine runoff and spillage risk. Morphological impacts will have to be assessed at a later stage when more information of the proposed new road is available. Further assessment will be required to determine the morphological impacts on Kelsterton Brook (should the new road cross it) and impacts of minor to moderate adverse magnitude are possible. An overall neutral impact is concluded as a result of the implementation of this package. This is assuming further assessment will be carried out and /or mitigation options are implemented where required		
	Groundwater	Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.		Slight Adverse[1]-Neutral[2]
	Flood Risk	Construction: Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: 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. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be		Large Adverse[1]-Neutral[2]

		provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided, SUDS should be used where practicable, and appropriate foul drainage should be provided. Watercourse crossings should be designed to allow the unrestricted passage of watercourse flows and effective groundwater mitigation should be employed if necessary.		
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, the new dual carriageway connecting the A55 and the A548 has the potential to create pollution linkages. Additionally, 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	Moderate Adverse [1]- Neutral [2]
Social				
Transport Safety		Would redirect a large proportion of existing traffic from the substandard A494/A55 route to the safer A548. Would separate strategic and local traffic and reduce traffic levels near to large populations. Reduces accidents involving freight transport.	Benefits particularly for the existing A55/A494 corridor.	Moderate Benefit
Personal Security		Limited impact. Truck stops may reduce HGV crime. Park and Ride may be a perceived personal security risk.		Neutral
Permeability		Improved permeability for those living on the A55/A494 corridor due to reduced traffic levels here. The alternative A548 route could lead to severance impacts for some dwellings between Kersterton and Northop.	Benefits for those living near to the A55/A494 route. Disbenefits for those living along the A548 route.	Neutral
Physical Fitness		No positive or negative impact on physical fitness		Neutral
Social Inclusion		Improved accessibility to opportunities in North Wales and England and easier travel along the A55/A494 for local movements for road based travel. Limited impacts for those without access to a car.		Neutral
Equality, Diversity & Human Rights		No positive or negative discriminatory impact on any individual equality impact group		Neutral
Public Acceptability: Likely support from those living along the A55/A494 and opposition from those living along the A548 alignment.				
Acceptability to other Stakeholders: Consultation indicated stakeholder support. Stakeholders questioned the A548 routes ability to replace the A55/A494 due to the capacity of the Flintshire bridge. Existing corridor would still require significant maintenance and to stay as trunk road.				
Technical and Operational Feasibility: Significant land purchase required as well as environmental mitigation. Significant maintenance still required on the A55/A494 corridor.				
Financial Affordability and Deliverability: The high cost of this package means that funding will need to be sought from the delivery agencies that have been identified. TENS funding may be available for the Freight Consolidation Centres. The majority of the options contained in this package are deliverable. They will be subject to the successful completion of statutory				

procedures and the availability of funding from budgets approved by the WG.
Risks: The main risk associated with this package is the availability of funding from the key delivery agencies.

Table 6.8 – AST - 3B.3 Capacity Improvements: Highway Options: Local Highway Schemes

Option Description: 3B.3. Capacity Improvements: Highway Options: Local Highway Schemes			
Criteria	**Assessment**	**Distribution**	**Significance**
Welsh Impact Areas			
Economy			
TEE	Estimated Total Capital Cost = £40m (2010 prices) Modelling indicates overall reductions in VOCs of £3.4m. Savings are distributed evenly between Fuel and Non-fuel costs. Slight travel time savings equating to £11.6m benefit. Indirect tax revenues decrease by £1.1m. Quicker journeys, reduced journey time variability and increased reliability for local trips between Connah's Quay and Deeside Park	All road users on the A55/A494 corridor and across study area.	Slight Beneficial
EALI	Potential localised economic responses in GVA and jobs, due to improved accessibility for all modes from labour market locations along the B5129 corridor and the Deeside Industrial Park.	Potential economic benefits will be restricted to specific locations, due to the direct accessibility improvements between labour market locations along the B5129 corridor and the Deeside Industrial Park.	Slight Beneficial
Environment			
Noise	Small changes in traffic causing small increases and decreases noise. Both slight adverse and beneficial impacts in the opening year and future year.	Generally urban areas across the study area	Neutral
Local Air Quality	Increase in vehicle-km travelled in initial forecast year. Total pollutant emissions increase. Slight decrease in vehicle-km in design year. Small predicted decreases in pollutant emissions.	Potential for improvement in air quality near to local roads due to reduced congestion and redistribution of traffic. Air quality near to road links where traffic volumes increase is likely to worsen.	Slight Adverse in opening year Slight Beneficial in design year
Greenhouse Gas Emissions	Overall decrease in carbon (CO_2) emissions predicted	Network-wide	Slight beneficial in terms of C emissions.
Landscape and Townscape	The single option, to build a new local bridge connecting the B5129 with Deeside Park is considered to be of insufficient scale to cause any significant effects.	Deeside	Neutral
Bio-diversity	Potential works within or close to Internationally and nationally protected sites. This package poses ecological risk through loss of habitats including; estuarine habitats, mature trees and scrub. May cause disturbance to wildlife corridors/habitats, which are likely to be important for a number of protected species including; otter,	Between Connah's Quay and Deeside Park	Large Adverse[1]– Neutral/Slight adverse [2] NB – Some unmapped options cannot

		birds, badger, reptiles and bats. Large adverse effects will occur if appropriate mitigation is not implemented for the Dee crossing. The significance of effect could be reduced following mitigation to neutral/slight adverse.		be fully considered at this stage.
	Heritage	The potential new crossing of the River Dee is the main cause of concern from this package. Any works along the foreshore may disturb archaeological deposits, particularly previously unrecorded sites. There will also be an effect on +the surrounding historic environment. Dependant on possible design mitigation, the significance of this may vary.	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 including options to prevent and control silt-laden runoff and spillages, construction impacts can be effectively mitigated. Temporary discharge consents will be obtained where necessary from the EAW. Chemicals and fuels will be stored appropriately on site away from watercourses and in bunded areas with isolated drainage systems, in accordance with good site practice. Vehicles will be inspected before and regularly during their use. Emergency plans in the event of spillage will be developed. Any works close to or within a watercourse (Controlled Water) will need to be strictly controlled to prevent adverse impacts on water quality or through physical changes. All work will be controlled by good practice guidance including the EAW's PPGs as set out in Section 9.2.1. Such works will require Flood Defence Consent from the EAW, and where necessary diversions will be used. As a result of these options, temporary impacts on the morphology of watercourses can be reduced to minor adverse. 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.	Impacts could occur across the study area	Slight Adverse[1]-Neutral[2]
	Groundwater	Both construction and operational effects are anticipated to be Slight adverse for this Package,		Slight Adverse[1]-

		due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.		Neutral[2]
	Flood Risk	Construction: Assuming good practice is followed during construction of the bridge, including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts can be effectively mitigated. Water mains and sewers should be located before construction and temporary discharges agreed with the EAW. Operation: During the operation phase of the proposed scheme impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required. Infrastructure should be located above the tidal or fluvial flood level if practicable, compensatory flood storage should be provided for loss of functional flood plain if required by the EAW, adequate surface water drainage should be provided to ensure additional impermeable area and overland flows are contained, appropriate surface water attenuation and storage should be provided, and SUDS should be used where practicable. The bridge should be designed to allow the unrestricted passage of watercourse flows and effective groundwater mitigation should be employed if necessary.		Moderate 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, the new road bridge between Connah's Quay and Deeside Industrial Park has the potential to create pollution linkages and/or instabilities. Additionally, 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	Entire Study Area.	Moderate Adverse[1]- Neutral [2]

	impact. The operational impact will be neutral.		
Social			
Transport Safety	Improved safety for trips travelling between Connah's Quay and Deeside Park improving safety on the A494 Dee crossing and the B5129.	Benefits for the A494 Dee crossing and B5129.	Slight Benefit
Personal Security	Benefits for walkers and cyclists due to the ability to cross the river alongside general traffic, promoting perceived personal security due to informal surveillance.	Benefits for those wishing to cross the river Dee.	Slight Benefit
Permeability	Limited benefits as the new crossing is likely to be near to the existing rail crossing which is open to pedestrians and cyclists.		Neutral
Physical Fitness	A new bridge across the River could remove one of the barriers in the study area, and local schemes could increase walking and cycling levels.	Benefits for users segregated by the River Dee.	Slight Beneficial
Social Inclusion	Offers a new direct link between Connah's Quay and Deeside park. This will be open to public transport operators to use. Helping to improve access to work opportunities for those from Connah's Quay.	Benefits for Connah's Quay.	Slight Benefit
Equality, Diversity & Human Rights	No positive or negative discriminatory impact on any individual equality impact group		Neutral
Public Acceptability: Public consultation has not been undertaken, but no issues anticipated.			
Acceptability to other Stakeholders: Stakeholder consultation indicates a lack of support due to limited benefits			
Technical and Operational Feasibility: Would require a large bridge structure with high clearance to allow Airbus to transport wings down the Dee.			
Financial Affordability and Deliverability: The high cost of this package means that funding will need to be sought from the delivery agent. Subject to funding being available this package is deliverable.			
Risks: There is a risk that there will be insufficient traffic using the new bridge to justify the high financial cost of this package			

6.2 Stage 1 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 set of preferred packages 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: Model Development Report
Appendix C: Economic Assessment Report
Appendix D: Economic Activity and Location Impacts (EALI) Report
Appendix E: Environment Report
Appendix F: Health Impact Assessment (HIA)

Package 1: Managing Demand

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 1: Managing Demand is estimated at £0.64m (2010 prices).

The capital cost is 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.

Modelling of this package has indicated that there will be slight highway Vehicle Operating Cost savings. Highway Vehicle Operating Cost savings will be concentrated to consumer trips.

Travel Time Savings
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.

Modelling of this package has indicated that there will be slight highway travel time savings on the A55/A494 and across the study area.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will decrease. This is mainly due to a shift from road freight to rail and more efficient use of existing road freight trips.

Freight operators' revenue would increase if transferring road freight to rail is a more cost effective option.

Reliability
The reliability of highway trips in the transport corridor should benefit 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. Options such as the Deeside Industrial Park workplace travel plan and Shotton/Connah's Quay 'Sustainable Travel Community' represent the potential of localised economic activity benefits. 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
This package results in both increases and decreases in noise levels as a result of changes in traffic, which on balance leads to an overall assessment of **neutral**.

Local Air Quality
This package is predicted to reduce the overall traffic volume on the local road network in the design year of 2025 with corresponding reductions in pollutant emissions. Therefore this package will have **slight benefit** on local air quality.

Greenhouse Gas Emissions
This package is predicted to reduce overall traffic volumes on the local road network and therefore there will be a decrease in carbon (CO2) emissions predicted. The impact is considered to be of **slight benefit** overall.

Landscape and Townscape
This package does not include any proposals which will have a physical impact on the landscape and townscape, and therefore it is not anticipated to have any direct impact on the landscape and townscape. The scale of impact will be **neutral**.

Biodiversity
The package will help to reduce traffic within the study area, and will therefore have a positive effect on designated sites, habitats and species in the area through the reduction in emissions, cleaner surface water run-off from the roads and a reduction in potential wildlife/vehicle collisions. No significant negative impacts have been identified, therefore the scale is considered to be **neutral**.

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. There the scale of impact is considered to be of **slight benefit**.

Soils
This package has no intrusive works planned, and the proposed slight decrease in traffic, 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). The package will therefore have a **neutral impact**.

Water Environment
This package would not involve any construction activities. Therefore, no construction impacts are expected as a result the implementation of this package. Furthermore during the operation of the package, the impact is assessed to be negligible on surface water, ground water and flood risk. Therefore the package is considered to have **neutral impact**.

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 links which people were unaware of, which may increase permeability for these individuals.

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, 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, 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.

One of the major employment areas within the area is the Deeside Industrial Park, and is linked to the residential areas of Shotton, Queensferry and Connah's Quay by the National Cycle network Route 5. Shotton and Queensferry is located within 5Km of the industrial estate, therefore encouraging people from these areas to cycle to work daily would achieve the targets set out for increasing physical fitness.

Furthermore, this package includes local public campaigns, the provisions of travel plans and by encouraging a sustainable travel community within Shotton and Connah's Quay. 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.

Given the potential for this package to encourage a modal shift to walking and cycling and therefore help improve physical fitness; this package is ranked as **moderately beneficial**.

Social inclusion
This package does not include any physical improvements in accessibility levels, as the package focuses on encouraging behavioural change. The options aimed at encouraging sustainable travel to work, such as encouraging employers to support walking and cycling and workplace travel planning at Deeside Industrial Park may help to identify barriers which are preventing those without access to a car from taking up work opportunities. Funds could then be used to help overcome these barriers, helping to improve access to employment opportunities and supporting social inclusion.

The parking management element of this package may reduce accessibility for those who need to use their car to access opportunities; as there may be fewer suitable nearby parking opportunities once the strategy is implemented.

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

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 workplace travel planning should lead to benefits for those without access to a car, which is likely to lead to a positive benefit for socially deprived groups.

Overall it is anticipated that this package will have a **neutral impact** upon equality, diversity and human rights issues.

Acceptability

Public Acceptability
No public consultation has yet been undertaken, however it is felt that this package would be broadly supported by the public. However, stakeholders have identified that the parking management element of the package may cause problems for the local community.

Acceptability to other stakeholders

Stakeholder consultation indicates cautious support for this package. It was felt that the package would have a small impact, particularly on strategic trips and seasonal trips. It was felt that the package would be more effective when combined with options to disincentive private car use and that some infrastructure improvements were also required for the package to succeed. The parking management element of the package was felt to require a reduction in car use before this would be acceptable.

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 6.9: Package 1: Managing Demand – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Encourage employers to increase cycling within its work force	0.02	Flintshire CC	25
	Develop a local publicity campaign to promote walking and cycling	0.05	Flintshire CC	26
Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	0.05	Taith / Network Rail	62
	Freight Exchange	0.01	WG / Taith	66
Demand Management	Workplace travel planning at employers Deeside Industrial Park	0.01	Flintshire CC	77
	Shotton/Connah's Quay 'Sustainable Travel Community'	0	Flintshire CC	78
	Parking management strategy	0	Flintshire CC	79
	Promoting car clubs and car sharing	0.5	Flintshire CC	80

The total cost of this package is approximately £0.64m (2010 prices). There are potentially four 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

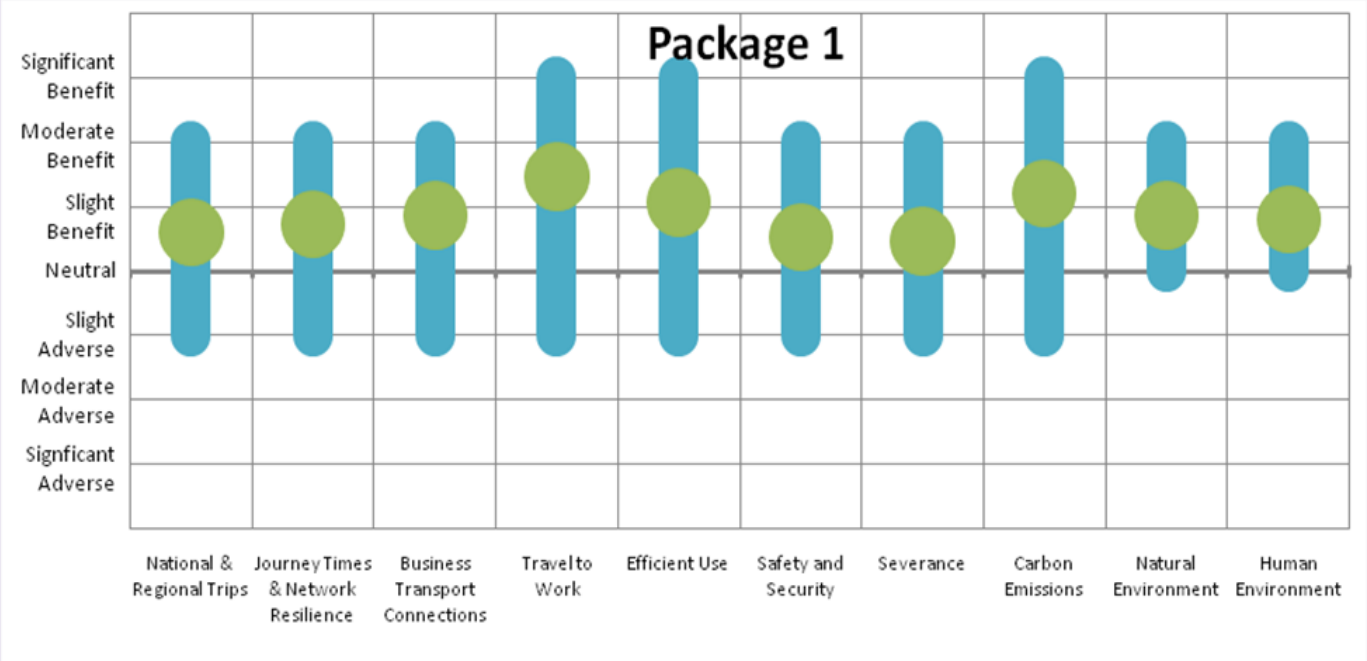
The low cost of this package means that the financial risk is low.

Risks with this package include the 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 in general stakeholders considered the package to contribute positively to all of the Transport Planning Objectives. Stakeholders scored the package most highly against the objectives relating to travel to work and carbon emissions and least highly against safety and security and severance objectives.

Figure 6.1 Managing Demand: Stakeholder Assessment



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

This package does not involve any changes to the infrastructure of the study area, the impacts on national and regional trip movements are therefore limited.

The package should help to encourage some local and commuter trips to be undertaken using sustainable travel modes. This will help to slightly reduce local traffic movements on the A55/A484 corridor, freeing up some capacity for strategic trips.

The freight elements of this package should help to facilitate necessary national and regional freight trips by increasing awareness of existing rail freight opportunities and utilising a freight exchange to help encourage more efficient HGV utilisation.

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

<u>To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events</u>

The journey time reliability of the A55/A494 corridor should improve slightly due to options aimed at encouraging a mode shift away from commuter car use as well as more efficient use of existing road trips (through options such as car sharing), helping to reduce weekday peak period traffic levels.

This package is unlikely to influence traffic levels during periods of seasonal high demand, such as Bank Holidays as these demand management options will not be able to influence this occasional strategic demand.

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

To reduce carbon emissions from transport along the A55 A494 study corridor.
This package should slightly reduce carbon emissions from the study area due to a reduction in levels of private car use. This will **contribute slightly** towards this Transport Planning Objective.

To improve transport connections for businesses within the study area to key economic centres and employment sites.
This package will have a limited impact upon business transport connections as the package does not involve any changes to transport infrastructure in the study area. The options included focus on behavioural change and should help to increase use of sustainable travel modes through a reduction in private car use. This will help to slightly reduce traffic levels on the A55/A494, freeing up some additional capacity to support business interactions.

The freight elements of the package will help to increase the awareness of businesses regarding current rail freight possibilities and help to increase the efficiency with which HGVs are used. This should help businesses to save money in the transport of goods to economic centres.

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 does not include any physical improvements in accessibility levels, as the package focuses on encouraging behavioural change. The options aimed at encouraging sustainable travel to work, such as encouraging employers to support walking and cycling and workplace travel planning at Deeside Industrial Park may help to identify barriers which are preventing those without access to a car from taking up work opportunities. Funds could then be used to help overcome these barriers, helping to improve access to employment opportunities and supporting social inclusion.

The parking management element of this package may reduce accessibility for those who need to use their car to access employment sites, as there may be fewer suitable nearby parking opportunities once the strategy is implemented.

Overall it is anticipated that this package will have a **neutral impact** upon the accessibility between employment sites and workforce catchment areas.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.
Overall this package would have a **negligible impact** upon the human environment, with a slight benefit in terms of local urban air quality and neutral impacts on noise, light pollution and landscape and townscape.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package would have a **neutral impact** on the natural environment, with slight improvements to the local air quality and neutral impacts on biodiversity, water and soils.

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
This package should improve the safety of transport users slightly, through reducing the number of car and HGV trips in the study area. There will be an overall neutral impact on transport safety resulting from reduced risk of bicycle theft providing a positive impact, but the parking management strategy leading to some trips to be made by modes considered less secure than private car use. Overall it is considered that this package will have a **neutral impact** upon this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure along the A55 A494 study corridor.
This package will help to encourage the use of existing walking, cycling and public transport services and infrastructure and reduce use of the private car. This will help to make better use of existing transport infrastructure, but the maintenance needs of the study corridor will not be resolved. Overall it is considered that this package will have a **slight beneficial impact** upon this Transport Planning Objective.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.
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 links which people were unaware of, which may increase permeability for these individuals.

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

Package 2A: Making Best Use – Non-Highway Options

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 2A: Making Best Use – Non-highway options is estimated at £3m (2010 prices).

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.

Bus priority on 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 and VOCs for other (non-bus) road users.

Modelling of this package has indicated that the highway Vehicle Operating Cost will slightly decrease

Travel Time Savings
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.

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

Modelling of this package has indicated that highway travel times on the A55/A494 and across the study area will slightly decrease.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will decrease. This is mainly due to a shift from road freight to rail and more efficient use of existing road freight trips.

Freight operators' revenue would increase if transferring road freight to rail is a more cost effective option.

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 extensions to existing rail services and improved station accessibility resulting in higher levels of patronage.

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 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

Grant, Subsidy and any Developer Contributions
There is potential for bus operator contributions towards area wide ticketing and integrating cycling with passenger transport services

All rail options included in this package could be subject to contributions from Network Rail and/or Rail 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 local area, related to specific options. Key economic responses are driven by the facility improvements at Shotton station and provision of enhanced tourist accessibility to Llandudno from Manchester Airport. These improvements are likely to increase the level of local GVA, due

to improved rail station passenger utilisation and increased interaction with local amenities. There is also the potential for direct job creation within the station facilities.
At Wales level, seasonal tourism employment growth and investment maybe generated through improved accessibility to the key tourist location of Llandudno. However the scheme is more likely to support this economic activity, rather than expand it.
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 and wider economy of North Wales.

Environment

Noise
This package has the potential to both increase and decreases these noise levels as a result of changes in traffic; however the overall assessment is predicted to be **neutral**.

Local Air Quality
The package is predicted to reduce the overall traffic volume on the local road network in the design year of 2025 with corresponding reductions in pollutant emissions. The impact is therefore considered to be of **slight benefit**.

Greenhouse Gas Emissions
The construction phase of the proposed packages will lead to higher emission of C (or CO2 equivalent) because of machines and equipment used on site. These impacts will increase the amount of CO2 emitted from Flintshire. However, in comparison to emissions for the whole county the increase associated with construction activities will be small. During operation it is predicted that this package will result in a reduction of carbon emissions, therefore overall this package will have **slight benefit.**

Landscape and Townscape
This package comprises largely of operation improvements to existing services, which will have a small scale changes to the Landscape and Townscape, which is not considered to be significant. Therefore this package will have a **neutral impact** on Landscape and Townscape.

Biodiversity
This package may help reduce traffic within the study area, thereby potentially having some 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, although these are not considered to be significant.
The package does pose a slight ecological risk through a minor loss of vegetation to allow the installation of new signage, works to create/improve walking and cycling facilities could potentially have impacts, depending upon the extent and location of the route. Overall, this package is considered to have a **neutral impact** on Biodiversity.

Heritage
This package may result in impacts to built heritage surrounding stations identified for improvements. However, this impact is considered to be slight and therefore the package will have a neutral impact on Heritage.

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. Additionally, the operation of the scheme has the potential to create new pollution, both through incidents and through the day-to-day running of the roadways.
However, with mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will also be **neutral**.

Water Environment
It is predicted that the potential for this package to affect surface water bodies is very low. Therefore, no construction impacts are expected as a result of the implementation of this package.
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 as a result of this package. Therefore, impacts are assessed to be neutral.
Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal Aquifer) and the potential for creating both pathways to pre-existing contamination as well as new pollution. However, with appropriate mitigation this can be reduced to a neutral impact.
Assuming best practice is followed during the construction phase, the construction impacts on flood risk can be effectively mitigated. During the operational phase, the impact on flood risk is considered to also be **neutral**.

Social

Transport safety
This package should improve the transport safety of walkers and cyclists through improvements to the safety of existing routes as well as the ability to interchange onto public transport and signage of existing off road routes, reducing the need to travel on road, therefore improving safety.

The bus and rail elements of this package will encourage mode shift away from the private car to public transport, reducing the number of car trips through the study area and switching them to modes of transport which are generally safer.

The publicity of port rail and inland rail terminals should help to slightly reduce the numbers of HGVs using the A55 and A494, moving them to rail, a safer transport mode and helping to reduce the number of accidents involving HGVs.

Overall this package is likely to have a **slight beneficial** impact upon transport safety.

Personal security
This package should improve the personal security of walkers and cyclists through improving the design of existing walking and cycling links to make them more secure, providing signage about the most appropriate routes and providing secure cycle parking at public transport interchanges to reduce the incidence of cycle theft.

Improved connections between rail and bus services at Shotton should improve the perceived personal security of passengers wishing to interchange between modes at this location.

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 **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 better use of the existing transportation facilities and infrastructure within the study corridor. This has several options within it, which will encourage walking and cycling within the study corridor. For example, better integration of cycling with other public transport services, and improved security at existing public transport interchanges.

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.

Following the guidance on increasing 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 Shotton Stations will improve the physical fitness of a much larger catchment area, including the residential areas of Connah's Quay and Aston.

Given the potential for this package to encourage a modal shift to walking and cycling and therefore help improve physical fitness; this package is ranked as **moderately beneficial**.

Social inclusion
This package will help to improve social inclusion in the study corridor through providing bus priority through Connah's Quay, Shotton and Queensferry which will help to improve the public transport accessibility of these locations and for bus trips travelling through the area to Chester. This will help to improve the accessibility of the area to work opportunities in Chester, as well as health and education opportunities there. The extension of Llandudno to Manchester rail services as far as Manchester Airport will offer residents of the study area without access to a car improved opportunities to access national and international flights.

Overall it is anticipated that this package will have a **slight 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 bus priority options and integrated ticketing should benefit women, who typically make greater use of bus services than men.

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

Overall it is anticipated that this package will have a **slight beneficial** impact upon equality, diversity and human rights issues.

Acceptability

Public Acceptability

No public consultation has yet been undertaken; however it is felt that this package would be broadly supported by the public. Some stakeholder consultees felt that the package would not be acceptable to local commuters as it does not go far enough to resolve the peak period traffic problems experienced along the corridor.

Acceptability to other stakeholders

Stakeholder consultation indicates support for this package. A number of additional options were suggested including additional trains stopping at Shotton, cycle training, and journey planning. Consultees were not sure on the need for trains to go to Manchester Airport and instead felt that congestion issues were a more significant issue to resolve as this affects bus punctuality. Consultees were unsure that there would be space to implement bus priority without leading to additional 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.

Rail options are technically and operationally feasible, some rail services have already been extended through to the airport. Non-car station access improvements would need to be linked to other improvements for sustainable transport modes.

With a significant change in business circumstances including strong competition between rail freight companies, efficient operating practice and concern over 'green' issues there could be a step change in use of rail freight.

Financial Affordability, Deliverability

Table 6.10: Package 2A: Making Best Use – Non Highway Options – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Walking and Cycling	Encourage secure cycling parking at public transport interchanges	0.04	Local Highway Authorities	28
	Integrate cycling with other passenger transport services, for example use of buses with cycle carriers	0.1	Local Highway Authorities / Public Transport Operators	29
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.1	Local Highway Authorities	30
	Provide additional signage for walkers and cyclists	0.04	Local Highway Authorities	31

Bus	Bus priority along the B5129 through Connah's Quay/Shotton/Queensferry.	1	Flintshire CC	
	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	37
Rail	Extension of Llandudno-Manchester service to Manchester Airport.	0	Network Rail / Train operators	43
	Improved station accessibility (non-car station access)	0.15	Network Rail / Local Highway Authorities	47
	Improved connection between rail and bus services at Shotton stations	1	Network Rail / Flintshire CC	83
Freight	Publicise the whereabouts and services from Possible Port Rail & Inland Rail Terminals	0.05	Taith / Network Rail	64

The total cost of this package is approximately £3m (2010 prices). There are potentially five 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.

Rail and freight options included in the package are relatively low cost and are considered deliverable.

Risk

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

Despite the benefits to bus passengers, bus priority 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.

The main risks associated with this package are the deliverability issues associated with the bus priority along the B5129 and providing the additional facilities required to integrate cycling with passenger transport services.

Bus priority options are at risk of causing additional delays to non-bus traffic once completed and all traffic during the construction period.

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. This shows that stakeholders in general considered the package to contribute positively, but not particularly strongly to all of the Transport Planning Objectives. The package was considered most successful against the objectives relating to reducing carbon emissions and facilitating travel to work. The package was considered less successful against objectives relating to national and regional trips and business transport connections. Some stakeholders felt that the package would contribute negatively to the objectives relating to travel to work and efficient use.

Figure 6.2 Making Best Use- Non Highway Options: Stakeholder Assessment

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

Most of the options contained within this package relate to improvements to local public transport and walking and cycling improvements. These improvements will not directly influence national and regional trip movements, but should help to slightly reduce traffic levels on the A55/A494 corridor, facilitating improved connections for strategic trips. Extension of Llandudno to Manchester services as far as Manchester Airport should help to facilitate improved access to Manchester Airport and international opportunities for those living in North Wales.

Publicity of port and inland rail terminals should help to facilitate the movement of freight regionally and nationally.

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

<u>To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.</u>

The journey time reliability of the A55/A494 corridor for trips utilising the strategic road network 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 traffic levels.

The extension of Llandudno-Manchester services as far as Manchester Airport may help to make rail a more viable alternative to car travel for tourist trips, helping to slightly reduce seasonal peak demand and the associated impacts on the strategic road network.

Journey time reliability for bus services should be expected to increase due to bus priority along the B5129. Integrated area ticketing would reduce bus dwell times and improve service reliability, even with increased patronage.

Bus priority on the B5129 may decrease the journey reliability of other motorised modes.

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

To reduce carbon emissions from transport along the A55 A494 study corridor.
Overall decrease in carbon (CO_2) emissions predicted
This package should **slightly reduce** carbon emissions from the study area due to a reduction in levels of private car use.

To improve transport connections for businesses within the study area to key economic centres and employment sites.
Most of the options contained within this package relate to improvements to local public transport and walking and cycling improvements. These improvements will not directly improve transport connections for businesses in the study are to key economic centres and employments sites, but should help to slightly reduce traffic levels on the A55/A494 corridor, facilitating improved connections for business trips.

Extension of Llandudno to Manchester services as far as Manchester Airport should help to facilitate improved access to Manchester Airport and therefore international connections.

Publicity of port and inland rail terminals should help to facilitate the movement of goods between businesses in the study area and key economic centres.

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.
The improvements to existing walking and cycling links and bus priority options should improve the ability to access employment sites from workforce catchment areas for those without access to a car.

To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape.
This package will have a **neutral impact** on the human environment due to a slight improvement in local air quality alongside neutral impacts on noise levels, light pollution and landscape and townscape.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package will have a **neutral impact** on the natural environment due to a slight improvement in local air quality alongside a neutral impact on water, soils and biodiversity during operation of the scheme assuming necessary mitigating options are implemented.

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
This package should improve the safety and personal security of transport users due to improvements to the safety of existing walking and cycling routes and improvements to bus and rail which will promote a switch from car use to safer transport modes as well as a reduction in HGV trips. Personal security will also improve due to improvements to existing walking and cycling infrastructure, improved interchange arrangements and greater levels of informal surveillance for public transport and non-motorised modes.

To maintain and make more efficient use of the existing transport infrastructure along the A55 A494 study corridor.
This package seeks to maintain and make best use of the existing non highway infrastructure in the study area through options such as improvements to existing walking and cycling links, signage, bus priority and improved station accessibility. These options should help to encourage greater use of public transport, walking and cycling in a cost efficient way.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.
This package seeks to improve the safety and security of existing walking and cycling routes. This could include improvements to the routes which cross the A55/A494 and may address some of the issues with these routes, such as perceived risk of crime, preventing people from using these routes. Overall this package will have a **slight beneficial** impact upon the permeability of the A55/A494 corridor.

Package 2B: Making Best Use –Highway Options

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 2B: Making Best Use – Highway options is estimated at £22m (2010 prices). Approximately £16m of the total cost of this package is associated with undertaking necessary maintenance on the A55.A494 and improving the resilience and safety of the corridor.

Vehicle Operating Costs (VOCs)
Modelling of this package has indicated that Vehicle Operating Costs across all highway trips in the study area will increase.

Travel Time Savings

The reduction in the number of slip roads and ramp metering will limit access on the strategic road network improving travel times of long distance/through trips. Increased congestion on local roads will have a negative impact on travel times of local short distance trips.

Modelling of this package has indicated that highway travel times across all highway trips in the study area will increase.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will slightly decrease.

Reliability
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.

There are a number of highway options included in this package to manage traffic on the A55/A494 corridor. These will improve the reliability of longer distance strategic trips.

The reduction in the number of slip roads and ramp metering 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.

Minor on-line improvements on the B5129 will improve reliability for local traffic.

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

Economic Activity and Location Impacts (EALI)
This corridor has been identified for extensive development growth within the Flintshire Unitary Development Plan (UDP) including employment within the Deeside Industrial Park, Broughton and housing within the A55/A494 conurbations.
This package is designed to improve the highway network performance and reliability of the principle A55/A494 route through the study area to the benefit both the local and strategic traffic without providing large scale infrastructure. These options are designed to improve the highway network to a sufficient standard to accommodate the existing demand, which is currently being constrained by the existing highway limitations. The mitigation of specific highway constraints is likely to result in a direct increase in productivity for both the existing corridor based employers and strategic users. This is likely to result in a localised increase in GVA and jobs. However, the overall scale of potential economic responses and additional investment is likely to be restricted to the level of service provided by the remaining highway capacity.
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.

Environment

Noise
This package has a potential to impact noise levels through changes in traffic flows and possibly due to reduced congestions. Reducing congestion may increase noise levels due to increases in mean traffic speeds although this would only be significant

during periods when the traffic is congested and likely to be a small influence over the 18-hour assessment period. The overall assessment is judged to be a **slight adverse** impact.

Local Air Quality
The package is likely to reduce the overall traffic volume on the local road network, with corresponding reductions in pollutant emissions. Therefore this package will have **slight benefit** on local air quality.

Greenhouse Gas Emissions
The construction phase of the proposed packages will lead to higher emission of C (or CO2 equivalent) because of machines and equipment used on site. These impacts will increase the amount of CO2 emitted from Flintshire. However, in comparison to emissions for the whole county the increase associated with construction activities will be small. Overall an increase in carbon (CO2) emissions are predicted to have a **Slight Adverse** impact

Landscape and Townscape
This package includes improvements to the A55 which could have a slight adverse impact on the Landscape; however this is not likely to be a significant impact. The remainder of the options within the package are unlikely to have an impact on Landscape and Townscape due to the type and scale of proposals. Therefore this package will have a **Neutral Impact**.

Biodiversity
This package poses an ecological risk through 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 including; GCN, otter, badger, reptiles and bats. Furthermore there is the potential for works within 200m of protected sites. Will appropriate mitigation, it is considered that the impact on biodiversity will be **Neutral**.

Heritage
The improvements between Northop and Ewloe have the potential to impact on previously recorded prehistoric remains and affect the setting of built heritage assets. However it is considered that the overall impact on Heritage is **Neutral**.

Soils
This package has the potential to disturb pre-existing mine works and create instabilities; similarly, pathways to pre-existing contamination may be created. Additionally, 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 appropriate mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be **neutral**.

Water Environment
Assuming good practice is followed during construction including options to prevent and control silt-laden runoff and spillages, the impact on surface water would be neutral. It is unlikely that this package would result in significant changes in the loading of highway pollutants and spillage risk. No morphological changes are likely to occur as a result of this package. During the operation phase of the proposed scheme impacts are all assessed to be neutral.
Due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.
Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts on flood risk can be effectively mitigated. During the operation phase impacts are all assessed to be **neutral**.

Social

Transport safety
This package should help to improve transport safety for all users of the A55/A494 corridor. Maintenance will be undertaken to bring the highway up to a more acceptable condition, with additional improvements identified, such as widening narrow lanes and concrete safety barriers all contributing to improved safety levels.

Variable messaging signs will ensure drivers are able to react to any incidents on the highway, with speed limits made which are appropriate to current road conditions.

The signage strategy, ramp metering and reducing the number of slip roads onto the A494 will all help to reduce the use of the corridor, particularly at peak times; helping to improve transport safety along the corridor. However, these restrictions may contribute to higher traffic levels along local roads, potentially reducing safety here.

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

Personal security
Improvements to the strategic highway are unlikely to influence levels of perceived or actual personal security. It is anticipated that this package will have a **neutral impact** upon personal security.

Permeability
Permeability relates to the ability for non-motorised modes to travel through an area. As this package relates only to the strategic highway and does not involve any changes to current crossing arrangements it is anticipated that this package will have a **neutral impact** upon permeability levels.

Physical fitness
This option package seeks to provide additional capacity by making better use of existing facilities and infrastructure on the A55/A494 corridor. This includes schemes such as the introduction of variable message systems and improvements to the signage strategy. Whilst improving the operation of the A55/A494, it is unlikely that this package will result in a significant modal shift away from walking and cycling to private vehicles, or encourage more users to travel via sustainable modes. Therefore, it is considered that this package can be assessed as **neutral** on physical fitness.

Social inclusion
This package will help to reduce congestion along the B5129 and slightly reduce traffic levels on the strategic highway. This will improve accessibility levels for the private car as well as public transport users to access work and other opportunities at key destinations such as Chester and the Deeside Industrial Park. This will help to promote social inclusion.

Ramp metering and the reduction of slip road access onto the A494 may reduce accessibility for some traffic movements, which may require buses and private cars to use alternative routes, reducing current accessibility levels.

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

Equality, Diversity & Human Rights
This package is anticipated to have a **neutral impact** on issues of equality, diversity and human rights.

Acceptability

Public Acceptability
No public consultation has yet been undertaken, however it is felt that this package would be broadly supported by the public. The loss of slip road access onto the strategic highway may be opposed by some local residents who may need to undertake significant rerouting.

Acceptability to other stakeholders
Stakeholder consultation has indicated that this package would be supported in part. Some felt that ramp metering and reducing slip roads were necessary options to help reduce congestion and incidents, however others questioned the value of these options and the impacts on traffic levels along local roads.

Technical & Operational Feasibility
The restrictive nature of the existing A55/A494 corridor will mean that undertaking necessary maintenance and resilience and safety improvements are likely to have significant operational impacts on existing traffic. Other improvements, such as those on the B5129 are also likely to cause local traffic congestion during the construction phase.

Elements such as Ramp metering and reducing the number of slip roads onto the A494 are likely to result in operational issues for the local road network which will have to cope with additional trips and may require localised junction improvements.

Suspension of non essential maintenance at peak periods may increase maintenance time and costs. Consultation with the maintenance contractor and local authority would be needed to ascertain the operational impact on maintenance schedules.

Financial Affordability, Deliverability

Table 6.11: Package 2B: Making Best Use – Highway Options – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Highway	Variable Messaging Signs	0.4	WG and Highways Agency	2
	Undertake necessary maintenance on the existing A55/A494 route	6	WG	3
	Consider a signage strategy for traffic travelling to/from North England	0.2	WG and Highways Agency	4
	Ramp metering on some junctions	0.33	WG	6
	Improve the resilience and safety of the corridor	10	WG	7
	Reduce congestion along the B5129 through Shotton/Queensferry/Connah's Quay	5	Flintshire CC	10
	Reduce the number of slip roads on the A494 – strategic junctions. Reduce local distributer road access.	0.08	WG / Flintshire CC	16
Freight	Suspension of non essential maintenance at peak periods	0	WG	70

The total cost of this package is approximately £22m (2010 prices). There are potentially three delivery agents identified in this package.

The majority of elements of this package can be delivered relatively easily. Approximately £16m of the total cost of this package is associated with undertaking necessary maintenance on the A55.A494 and improving the resilience and safety of the corridor. The delivery agent for these options has been identified as WG.

The reduction in the number of slip roads on the A494 may not be popular with the public, which may lead to political pressure to remove this element from the package.

Risk

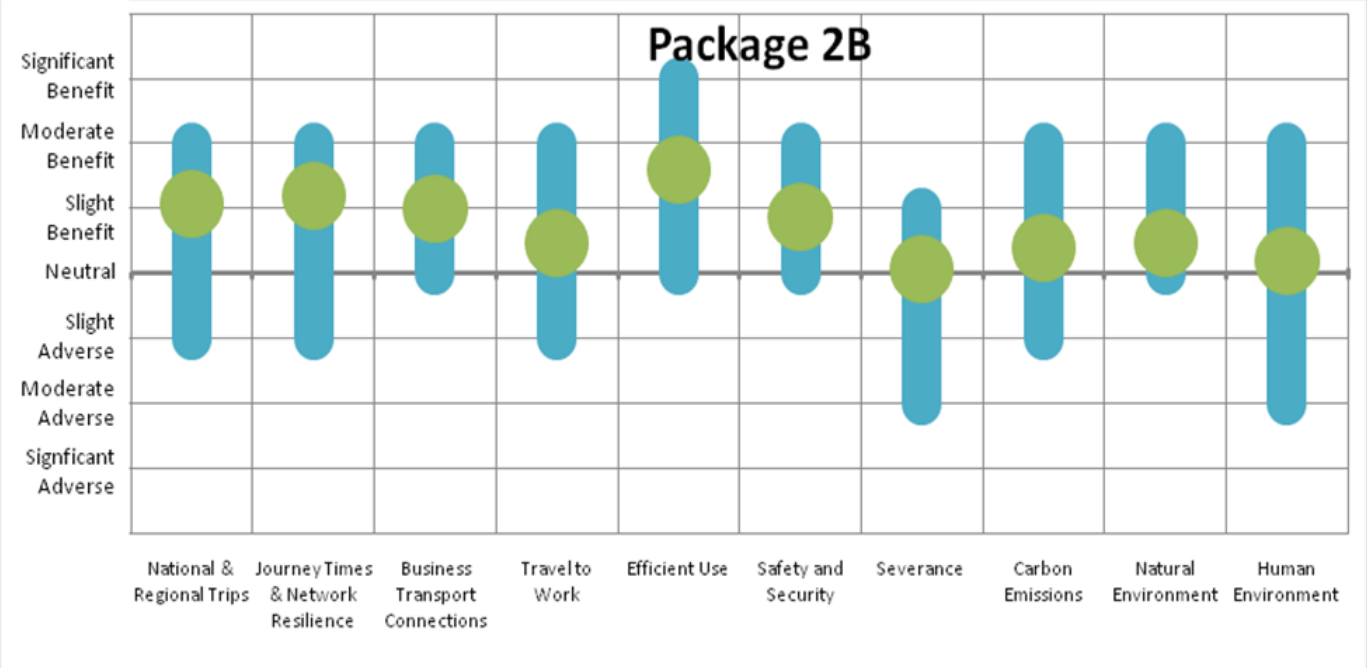
Highway options would cause delays to traffic during the construction period.

A large proportion of the options included in this package are dependent on WG funding. If WG funding is unavailable then this package would become more difficult to deliver.

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. Stakeholders have indicated that they consider this package to contribute positively to all of the Transport Planning Objectives with the exception of severance, which they consider the package to have an overall neutral impact upon this objective. This package was considered to have the most positive impact upon the objective relating to making efficient use of existing transport infrastructure.

Figure 6.3 Making Best Use – Highway Options: Stakeholder Assessment



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

The options contained within this package should help to make the best use of the existing A55/A494 corridor, limiting the impact of incidents, congestion and maintenance on journey times and helping to reduce the use of the corridor by local traffic. This will help necessary national and regional trips to travel through the study area without significant delays. This will have a **moderate beneficial** impact upon this Transport Planning Objective.

<u>To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.</u>

Resilience and safety improvements as well as necessary maintenance will help to improve the resilience of the A55/A494 corridor and reduce journey time variability. 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, particularly beneficial during periods of seasonal high demand.

Suspension of non essential road maintenance in peak times will help to reduce delays and increase journey reliability. But, moving maintenance into the off peak periods could lead to journey time variability outside of peak periods.

Ramp metering and 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 may be offset by increase journey time variability for local trips. Minor on-line improvements on the B5129 will improve reliability for local traffic.

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

<u>To reduce carbon emissions from transport along the A55 A494 study corridor.</u>

This package will cause an overall **slight increase** in the amount of carbon emitted by transport in the study area.

To improve transport connections for businesses within the study area to key economic centres and employment sites.
The options contained within this package should help to improve journey times, journey time reliability and the resilience of the existing A55/A494 corridor through options such as ramp metering, reduction in slip roads and variable messaging signs. This options will help to ensure that the corridor provides a reliable connection for businesses in the study area to key economic centres and employment sites in North Wales and England. The improvements are unlikely to significantly improve journey times for businesses, but should help to reduce journey time variability, providing businesses with more certainty, an important consideration for the logistics industry.

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

To improve access between employment sites and workforce catchment areas.
This package will help to reduce congestion along the B5129 and slightly reduce traffic levels on the strategic highway. This will improve accessibility levels for the private car as well as public transport users to access work and other opportunities at key destinations such as Chester and the Deeside Industrial Park.

Ramp metering and the reduction of slip road access onto the A494 may reduce accessibility for some traffic movements, which may require buses and private cars to use alternative routes, reducing current accessibility levels.

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 scenario results in a slight improvement in local air quality across the modelled area, but restriction on local access onto the strategic road network will result in worsening local air quality in some urban areas resulting from re-routing. Noise impacts will be both positive and negative, but for the same reason as above some urban areas will experience slightly increased noise levels. There may be a slight adverse impact upon landscape and townscape due to the impacts of lane widening on the screening of the A494. Overall this package is likely to have a **slight adverse** impact on the human environment.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
With the correct mitigation it is anticipated that this package will have a **neutral impact** during operation upon the natural environment including local air quality, water, soil pollution and biodiversity.

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.

This package should help to improve transport safety for all users of the A55/A494 corridor. Maintenance will be undertaken to bring the highway up to a more acceptable condition, with additional improvements identified, such as widening narrow lanes and concrete safety barriers all contributing to improved safety levels.

Variable messaging signs will ensure drivers are able to react to any incidents on the highway, with speed limits made which are appropriate to current road conditions.

The signage strategy, ramp metering and reducing the number of slip roads onto the A494 will all help to reduce the use of the corridor, particularly at peak times; helping to improve transport safety along the corridor. However, these restrictions may contribute to higher traffic levels along local roads, potentially reducing safety here.

Improvements to the strategic highway are unlikely to influence levels of perceived or actual personal security.

Overall it is anticipated that this package will be **moderately beneficial** in contributing to this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure along the A55 A494 study corridor.
This package seeks to undertake necessary maintenance along the A55/A494 alongside improvements to the resilience and safety of the corridor to try to make this route fit for purpose. Other options such as variable messaging signs, ramp metering and reducing local slip roads onto the A494 seek to make the corridor more efficient at fulfilling its primary purpose of providing a route for strategic traffic.

Overall it is considered that this package will be **significantly beneficial** in contributing to this Transport Planning Objective.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.
Permeability relates to the ability for non-motorised modes to travel through an area. As this package relates only to the strategic highway and does not involve any changes to current crossing arrangements it is anticipated that this package will have a neutral impact upon this Transport Planning Objective.

Package 3A: Capacity Improvements – Non-Highway Options

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 3A: Capacity Improvements – Non-highway options excluding long term options is estimated at £94m. Including long term options the capital cost is estimated at £317m.

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.

Bus lanes on the A55/A494 will decrease bus operating costs through a reduction in fuel and non fuel costs.

Modelling of this package has indicated that the highway Vehicle Operating Cost will slightly decrease.

Travel Time Savings
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.

Modelling of this package has indicated that highway travel times on the A55/A494 and across the study area will slightly decrease.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will decrease. This is mainly due to a shift from road freight to rail and more efficient use of existing road freight trips.

Freight operators' revenue would increase if transferring road freight to rail is a more cost effective option.

Bus operator revenues will increase due to increased passenger numbers resulting from options included in this package.

Rail operator revenues will increase due to extensions to existing rail services and improved station accessibility resulting in higher levels of patronage.

Reliability

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

Crossing facilities on the A55/A494 will increase the reliability of walking and cycling journeys. Crossings facilities that require highway traffic to be stopped would reduce the reliability of road journeys.

The provision of bus lanes on the A55/A494 would increases the reliability of bus journeys. The reliability of existing non-bus highway journeys would decrease as a result of the re-allocation of road space.

Line speed improvements and guage enhancements would improve the reliability of rail journeys on the North Wales coast line.

Freight options aimed at reducing the number of HGV trips will reduce congestion and improve journey reliability for other road users.

Grant, Subsidy and any Developer Contributions

All bus options included in this package could be subject to contributions from bus operators.

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 corridor has been identified for extensive development growth within the Flintshire Unitary Development Plan (UDP) including employment within the Deeside Industrial Park, Broughton and housing within the A55/A494 conurbations.

In principle this package has the potential to generate a positive economic response, principally at a localised level.
Primary economic benefits are generated by improved accessibility with the Deeside Industrial Park form key surrounding labour market locations, as demonstrated by the new Deeside rail station. This package directly generates employment through options such as the new rail stations in Queensferry and Deeside and the Park and Ride service in Northop.
The multi modal accessibility options within this package support the delivery of proposed developments within the Deeside Industrial Park, potentially generating up to 5,500 new jobs. However, based on the options within this package and current employment mix (primarily manufacturing), a significant development and investment response is unlikely due to remaining highway constraints. The overall level of attainable development is dependent on the level of service and accessibility provided.
Generally the options within this package improve the level of accessibility for all users along the A55/A494 corridor, by alleviating private car dependency through the provision of viable alternative modes, principally rail based. However, the scale of benefit is dependent on the adoption of alternative travel.
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.

Environment

Noise
This package results in both increases and decreases in noise levels as a result of changes in traffic, and balance lead to an overall assessment of **neutral**.

Local Air Quality
The package is likely to reduce the overall traffic volume on the local road network, with corresponding reductions in pollutant emissions. Therefore this package will have **slight benefit** on local air quality.

Greenhouse Gas Emissions
The construction phase of the proposed packages will lead to higher emission of C (or CO2 equivalent) because of machines and equipment used on site. These impacts will increase the amount of CO2 emitted from Flintshire. However, in comparison to emissions for the whole county the increase associated with construction activities will be small. Overall there is a decrease in carbon (CO2) emissions predicted which will have **Slight Benefit.**

Landscape and Townscape
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 existing footpath.
The provision of a new lane, for bus use only on the A55/A454 would be expected to generate only Neutral landscape impact as the area is already dominated by the existing Highway. Other Bus proposals will also be have a Neutral impact, in landscape/townscape impact as they are not significant in landscape/townscape terms due to the type the proposal which involve changes to bus services type and frequency only.
The development of a new station at Deeside 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. 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. The provision of additional rail services would have also have Neutral landscape/townscape impact
Freight proposals have the potential to impact Landscape and Townscape, however it is likely they would not be located in areas of landscape sensitivity but could be extensive in scale and potentially incorporate and require significant associated infrastructure.
The provision of a new Park and Ride facility could impact adversely upon the generally good quality rural landscape adjoining Northop and the extent of this would be determined by micro-siting and other mitigation options, including planting. It is considered, subject to successful mitigation, that likely impacts would be Neutral to Slight Adverse in the long.

Overall, Package 3A would have potentially **Neutral impact**, subject to appropriate mitigation of the Northop Park and Ride site.

Biodiversity
This package would result in potential works within or close to a number of internationally and nationally protected sites. Furthermore Options within this package pose ecological risk through the loss of woodland, mature trees, scrub/hedgerows and estuarine habitat. There is the potential of disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species including; GCN, otter, badger, reptiles and bats. However, following mitigation it is predicted that the impact is likely to be neutral.

Heritage
This package may have impacts both upon previously unrecorded archaeological sites in proximity to Northop, Deeside and Queensferry. Elements of the built heritage may be impacted within the urban centres where the need for transport improvements has been identified. However, it is considered that overall this package will result in a **neutral impact** on Heritage.

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, the new rail station at Deeside Industrial Park has the potential to present challenges with respect to contaminated land. Additionally, the operation of the scheme has the potential to create new pollution, both through Incidents and through the day-to-day running of the roadways. With mitigation, both stability and contamination will be improved, leading to a neutral construction impact. The operational impact will be **neutral**.

Water Environment
The package would require construction works to take place within the study area. Assuming good practice is implemented during construction including options to prevent and control silt-laden runoff and spillages, the impact on surface water can be effectively mitigated. It is unlikely there is the potential to significantly modify the runoff content from roads or to significantly influence the spillage risk along the routes. Additionally, no morphological changes are expected. During the operation phase of the proposed scheme impacts are all assessed to be Neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.

Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.

Construction: Assuming good practice is followed during construction including provision of appropriate site drainage to control silt and debris laden runoff, temporary attenuation, appropriately designed temporary works to allow the passage of flows in watercourses, temporary foul drainage, and compensatory flood storage if required by the EAW, the construction impacts on flood risk can be effectively mitigated. During the operation phase impacts are all assessed to be **neutral**.

Social

Transport safety
For walkers and cyclists the provision of routes parallel to as well as safe crossing opportunities of the A55/A494 corridor should help to reduce the incidence of accidents involving pedestrians and cyclists on the strategic highway. Additional walking and cycling links should also reduce the need for walkers and cyclists to travel on road through the corridor, helping to reduce conflicts with motorised transport modes.

The new bus, coach and routes as well as additional new stations should help to provide viable direct public transport routes, helping to encourage people to use public transport and reducing the need to walk along dangerous routes to reach the desired destination.

Bus and rail improvements should reduce the number of cars using the roads, shifting these trips to bus and rail, which have better safety levels.

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

Personal security
This package involved improvements to existing walking and cycling routes as well as a number of new routes which will be constructed to modern standards to ensure personal security. Additional crossing opportunities will be provided for the River Dee and A55/A494 corridor, which will be designed to ensure they are not a crime risk.

The proposed public transport improvements should provide more direct routes to destinations, reducing the perceived personal security risk involved in the requirement to walk a significant distance to destinations.

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 upon the personal security of all transport users within the study area.

Permeability
The provision of parallel walking and cycling provision along the A55/A494 corridor as well as new opportunities to cross the strategic highway and River Dee should significantly help to reduce the severance impacts of these obstacles and allow walkers and cyclists to more easily access services, facilities and opportunities.

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

Physical fitness
This option package seeks to provide additional capacity through the provision of new infrastructure, which includes dedicated walking and cycling links. One such proposed link is the formalisation of an existing cycle link from Neston to Deeside Industrial Park, eventually linking up with the existing National Cycle Route 5.

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.

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.

Further options within this option include providing alternative routes parallel to the existing A55/A494 corridor for cycling and walking provision, as well identifying new routes to public transport interchanges. Improvements to links to public transport is likely to encourage a modal shift towards walking and cycling.

It is therefore considered that this option package will encourage a modal shift to walking and cycling, and is scored as of **moderate benefit**.

Social inclusion
This package will help to promote social inclusion through increasing public transport accessibility to key destinations for deprived groups within the study area.

New cross Dee bus routes will help to connect Holywell, Flint, Deeside Park, Chester, Mold and Ellesmere Port. This will help to improve accessibility to work opportunities at locations such as Chester and Deeside Park for residents without access to a car in deprived locations such as Holywell, Flint, Connah's Quay and Ellesmere Port.

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 wider social inclusion.

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

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.

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 acceptable to the local public.

Acceptability to other stakeholders
Stakeholder consultation has indicated that the provision of bus lanes along the A55/A494 would not be supported due to the impacts of this on general traffic and the questionable levels of bus use along this route. The park and ride element of the package was approved of by some, however others questioned which areas it would serve and the need for disincentives to car use to incentivise its use. A number of other alterations were also recommended.

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. The width of the River Dee will mean that the provision of additional crossing opportunities for walkers and cyclists will involve the construction of a relatively large structure, with implications for the technical feasibility of the package. The provision of pedestrian crossing facilities along the A55/A494 corridor could also cause disruption impacts for general traffic during the construction phase.

Providing bus lanes along the A55/A494 is likely to cause a number of operational impacts due to the loss of existing lanes to general traffic and a resultant loss of resilience of the corridor.

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.

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.

New stations at Queensferry and Deeside Park are technically and operationally feasible, with Deeside Park station currently going through the Network Rail GRIP process.

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.

A strategic park and ride site at Northop would be technically and operationally feasible, but would require the purchase of land.

Financial Affordability, Deliverability

Table 6.12: Package 3A: Capacity Improvements – Non-Highway Options – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Walking & Cycling	Provide parallel provision and alternative routes for pedestrians and cyclists	1	WG / Flintshire CC	24
	Provide safe walking and cycling routes from communities to public transport interchanges.	0.1	Flintshire CC	32
	Provide walking and cycling crossing facilities on the A55/A494 corridor and associated junctions at key points of desire	0.1	WG / Flintshire CC	33
	Provide additional opportunities for walkers and cyclists to cross the River Dee	1	Flintshire CC	35
	Provide a cycle link between Deeside and Neston	0.5	Flintshire CC / Cheshire West & Chester	84

Bus	Bus lanes along the A55/A494 corridor	10 - 20	WG	
	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	WG / Local Highway Authorities / Bus Operators	
	New cross Dee bus route between Mold and Ellesmere Port	0.25	WG / Local Highway Authorities / Bus Operators	
	Taith express coach services	0.25	WG / Taith / Bus Operators	41
	Rail link bus routes from Hawarden bridge station to Deeside Industrial Park employers	0.25	Flintshire CC / Bus Operators	
Rail	Service frequency increase on Borderlands Line (hourly to half-hourly)	10	Network Rail / Train operators	45
	Service frequency increase on Borderlands Line (hourly to half-hourly), plus extension into Liverpool	200	Network Rail / Train operators	46
	New rail station at Deeside Industrial Park	7.5	Network Rail / Flintshire CC	49
	Fast Llandudno-Manchester Airport service	0	Network Rail / Train operators	50
	Fast Llandudno-Manchester Airport service, splitting & joining at Chester with Wrexham portion	23	Network Rail / Train operators	51
	Extension of London-Chester services to Bangor/Holyhead	0	Network Rail / Train operators	54
	Rhyl-Chester (with possible extension to Crewe) local shuttle	2	Network Rail / Train operators	55
	Linespeed improvements and gauge enhancements on North Wales coast line	27	Network Rail	56
	New station at Queensferry on the North Wales Main Line	3 - 5	Network Rail / Flintshire CC	57
Freight	Freight Train electrification	5	Network Rail	75
	Open Access Rail Terminal	15	Network Rail / WG	82
Demand Management	Strategic Park and Ride site on the A55 at Northop	5	WG / Flintshire CC	

The total cost of this package excluding long term rail options is approximately £94m (2010 prices). Including long term options the capital cost is estimated at £317m (2010 prices). There are potentially eight delivery agents identified for this package.

The majority of the walking and cycling elements of this package can be delivered relatively easily.

The majority of the bus elements of this package can be delivered relatively easily given the support of bus operators. However, providing bus lanes along the A55/A494 corridor would require significant funding from WG and would be more difficult to deliver.

There is significant financial cost associated with the rail options in this package. The majority of this is associated with 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 long term rail option financially unaffordable.

Freight train electrification would need to be delivered in Tandem with line electrification, cost is for electric freight trains, but excludes the cost of line electrification.

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

Risk

The financial risk associated with this package is considered high. There is a significant cost in providing bus, rail and freight options that would be all at risk of additional costs. In particularly long term rail options have significant financial risk.

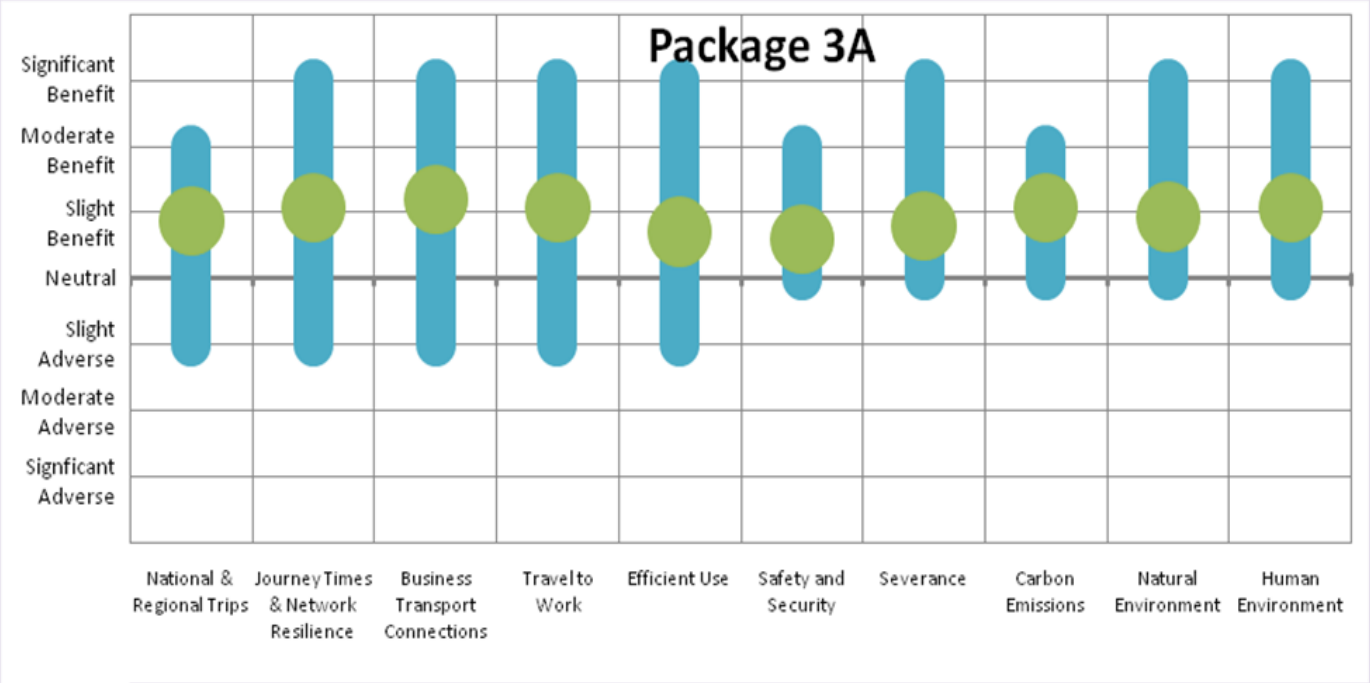
Rail and bus options require full support from Network Rail and transport operators

There is a risk that the provision of bus lanes on the A55/A494 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. Stakeholders in general considered this package to contribute positively to all of the Transport Planning Objectives, however there was a large degree of variation between the highest and lowest scores given by stakeholders, particularly for the objectives relating to journey times and network resilience, business transport connections, travel to work and making more efficient use.

Figure 6.4 Capacity Improvements- Non Highway Options: Stakeholder Assessment



To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight.
This package includes a number of improvements to regional and national public transport through provision of the Taith express coach services as well as rail service and speed improvements. These improvements should help to facilitate the regional and national passage of people through the corridor and North Wales between destinations including Holyhead, Chester, Manchester and London. These improvements, alongside localised public transport improvements should help encourage mode shift, helping to reduce levels of traffic along the A55/A494 corridor, helping to facilitate necessary national and regional highway trips. Rail electrification, linespeed improvements and open access rail terminals should help facilitate the regional and national movement of freight by rail. Overall it is considered that this package will have a **significant beneficial** impact upon this Transport Planning Objective.

To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.
The journey time reliability of the A55/A494 corridor for trips utilising the strategic road network 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 traffic levels.

The proposed improvements to rail services to tourist destinations in North Wales, such as Rhyl, Bangor and Llandudno may help to make rail a more viable alternative to car travel for tourist trips, helping to slightly reduce seasonal peak demand and the associated impacts on the strategic road network. Linespeed improvements and gauge enhancements will improve the resilience of the North Wales rail network.

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

To reduce carbon emissions from transport along the A55 A494 study corridor.
This package is predicted to provide a slight benefit in terms of a reduction in carbon emissions due to mode shift away from private car use towards the use of public transport.

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

To improve transport connections for businesses within the study area to key economic centres and employment sites.
This package will improve public transport connections from the study area to destinations on the North Wales coast and in England. This will help to facilitate public transport connections for businesses to these economic centres. Stations at Queensferry and Deeside Park will allow businesses at these locations to utilise rail for business trips.

An open access rail terminal will allow businesses within the study area to utilise rail freight to transport goods to key economic centres.

The more localised improvements to public transport and walking and cycling will help to reduce local and commuter highway trips. This will free up highway capacity for necessary business trips.

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

To improve access between employment sites and workforce catchment areas.
The improvements contained within this package, such as the new cross Dee bus routes, rail link bus routes, new walking and cycling links and rail station and service improvements should all help to improve accessibility between workforce catchments and employment sites including Deeside Industrial Park and Chester for those without access to a car. it is anticipated that this package will have a **significant beneficial** 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 predicted to have a slightly beneficial impact upon local air quality in urban areas alongside a neutral impact upon noise, light pollution and landscape and townscape. Overall it is anticipated that this package will have a **neutral 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 predicted to have a slightly beneficial impact upon local air quality in the natural environment alongside neutral impacts on biodiversity, soil pollution and water during the operation of the package assuming necessary mitigation options are implemented.
Overall it is anticipated that this package will have a **neutral impact** upon this Transport Planning Objective.

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
For walkers and cyclists the provision of routes parallel to as well as safe crossing opportunities of the A55/A494 corridor should help to reduce the incidence of accidents involving pedestrians and cyclists on the strategic highway. Additional walking and

cycling links should also reduce the need for walkers and cyclists to travel on road through the corridor, helping to reduce conflicts with motorised transport modes. These improvements will be constructed to modern standards to ensure personal security and limit fear of crime.

The new bus, coach and routes as well as additional new stations should help to provide viable direct public transport routes, helping to encourage people to use public transport and reducing the need to walk along dangerous routes (with perceived personal security risks) to reach the desired destination.

Bus and rail improvements should reduce the number of cars using the roads, shifting these trips to bus and rail, which have better safety levels. 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 upon this Transport Planning Objective.

To maintain and make more efficient use of the existing transport infrastructure along the A55 A494 study corridor.

This package involves the provision of considerable amounts of new non-highway transport infrastructure. This infrastructure will help make better use of existing infrastructure, for example through providing walking and cycling connections from settlements to existing walking and cycling provision. The new cross Dee bus routes will seek to involve improvements to existing services where practical. Improvements such as rail link bus routes will help to make existing rail services a more efficient and viable proposition.

Overall it is anticipated that this package will provide a **moderate benefit** in contributing to this Transport Planning Objective.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.

The provision of parallel walking and cycling provision along the A55/A494 corridor as well as new opportunities to cross the strategic highway and River Dee should significantly help to reduce the severance impacts of these obstacles and allow walkers and cyclists to more easily access services, facilities and opportunities.

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

Package 3B.1.1: Capacity Improvements – Highway Options – A55/A494 Corridor – Existing A55/A494 Alignment

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 3B.1.1: Capacity Improvements – highway is estimated at £199m (2010 prices). The majority of this cost (£193m) is associated with on-line highway improvements on the A55/A494 and improvements to interchanges.

Vehicle Operating Costs (VOCs)

Modelling of this package has indicated that the highway Vehicle Operating Cost will increase by £18.4m. The majority of this increase is associated with increased fuel costs. Increases to Non-fuel operating costs are minimal.

Travel Time Savings
Modelling of this package has indicated that highway travel times on the A55/A494 and across the study area will decrease. Modelling suggests that Eastbound travel times between Northop and Shotwick via the A55/A494 will decrease by 3 minutes in the morning peak. Westbound evening peak travel times decrease by 4 minutes.

Modelling of this package has indicated that the travel time benefits will increase by £128m. Travel time benefits to consumers and businesses are similar.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will increase by £10.6m.

Freight operators' revenue will increase as freight options included in this package improve efficiency and reliability.

Reliability
On-line highway improvements on the A55/A494 and improvements to interchanges will ease congestion and improve journey reliability of all road users, particularly during peak times.

Freight options aimed at reducing the number of HGV trips will reduce congestion and improve journey reliability for other road users.

A park and car share scheme has the potential to reduce the number of solo car journeys, reducing congestion and increasing journey reliability for other road users.

Grant, Subsidy and any Developer Contributions

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 study area. Primary economic responses are generated by the highway improvements to the A494/A55, particularly the Ewloe to Queensferry section including the Ewloe Interchange and A494 River Dee crossing. The WelTAG Planning Stage assessment identified the A494 River Dee crossing limited capacity, delays and congestion, as key constraining factors to the economic performance of the area. The alleviation of specific highway constraints is likely to generate a significant economic response both locally and nationally. The options within this package are designed to support the existing demand, provide additional capacity and improve the highway resilience.
Providing additional highway capacity may encourage existing corridor businesses to expand while also facilitating additional development demand, potentially generating employment. This package facilitates the delivery of development allocations within the Deeside Industrial Park, programmed to create up to 5,500 new jobs.
This package is likely to generate a minor displacement response, based on an increase in competitive status of the A494/A55 corridor from alternative locations within Wales and Northern England.
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.

Environment

Noise

The results indicate that improvements in capacity and reduction in congestion to the A494, the A55 Ewloe interchange and the A55 Ewloe to Northop will cause noise to increase due to increases in traffic flow and speeds. This will be off-set elsewhere on the road network with reduction in noise as traffic flows decrease.

The assessment indicates a range of impacts from moderate adverse to moderate beneficial impacts. However, about 90% of the data was evenly spread within the ± 0.9 dB(A) range and on balance lead to an overall assessment of **neutral**.

Local Air Quality

The improvements in network capacity proposed as part of this package will lead to higher levels of vehicle kilometres travelled through the study area due to the release of suppressed demand. This will increase total emissions of NO_X and PM_{10} causing an adverse effect on local air quality. Deterioration in local air quality should be expected near to links where traffic flows increase significantly. The redistribution of traffic through the network may result in slight improvements in air quality in some locations. This package will have a slight adverse impact in the forecast year and a **moderate adverse** impact in the design year.

Greenhouse Gas Emissions

This option results in a significant increase in the capacity of the A55/A494 corridor. This will lead to an increase in vehicle kilometres, which will cause a corresponding increase in CO_2 emissions. Overall this package will have a **moderate adverse** impact in terms of greenhouse gas emissions.

Landscape and Townscape

The highway options have the capacity for adverse Landscape and Visual impacts as they advocate large scale physical change to the landscape and townscape. The likely changes to the A55/A494 corridor could have a Moderate Adverse effect, as the changes are substantial in scale. The effect would be localised and limited to some degree as the area is already dominated by the road corridor in the urban area and forms a 'good fit' into the landscape over the rural section along the A494, within which it is largely not visible over wide areas.

Improvements to the Ewloe interchange could potentially create Moderate Adverse impacts on the surrounding Townscape/ Landscape. The existing interchange is well screened by substantial earthworks and extensive areas of semi-mature planting and, due to the potentially significantly reduced limited space available for mitigation and proximity of visual receptors, the removal of existing screen planting could lead to a significant reduction in the integration of the road into its receiving environment.

The proposed Freight Consolidation Centre at Deeside would be located in a non-sensitive area and as such would have a Neutral impact. HGV Only Lanes suggests options to be part time and thus not requiring additional infrastructure as such, if this is the case, this would also be Neutral.

Overall this package would be **slight adverse**, following appropriate mitigation.

Biodiversity

This package would potentially impact a number of internationally and nationally protected sites. Furthermore the package poses ecological risk through 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 including GCN, otter, badger, reptiles and bats. Following appropriate mitigation the impact is considered to be **slight adverse**.

Heritage

The main potential impacts arising from this package will be on previously recorded archaeological sites adjacent to the A55 and A494 where any carriageway widening takes place. There would be impacts on the setting of identified built heritage assets that are located in close proximity to any construction and operation phases. The construction of a new road across undeveloped land may have additional implications for any previously unrecorded archaeological assets. However, with appropriate mitigation it is considered the impact will be **neutral**.

Soils

Without mitigation, this package has the potential to disturb pre-existing mine workings and create instabilities; similarly, pathways to pre-existing contamination may be created. The A55 Ewloe to Northop improvements in particular have the potential to create instabilities. Additionally, 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**.

Water Environment

Assuming good practice is implemented during construction including options to prevent and control silt-laden runoff and spillages, construction impacts can be effectively mitigated on surface water. 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.

Both construction and operational effects are anticipated to be Slight adverse for this Package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.

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

Social

Transport safety

The improvement of the section of the A494 from Drome Corner to Queensferry should help to improve transport safety as this section of road is currently substandard and a 50mph limit is imposed to help avoid serious accidents.

Improvements to the Ewloe interchange will also help to increase transport safety for users of the strategic highway, as this junction is currently a focus for accidents.

Improvements to the stretch of the A55 from Ewloe to Northop will also have a marginal beneficial impact of transport safety as although this stretch of road is not a particular accident black spot any improvements will be constructed to modern safety standards and the current dangerous pedestrian crossing arrangements will be revised.

The freight improvements will help to improve the safety of freight haulage through the study area. Truckstops will help to reduce the incidence of accidents involving HGVs as it will encourage drivers to take a break. Freight Consolidation Centres will help to reduce the number of HGV trips using the study corridor, with HGV only lanes helping to reduce conflicts between freight and general traffic.

Overall it is anticipated that this package will have a **significant beneficial** impact upon transport safety within the study corridor.

Personal security

Improvements to the strategic highway are unlikely to influence levels of perceived or actual personal security.

A truck stop may help to incidence of HGVs parking in laybys, where they can become the victims of crime.

A park and car share scheme may be perceived as a personal security risk, as vehicles will be left unattended at locations in the study area.

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

Permeability

This package is unlikely to have a significant impact on levels of permeability for pedestrians and cyclists as it involved the construction of new highways utilising existing alignments only. Any highway improvements may also involve improvements to existing pedestrian crossing points of the A55 and A494 as part of the construction work, which may offer permeability improvements were existing crossings are perceived as dangerous.

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

Physical fitness

This option package seeks to improve capacity of the existing A55/A494 corridor using the existing alignment. For example, this includes providing an additional lane on the A494 River Dee Crossing, and the provision of HGV only lanes. This option could encourage the use of private vehicles, through induced demand, reduce levels of walking and cycling. This could lower the levels of physical fitness. However, it is unlikely that improving the capacity of this route will encourage a modal shift to private vehicles. The new highway works could provide additional crossing points across the A55/A494, which could remove one of the barriers to walking and cycling. However, it is likely that this option has no discernible physical fitness benefits, as it neither encourages nor discourages physical fitness. Therefore, this option package is considered **neutral**.

Social inclusion
This package will help to promote social inclusion through improved journey times for road based transport modes, offering improved accessibility to opportunities in North Wales and England. The benefits to people within the study area without access to a car are likely to be limited to journey time benefits for any bus routes which utilise the strategic highway network and the improved opportunities to car share.

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

Equality, Diversity & Human Rights
This package is not anticipated to have any **significant impact** upon issues of equality, diversity and human rights.

Acceptability

Public Acceptability
Public consultation has not yet been undertaken on this package. There was previous opposition to the Drome Corner to Ewloe scheme. Some of this opposition related to the scale of those proposals and it is likely that opposition to a scaled down scheme would be less.

Acceptability to other stakeholders
Stakeholder consultation has indicated mixed levels of support for this package. Some stakeholders questioned the benefits of HGV only lanes, and others questioning whether three lanes would be required if other packages where implemented alongside this to reduce demand. Stakeholders felt that even with the improvements proposed there would be a need to reduce the number of junctions accessing the A55/A494. Others thought that the package would receive local opposition on environmental grounds.

Technical & Operational Feasibility
Widening of the existing carriageway alignment along the A55 / A494 would improve traffic flow and journey time reliability. Managed motorway concepts and slip-road improvements could also be used to improve the operational effectiveness of this route. Improvements to Ewloe Interchange are based on previous proposals by the Welsh Government. The highway proposals would require significant land-take outside of the existing highway boundary. Construction of on-line widening would cause a severe amount of disruption to traffic flow on the A55 and A494.

Consolidation Centres mean fewer, fuller trucks running on highway and possibility of modal shift, if rail connected. Provision of a truckstop would reduce overnight parking of HGVs in laybys providing safer facilities for drivers. Suitable locations and an operator for the consolidation centre and truckstop need to be identified.

HGV only lanes, especially timed with port sailings, could improve traffic flow, for other road users, by preventing overtaking and removing slower traffic out of the path of HGVs. To be feasible, the provision of HGV only lanes would need to be combined with highway capacity improvements and variable messaging signs.

Park and car share scheme would need significant promotion with local businesses, however it is unlikely to attract significant numbers of users.

Financial Affordability, Deliverability

Table 6.13: Package 3B.1.1: Capacity Improvements – Highway Options – A55/A494 Corridor – Existing A55/A494 Alignment – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Highway	Drome Corner to Queensferry Improvements	65	WG	19
	A494 Queensferry to Ewloe Improvements			18
	Ewloe Interchange Improvements	96	WG	14
	A55 Ewloe to Northop Improvements	32	WG	22

Freight	Freight Consolidation Centres including one at Deeside	1	WG / Taith	61
	Truckstops	3	WG / Taith	71
	HGV Only Lanes (Study)	1	WG	72
Demand Management	Park and Car Share scheme	1	WG / Flintshire CC	76

The total cost of this package is approximately £199m (2010 prices). There are potentially three delivery agents identified for this package. The highway options associated with this package have significant financial cost, however if funding is available the schemes are considered deliverable.

The 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.

Deliverability of truckstops have been notoriously difficult in recent years due to planning restrictions and problems attracting private investors. The deliverability of HGV only lanes could be studied in more detail if this package is taken forward to a Stage 2 WelTAG Appraisal.

Whilst the park and car share scheme at Northop would be straightforward to deliver, it is likely it would not attract high levels of use.

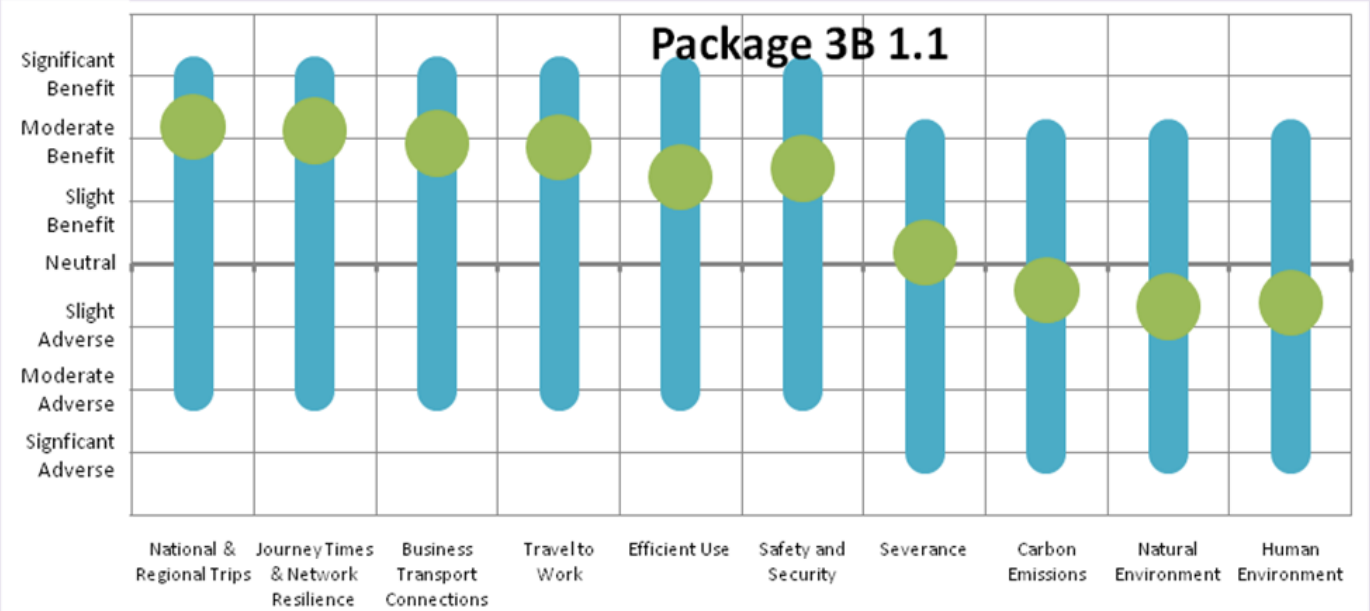
Risk

The main risks associated with this package are the availability of funding from the key delivery agencies and Public Inquiry process. These will be subject to the successful completion of statutory procedures and the availability of funding from budgets approved by the WG.

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. Stakeholders have indicated varied views regarding how well this package would contribute to the various Transport Planning Objectives. On average stakeholders felt that this package would contribute very positively to objectives relating to national and regional trips and journey times and network resilience. However, stakeholders thought that the package would have a **slight negative** impact on objectives relating to carbon emissions and the natural and human environments.

Figure 6.5 Capacity Improvements- Highway Options A55/A494: Stakeholder Assessment



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

This package includes significant improvements to the highway capacity along the A55 and A494 through online improvements. This additional capacity will facilitate strategic traffic being able to utilise these links to travel between destinations in North Wales and England. This package will resolve the congestion problems that occur on these links, helping to facilitate necessary trip movements. However, there will still be a significant portion of local traffic movements using these links alongside strategic traffic, which may constrict free movement for strategic trips.

Truck stops will give HGV drivers making regional or national trips an appropriate stopping point along their journey. A Freight Consolidation Centre would facilitate more efficient transport of freight to Deeside Park.

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

<u>To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.</u>

Capacity improvements to the A55/A494 between Northop and Drome Corner will provide additional highway capacity, helping to reduce journey time variability and enhance the resilience of the transport network. The improvements will also help to improve the ability to undertake maintenance on the corridor without causing major delays.

The improvements should enable the corridor to cope with the additional high demand that occurs during season peak periods, such as bank holidays.

Freight Consolidation Centres should reduce use of the corridor by HGVs. Truck stops and HGV only lanes will help to reduce the likelihood of accidents involving HGVs, helping to reduce the potential of incidents on the corridor.

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

To reduce carbon emissions from transport along the A55 A494 study corridor.
The options included in this package are likely to increase the use of the A55/A494 corridor due to current suppressed demand. This is likely to result in an increase in vehicle kilometres and a consequent increase in carbon emissions. This is considered to have a **moderately adverse** impact upon this Transport Planning Objective.

To improve transport connections for businesses within the study area to key economic centres and employment sites.
The improvements to the A55 and A494 corridors will provide additional highway capacity, helping to overcome current congestion issues and improve transport connections for businesses in the study area at locations such as Deeside Park, Broughton and Chester to interact with economic and employment centres in the study area, North Wales and England. Overall it is anticipated that this package will **contribute significantly** to this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.
This package should help to reduce congestion along the A55/A494 corridor. This will help to improve peak period journey times between workforce catchment areas in the study area and employment sites, such as Deeside Park for those with access to a car and for public transport routes which make use of the A55/A494. Overall it is anticipated that this package will **contribute moderately** positively to 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 result in a slight deterioration in local air quality in the human environment alongside a neutral impact on noise, light pollution and moderate adverse impact upon landscape and townscape. Overall it is anticipated that this package will have a **slight adverse** 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 likely to result in slight adverse impacts upon local air quality as well as neutral impacts upon water, soils and biodiversity during the operation of the scheme, assuming suitable mitigation is undertaken.

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

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
The improvement of the section of the A494 from Drome Corner to Queensferry should help to improve transport safety as this section of road is currently substandard and a 50mph limit is imposed to help avoid serious accidents.

Improvements to the Ewloe interchange will also help to increase transport safety for users of the strategic highway, as this junction is currently a focus for accidents.

Improvements to the stretch of the A55 from Ewloe to Northop will also have a marginal beneficial impact of transport safety as although this stretch of road is not a particular accident black spot any improvements will be constructed to modern safety standards and the current dangerous pedestrian crossing arrangements will be revised.

Improvements to the strategic highway are unlikely to influence levels of perceived or actual personal security.

The freight improvements will help to improve the safety of freight haulage through the study area. Truck stops will help to reduce the incidence of accidents involving HGVs as it will encourage drivers to take a break. It may also help to incidence of HGVs parking in laybys, where they can become the victims of crime.

Freight Consolidation Centres will help to reduce the number of HGV trips using the study corridor, with HGV only lanes helping to reduce conflicts between freight and general traffic.

A park and car share scheme may be perceived as a personal security risk, as vehicles will be left unattended at locations in the study area.

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 along the A55 A494 study corridor.
This package would involve the replacement of a large amount of the existing highway infrastructure along the A55/A494 corridor, rather than making more efficient use of the existing infrastructure.

Truck stops and Freight Consolidation Centres will seek to make more efficient use of existing freight infrastructure in the study area.

Overall it is anticipated that this package would have a **moderately adverse** impact upon this Transport Planning Objective.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.
This package is unlikely to have a significant impact on levels of permeability for pedestrians and cyclists as it involved the construction of new highways utilising existing alignments only. Any highway improvements may also involve improvements to existing pedestrian crossing points of the A55 and A494 as part of the construction work, which may offer permeability improvements were existing crossings are perceived as dangerous.

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

Package 3B.1.2: Capacity Improvements – Highway Options – A55/A494 Corridor – Orange Route

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs

The capital cost of Package 3B.1.2: Capacity Improvements – highway options is estimated at £205m (2010 prices) The majority of this cost (£199m) is associated with the provision of a new highway link parallel to the A494, on-line highway improvements on the A55/A494 and improvements to interchanges.

Vehicle Operating Costs (VOCs)

Modelling of this package has indicated that the highway Vehicle Operating Cost will increase by £23m. The majority of this increase is associated with increased fuel costs. Increases to Non-fuel operating costs are minimal.

Travel Time Savings

Modelling of this package has indicated that highway travel times on the A55/A494 and across the study area will decrease. Modelling suggests that eastbound travel times between Northop and Shotwick via the A55/A494 will decrease by 3 minutes in the morning peak. Westbound, evening peak travel times decrease by 4.5 minutes.

Modelling of this package has indicated that the travel time benefits will increase by £107m. Travel time benefits to consumers and businesses are similar.

Revenues and User Charging

Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will increase by £12.5m.

Freight operators' revenue will increase as freight options included in this package improve efficiency and reliability.

Reliability

A new highway link parallel to the A494, on-line highway improvements on the A55/A494 and improvements to interchanges will ease congestion and improve journey reliability of all road users, particularly during peak times. Northbound traffic joining the A494 from the B5125 at Ewloe may potentially have a reduction in journey reliability if the new A494 parallel link does not allow access from the A494/B5125 junction.

Freight options aimed at reducing the number of HGV trips will reduce congestion and improve journey reliability for other road users.

A park and car share scheme has the potential to reduce the number of solo car journeys, reducing congestion and increasing journey reliability for other road users.

Grant, Subsidy and any Developer Contributions

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 study area. The package includes the same options within package 3B.1.1 with the exception of the A494 Queensferry to Ewloe improvement which is replaced by a parallel link to the A494 as proposed within the 1992 Welsh Office public consultation. Therefore the economic responses are likely to be similar with the exception of the A494 option.

The difference in economic response between the two packages is dependent on the level of benefit provided by each option. In principal this difference is likely to be limited, with the exception of the possible attraction of additional investment into the newly accessible land parallel to the A494.

Alleviating the transport congestion generated by the A55 and A494 Ewloe to Queensferry section, including the River Dee crossing, is likely to result in a significant uplift in productivity within the study area, as this represents a key constraint to the existing site.

Providing additional highway capacity encourages the existing corridor businesses to expand and facilitates additional development demand, potentially generating employment. This package facilitates the delivery of development allocations within the Deeside Industrial Park, programmed to create up to 5,500 new jobs.

This package is likely to generate a minor displacement response, based on an increase in competitive status of the A494/A55 corridor from alternative locations within Wales and Northern England. The A494 parallel link is unlikely to significantly alter the spatial economic activity response.

Overall it is anticipated that this package will have a **significant beneficial i**mpact on the level and location of economic activity within the study area and wider economy of North Wales.

Environment

Package 3B.1.2 - Capacity Enhancements - Highway Options – A55/A494 Corridor – Orange Route Alignment

Noise

This scenario has several features that are similar to package 3B.1.1 in that improvements in capacity and reduction in congestion to the A494 and the A55 Ewloe interchange will cause noise to increase due to increases in traffic flow and speeds. However, the inclusion of the Orange Route, by-passing parts of the A494 would lead to reduction in noise for receptors along the by-pass section but increases in noise for receptors along the Orange Route corridor.

Although moderate adverse impacts are expected for both the Initial forecast and future year, very large beneficial impacts are expected along stretches of the A494 which are by-passed by the Orange Route.

However, no assessment of the impact of the new Orange Route Alignment has been included because this would require a detailed noise survey to assess existing noise levels prior to the road opening in order to estimate the change in noise level due to traffic on the new road. Clearly, noise from traffic on this road may have a large adverse impact on noise sensitive receptors in the vicinity, particularly those not already affected by noise from traffic along the A494. In addition, the large benefits indicated along the A494 may be off-set by the noise from traffic on the Orange Route but this would depend on the proximity of the new road Overall assessment is expected to be **slight adverse**.

Local Air Quality

The improvements in network capacity proposed as part of this package will lead to higher levels of vehicle kilometres travelled through the study area due to the release of suppressed demand. This will increase total emissions of NO_X and PM_{10} causing an adverse effect on local air quality. Deterioration in local air quality should be expected near to links where traffic flows increase significantly. The redistribution of traffic through the network may result in slight improvements in air quality in some locations, such as along the existing A494 alignment parallel to the orange route. This package will have a moderate adverse impact in the forecast year and design year.

Greenhouse Gas Emissions

This option results in a significant increase in the capacity of the A55/A494 corridor. This will lead to an increase in vehicle kilometres, which will cause a corresponding increase in CO_2 emissions. Overall this package will have a **moderate adverse** impact in terms of greenhouse gas emissions.

Landscape and Townscape

The highway options advocate large scale physical change to the landscape and townscape resource, including widening from two to three lanes the majority of the A55/A494 route. The likely changes to on line section of the improvement could have a Moderate Adverse effect, as the changes themselves are substantial in scale, though effects would be limited as the setting of the A494 is already dominated, by the road corridor. The improvements to the Ewloe interchange could potentially create Moderate Adverse impacts on the surrounding Townscape/ Landscape. The existing interchange is well screened by substantial earthworks and extensive areas of semi-mature planting and, due to the potentially significantly reduced limited space available for mitigation and proximity of visual receptors, the removal of existing screen planting could lead to a significant reduction in the integration of the road into its receiving environment.

The provision of a parallel link in the fields immediately adjoining the Shotton to Ewloe section of the A494 could potentially lead to Moderate to Large Adverse impact as a result of a further reduction of open land between Mancot and Aston, within the Green Barrier. Although the Green Barrier buffer between these is slight already it would be further undermined; and the areas character would become more influenced by the adjoining urban fringe and suburban development. The setting of Aston Hall, a Listed Building, could also be significantly affected and the routing through Ewloe to connect the link with the Ewloe Interchange could pose difficulties in integration, with or without the demolition of property, and adversely affect the setting of surrounding properties.

The proposed Freight Consolidation Centre at Deeside would be located in an area of low sensitivity and as such would be Neutral in impact. HGV Only Lanes (suggests options to be part time and thus not requiring additional infrastructure) as such, if this is the case, this would also be Neutral.

Overall, this package would have potentially Moderate to Large Adverse effects due to the effects of the off line link between Shotton to Ewloe and improvements of the Ewloe Interchange and other highway improvements. However, with appropriate mitigation this impact could be reduce to **slight adverse**.

Biodiversity

This package predicts works within or close to a number of internationally and nationally protected sites. Options within this package pose ecological risk through the loss of woodland, mature trees, scrub/hedgerows and disturbance of wildlife corridors/habitats, which are likely to be important for a number of protected species including GCN, otter, badger, reptiles and bats. Large adverse effects will occur if appropriate mitigation is not implemented, in particular for the Dee crossing. The significance of effect could be reduced following mitigation to **neutral/slight adverse**.

Heritage

This package will have potential impacts on both buried archaeological remains near Northop and adjacent to the A55 and A494 where any carriageway widening and the provision of a new link takes place and on built heritage throughout the study area that are located in close proximity to any construction and operation phases. With appropriate mitigation this will have a **neutral impact**.

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. The A55 Ewloe to Northop Improvements and the parallel link east of the A494 in particular have the potential to create pollution linkages and/or instabilities. Additionally, 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**.

Water Environment

Assuming good practice is implemented during construction including options to prevent and control silt-laden runoff and spillages, construction impacts can be effectively mitigated on surface water. 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 no appropriate treatment existed in the do-minimum scenario). Further assessment will be required during the design of stream crossings, particularly the River Dee crossing. 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 moderate adverse magnitude may occur.

Both construction and operational effects are anticipated to be Slight adverse for this Package on ground water, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.

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

Social

Transport safety

The improvement of the section of the A494 from Drome Corner to Queensferry should help to improve transport safety for road users as this section of road is currently substandard and a 50mph limit is imposed to help avoid serious accidents.

For pedestrians this package involves downgrading the existing stretch of the A494 from Queensferry to Ewloe to a local road, with a new road constructed to the east of the existing alignment. Assuming that safe pedestrian crossing arrangements are in place to cross the new road this should help to reduce the incidence of accidents involving pedestrians trying to cross the current A494 alignment at grade, as this route would be converted to a low speed, low traffic flow local road connection with suitable pedestrian crossing opportunities.

Improvements to the Ewloe interchange will also help to increase transport safety for users of the strategic highway, as this junction is currently a focus for accidents.

Improvements to the stretch of the A55 from Ewloe to Northop will also have a marginal beneficial impact on transport safety as although this stretch of road is not a particular accident black spot any improvements will be constructed to modern safety standards and the current dangerous pedestrian crossing arrangements will be revised.

The freight improvements will help to improve the safety of freight haulage through the study area. Truckstops will help to reduce the incidence of accidents involving HGVs as it will encourage drivers to take a break. Freight Consolidation Centres will help to reduce the number of HGV trips using the study corridor, with HGV only lanes helping to reduce conflicts between freight and general traffic.

Overall it is anticipated that this package will have a **significant beneficial** impact upon transport safety within the study corridor.

Personal security
This package involves the construction of a new highway alignment between Ewloe and Queensferry to the east of the existing route. For pedestrians wishing to cross the A494 corridor this represents an additional barrier. Pedestrian crossings can be perceived as a personal security risk, so this additional crossing requirement may be perceived negatively by pedestrians.

For users of the new road personal security levels are likely to be unchanged from at present.

A truck stop may help to reduce the incidence of HGVs parking in laybys, where they can become the victims of crime.

A park and car share scheme may be perceived as a personal security risk, as vehicles will be left unattended at locations in the study area.

Overall it is anticipated that this package will have a **slight negative** impact upon personal security levels.

Permeability
This package involves the construction of a new highway alignment between Ewloe and Queensferry to the east of the existing route. The existing route will then form a local road connection, with a reduced carriageway width. Whilst pedestrian crossing opportunities will be provided as part of these changes the addition of an extra road to cross is likely to present a severance barrier for the communities such as Aston and Hawarden living directly next to the proposed route, as individuals would now have an additional road to cross to access facilities found across the A494 corridor.

Overall it is anticipated that this package would have a **moderate negative** impact upon the permeability of the A55/A494 corridor.

Physical fitness
This option package seeks to improve capacity of the existing A55/A494 corridor making use of a new alignment between Ewloe and Queensferry. This includes providing an additional lane on the A494 River Dee Crossing, and the provision of HGV only lanes, and parallel running to the existing A55/A494. This option could encourage the extra use of private vehicles, through induced demand, reducing levels of walking and cycling. This could lower the levels of physical fitness. However, it is unlikely that improving the capacity of this route will encourage a modal shift to private vehicles. Therefore; this option has no discernible physical fitness benefits, as it neither encourages nor discourages physical fitness. Therefore, this option package is considered **neutral**.

Social inclusion
This package will help to promote social inclusion through improved journey times for road based transport modes, offering improved accessibility to opportunities in North Wales and England. The benefits to people within the study area without access to a car are likely to be limited to journey time benefits for any bus routes which utilise the strategic highway network and the improved opportunities to car share.

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

Equality, Diversity & Human Rights
This package is not anticipated to have any **significant impact** upon issues of equality, diversity and human rights.

Acceptability

Public Acceptability
Public consultation has not yet been undertaken. This package is likely to be opposed by those living near to the orange route alignment, but may be supported by those living near to the current A494.

Acceptability to other stakeholders
Stakeholder consultation has indicated that this package would not be supported. Some felt that the greenfield nature of the orange route would make it environmentally unacceptable. Others highlighted the community severance impacts of the package. The stakeholders did recognise that the impacts of construction on traffic would be less as part of this option than with an option proposing online improvements.

Technical & Operational Feasibility

Widening of the existing carriageway alignment along the A55 / A494 would improve traffic flow and journey time reliability. Managed motorway concepts and slip-road improvements could also be used to improve the operational effectiveness of this route. Improvements to Ewloe Interchange are based on previous proposals by the Welsh Government. The highway proposals would require significant land-take outside of the existing highway boundary. Construction of on-line widening would cause a severe amount of disruption to traffic flow on the A55 and A494.

The provision of a parallel link running east of the A494 between Ewloe and Queensferry would reduce the impacts of construction on the existing traffic using the A494. However, it would require significant amounts of land take, demolition and would involve significant greenfield construction, new junctions and structures adding to the technical complexity of the scheme.

Consolidation Centres mean fewer, fuller trucks running on highway and possibility of modal shift, if rail connected. Provision of a truckstop would reduce overnight parking of HGVs in laybys providing safer facilities for drivers. Suitable locations and an operator for the consolidation centre and truckstop need to be identified.

HGV only lanes, especially timed with port sailings, could improve traffic flow, for other road users, by preventing overtaking and removing slower traffic out of the path of HGVs. To be feasible, the provision of HGV only lanes would need to be combined with highway capacity improvements and variable messaging signs.

Park and car share scheme would need significant promotion with local businesses, however it is unlikely to attract significant numbers of users.

Financial Affordability, Deliverability

Table 6.14: Package 3B.1.2: Capacity Improvements – Highway Options – A55/A494 Corridor – Orange Route – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Highway	Drome Corner to Queensferry Improvements	71	WG	19
	Parallel link running east of the A494 between Ewloe and Queensferry			82
	Ewloe Interchange Improvements	96	WG	14
	A55 Ewloe to Northop Improvements	32	WG	22
Freight	Freight Consolidation Centres including one at Deeside	1	WG / Taith	61
	Truckstops	3	WG / Taith	71
	HGV Only Lanes (Study)	1	WG	72
Demand Management	Park and Car Share scheme	1	WG / Flintshire CC	76

The total cost of this package is approximately £205m (2010 prices). There are potentially three delivery agents identified for this package.

The 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.

Deliverability of truckstops have been notoriously difficult in recent years due to planning restrictions and problems attracting private investors. The deliverability of HGV only lanes could be studied in more detail if this package is taken forward to a Stage 2 WelTAG Appraisal.

Whilst the park and car share scheme at Northop would be straightforward to deliver, it is likely it would not attract high levels of use.

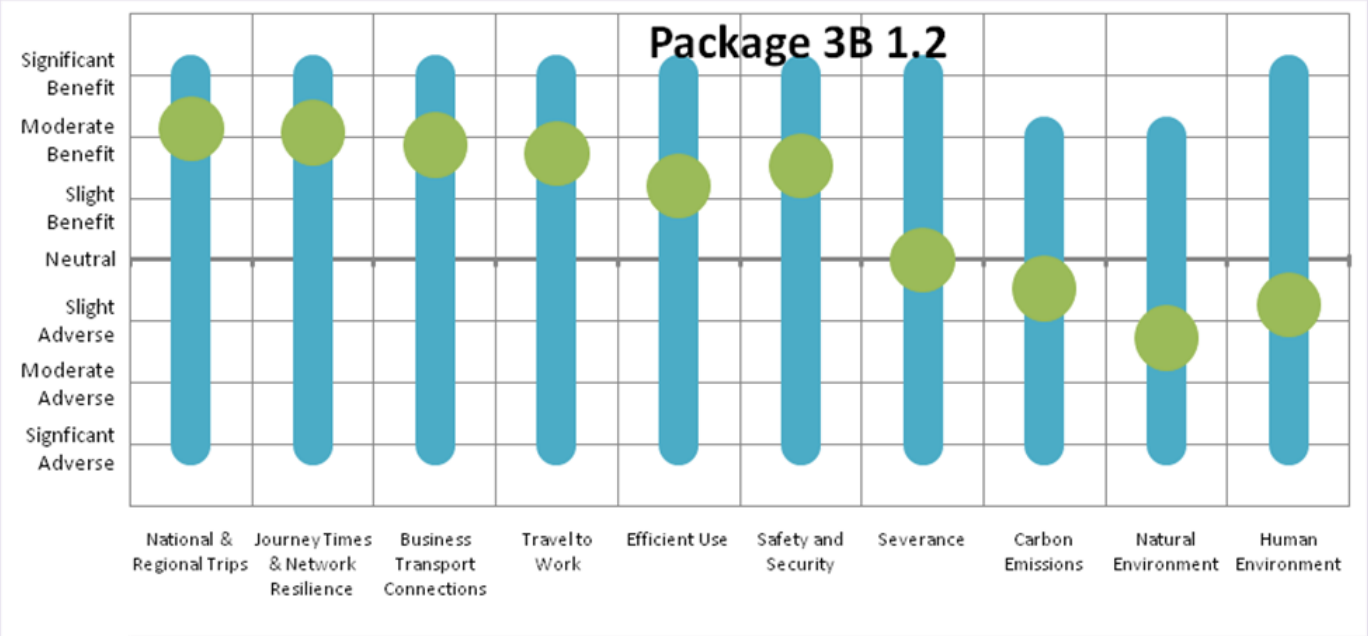
Risk

The main risks associated with this package are the availability of funding from the key delivery agencies and Public Inquiry process. These will be subject to the successful completion of statutory procedures and the availability of funding from budgets approved by the WG.

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. Stakeholders felt that this package would contribute very positively to objectives relating to national and regional trips, journey times and network resilience and business transport connections. The package was considered to contribute negatively to objectives relating to carbon emissions the human and particularly the natural environment. There was a great deal of variation in the scores given by stakeholders for this package.

Figure 6.6 Capacity Improvements – Highway Options A55/A494: Stakeholder Assessment



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

This package includes significant improvements to the highway capacity along the A55 and A494, with a new parallel link created on the A494 between Ewloe and Queensferry. This additional capacity will facilitate strategic traffic being able to utilise these links to travel between destinations in North Wales and England. This package will resolve the congestion problems that occur on these links, helping to facilitate necessary trip movements. However, there will still be a significant portion of local traffic movements using these links alongside strategic traffic, which may constrict free movement for strategic trips.

Truck stops will give HGV drivers making regional or national trips an appropriate stopping point along their journey. A Freight Consolidation Centre would facilitate more efficient transport of freight to Deeside Park.

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

<u>To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.</u>

Capacity improvements to the A55/A494 between Northop and Drome Corner will provide additional highway capacity, helping to reduce journey time variability and enhance the resilience of the transport network. The improvements will also help to improve the ability to undertake maintenance on the corridor without causing major delays.

This package will create a new route between Ewloe and Queensferry. This will provide a route alternative to the current A494 alignment, which will be downgraded. This will provide additional network resilience to incidents on this section of the corridor.

The improvements should enable the corridor to cope with the additional high demand that occurs during season peak periods, such as bank holidays.

Freight Consolidation Centres should reduce use of the corridor by HGVs. Truck stops and HGV only lanes will help to reduce the likelihood of accidents involving HGVs, helping to reduce the potential of incidents on the corridor.

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

To reduce carbon emissions from transport along the A55 A494 study corridor.
The options included in this package are likely to increase the use of the A55/A494 corridor due to current suppressed demand. This is likely to result in an increase in vehicle kilometres and a consequent increase in carbon emissions. The options included in this package are likely to increase the use of the A55/A494 corridor due to current suppressed demand. This is likely to result in an increase in vehicle kilometres and a consequent increase in carbon emissions. This is considered to have a **moderately adverse** impact upon this Transport Planning Objective.

To improve transport connections for businesses within the study area to key economic centres and employment sites.
The improvements to the A55 and A494 corridors will provide additional highway capacity, helping to overcome current congestion issues and improve transport connections for businesses in the study area at locations such as Deeside Park, Broughton and Chester to interact with economic and employment centres in the study area, North Wales and England. Overall it is anticipated that this package will **contribute significantly** to this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.
This package should help to reduce congestion along the A55/A494 corridor. This will help to improve peak period journey times between workforce catchment areas in the study area and employment sites, such as Deeside Park for those with access to a car and for public transport routes which make use of the A55/A494. The improvements will create a new alignment for the A494, leaving the old alignment as a local connection, improving local accessibility links. Overall it is anticipated that this package will **contribute moderately** positively to 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 result in a slight deterioration in local air quality in the human environment alongside a slight adverse impact on noise and moderate adverse impact upon landscape and townscape, although some areas will benefit and some areas will experience significant adverse conditions due to the majority of traffic moving onto the new road alignment. Overall it is anticipated that this package will have a **slight adverse** 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 likely to result in slight adverse impacts upon local air quality as well as neutral impacts upon water, soils and biodiversity during the operation of the scheme, assuming suitable mitigation is undertaken. Impacts on the natural environment during construction are likely to be more significant that for online improvements.

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

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
The improvement of the section of the A494 from Drome Corner to Queensferry should help to improve transport safety as this section of road is currently substandard and a 50mph limit is imposed to help avoid serious accidents.

For pedestrians this package involves downgrading the existing stretch of the A494 from Queensferry to Ewloe to a local road, with a new road constructed to the east of the existing alignment. Assuming that safe pedestrian crossing arrangements are in place to cross the new road this should help to reduce the incidence of accidents involving pedestrians trying to cross the current A494 alignment at grade, as this route would be converted to a low speed, low traffic flow local road connection with suitable pedestrian crossing opportunities. However, pedestrian crossings can be perceived as a personal security risk, so this additional crossing requirement may be perceived negatively by pedestrians.

Improvements to the Ewloe interchange will also help to increase transport safety for users of the strategic highway, as this junction is currently a focus for accidents.

Improvements to the stretch of the A55 from Ewloe to Northop will also have a marginal beneficial impact of transport safety as although this stretch of road is not a particular accident black spot any improvements will be constructed to modern safety standards and the current dangerous pedestrian crossing arrangements will be revised.

Improvements to the strategic highway are unlikely to influence levels of perceived or actual personal security. The freight improvements will help to improve the safety of freight haulage through the study area. Truck stops will help to reduce the incidence of accidents involving HGVs as it will encourage drivers to take a break. It may also help to incidence of HGVs parking in laybys, where they can become the victims of crime.

Freight Consolidation Centres will help to reduce the number of HGV trips using the study corridor, with HGV only lanes helping to reduce conflicts between freight and general traffic.

A park and car share scheme may be perceived as a personal security risk, as vehicles will be left unattended at locations in the study area.

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 along the A55 A494 study corridor.
This package would involve the replacement of a large amount of the existing highway infrastructure along the A55/A494 corridor, rather than making more efficient use of the existing infrastructure.

Truck stops and Freight Consolidation Centres will seek to make more efficient use of existing freight infrastructure in the study area.

Overall it is anticipated that this package would have a **moderately adverse** impact upon this Transport Planning Objective.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.

This package involves the construction of a new highway alignment between Ewloe and Queensferry to the east of the existing route. The existing route will then form a local road connection, with a reduced carriageway width. Whilst pedestrian crossing opportunities will be provided as part of these changes the addition of an extra road to cross is likely to present a severance barrier for the communities such as Aston and Hawarden living directly next to the proposed route, as individuals would now have an additional road to cross to access facilities found across the A494 corridor.

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

Package 3B.2: Capacity Improvements – Highway Options – A548 Corridor

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 3B.2: Capacity Improvements – Highway options is estimated at £159m (2010 prices). The majority of this cost (£153m) is associated with the enhancement of the A548 route between Flint and the A550, and a new road connecting the A55 and A548.

Vehicle Operating Costs (VOCs)
Modelling of this package has indicated that the highway Vehicle Operating Cost will decrease by £2m. Fuel costs increase slightly, however this is offset by reductions in Non-fuel costs.

Travel Time Savings
Modelling of this package has indicated that highway travel times on the A55/A494 and across the study area will decrease. Modelling suggests that eastbound travel times between Northop and Shotwick via the A55/A494 will decrease by 3.5 minutes in the morning peak. Westbound evening peak travel times decrease by 5 minutes.

Modelling of this package has indicated that the travel time benefits will increase by £121m. Travel time benefits to consumers and businesses are similar.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will increase by £2.3m.

Freight operators' revenue will increase as freight options included in this package improve efficiency and reliability.

Reliability
The enhancement of the A548 route between Flint and the A550, and a new road connecting the A55 and A548 will improve journey reliability of all road users, particularly during peak times. Traffic that remains on the A55/A494 route will benefit from reduced congestion whilst traffic on the new strategic route via the A548 will benefit from a new high grade more direct and less congested alternative.

Freight options aimed at reducing the number of HGV trips will reduce congestion and improve journey reliability for other road users.

A park and car share scheme has the potential to reduce the number of solo car journeys, reducing congestion and increasing journey reliability for other road users.

Grant, Subsidy and any Developer Contributions

Economic Activity and Location Impacts (EALI)
The economic responses to this package are primarily driven by the highway options, which promote the utilisation of the A548 as a strategic route by providing an alternative connection with the A55 (E22 Trans European Road Network (TERN).
Highway access improvements are likely to generate a positive economic response in productivity for both local and strategic traffic due to the improved route choice within the study area to key locations such as the Deeside Industrial Park and broader employment markets i.e. Northern England. Key locations to benefit from this option are Flint and Northop. In addition the A548 connection with the A55 enables the area to facilitate and attract additional investment to the now accessible land.
The current highway arrangement focuses investment towards the Deeside Industrial Park and general eastern side of the study area as specified within the Flintshire UDP. This package contradicts the polices within the Flintshire UDP by providing new highway infrastructure within the western side of the study area, which potentially attracts investment into to the newly accessible land provided by the proposed A548 to A55 connection and fails to facilitate development growth within the direct A55/A494 corridor as programmed within the UDP. The transfer of economic growth to the west is likely to result in a displacement effect from the east, where the congestion constraints remain.
This package is a departure from the standard method of mitigating the existing highway constraints on the A55 and A550 by promoting an alternative strategic route which avoids this key congestion. In principle the options have been designed to maximise the utilisation of the A548 River Dee crossing as a strategic route, to the benefit of the strategic road network.
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 by adjusting the economic structure of the area. However, this proposal conflicts with the regional development programme for Flintshire.

Environment

Package 3B.2 - Capacity Enhancements - Highway Options – A548 Corridor

Noise
This package includes the construction of a new road connecting the A55 and A548. This will result in an increase in traffic along the A548 to A550 resulting in an increase in traffic noise levels leading to large adverse impacts both in the Initial forecast and future years. Some moderate beneficial impacts are indicated along sections of the road network where traffic is diverted towards the new road link.

No assessment of the noise impact of the new road connecting the A55 and A548 has been included for similar reasons as that given for the Orange Route (option 3B.1.2). The exact location of the road was not known when this assessment was carried out. The noise impact of the traffic from this road is likely to be large due to the rural location. Overall the significance of the impacts is assessed as **moderate adverse**.

Local Air Quality
Package 3B.2 is predicted to result in a small increase in total vehicle-km travelled (an increase of 68,773 vehicle-km/day; 2.4%). This is due to the enhancement of the A548 route corridor as a strategic alternative to the A55 / A494 route corridor, providing a shorter route for through traffic around Connah's Quay. In terms of pollutant emissions, total NOX emissions are predicted to increase by 10,073 kg/year and total PM10 emissions by 823 kg/year.

Deterioration in local air quality should be expected near to road links where traffic flows increase significantly.
Construction of new road link will introduce traffic to a new area and air quality near to the new link will need to be assessed.
Some areas may experience slight improvements in air quality through the redistribution of traffic on the network.

Overall it is considered that this package will have a **slight adverse** impact in the forecast and design years.

Greenhouse Gas Emissions
This package will result in a slight increase in carbon emissions due to the additional capacity created causing additional trips to be made alongside a slightly shorter route than presently available. This leads to a slight increase in vehicle kilometres and a **moderate adverse** impact on greenhouse gas emissions from the study area.

Landscape and Townscape
The highway options have the capacity for adverse Landscape and Visual impacts as they advocate physical change to the landscape and townscape resource. It is assumed improvements would be online and minor within this area. As such the option would have a Neutral impact. The section of the A494 from the interchange with the B5129 to its junction with the A550 is of low sensitivity and the combination of the industrial landscape of Deeside Park and the low lying position of the road within an expansive landscape, would help conceal it from view over the wider area while this would mean impacts would reduced, they could still be Slight Adverse, without mitigation.

The proposed new dual–carriageway between the A55 and A548 would constitute a significant further urbanisation of the remaining open area of countryside, currently greenbelt, between Flint/Northop and the Queensferry/Shotton/Connah's Quay settlements. The area also contains Ancient Woodland and other areas of significant, though unprotected, trees. Oakenholt Hall, Cheshire Farm and Plas Bellin are Listed Buildings within the area, the setting of which could be potentially detrimentally affected. Key constraints would be the overall scale of impact and potential impacts on the Ancient Woodland and Listed Buildings, any of which could have a potentially, Large Adverse impact.

The proposed Freight Consolidation Centre at Deeside would be located in a non- sensitive area and as such would be Neutral in impact. HGV Only Lanes suggests options to be part time and thus not requiring additional infrastructure if this is the case; the effect would also be Neutral.

Overall, this Package would have potentially **Large Adverse** effects due to the proposed new dual–carriageway between the A55 and A548, however with appropriate mitigation this could be reduced to a moderate impact.

Biodiversity
This package includes potential works within or close to a number of internationally and nationally protected sites. Furthermore, there is a potential ecological risk through the loss of woodland (including Ancient Woodland), mature trees, standing water, scrub and hedgerows. This is likely to disturb wildlife corridors/habitats, which are likely to be important for a number of protected species including GCN, otter, water vole, badger, reptiles and bats. Moderate adverse effects will occur if appropriate mitigation is not implemented, in particular for the new road. The significance of effect could be reduced following mitigation to **neutral**.

Heritage
Some of the options within this package may have implications for both upstanding built heritage features in urban centres and for buried archaeological remains outside Northop. There is also the potential for previously unrecorded remains to be

encountered during any new connecting road between the A55 and A548. Any construction in proximity to the A458 has the potential to encounter remains relating to the Roman settlement and road here. Overall the impact is considered to be **neutral**.

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, the new dual carriageway connecting the A55 and the A548 has the potential to create pollution linkages. Additionally, 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.**

Water Environment

Assuming good practice is implemented during construction including options to prevent and control silt-laden runoff and spillages; the construction impacts can be effectively mitigated on surface water. During the operation phase it is likely that a slight beneficial impact will occur in terms of routine runoff and spillage risk. Morphological impacts will have to be assessed at a later stage when more information of the proposed new road is available. Further assessment will be required to determine the morphological impacts on Kelsterton Brook (should the new road cross it) and impacts of minor to moderate adverse magnitude are possible. An overall neutral impact on surface water is concluded as a result of the implementation of this package. This is assuming further assessment will be carried out and /or mitigation options are implemented where required.

Both construction and operational effects are anticipated to be Slight adverse for ground water, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.

Assuming good practice is followed during construction, the construction impacts on flood water 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.

Social

Transport safety

This package should help to improve transport safety along the current A55/A494 alignment as a proportion of the traffic will be take the alternative A548 corridor route instead. As this corridor is currently under utilised and largely separate from any significant settlements the route should improve safety levels overall due to fewer conflicts between strategic and local movements and less likelihood of incidents involving pedestrians or cyclists.

The substandard design of parts of the existing A55/A494 will continue to be a safety issue and will not be resolved as part of this package, beyond reducing the number of vehicles using this corridor.

Improvements to the A548 at Flint should help to reduce the perceived accident risks at this location.

The freight improvements proposed will help to improve the safety of freight haulage through the study area. Truckstops will help to reduce the incidence of accidents involving HGVs as it will encourage drivers to take a break. Freight Consolidation Centres will help to reduce the number of HGV trips using the study corridor, with HGV only lanes helping to reduce conflicts between freight and general traffic.

Overall it is anticipated that this package will have a **moderate beneficial** impact upon transport safety within the study area.

Personal security

Changes to the strategic highway network are unlikely to influence levels of perceived or actual personal security for road users.

A truck stop may help to reduce the incidence of HGVs parking in laybys, where they can become the victims of crime.

A park and car share scheme may be perceived as a personal security risk, as vehicles will be left unattended at locations in the study area.

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

Permeability

This package will involve the strategic route through the study area being moved from the current A55/A494 alignment to the A548 corridor. This is likely to result in improved permeability for those living on the existing A55/A494 corridor, who will be able to more easily cross this corridor on foot or by bike due to reduced traffic levels.

The alternative A548 corridor is away from any substantial residential areas, but may cause severance impacts for some dwellings along the stretch of new road constructed between Kersterton and Northop.

Overall it is anticipated that this package will have a **neutral impact** upon permeability levels within the corridor.

Physical fitness
This option package seeks to increase capacity through the provision of new infrastructure on the A548, to make it more of a strategic route and remove pressure from the A55/A494 corridor. Given this influences more strategic trips, it is unlikely to impact people wishing to walk or cycle in the study area. Therefore, this option is **neutral**.

Social inclusion
This package will help to promote social inclusion through improved journey times for road based transport modes, offering improved accessibility to opportunities in North Wales and England, as well as freeing up the existing A55/A494 corridor for local traffic movements.

The benefits to people within the study area without access to a car are likely to be limited to journey time benefits for any bus routes which utilise the strategic highway network and the improved opportunities to car share.

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

Equality, Diversity & Human Rights
This package is not anticipated to have any **significant impact** upon issues of equality, diversity and human rights.

Acceptability

Public Acceptability
Public consultation has not been undertaken at this stage. This package may receive support from those living along the existing A55/A494 corridor, where traffic levels would decrease, but would be opposed by those living near to the proposed Kersterton to Northop route alignment.

Acceptability to other stakeholders
Stakeholder consultation indicated broad support of this package. Consultees indicated that due to the two lane dual carriageway nature of Flintshire Bridge this could not be a three lane route; this may therefore limit its ability to replace the existing A55/A494 route. The existing A494 route would still require maintenance and would need to remain a trunk road due to the links to Chester and Broughton. Consultees also indicated that the cost and environmental impact of this package may be high.

Technical & Operational Feasibility
Enhancement of the A548 route would involve the improvement to key junctions along this route. This would require land purchase and would lead to disruption and delays to traffic during the construction phase.

A new road connecting the A55 and A548 would involve a new 4km link through greenfield land. This would be relatively straight forward in terms of the engineering issues but would probably require significant cuttings and embankments and impact on farmland, with likely environmental mitigation adding to the technical complexity of the scheme.

Operationally improvements to this route are unlikely to result in a big enough reduction in traffic levels using the A55/A494 route to allow this route to be detrunked. Significant maintenance would also still be required on this route in the medium term.

Consolidation centres mean fewer, fuller trucks running on highway and possibility of modal shift, if rail connected. Provision of a truckstop would reduce overnight parking of HGVs in laybys providing safer facilities for drivers. Suitable locations and an operator for the consolidation centre and truckstop need to be identified.

HGV only lanes, especially timed with port sailings, could improve traffic flow, for other road users, by preventing overtaking and removing slower traffic out of the path of HGVs. To be feasible, the provision of HGV only lanes would need to be combined with highway capacity improvements and variable messaging signs.

A park and car share scheme would need significant promotion with local businesses, however it is unlikely to attract significant numbers of users.

Financial Affordability, Deliverability

Table 6.15: Package 3B.2: Capacity Improvements – Highway Options – A548 Corridor – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Highway	Enhance the A548 route between Flint and the A550	64	WG / Flintshire CC	8
	New road connecting the A55 and A548	89	WG	11
Freight	Freight Consolidation Centres including one at Deeside	1	WG / Taith	61
	Truckstops	3	WG / Taith	71
	HGV Only Lanes (Study)	1	WG	72
Demand Management	Park and Car Share scheme	1	WG / Flintshire CC	76

The total cost of this package is approximately £159m (2010 prices). There are potentially three delivery agents identified for this package.
The highway options associated with this package have significant financial cost, however if funding is available the schemes are considered deliverable.

Deliverability of truckstops have been notoriously difficult in recent years due to planning restrictions and problems attracting private investors. The deliverability of HGV only lanes could be studied in more detail if this package is taken forward to a Stage 2 WelTAG Appraisal.

Whilst the park and car share scheme at Northop would be straightforward to deliver, it is likely it would not attract high levels of use.

The high cost of this package means that funding will need to be sought from the delivery agencies that have been identified. TENS funding may be available for the Freight Consolidation Centres. The majority of the options contained in this package are deliverable. They will be subject to the successful completion of statutory procedures and the availability of funding from budgets approved by the WG.

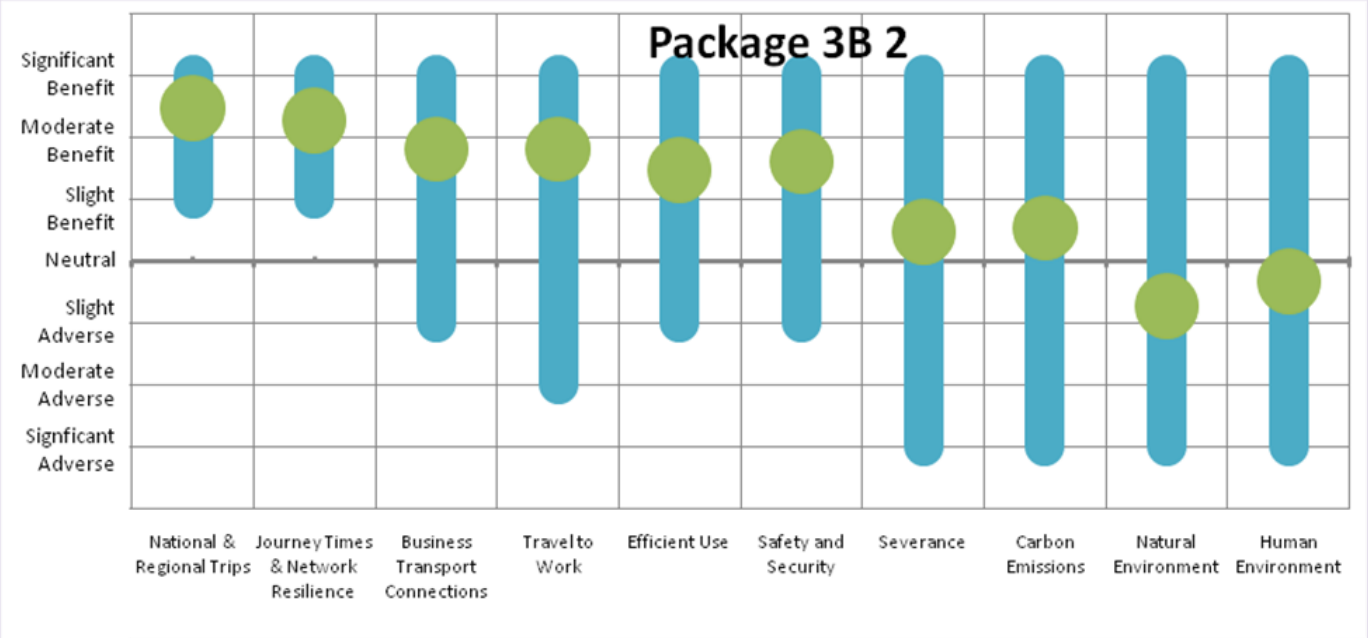
Risk

The main risks associated with this package are the availability of funding from the key delivery agencies and Public Inquiry process. These will be subject to the successful completion of statutory procedures and the availability of funding from budgets approved by the WG.

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 scored this package most highly against objectives relating to national and regional trips and journey times and network resilience. The package was considered to contribute negatively to the human and natural environments.

Figure 6.7 Capacity Improvements – Highway Options A458: Stakeholder Assessment



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

This package would provide a route alternative to the A55/A494 for traffic travelling between North Wales and the north of England. This strategic traffic would have a slightly more direct route utilising the current A548 which should provide a slight journey time benefit. The package would also allow this traffic to have a suitable diversion if the road needed to be closed for maintenance or due to an incident. Traffic travelling from North Wales to Chester or Wrexham would continue to use the current A55, however a significant proportion of the traffic currently using this route will take the alternative route which should mean that the current congestion problems experienced at Ewloe Interchange are negated. Overall it is considered that this package will have **large benefit** towards this Transport Planning Objective.

<u>To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.</u>

Enhancements to the A548 and a new link between the A55 and A548 will provide additional highway capacity for strategic trips; helping to reduce journey time variability and enhance the resilience of the transport network and facilitate maintenance through the provision of a route alternative to the A55/A494. During incidents, periods of maintenance or high demand strategic traffic can be directed along different routes to help limit the impacts on journey times.

The improvements should enable the corridor to cope with the additional high demand that occurs during season peak periods, such as bank holidays.

Freight Consolidation Centres should reduce use of the corridor by HGVs. Truck stops and HGV only lanes will help to reduce the likelihood of accidents involving HGVs, helping to reduce the potential of incidents on the corridor.

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

<u>To reduce carbon emissions from transport along the A55 A494 study corridor.</u>

This package is likely to result in an increase in the levels of carbon emissions from the study corridor due to an increase in vehicle kilometres through the study area resulting from the new route freeing up spare network capacity, allowing suppressed trips to be undertaken. Overall this package is likely to have a **moderate adverse** impact upon this Transport Planning Objective.

To improve transport connections for businesses within the study area to key economic centres and employment sites.
This package will provide a new route alternative for strategic traffic travelling to and from North Wales and England. This new road connection should improve accessibility for businesses in the study area, such as at Deeside Park to the rest of North Wales and for businesses in the rest of North Wales to trade with businesses in the study area and in North England. The package will also contribute to a reduction in traffic levels on the A55/A494 corridor, freeing these movements up for more localised traffic, helping to facilitate transport connections between businesses in Deeside, Chester and Wrexham. Overall it is anticipated that this package will have a **significant beneficial** impact upon this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.
This package will reduce the levels of strategic traffic using the existing A55/A494 corridor as this traffic will move onto the A548 alternative route. This will free up the A55/A494 corridor for use by local traffic. This will help to improve accessibility between employment sites such as Deeside Park and Chester and workforce catchment areas such as Connah's Quay, Mold and Ewloe. Both private car drivers and public transport users will be able to benefit from the improved journey times along the existing A55/A494 route. Overall it is anticipated that this package will have a **moderate beneficial** 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 may result in improvements to the human environment as the majority of traffic will be carried away from major population centres. Local air quality is likely to worsen across the study corridor, but may improve along the existing A55/A494 route where the majority of the study corridors population lives. Noise impacts are likely to be moderately adverse overall, but there may be benefits to the existing A55/A494 route, where the population live near to the road. The impacts of this option on landscape and townscape are likely to be moderately adverse, but there may be benefits to Flint.

Overall it is anticipated that this package will have a **slight beneficial** impact upon the human environment.

To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts.
This package is likely to have negative impacts on the natural environment due to traffic being moved into a green-field location. Local air quality adjacent to the new link and along the existing A548 is likely to worsen. Impacts on water, soils and biodiversity will be negative during construction, but it is thought that suitable mitigating options can be incorporated to limit these impacts during the operation of the scheme.

Overall it is anticipated that this package will have a **moderate negative** impact upon the natural environment.

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
This package should help to improve transport safety along the current A55/A494 alignment as a proportion of the traffic will be take the alternative A548 corridor route instead. As this corridor is currently under utilised and largely separate from any significant settlements the route should improve safety levels overall due to fewer conflicts between strategic and local movements and less likelihood of incidents involving pedestrians or cyclists.

The substandard design of parts of the existing A55/A494 will continue to be a safety issue and will not be resolved as part of this package, beyond reducing the number of vehicles using this corridor.

Improvements to the A548 at Flint should help to reduce the perceived accident risks at this location.

The freight improvements proposed will help to improve the safety of freight haulage through the study area. Truckstops will help to reduce the incidence of accidents involving HGVs as it will encourage drivers to take a break. A truck stop may also help to reduce the incidence of HGVs parking in laybys, where they can become the victims of crime.

Freight Consolidation Centres will help to reduce the number of HGV trips using the study corridor, with HGV only lanes helping to reduce conflicts between freight and general traffic.

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 along the A55 A494 study corridor.
This package would seek to make better use of the existing Flint bridge and A548 route which currently have a level of capacity beyond current traffic levels. This option would not involve maintenance of the existing A55/A494 route and the likely levels of traffic still required to use this route would make maintenance and improvements to this route a requirement.

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

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.
This package will involve the strategic route through the study area being moved from the current A55/A494 alignment to the A548 corridor. This is likely to result in improved permeability for those living on the existing A55/A494 corridor, who will be able to more easily cross this corridor on foot or by bike due to reduced traffic levels.

The alternative A548 corridor is away from any substantial residential areas, but may cause severance impacts for some dwellings along the stretch of new road constructed between Kersterton and Northop.

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

Package 3B.3: Capacity Improvements – Highway Options – Local Highway Schemes

Economy

Transport Economic Efficiency (TEE)

Capital and Operating Costs
The capital cost of Package 3B.3: Capacity Improvements – Highway options is estimated at £40m.

Vehicle Operating Costs (VOCs)
Modelling of this package has indicated that the highway Vehicle Operating Cost will decrease by £3.4m. Savings are distributed evenly between Fuel and Non-fuel costs.

Travel Time Savings
Modelling of this package has indicated that highway travel times on the A55/A494 and across the study area will decrease slightly.

Modelling of this package has indicated that the travel time benefits will increase by £11.6m. Travel time benefits to consumers and businesses are similar.

Revenues and User Charging
Modelling of this package has indicated that indirect tax revenues from VAT and fuel tax will decrease by £1.1m.

Reliability
This option will provide an additional crossing of the River Dee, facilitating quicker journeys, reduced journey time variability and increased reliability for local trips between Connah's Quay and Deeside Park.

Grant, Subsidy and any Developer Contributions

Economic Activity and Location Impacts (EALI)
In principle providing an additional connection to the Deeside Industrial Park from the local labour market locations, such as Shotton and Connah's Quay, will generate a positive economic response at a localised level, due to improved accessibility and consequential productivity. However, the level of economic response will be restricted by the broader strategic transport network issues.
Providing a new road bridge could stimulate inward investment into the area, as it avoids localised network congestion. However, providing an additional highway connection across the River Dee is likely to sustain car dependency rather than suppress it as stated within the transportation polices within the Flintshire UDP. Regardless of existing network congestion, the two areas are already well connected via two crossing points to east, the A550 and B5441 Welsh Road and the A458 to the west. Based on this existing level accessibility, it is unlikely that an economic case can be founded for the capital expenditure.
The overall economic responses to this package are likely to be limited by the fact the scheme only provides localised accessibility benefits between the Deeside Industrial Park and local labour markets.
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 new road bridge between Connah's Quay and Deeside Park is likely to have only a slight adverse to slight beneficial impact due to small changes in traffic. However, about 98% of the data was evenly spread within the ± 0.9 dB(A) range and on balance an overall assessment is judged as **neutral**.

Local Air Quality
This package should reduce the amount of vehicle kilometres due to offering a more direct route between Connah's Quay and Deeside Park. This should cause a small decrease in pollutant emissions. There is a potential for improvement in air quality near to local roads due to reduced congestion and redistribution of traffic. Air quality near to the proposed new crossing is likely to worsen. This option is considered to have a **slight beneficial** impact.

Greenhouse Gas Emissions
This package will result in a slight reduction in carbon emissions due to it offering a more direct route between Connah's Quay and Deeside Park for vehicles currently making this trip. This will result in a reduction in vehicle kilometres compared to the do minimum scenario and therefore a reduction in carbon emissions. This option is considered to have a **slight beneficial** impact.

Landscape and Townscape

The package proposes a new local road bridge connecting the B5129 with Deeside Industrial Park south of the existing listed railway bridge. It is not envisaged a 'local ' bridge would be of sufficient scale to change the character of the wider area and would not change the degree of intervisibility up and down the River Dee at this point due to its proximity to other existing bridges. It would be required to take into account any effects on the setting of the nearby Listed Bridge and this would be accommodated in its design; it is the anticipated the overall impact of this single development would therefore be **Neutral** in impact.

Biodiversity

This package includes a potential impact within or close to internationally and nationally protected sites. Furthermore, there the package poses an ecological risk through loss of habitats including; estuarine habitats, mature trees and scrub. This may cause disturbance to wildlife corridors/habitats, which are likely to be important for a number of protected species including; otter, birds, badger, reptiles and bats. Large adverse effects will occur if appropriate mitigation is not implemented for the Dee crossing. The significance of effect could be reduced following mitigation to **neutral/slight adverse**.

Heritage

This package mainly concerns the potential new river crossing between Connah's Quay and Deeside. Any new bridge may have an impact on the setting of the surrounding built heritage. Its location on the river may also mean that its visibility is greater. However, overall it is considered this package will have a **neutral impact** on heritage.

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, the new road bridge between Connah's Quay and Deeside Industrial Park has the potential to create pollution linkages and/or instabilities. Additionally, 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**.

Water Environment

Assuming good practice is implemented during construction including options to prevent and control silt-laden runoff and spillages, construction impacts can be effectively mitigated for surface water. As a result of these options, temporary impacts on the morphology of watercourses can be reduced to minor adverse. 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.

Both construction and operational effects on groundwater are anticipated to be Slight adverse for this package, due to the sensitivity of the groundwater as a designated aquifer (particularly in the north-east corner of the site, where it is a Principal 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 (due to the assumed remediation of any potential contamination) as a construction effect and as neutral due to operation.

Assuming good practice is followed during construction of the bridge, the impact on flood risk can be effectively mitigated. During the operation phase of the proposed scheme impacts are all assessed to be neutral, assuming further assessment will be carried out and / or mitigation options implemented where required.

Social

Transport safety

A new road bridge between Connah's Quay and Deeside Park will help to reduce the need to use the A494 Dee crossing and other local roads to travel between Connah's Quay and Deeside Park. This should improve the safety of travelling between these locations for those using the new crossing and traffic using existing crossings, due to reduced traffic levels on these crossings. There are unlikely to be any wider safety benefits resulting from this package.

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

Personal security

The provision of a new road bridge between Connah's Quay and Deeside Park will provide an additional opportunity to cross the River Dee. This will help to promote increased personal security by providing choice for those who perceive existing crossings as a crime risk. The new crossing would provide pedestrians and cyclists with an opportunity to cross the river alongside general traffic, offering the benefit of increased informal surveillance and therefore increased personal security.

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

Permeability
There are already opportunities for pedestrians and cyclists to cross the River Dee at Shotton. The precise location of the proposed bridge has not been established, but is likely to be close to the existing railway crossing which can also be used by pedestrians and cyclists. This would mean that the new bridge would not offer any significant additional permeability benefits, beyond providing a more substantial link into Deeside Park. This package is therefore considered to have a **neutral impact** upon permeability.

Physical fitness
This option package seeks to increase capacity by the provision of new infrastructure. This includes providing a new road bridge connecting the B5129 at Connah's Quay with Deeside Park. 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.

The provision of a new bridge in this location could overcome one of the major barriers to walking and cycling in the study area, The River Dee. The improved connections between a major employment area at Deeside Industrial Park and the residential areas of Connah's Quay could encourage a modal shift to walking and cycling. However, creating a direct road link from the residential area to the employment area could also induce demand for private vehicle trips, therefore having a negative impact on physical fitness. However; it is considered that this option would provide a **slight beneficial** impact on physical fitness

Social inclusion
This package offers the potential for bus operators to offer more direct routes between the Connah's Quay/Shotton area and employment opportunities at Deeside Park. If operators chose to take up this opportunity then residents could benefit from improved public transport journey times to Deeside Park. This may encourage job seekers from the Connah's Quay/Shotton area to take up work opportunities at Deeside Park, promoting increased social inclusion.

Overall this package is likely to have a **slight beneficial** impact in terms of social inclusion.

Equality, Diversity & Human Rights
This package is not anticipated to have any **significant impact** upon issues of equality, diversity and human rights.

Acceptability

Public Acceptability
Public consultation has not yet been undertaken, however there are no major public acceptability issues foreseen with this package.

Acceptability to other stakeholders
Stakeholder consultation has indicated that this package would not be supported. Stakeholders felt that the bridge would offer few benefits to the objectives of the study and would be costly, with mitigating options needed to facilitate the transport Airbus wings along the River Dee and potential need for flood defences. The option may also encourage HGV trips to route through the Shotton/Connah's Quay area, with associated negative impacts.

Technical & Operational Feasibility

A new bridge between Connah's Quay and Deeside Park would by technically feasible, but, due to the width of the River Dee would require a substantial bridge structure. This would also need to have high clearance to allow wings from the Airbus factory to be transported upstream.

A bridge at this location might cause unintended re-routing of freight trips originating from Deeside Park, causing increased HGV trips through Shotton/Connah's Quay.

Financial Affordability, Deliverability

Table 6.16: Package 3B.3: Capacity Improvements – Highway Options – Local Highway Schemes – Estimated Costs and Delivery Agents

Theme	Name	Estimated Cost £m	Delivery Agent	Reference
Highway	New road bridge between Connah's Quay and Deeside Park	40	Flintshire CC	23

The total cost of this package is approximately £40m (2010 prices). There is potentially one delivery agent identified for this package.

The highway option associated with this package has significant financial cost, however if funding is available the schemes are considered deliverable.

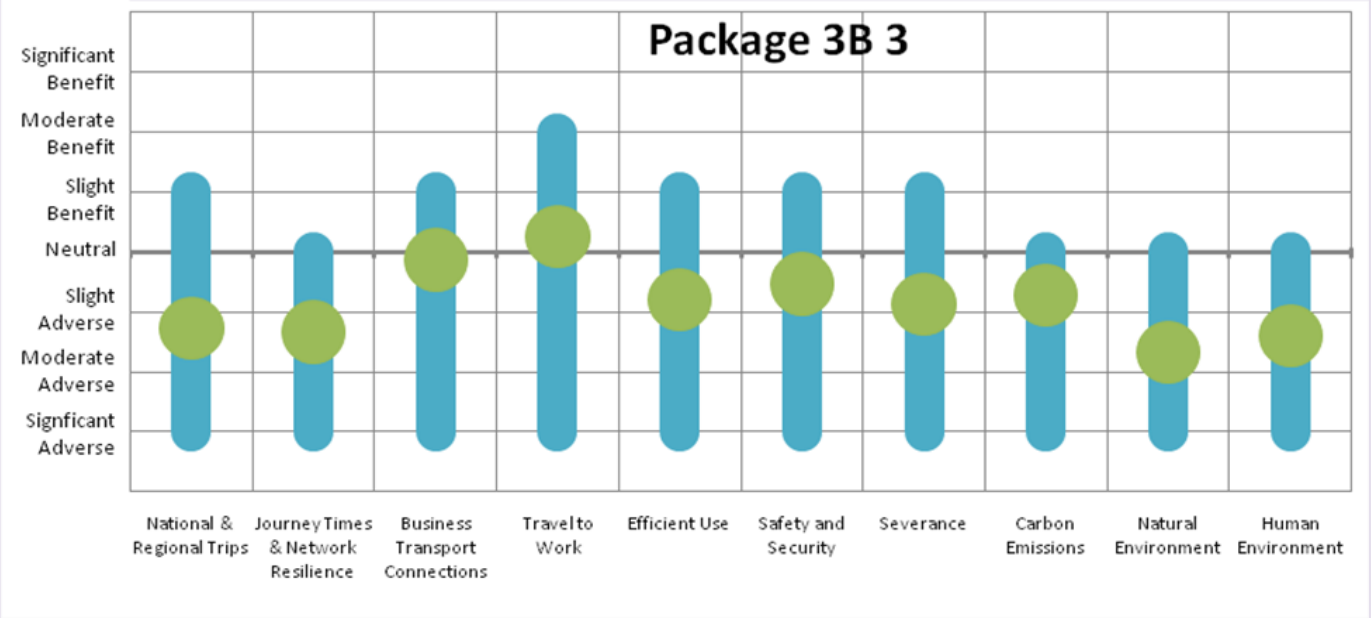
Risk

There is a risk that there will be insufficient traffic using the new bridge to justify the high financial cost of this 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 6.8. Stakeholders considered this package to contribute negatively to many of the Transport Planning Objectives for this study. The package was scored particularly poorly against objectives relating to the natural environment and journey times and network resilience. The only objective which this package was considered to have a positive impact upon was travel to work.

Figure 6.8 Capacity Improvements – Local Highways Options: Stakeholder Assessment



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

This option will allow some of the local traffic wishing to travel between Connah's Quay and Deeside Park to do so without travelling on the strategic road network. This will slightly reduce traffic using the existing A494 Dee crossing, helping to facilitate national and regional trip movements. Overall it is anticipated that this package will have a **slight beneficial** impact upon this Transport Planning Objective.

To reduce journey time variability and enhance the transport network resilience of the A55/A494 study corridor to periods of high demand, incidents and maintenance events.

This option will provide an additional crossing of the River Dee, facilitating quicker journeys and reduced journey time variability for trips between Connah's Quay and Deeside Park. It is not anticipated that this additional crossing would significantly improve the resilience of the A55/A494 corridor to periods of high demand, incidents or maintenance events. Overall it is anticipated that this option would have a **neutral impact** upon this Transport Planning Objective.

To reduce carbon emissions from transport along the A55 A494 study corridor.

This package will result in a slight reduction in carbon emissions due to it offering a more direct route between Connah's Quay and Deeside Park for vehicles currently making this trip. This will result in a reduction in vehicle kilometres compared to the do minimum scenario and therefore a reduction in carbon emissions. This option is considered to have a **slight beneficial** impact.

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

This package will improve transport connections between the Connah's Quay and Deeside Park areas. However, this is unlikely to provide a transport connection of value to businesses as the Connah's Quay area is predominantly residential. It is therefore considered that this package will have a **neutral impact** upon this Transport Planning Objective.

To improve access between employment sites and workforce catchment areas.

This package offers a more direct connection between the employment site of Deeside Park and the workforce catchment at Connah's Quay/Shotton/Queensferry. This should improve access between these locations for the private car users. If bus operators chose to take up this opportunity then residents without access to a car could also benefit from improved access to Deeside Park. Overall this package is likely to have a **moderate beneficial** 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 neutral impact on the human environment in terms of local air quality, noise, light pollution and landscape and townscape impacts. This is because the proposed bridge option has only a very small impact on traffic flows. The package may provide a more direct route, reducing the need to use local roads in the Shotton area, improving this environment but may also provide a short cut for HGV trips travelling from Deeside Industrial Park.

Overall it is anticipated that this package will have a **neutral 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.
It is anticipated that this package will have a neutral impact on local air quality, water, soil pollution and biodiversity during the scheme operational phase, assuming suitable mitigation is undertaken, the impacts on this Transport Planning Objective are therefore likely to be **neutral**.

To improve the actual and perceived safety and personal security of all transport users along the A55 A494 study corridor.
A new road bridge between Connah's Quay and Deeside Park will help to reduce the need to use the A494 Dee crossing and other local roads to travel between Connah's Quay and Deeside Park. This should improve the safety of travelling between these locations for those using the new crossing and traffic using existing crossings, due to reduced traffic levels on these crossings.

This additional crossing point will help to promote increased personal security by providing choice for those who perceive existing crossings as a personal security risk. The new crossing would provide pedestrians and cyclists with an opportunity to cross the river alongside general traffic, offering the benefit of increased informal surveillance and therefore increased personal security.

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

To maintain and make more efficient use of the existing transport infrastructure along the A55 A494 study corridor.
This package would involve the construction of a significant additional structure and could therefore not be considered to be making efficient use of existing transport infrastructure. This package is therefore considered to have a **slight adverse** impact upon this Transport Planning Objective.

To improve permeability across the A55/A494 study corridor for non-motorised modes at key points of desire.
There are already opportunities for pedestrians and cyclists to cross the River Dee at Shotton. The precise location of the proposed bridge has not been established, but is likely to be close to the existing railway crossing which can also be used by pedestrians and cyclists. This would mean that the new bridge would not offer any significant additional permeability benefits, beyond providing a more substantial link into Deeside Park. This package is therefore considered to have a **neutral impact** upon this Transport Planning Objective.

Table 6.17 – Appraisal Summary

		Package Description							
		Option Description: 1. Managing Demand	**Option Description: 2A. Making Best Use: Non-Highway Options**	**Option Description: 2B. Making Best Use: Highway Options**	**Option Description: 3A. Capacity Improvements: Non-Highway Options**	**Option Description: 3B.1.1. Capacity Improvements: Highway Options: A55-A494 Corridor: Existing A55-A494 Alignment**	**Option Description: 3B.1.2. Capacity Improvements: Highway Options: A55-A494 Corridor: Orange Route**	**Option Description: 3B.2. Capacity Improvements: Highway Options: A548 Corridor**	**Option Description: 3B.3. Capacity Improvements: Highway Options: Local Highway Schemes**
Economy	TEE	+	+	-	+	++	+++	+++	+
	EALI	+	+	+	++	++	+++	+++	+
Environment	Noise	0	0	-	0	0	-	--	0
	Local Air Quality	+	+	+	+	--	--	-	0
	Greenhouse Gas Emissions	+	+	-	+	--	--	--	+
	Landscape and Townscape	0	0	0	0	-	-	--	0
	Bio-Diversity	0	0	0	0	-	-	0	-
	Heritage	+	0	0	0	0	0	0	0
	Surface Water	0	0	0	0	0	0	0	0
	Ground Water	0	0	0	0	0	0	0	0
	Flood Risk	0	0	0	0	0	0	0	0
	Soils	0	0	0	0	0	0	0	0
Social	Transport Safety	+	+	++	++	+++	+++	++	+
	Personal Security	0	+	0	++	0	-	0	+
	Permeability	+	+	0	+++	+	--	0	0
	Physical Fitness	++	+	0	++	0	0	0	+
	Social Inclusion	0	+	0	+++	0	0	0	+
	Equality Diversity & Human Rights	0	+	0	+	0	0	0	0
Transport Planning Objectives	National & Regional Trips	+	+	++	+++	++	++	+++	+
	Journey Times & Network Resilience	+	+	++	+	++	++	+++	0
	Carbon Emissions	+	+	+	+	--	--	--	+
	Business Transport Connections	+	+	++	++	+++	+++	+++	0
	Travel to Work	0	+	0	+++	++	++	++	++
	Human Environment	0	0	-	0	-	-	+	0
	Natural Environment	0	0	0	0	0	-	--	0
	Safety and Security	0	++	++	++	++	++	++	+
	Efficient Use	+	++	+++	++	--	--	0	-
	Severance	+	+	0	+++	+	--	0	0

Key			
+++	Large Benefit	---	Large Adverse
++	Moderate Benefit	--	Moderate Adverse
+	Slight Benefit	-	Slight Adverse
0	Neutral		

6.3 Summary of assessment

This 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.

Figure 6.17 summarises the findings from this appraisal work. This shows that in general all of the packages contribute positively to a number of the Welsh Impact Areas and the Transport Planning Objectives. The managing demand and non-highway packages tend to score better against the environmental and social objectives, whereas the highway packages in general score more positively on economic and business travel grounds.

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 6.18 indicates the options which will not be considered as part of any further appraisal, as well as the justification for these decisions.

Table 6.18: Options considered not suitable for further assessment

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.	29
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.	36
Improved connection between rail and bus services at Shotton station	Stakeholder consultation has indicated that these improvements have now been completed.	83
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
Suspension of non-essential maintenance at peak periods	Consultation with the highway authority has indicated that this option is already being undertaken where feasible.	70
Bus lanes along the A55/A494	This appraisal and stakeholder consultation indicates that this option would have significant impacts on the capacity of this corridor for general traffic. Currently very few services make use of the A55/A494 so utilisation of these lanes is likely to be low.	38
HGV Only Lanes (Study)	This option will be considered as a possible element of an active traffic management strategy as part of the next stage of work.	72
Parallel link running east of the A494 between Ewloe and Queensferry	Assessment of this option has indicated that the costs are likely to be higher and benefits less than for online improvements between these locations. The option is likely to require significant environmental mitigation and stakeholder consultation indicated that this option would not be supported. As this option forms the only difference between package 3B1.1 and 3B1.2 this means that package 3B1.2 will not be assessed as part of the next stages of this process.	82

Establishing a Preferred Package

7 Establishing a Preferred Package

Introduction
This section of the report outlines the process that has been undertaken to establish a set of preferred packages for appraisal as part of the next stage of assessment (WelTAG Stage 2).

Methodology
Following the Stage 1 WelTAG assessment of the all the option packages reported in section 6 of this report a number of options were identified as not suitable for further assessment (identified in table 6.8).

In general none of the overall packages assessed as part of this WelTAG Stage 1 assessment have succeeded in meeting the entire range of transport planning objectives identified for the study area. To achieve this it is considered necessary to identify a suitable multimodal package, which can help to achieve some of the strategic and business travel requirements resolved by a highway package alongside minimising carbon emissions, facilitating improve access to employment for those without a car and resolving severance issues best achieved through public transport and walking and cycling improvements. For this reason the packages proposed for assessment at WelTAG Stage 2 are multimodal; incorporating highway, public transport and walking and cycling elements assessed as Stage 1 to help maximise the benefits and resolve the transport planning objectives of the study.

It is recommended that two preferred packages are taken forward for Stage 2 appraisal, the next stage of the WelTAG scheme assessment process. The decision to recommend which options and packages are taken forward has been based on the outcomes from the Stage 1 assessment which assessed the packages against the environmental, social and economic appraisal criteria as well as the studies transport planning objectives.

The WelTAG Stage 2 Process
A WelTAG Stage 2 assessment involves a more detailed, quantitative evidence based appraisal of the packages of options selected for further development at this stage. As with the Stage 1 assessment the appraisal focuses on the Welsh Impact Areas to give the Welsh Government a consistent basis for determining funding and approval. The performance against the TPOs is also an important part of this assessment to ensure that local problems are effectively addressed by the proposals.

In order to undertake a Stage 2 assessment it is intended to undertake some further optioneering, modelling and concept design before the assessment process begins to allow refinement of the options for appraisal.

Proposed WelTAG Stage 2 Packages
The following packages have been identified for WelTAG Stage 2 Assessment, subject to further refinement:

- Package A – Demand Management, Making Best Use and Capacity Enhancements along the existing A55/A494 Corridor.
- Package B - Demand Management, Making Best Use and Capacity Enhancement utilising the A548 Corridor.

Package A – Demand Management, Making Best Use and Capacity Enhancements along the existing A55/A494 Corridor.

Introduction
This package which is recommended to be taken forward for a Stage 2 WelTAG Assessment contains options from the following Stage 1 assessment packages:

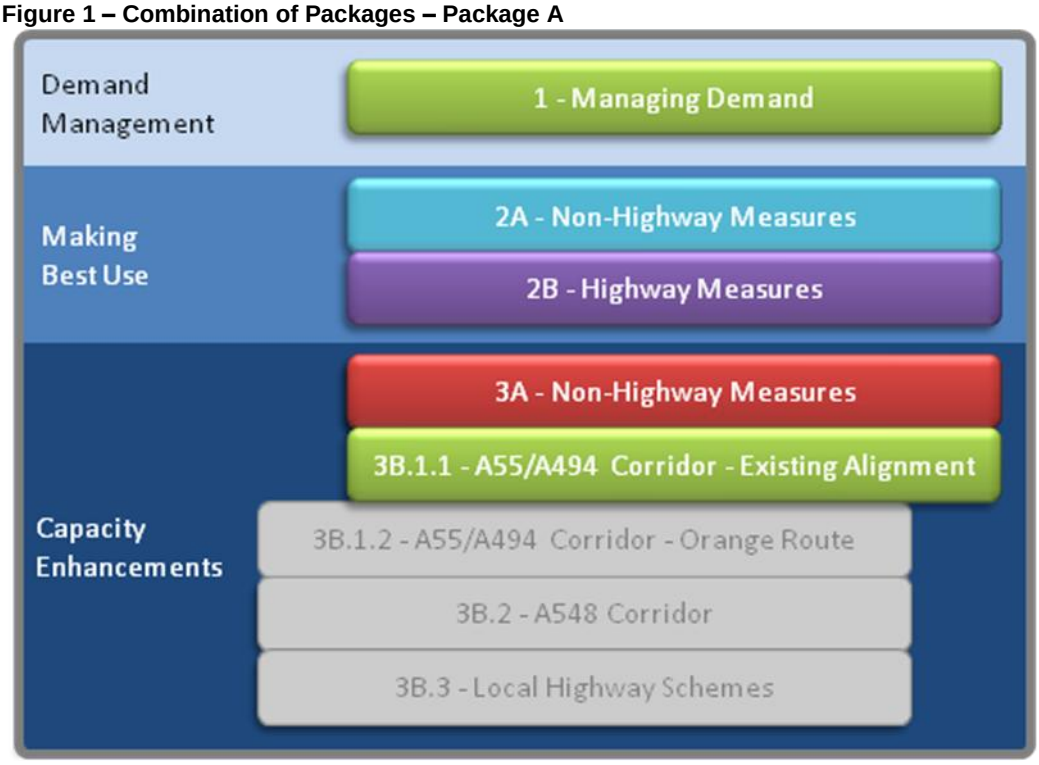
- Package 1: Managing Demand
- Package 2A: Making Best Use – Non-Highway Options
- Package 2B: Making Best Use – Highway Options
- Package 3A: Capacity Enhancements - Non-Highway Options
- Package 3B.1.1: Capacity Enhancements - Highway Options – A55/A494 Corridor – Existing Alignment

There was strong support for Package 3B.1.1 at the Stage 1 stakeholder consultation event. In addition Package 3B.1.1 scored well against the economy elements of the Stage 1 WelTAG assessment and the TPOs identified for this study. However, a highway scheme on its own will not achieve all the TPOs; therefore demand management, walking and cycling, and public transport options have also been included.

Overview
There are a number of major highway capacity enhancements which seek to improve road connections through the study corridor utilising the existing A55/A494 highway alignment. A series of freight and demand management elements also form part of this package.
This package includes a number of major non-highway capacity enhancements which seek to improve connections through the study corridor. This package also contains a set of "soft" options applied throughout the study area aimed at reducing the use of unsustainable transport modes by changing people's travel behaviour. Also included are options which seek to make more efficient use of existing non-highway and highway services, facilities and transport infrastructure.

Figure 1 indicates which option packages from the Stage 1 assessment have been combined to form Package A.

Figure 1 – Combination of Packages – Package A



This package contains the following Demand Management, Making Best Use and Capacity Enhancements (see Table 1).

Table 1: Elements contained within Package A

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
Demand Management	Local Authority Demand Management Strategy	0.6	Flintshire CC	-	The Local Authority Demand Management Strategy will include the following options: • Workplace travel planning at employers Deeside Industrial Park • Shotton/Connah's Quay 'Sustainable Travel Community' • Parking management strategy • Promoting car clubs and car sharing The proposed demand management strategy will seek to reduce the need to travel and encourage sustainable modes of transport. This element is also recommended by the NEWABTS Strategy, so an area wide initiative covering the NEWABTS area could contribute to resolving the problems along the A55/A494 corridor.
	Park and Car Share scheme	1	WG / Flintshire CC	76	Further work is required to establish the benefits of Park & Ride and Park & Car Share. As part of the NEWABTS Study it is recommended that a study be undertaken into the viability of these options for the area between Wrexham, Chester and Deeside. It is therefore recommended that a location on the A55/A494 corridor is assessed as part of this.
	Strategic Park and Ride site on the A55 at Northop	5	WG / Flintshire CC	81	
Walking and Cycling	Encourage employers to increase cycling within its work force	0.02	Flintshire CC	25	The proposed walking and cycling options will seek to provide a safe walking and cycling network linking key employment sites with key residential locations within 5km, improving access to Public Transport Interchanges and other key centres. These options appraised well against the environment and social elements of the Stage 1 WelTAG assessment. They are financially affordable and relatively easy to deliver. The improvements to the A55/A494 highway contained within this package also open up opportunities to deliver new walking and cycling links and crossing points adjacent to the A55/A494. A number of these walking and
	Develop a local publicity campaign to promote walking and cycling	0.05	Flintshire CC	26	
	Encourage secure cycling parking at public transport interchanges	0.04	Local Highway Authorities	28	
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.1	Local Highway Authorities	30	
	Provide additional signage for walkers and cyclists	0.04	Local Highway Authorities	31	
	Provide parallel provision and alternative routes for pedestrians and cyclists	1	WG / Flintshire CC	24	

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
	Provide safe walking and cycling routes from communities to public transport interchanges.	0.1	Flintshire CC	32	cycling interventions could be provided through the NEWABTS delivery plan. However, physical measures along the A55/A494 corridor should be taken forward as part of the preferred package.
	Provide walking and cycling crossing facilities on the A55/A494 corridor and associated junctions at key points of desire	0.1	WG / Flintshire CC	33	
	Provide additional opportunities for walkers and cyclists to cross the River Dee	1	Flintshire CC	35	
	Provide a cycle link between Deeside and Neston	0.5	Flintshire CC / Cheshire West & Chester	84	
Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	0.05	Taith / Network Rail	62	Rail freight can be cost effective over short distances if it operates efficiently. An initial freight exchange could be created on a localised basis within Deeside Park and used as a demonstration for wider proliferation across Wales. With a significant change in business circumstances including strong competition between rail freight companies, efficient operating practice and concern over 'green' issues there could be a step change in use of rail freight These options appraised well against the economy and environment elements of the Stage 1 WelTAG assessment. These freight options are financially affordable and would improve the efficiency of the freight transport network. Area wide options, such as freight train electrification would need to be delivered in tandem with line electrification through the NEWABTS delivery plan.
	Freight Exchange	0.01	WG / Taith	66	
	Publicise the whereabouts and services from Possible Port Rail & Inland Rail Terminals	0.05	Taith / Network Rail	64	
	Freight Consolidation Centres including one at Deeside	1	WG / Taith	61	
	Truckstops	3	WG / Taith	71	
	Freight train electrification	5	Network Rail	75	
	Open Access Rail Terminal	15	Network Rail / WG	82	
Local Public Transport	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	37	It is proposed that the majority of these Local Public Transport interventions would be delivered through the area wide NEWABTS strategy delivery plan.
	Improved station accessibility (non-car station access)	0.15	Network Rail / Local Highway Authorities	47	
	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	WG / Local Highway Authorities / Bus Operators	39	

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
	New cross Dee bus route between Mold and Ellesmere Port	0.25	WG / Local Highway Authorities / Bus Operators	40	
	Taith express coach services	0.25	WG / Taith / Bus Operators	41	
	Rail link bus routes from Hawarden bridge station to Deeside Industrial Park employers	0.25	Flintshire CC / Bus Operators	42	
Strategic Rail	New station at Queensferry on the North Wales Main Line	3 - 5	Network Rail / Flintshire CC	57	This WelTAG Stage 1 assessment (alongside the findings of the parallel NEWABTS Strategy) have identified that a number of strategic rail improvements will be of specific benefit to the A55/A494 corridor. Due to the strategic nature of these rail proposals many of the infrastructure improvements, costs and benefits would not be captured in a study focusing on the A55/A494 corridor. In addition to this Network Rail has its own appraisal process (GRIP) which is used to determine which rail improvements will be implemented nationally. It is therefore not considered appropriate to fully assess strategic rail improvements (shown in **grey**) as part of the A55/A494 WelTAG Stage 2 appraisal. However, to ensure that the potential benefits of these schemes (in terms of traffic reduction) are taking into account as part of this study it is proposed that sensitivity tests are undertaken to establish highway demand in a situation with and without these major rail improvements. If the highway demand is anticipated to be significantly lower with the proposed rail improvements then recommendations can be made for how the highway design can be scaled down should such improvements be approved. Through this approach the recommended package of improvements can be future proofed against decisions made by Network Rail which are outside the scope of this study. Electrification of the North Wales Main Line would be required to enable the operation of electric freight train, electrification would be through the NEWABTS delivery plan.
	Extension of Llandudno-Manchester service to Manchester Airport.	0	Network Rail / Train Operators	43	
	Service frequency increase on Borderlands Line (hourly to half-hourly)	10	Network Rail / Train Operators	45	
	New rail station at Deeside Industrial Park	7.5	Network Rail / Flintshire CC	49	
	Fast Llandudno-Manchester Airport service	0	Network Rail / Train Operators	50	
	Extension of London-Chester services to Bangor/Holyhead	0	Network Rail / Train Operators	54	
	Rhyl-Chester (with possible extension to Crewe) local shuttle	2	Network Rail / Train Operators	55	
	Linespeed improvements and gauge enhancements on North Wales coast line	27	Network Rail	56	

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
Highway	Variable Messaging Signs	0.4	WG and Highways Agency	2	These highway options would improve the efficiency of the highway network along the A55/A494 corridor. During WelTAG Stage 2 further consideration of these options would be required to define a series of making best-use highway schemes.
	Undertake necessary maintenance on the existing A55/A494 route	6	WG	3	
	Consider a signage strategy for traffic travelling to/from North England	0.2	WG and Highways Agency	4	
	Ramp metering on some junctions	0.33	WG	6	
	Improve the resilience and safety of the corridor	10	WG	7	
	Minor on-line improvements along the B5129 through Shotton/Queensferry/Connah's Quay	1	Flintshire CC	-	Minor on-line improvements along the B5129 through Shotton/Queensferry/Connah's Quay would consist of small scale options designed to reduce congestion and improve journey times for all highway modes. Congestion occurs regularly along the B5129 due to the high volumes of traffic, frequent junctions and kerb side activity. This is also a major bus route with high frequency services. Flintshire CC have already undertaken a study on the corridor looking at private, public transport and pedestrian/cyclists needs on corridor. It is recommended that progress should be made in the short term on implementing appropriate recommendations from the study.
	Reduce the number of slip roads on the A494 – strategic junctions. Reduce local distributer road access.	0.08	WG / Flintshire CC	16	These more significant highway improvements have been identified to contribute significantly to the economic objectives of this study. The exact scale of these improvements will be determined through additional testing.
	Drome Corner to Queensferry Improvements	65	WG	19	
	A494 Queensferry to Ewloe Improvements			18	
	Ewloe Interchange Improvements	96	WG	14	
	A55 Ewloe to Northop Improvements	32	WG	22	

Package B - Demand Management, Making Best Use and Capacity Enhancement utilising the A548 Corridor.

Introduction
This package which is recommended to be taken forward for a Stage 2 WelTAG Assessment contains options from the following Stage 1 assessment packages:

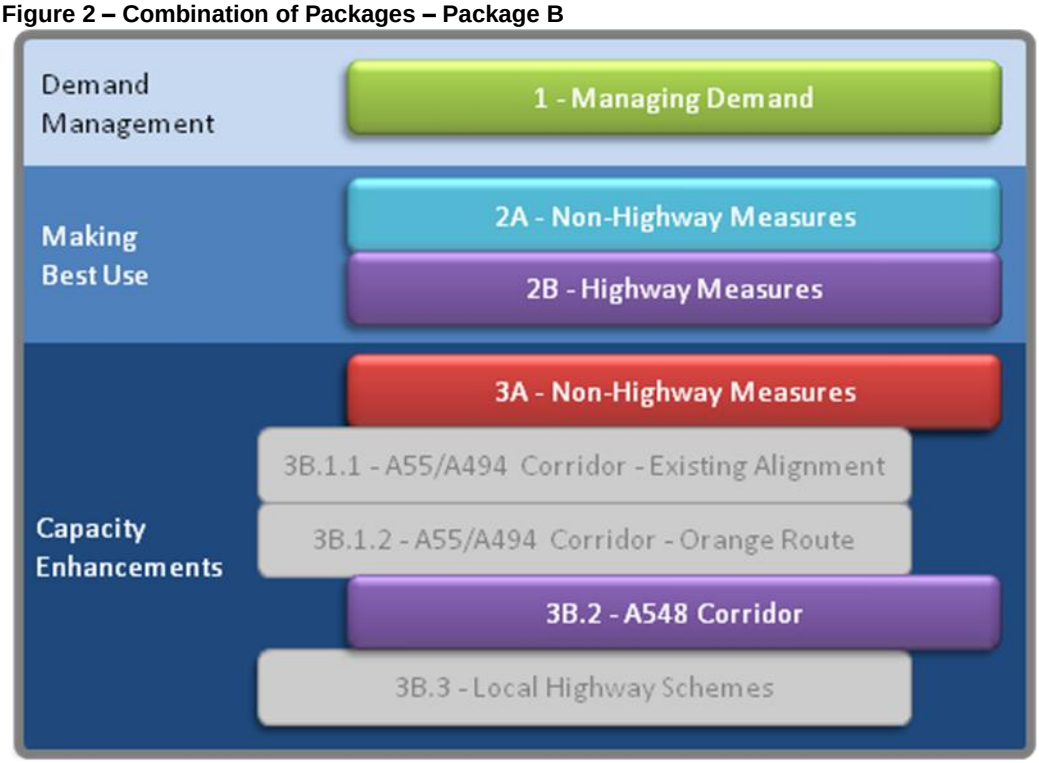
- Package 1: Managing Demand
- Package 2A: Making Best Use – Non-Highway Options
- Package 2B: Making Best Use – Highway Options
- Package 3A: Capacity Enhancements - Non-Highway Options
- Package 3B.2: Capacity Enhancements - Highway Options – A548 Corridor

There was strong support for Package 3B.2 at the Stage 1 stakeholder consultation event. In addition Package 3B.2 scored well against the economy elements of the Stage 1 WelTAG assessment and the TPOs identified for this study. However, a highway scheme on its own will not achieve all the TPOs, therefore demand management, walking and cycling, and public transport options have also been included as part of Package B.

Overview
This package contains major highway capacity enhancements which seek to improve capacity along the existing A548 and provide a new road between the A55 and A548 so that this route can cater for the strategic portion of the existing traffic using the A55/A494 corridor. A series of freight and demand management elements also form part of this package.
This package includes a number of major non-highway capacity enhancements which seek to improve connections through the study corridor. This package also contains a set of "soft" options applied throughout the study area aimed at reducing the use of unsustainable transport modes by changing people's travel behaviour. Also included are options which seek to make more efficient use of existing non-highway and highway services, facilities and transport infrastructure.

Figure 2 indicates which option packages from the Stage 1 assessment have been combined to form Package B.

Figure 2 – Combination of Packages – Package B



Package B contains the same non-highway elements as package A (listed below), with the additions along the A548 route replacing the major capacity improvements proposed along the existing A55/A494 corridor.

Table 2: Elements contained within Package B

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
Demand Management	Local Authority Demand Management Strategy	0.6	Flintshire CC	-	The Local Authority Demand Management Strategy will include the following options: • Workplace travel planning at employers Deeside Industrial Park • Shotton/Connah's Quay 'Sustainable Travel Community' • Parking management strategy • Promoting car clubs and car sharing The proposed demand management strategy will seek to reduce the need to travel and encourage sustainable modes of transport. This element is also recommended by the NEWABTS Strategy, so an area wide initiative covering the NEWABTS area could contribute to resolving the problems along the A55/A494 corridor.
	Park and Car Share scheme	1	WG / Flintshire CC	76	Further work is required to establish the benefits of Park & Ride and Park & Car Share. As part of the NEWABTS Study it is recommended that a study be undertaken into the viability of these options for the area between Wrexham, Chester and Deeside. It is therefore recommended that a location on the A55/A494 corridor is assessed as part of this.
	Strategic Park and Ride site on the A55 at Northop	5	WG / Flintshire CC	81	
Walking and Cycling	Encourage employers to increase cycling within its work force	0.02	Flintshire CC	25	The proposed walking and cycling options will seek to provide a safe walking and cycling network linking key employment sites with key residential locations within 5km, improving access to Public Transport Interchanges and other key centres. These options appraised well against the environment and social elements of the Stage 1 WelTAG assessment. They are financially affordable and relatively easy to deliver. The improvements to the A548 corridor contained within this package also open up opportunities to deliver new walking and cycling links and crossing points adjacent to the A55/A494, due to the potential
	Develop a local publicity campaign to promote walking and cycling	0.05	Flintshire CC	26	
	Encourage secure cycling parking at public transport interchanges	0.04	Local Highway Authorities	28	
	Improve the safety and security of existing walking and cycling routes and ensure they are maintained to a high standard	0.1	Local Highway Authorities	30	
	Provide additional signage for walkers and cyclists	0.04	Local Highway Authorities	31	
	Provide parallel provision and alternative routes for pedestrians and cyclists	1	WG / Flintshire CC	24	

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
	Provide safe walking and cycling routes from communities to public transport interchanges.	0.1	Flintshire CC	32	traffic reduction along this route. A number of these walking and cycling interventions could be provided through the NEWABTS delivery plan. However, physical measures along the A55/A494 corridor should be taken forward as part of the preferred package.
	Provide walking and cycling crossing facilities on the A55/A494 corridor and associated junctions at key points of desire	0.1	WG / Flintshire CC	33	
	Provide additional opportunities for walkers and cyclists to cross the River Dee	1	Flintshire CC	35	
	Provide a cycle link between Deeside and Neston	0.5	Flintshire CC / Cheshire West & Chester	84	
Freight	Assisting the TAITH partnership in Promoting the Use of Rail Freight	0.05	Taith / Network Rail	62	Rail freight can be cost effective over short distances if it operates efficiently. An initial freight exchange could be created on a localised basis within Deeside Park and used as a demonstration for wider proliferation across Wales. With a significant change in business circumstances including strong competition between rail freight companies, efficient operating practice and concern over 'green' issues there could be a step change in use of rail freight These options appraised well against the economy and environment elements of the Stage 1 WelTAG assessment. These freight options are financially affordable and would improve the efficiency of the freight transport network. Area wide options, such as freight train electrification would need to be delivered in tandem with line electrification through the NEWABTS delivery plan.
	Freight Exchange	0.01	WG / Taith	66	
	Publicise the whereabouts and services from Possible Port Rail & Inland Rail Terminals	0.05	Taith / Network Rail	64	
	Freight Consolidation Centres including one at Deeside	1	WG / Taith	61	
	Truckstops	3	WG / Taith	71	
	Freight train electrification	5	Network Rail	75	
	Open Access Rail Terminal	15	Network Rail / WG	82	
Local Public Transport	Integrated Area Ticketing	0.5	Local Highway Authorities / Public Transport Operators	37	It is proposed that the majority of these Local Public Transport interventions would be delivered through the area wide NEWABTS strategy delivery plan.
	Improved station accessibility (non-car station access)	0.15	Network Rail / Local Highway Authorities	47	
	New cross Dee bus route connecting Holywell, Flint, Deeside Industrial Park and Chester	0.25	WG / Local Highway Authorities / Bus Operators	39	

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
	New cross Dee bus route between Mold and Ellesmere Port	0.25	WG / Local Highway Authorities / Bus Operators	40	
	Taith express coach services	0.25	WG / Taith / Bus Operators	41	
	Rail link bus routes from Hawarden bridge station to Deeside Industrial Park employers	0.25	Flintshire CC / Bus Operators	42	
Strategic Rail	New station at Queensferry on the North Wales Main Line	3 - 5	Network Rail / Flintshire CC	57	This WelTAG Stage 1 assessment (alongside the findings of the parallel NEWABTS Strategy) have identified that a number of strategic rail improvements will be of specific benefit to the A55/A494 corridor. Due to the strategic nature of these rail proposals many of the infrastructure improvements, costs and benefits would not be captured in a study focusing on the A55/A494 corridor. In addition to this Network Rail has its own appraisal process (GRIP) which is used to determine which rail improvements will be implemented nationally. It is therefore not considered appropriate to fully assess strategic rail improvements (shown in **grey**) as part of the A55/A494 WelTAG Stage 2 appraisal. However, to ensure that the potential benefits of these schemes (in terms of traffic reduction) are taking into account as part of this study it is proposed that sensitivity tests are undertaken to establish highway demand in a situation with and without these major rail improvements. If the highway demand is anticipated to be significantly lower with the proposed rail improvements then recommendations can be made for how the highway design can be scaled down should such improvements be approved. Through this approach the recommended package of improvements can be future proofed against decisions made by Network Rail which are outside the scope of this study. Electrification of the North Wales Main Line would be required to enable the operation of electric freight train, electrification would be through the NEWABTS delivery plan.
	Extension of Llandudno-Manchester service to Manchester Airport.	0	Network Rail / Train Operators	43	
	Service frequency increase on Borderlands Line (hourly to half-hourly)	10	Network Rail / Train Operators	45	
	New rail station at Deeside Industrial Park	7.5	Network Rail / Flintshire CC	49	
	Fast Llandudno-Manchester Airport service	0	Network Rail / Train Operators	50	
	Extension of London-Chester services to Bangor/Holyhead	0	Network Rail / Train Operators	54	
	Rhyl-Chester (with possible extension to Crewe) local shuttle	2	Network Rail / Train Operators	55	
	Linespeed improvements and gauge enhancements on North Wales coast line	27	Network Rail	56	

	Name	Estimated Cost £m	Delivery Agent	Reference	Notes
Highway	Variable Messaging Signs	0.4	WG and Highways Agency	2	These highway options would improve the efficiency of the highway network along the A55/A494 and A548 corridors. During WelTAG Stage 2 further consideration of these options would be required to define a series of making best-use highway schemes.
	Consider a signage strategy for traffic travelling to/from North England	0.2	WG and Highways Agency	4	
	Minor on-line improvements along the B5129 through Shotton/Queensferry/Connah's Quay	1	Flintshire CC	-	Minor on-line improvements along the B5129 through Shotton/Queensferry/Connah's Quay would consist of small scale options designed to reduce congestion and improve journey times for all highway modes. Congestion occurs regularly along the B5129 due to the high volumes of traffic, frequent junctions and kerb side activity. This is also a major bus route with high frequency services. Flintshire CC have already undertaken a study on the corridor looking at private, public transport and pedestrian/cyclists needs on corridor. It is recommended that progress should be made in the short term on implementing appropriate recommendations from the study.
	Enhance the A548 route between Flint and the A550	64	WG / Flintshire CC	8	These more significant highway improvements along the alternative A548 highway corridor have been identified to contribute significantly to the economic objectives of this study. The exact scale and locations of these improvements will be determined through additional testing.
	New road connecting the A55 and A548	89	WG	11	

Establishing a Preferred Package Conclusions

This section of the report has outlined the approach taken to identify a set of preferred packages for assessment at WelTAG Stage 2. The WelTAG Stage 1 process, which assessed a number of packages aimed at managing demand, making best use and providing capacity enhancements to the highway and non-highway networks indicated that whilst these packages succeeded in meeting many of the objectives of this study none succeeded in meeting all of the aims. To achieve the full set of transport planning objectives a multimodal approach is required.

In terms of highway improvements two different approaches were identified – one utilising the existing A55/A494 alignment and one utilising the A548 route. These two options were successful at meeting the strategic and business travel objectives of the study. These options have therefore been combined with an appropriate set of demand management, making best use and capacity enhancements for highway and non-highway transport modes to seek to identify two packages for assessment at WelTAG Stage 2.

Further work will need to be undertaken prior to the Stage 2 assessment to further refine the options in engineering, modelling and cost terms and to develop a greater understanding of the benefits and dis-benefits of these options.

The strategic rail elements of the packages identified at WelTAG Stage 1 offer benefits for this study corridor, however as discussed above these options involve significant costs and impacts which would be felt significantly outside of the study area. Additionally a separate assessment process is required to appraise these options to comply with Network Rail procedures. It is therefore not considered appropriate to include these options in the WelTAG Stage 2 assessment, but the potential benefits of these options in terms of traffic reduction will be taken into account to future proof this study against decisions make by Network Rail.

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 current experienced on the A55/A494 corridor. This report contains the second stage of the A55/A494 Study 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 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 there were given due precedence in the assessment process. Adopting this approach and considering both highway and non – highway modes a set of eight packages were identified which seek to achieve 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 consultation has also been undertaken on the identified packages with key stakeholders. This process allowed detailed local knowledge and understanding to be applied to help shape the assessment process and the identified packages.

In summary the assessment process has identified that all of the packages go some way towards achieving the objectives of this study, however none of the packages are completely successful at achieving all of the objectives required. The demand management package and the packages focusing on non-highway walking, cycling and public transport improvements were most successful at achieving the environmental and social objectives of the study. The highway improvement packages were identified as particularly important in achieving the economic and business travel objectives. None of the identified packages therefore achieved the full range of criteria on their own.

The next stage of the assessment process (WelTAG Stage 2) will involve a more detailed assessment of a small number of packages against a set of predominantly quantitative criteria. To identify appropriate packages for assessment at this stage the package elements deemed successful at this stage have been regrouped into multimodal packages containing elements from the demand management, making best use and capacity improvements packages. It is hoped that through identifying mutually supportive package elements in this way the identified WelTAG Stage 2 packages will successfully achieve the full range of assessment criteria.

Two packages have been identified for assessment at WelTAG Stage 2; one which includes a set of multimodal improvements utilising the existing A55/A494 alignment and one making use of the A548 alignment to provide an alternative route for strategic traffic. The precise details of these packages will be refined ahead of the Stage 2 assessment to allow the detailed appraisal to be undertaken.