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A483 Llandeilo Transport Study

Welsh Government

WelTAG Stage One: Impact Assessment Report

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Appendices

1. Introduction

1.1 Background

This WelTAG Stage One Impact Assessment Report (IAR) includes detailed evidence, data and analysis which supports the statements made within the WelTAG Stage One Report (ref. B2331900-D4-5-001). This IAR also lists information in the project data store.

The IAR provides the analysis of the assessment undertaken during WelTAG Stage One as well as detailed evidence of the anticipated impacts of the proposed options. The IAR also sets out any other assessments that have been undertaken, contains details of the judgements made, as well as any assumptions and uncertainty surrounding the assessments.

1.2 Scope of the Study

It is generally acknowledged that the A483 through Llandeilo and Ffairfach experiences operational issues as there are physical, geometric and topographical constraints which restrict the flow of traffic. There are several areas with restricted visibility, a historic highway layout, tight radii of corners and adjacent one-way streets which affect its performance as a strategic route. A number of junctions on the A483 are not in accordance with current highway standards which affects the overall capacity and safety of the network. On-street parking along the A483 occurs as there is limited rear access for retail properties and the majority of residential properties lining the A483 do not have driveways. Footway pavements in many locations are narrow creating a potentially intimidating experience for pedestrians, pram/pushchair and wheelchair users and there is little dedicated cycling infrastructure.

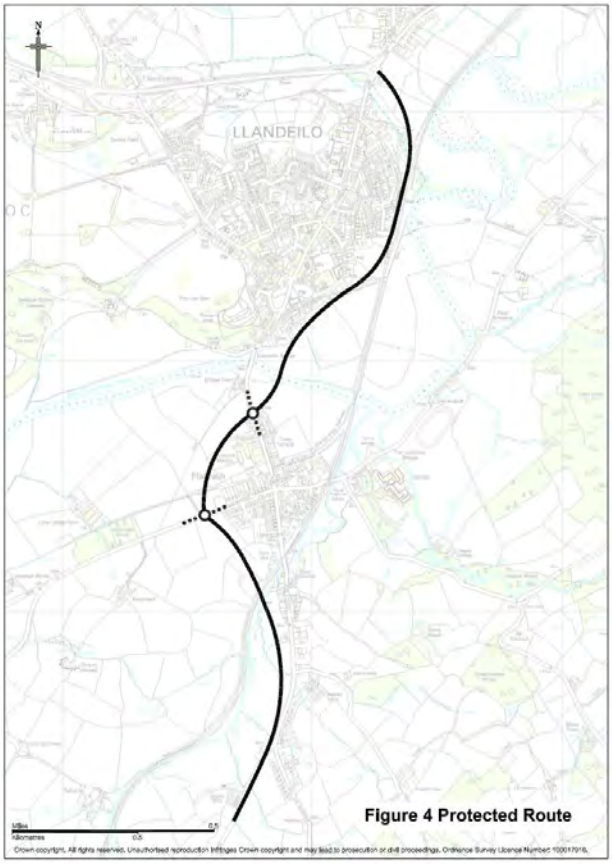
These issues have been acknowledged by the Welsh Government and The National Transport Finance Plan – 2017 Update includes details of proposed schemes being financed within the current programme for government. Within this document, Annex B provides a list of schemes, of which reference 22 under “Road Schemes to be constructed” refers to a bypass of Llandeilo and Ffairfach as follows:

Table 1-1: Extract from National Transport Finance Plan – 2017 Update

Reference	National Transport Finance Plan December 2017 Intervention Description	Intervention progress since July 2015
R22	Develop the currently protected route to deliver a combined bypass of Llandeilo and Ffairfach	Carry out a WelTAG appraisal in relation to the scheme, to confirm if a bypass is still required or if alternative solutions can be implemented.

In 2007 the Welsh Government published a refined preferred route for a Llandeilo bypass, the route of this is shown in Figure 1.1.

Figure 1.1: 2007 Refined Preferred Route



Due to the time that has elapsed since the protected route was identified it is necessary to review whether or not a bypass is required, and if so what the preferred route should be. This study comprises the first stage of the WelTAG appraisal outlined in Table 1.1. Its purpose is to identify and describe the issues with the transport network, and to define a set of objectives to address them. A long list of scheme options has then been identified with a high-level, qualitative appraisal undertaken which is used to provide a set of recommendations for further work to be undertaken in WelTAG Stage Two. The appraisal has been undertaken in accordance with the December 2017 version of WelTAG alongside new legislation and policy such as the Well-being and Future Generations Act 2015.

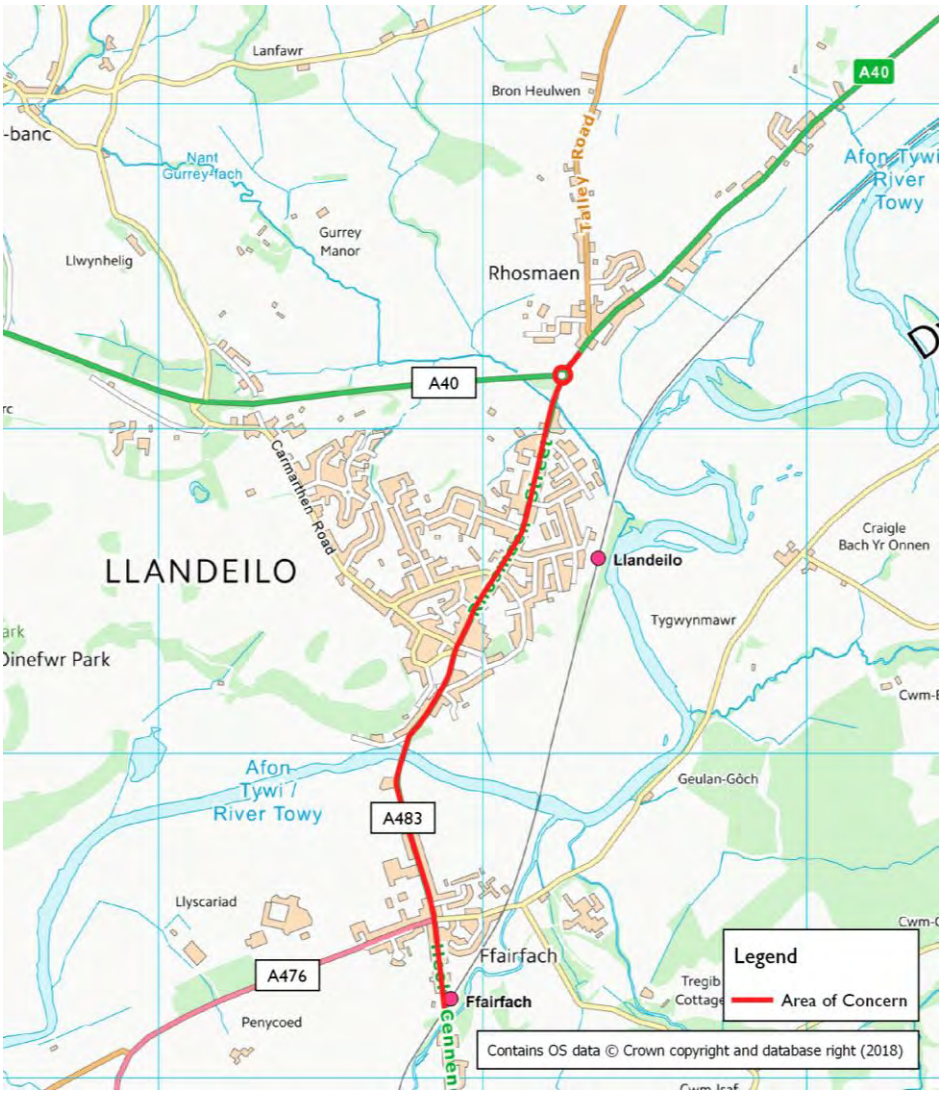
1.3 Study Area

Figure 1.2 below illustrates the area of concern which is primarily located along the A483 within Llandeilo and Ffairfach. It comprises the A483 from its junction with the A40 to the north of Llandeilo through to south of Ffairfach in the vicinity of Ffairfach railway station.

The A483 is situated at the heart of Llandeilo's town centre forming the high street (Rhosmaen Street). The A483 is a 2-way street with parking and loading-only bays located along its length where space allows. Double-yellow lines are present where the road width narrows. There are many side streets running off the A483, many of which

have poor visibility for traffic attempting to exit onto the A483. Footways are present throughout the majority of the A483 through Llandeilo and Ffairfach but are narrow in many places, forcing pedestrians to walk single file. To the north of Llandeilo, the A483 meets the A40 and to the south meets the A476 north of Ffairfach Train station.

Figure 1.2: Area of Concern within Llandeilo and Ffairfach



During the period since the Secretary of State's decision in 1994 additional environmental features have gained statutory protection or have been designated. These are:

- 1998 – Dyffryn Twyi river corridor identified as a Landscape of Outstanding Historic Interest;
- 1998 - River Towy designated a Site of Special Scientific Interest (SSSI) and candidate Special Area of Conservation (cSAC);
- 2004 - River Towy designated a Special Area of Conservation; and
- 2011 – Area Quality Management Area declared in Llandeilo for Nitrogen Dioxide (NO_2).

In undertaking this study, regard has been had to the previous work undertaken on Llandeilo; however, due to the length of time that had elapsed it was considered necessary to identify the problems as they currently present themselves and identify objectives that would act to address these problems.

This study will pay due cognisance to this previous work and undertake an updated assessment to determine if the previously highlighted issues are still present and if previously proposed interventions are still appropriate.

2. Legislative and Policy Context

2.1 Key National Legislation

Climate Change Act 2008

The Act imposes a duty on the Secretary of State to reduce UK wide greenhouse gas emissions in 2050 to a level which is at least 80 % below the level of emissions in 1990. It also obliges the Secretary of State to set carbon budgets for a successive five-year period and to prepare proposals and policies for meeting those carbon budgets. Part 2 of the Act establishes the Committee on Climate Change. Parts 4 and 5 of the Act impose limited duties and confer limited powers on Welsh Ministers in terms of contributing towards meeting the UK wide carbon targets.

The Active Travel (Wales) Act 2013

The Active Travel (Wales) Act 2013 requires the Welsh Government to take reasonable steps to enhance the provision for walkers and cyclists whenever it invests in highway infrastructure. This requirement has been carried forward into an Active Travel Plan for Wales, which states that the Welsh Government 'will therefore ensure that all highway construction and improvement schemes consider walking and cycling provision from the outset'.

Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations (Wales) Act 2015 is a significant piece of legislation in Wales that seeks to ensure that the needs of future generations are taken into account when public bodies, including the Welsh Government' take forward projects. Given the importance of this legislation it is considered separately in this chapter.

Environment (Wales) Act 2016

Part 1 – Sustainable management of natural resources, of The Environment (Wales) Act 2016 requires all public authorities (including the Welsh Government) to seek to "maintain and enhance biodiversity" where it is within the proper exercise of their functions. The Welsh Government must also seek to "promote the resilience of ecosystems". This ensures that biodiversity is an integral part of the decisions that public authorities take in relation to Wales.

Part 2 - Climate change – provides the Welsh Ministers with powers to put in place statutory emission reduction targets, including at least an 80% reduction in emissions by 2050 and carbon budgeting to support their delivery. This is vital within the context of our existing UK and EU obligations and sets a clear pathway for decarbonisation. It also provides certainty and clarity for business and investment.

2.2 Key National Policy and Guidance

One Wales: One Planet – the Sustainable Development Scheme for Wales (2009)

This document sets out the Welsh Government's objectives for achieving the goal of sustainable development (Welsh Assembly Government, 2009). In Wales this means achieving a better quality of life for current and future generations by:

- promoting social justice and equality of opportunity; and
- enhancing the natural and cultural environment and respecting its limits – using only a fair share of the earth's resources and sustaining our cultural legacy.

It identifies that more and more businesses are depending on fast, safe and reliable transport networks and services. Improving the productivity of Welsh businesses through reducing journey times for individuals and goods and encouraging international trade through larger and more connected markets provides an attractive investment environment.

Climate Change Strategy for Wales (2010)

The Climate Change Strategy for Wales (Welsh Assembly Government, 2010) was published in 2010 and sets out the Welsh Government's approach to tackling climate change, focussing on the need to reduce climate change emissions. A key element of this strategy is to promote sustainable travel options, including improved provision for cycling and walking, which also have benefits for health and well-being.

Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2011)

The Air Quality Strategy sets out air quality objectives and policy options to further improve air quality in the UK from today in to the long-term. As well as direct benefits to public health, these options are intended to promote important benefits to quality of life and help to protect the environment.

One Wales: Connecting the Nation: Wales Transport Strategy (2008)

The Wales Transport Strategy (Welsh Assembly Government, 2008) is an essential part of the Welsh Government's strategic policy agenda, with an overarching aim to achieve an integrated transport system for Wales. The document states that Welsh Government's desire to "achieve a nation with access for all, where travelling between communities and accessing services, jobs and facilities in different parts of Wales is both easy and sustainable, and which will support the growth of our economy".

The five strategic priorities of the Welsh Transport Strategy are:

1) reducing greenhouse gas emissions and other environmental impacts;
2) integrating local transport;
3) improving access between key settlements and sites;
4) enhancing international connectivity; and
5) increasing safety and security.

The strategy aims to improve connectivity by improving the road and rail infrastructure, as well as public transport services. As such, the strategy forms a basis to help identify a long list of transport mode options and will act as an aid to reduce the long list options into a recommended shortlist of options. Table 2-1 sets out the long-term outcomes that have been identified as the objectives of the Wales transport strategy.

Table 2-1: Long-term Outcomes set out in One-Wales: Connecting the Nation

Social	Economic	Environmental
• Improve access to healthcare	• Improve access to employment opportunities	• Increase the use of more sustainable materials
• Improve access to education, training and lifelong learning	• Improve connectivity within Wales and internationally	• Reduce the contribution of transport to greenhouse gas emissions

Social	Economic	Environmental
• Improve access to shopping and leisure facilities	• Improve the efficient reliable and sustainable movement of people	• Adapt to the impacts of climate change
• Encourage healthy lifestyles	• Improve the efficient reliable and sustainable movement of freight	• Reduce the contribution of transport to air pollution and other harmful emissions
• Improve the actual and perceived safety of travel	• Improve access to visitor attractions	• Improve the impact of transport on the local environment
		• Improve the impact of transport on our heritage
		• Improve the impact of transport on biodiversity

Environment Strategy for Wales (2006)

This document sets out the Welsh Government's long term strategy for the environment of Wales. The purpose of the strategy is to provide a framework within which to achieve and environment which is clean, healthy, biologically diverse and valued by the people of Wales. It states that the Welsh Government 'want to see our distinctive Welsh environment thriving and contributing to the economic and social well-being of all the people of Wales'.

The Wales Spatial Plan (2008)

The Wales Spatial Plan – People, Places, Futures was originally adopted in 2004 and was updated in July 2008 (Welsh Assembly Government, 2008b). It will be replaced by the National Development Framework which is currently being developed. One of the fundamental principles of The Wales Spatial Plan is sustainable development. The purpose of the Wales Spatial Plan is to ensure that what is done in the public, private and third sectors in Wales is integrated and sustainable. The spatial plan sets out how to achieve sustainable accessibility by balancing the social, economic and environmental impacts of travel while enhancing accessibility.

Part of this Strategy aims to promote distinctiveness by identifying the distinct identity of communities, the built and natural environment, and the Welsh language and culture. It identifies that the Design Commission for Wales can be a key partner in encouraging best practice in creating clean, safe and sustainable development.

An Active Travel Action Plan for Wales (2016)

This document sets out the Welsh Government's vision for Active Travel and has been published taking into account the need to deliver against the seven well-being goals in the Well-being of Future Generations (Wales) Act 2015. It notes that increasing rates of active travel in Wales will directly support the achievement of every one of the Well-being Goals. It makes reference to the Design Guidance that was published in December 2014 to supplement the Active Travel Act. That guidance provides advice on the planning, design and construction and maintenance of active travel networks and infrastructure and is to be used at all stages in the process. The Design Guidance is mandatory for highway authorities (including the Welsh Government) when setting out the standards of new and improved infrastructure for walking and cycling.

Planning Policy Wales (2016) and associated Technical Advice Notes (various dates)

Planning Policy Wales (PPW) (Edition 9), published in November 2016, sets out the Welsh Government's commitment to translate sustainable development into the planning system. In relation to improvement of the A483, the Welsh Government will strive to extend choice in transport and secure accessibility in a way which supports sustainable development.

PPW is supplemented by 21 topic-based Technical Advice Notes (TANs) and two Minerals Technical Advice Notes (MTANs). Each TAN and MTAN provides detailed planning advice on a different subject; these should be taken into account when considering development proposals. The following documents are considered potentially relevant to the transport solutions at Llandeilo.

- TAN 5: Nature Conservation and Planning (Welsh Government, 2009)
- TAN 6: Planning for Sustainable Rural Communities (Welsh Government, 2010)
- TAN 10: Tree Preservation Orders (Welsh Office, 1997)
- TAN 11: Noise (Welsh Assembly Government, 1997)
- TAN 12: Design (Welsh Government, 2016)
- TAN 15: Development and Flood Risk (Welsh Assembly Government, 2004)
- TAN 16: Sport, Recreation and Open Space (Welsh Assembly Government, 2009)
- TAN 18: Transport (Welsh Assembly Government, 2007)
- TAN 20: Planning and the Welsh Language (Welsh Government, 2013)
- TAN 21: Waste (Welsh Government, 2014)
- TAN 23 – Economic Development (Welsh Government, 2014)
- TAN 24: The Historic Environment (Welsh Government, 2017)
- MTAN 1 – Aggregates (Welsh Assembly Government, 2004)

Planning Policy Wales will be updated shortly and the updated version will be used at Stage Two.

Local Air Quality Management in Wales – Policy Guidance (2017)

This document states that local air quality management in Wales should be carried out by:

- Pursuing long-term, enduring solutions to any existing instances of non-compliance with the national air quality objectives;
- Seeking to manage air quality at the same time as achieving other, related outcomes;
- Taking every opportunity to talk to the public about air quality challenges, listen to their concerns and seek their views on potential solutions and their involvement in delivering them;
- Working activity with internal and external partners to mutual benefit in the delivery of desired outcomes; and
- Keeping exposure to air pollution as low as reasonably practicable across the whole of the population, looking out in particular for areas where the national air quality objectives might be at risk of being breached at some point in the future and acting pre-emptively to prevent those breaches from occurring.

2.3 Regional Context

Joint Transport Plan for South West Wales 2015 – 2020

The *Joint Transport Plan for South West Wales (2015 – 2020)* [Joint LTP] has been built based on the Regional Transport Plan (2010 – 2015) to *"support a vibrant, skilled, growing and connected regional economy*". The Joint LTP has also been updated to reflect emerging trends which may impact on access needs, as well as reviewing changes since the 2010 plan submission. Four LAs make up South West Wales, these include:

- Carmarthenshire County Council;
- Neath Port Talbot County Borough Council;
- Pembrokeshire County Council; and
- City and County of Swansea.

The four LAs listed above 'have worked collaboratively to create an overarching City Region LTP, with four local programmes of projects… The Joint LTP will provide the framework for improving connectivity to, from and within the region for the period 2015 – 2020'. As the majority of the baseline work for the Regional Transport Plan was relevant, this formed a solid basis for the Joint LTP which has a vision for a better connected region: "*To improve transport and access within and beyond the region to facilitate economic regeneration, reduce deprivation and support the development and use of more sustainable and healthier modes of transport*". The Joint LTP has numerous objectives for a better connected region which are:

- To improve the efficiency and reliability of the movement of people and freight within and beyond South West Wales to support economic growth in the City Region;
- To improve access for all to a wide range of services and facilities including employment and business, education and training, health care, tourism and leisure activities;
- To improve the sustainability of transport by improving the range and quality of, and awareness about, transport options, including those which improve health and well-being;
- To improve integration between policies, service provision and modes of transport in South West Wales;
- To implement measures which will protect and enhance the natural and built environment and reduce the adverse impact of transport on health and climate change; and
- To improve road safety and personal security in South West Wales.

2.4 Local Context

Local Development Plan 2006-2021, Carmarthenshire County Council

Carmarthenshire County Council's Local Development Plan (LDP), which was adopted in December 2014, sets out the spatial vision for the future of Carmarthenshire and a framework to determine the distribution and delivery of growth and development in the county. The Transport and Accessibility section of the LDP covers the following:

- Promoting walking;
- Encouraging cycling;
- Promoting public transport;
- Traffic management;
- Distribution centre location;
- Access to developments; and

- Transport infrastructure impacts.

The LDP states that land is required to facilitate improvements to the cycle network which will be safeguarded. The land required includes the Towy Valley which is located between Llandeilo and Carmarthen. The LDP also identifies that 'cycling and walking form an important part of an Integrated Transport Strategy, the sustainability objectives of the Plan (including reducing reliance on the car) and the promotion of greater accessibility and healthier lifestyles. Cycling and walking have a significant role in achieving the delivery of sustainable transportation'.

The LDP includes policies regarding development control and seeks to protect the environment from inappropriate development. Under Policy EP2 – Pollution, the concerns regarding air pollution and health are considered.

The LDP also provides details of land allocations for potential development, this includes areas that have been allocated within Llandeilo. These allocations have not been considered further in this WelTAG Stage One report.

Brecon Beacons National Park Authority Local Development Plan

The Brecon Beacons National Park Authority Local Development Plan was adopted in December 2013 and covers the period up to 2022. The adopted LDP forms the development plan for the Brecon Beacons National Park.

3. Legislative and Policy Context

In order to strengthen the sustainable development framework in Wales, a pilot National Conversation was launched in February 2014, to define the 'Wales We Want', led by the Commissioner for Sustainable Futures. The Wales We Want Report (Welsh Government and Sustain Wales, 2010), sets out seven foundations for the well-being of future generations. This resulted in the enactment of the Well-Being of Future Generations (Wales) Act 2015. The Act requires public bodies (of which the Welsh Government is one) to carry out sustainable development. Section 2 of the Act defines this as:

> *"Sustainable development means the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals."*

In the Act, any reference to a public body doing something 'in accordance with the sustainable development principle' means that the body must act in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs.

3.1 Well-being Goals

The Act defines seven 'well-being' goals, as set out in Table 3-1.

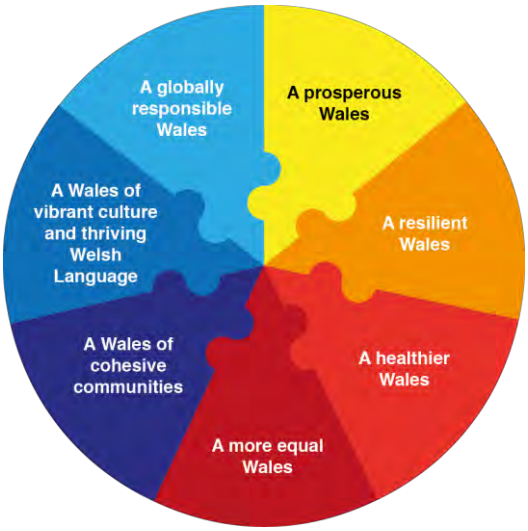


Table 3-1: Well-being Goals

Well-being Goal	Description of Goal
A prosperous Wales	An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
A resilient Wales	A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

Well-being Goal	Description of Goal
A healthier Wales	A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
A more equal Wales	A society that enables people to fulfil their potential no matter what their background or circumstances are (including their socio economic background and circumstances).
A Wales of cohesive communities	Attractive, viable, safe and well-connected communities.
A Wales of vibrant culture and thriving Welsh language	A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.
A globally responsible Wales	A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

3.2 Ways of Working

The Act outlines five ways of working that public bodies need to think about to show that they have applied the sustainable development principle. Public bodies need to make sure that when making their decisions they take into account the impact they could have on people living their lives in Wales in the future. These are set out in Table 3-2. Following these ways of working will help us work together better, avoid repeating past mistakes and tackle some of the long-term challenges we are facing.

Table 3-2: Ways of Working

Ways of Working	
	The importance of balancing short-term needs with the need to safeguard the ability to also meet long-term needs.
	How acting to prevent problems occurring or getting worse may help public bodies meet their objectives.
	Considering how the public body's Well-being Objectives may impact upon each of the Well-being Goals, on their other objectives, or on the objectives of other public bodies.

Ways of Working	
	Acting in collaboration with any other person (of different parts of the body itself) that could help the body to meet its Well-being Objectives.
	The importance of involving people with an interest in achieving the Well-being Goals, and ensuring that those people reflect the diversity of the area which the body serves.

Each public body is now required under the Act to publish a set of Well-being Objectives, designed to maximise their contribution to achieving each of the Well-being Goals (see 'Taking Wales Forward: The Welsh Government's Well-being Objectives' section below). The Well-being Goals will form the framework of these objectives, as well as indicators to be used to measure well-being.

3.3 Location of the Study

The A483 Llandeilo Transport Study is focussed on issues caused by transport around Llandeilo and Ffairfach in Carmarthenshire. To the east of Llandeilo, and wrapping to the eastern extent of Ffairfach lies the Brecon Beacons National Park. Information regarding the baseline environment in terms of well-being assessments is therefore primarily focused on Carmarthenshire, except where national trends provide a more appropriate frame of reference.

In addition to the Well-being Objectives set out in Taking Wales Forward there are seven additional public bodies whose Well-being Objectives have been identified as being potentially relevant to the A483 Llandeilo Transport Study. These are:

- Brecon Beacons National Park Authority;
- Carmarthenshire County Council;
- Carmarthenshire Public Services Board;
- Hywel Dda Health Board;
- Mid Wales Fire and Rescue Service;
- Natural Resources Wales; and
- Public Health Wales.

Each of these public bodies will be considered in turn within this report.

3.4 Welsh Government Well-being Objectives

Each public body must identifiy Well-being Objectives. The Well-being Objectives of the public bodies relevant to the Llandeilo transport study are set out below.

3.4.1 Taking Wales Forward: The Welsh Government's Well-being Objectives (2016)

The duties on Welsh Ministers under section 3(2)(a) and 7 of the Act requires Well-being Objectives to be developed and published by public bodies, to help maximise the contribution of the Welsh Government (and other public bodies under the same duty) to the seven Well-being Goals outlined in the Act.

On 4 November 2016, the Welsh Government published its Well-being Objectives in *Taking Wales Forward*, which set out how the Welsh Government will use the Act to help deliver its programme for government and maximise its contribution to the seven overarching Well-being Goals that apply to public bodies in Wales (Welsh Government, 2016).

Taking Wales Forward is the Welsh Government's programme for the five-year period 2016-2021. It sets out the Welsh Government's programme to drive improvement in the Welsh economy and public services, delivering a Wales which is:

- prosperous and secure;
- healthy and active;
- ambitious and learning; and
- united and connected.

The above four cross-cutting strategies aim to help the Welsh Government to deliver the promise of its Act. The Welsh Government developed fourteen Well-being Objectives that were designed to reflect the key priorities for improvement in the Welsh economy, society, environment and culture. They aimed to form the foundation of the four cross-cutting strategies in *Taking Wales Forward* and to maximise the contribution the Welsh Government can make towards achieving the seven national Well-being Goals. The fourteen Well-being Objectives contained in Taking Wales Forward have been revised in the subsequent 'Prosperity for All' document published in 2017.

3.4.2 Prosperity for All: the national strategy (2017)

Prosperity for All: the national strategy (Welsh Government, 2017) takes the key commitments set out in *Taking Wales Forward* and places them in a long term context. It sets out how they fit with the work of the wider Welsh public service to lay foundations for achieving prosperity for all. It sets out the Welsh Government's vision for each theme, showing how they will contribute to prosperity for all. Table 3-3 details the key themes set out in *Prosperity for All*.

Table 3-3: Key Themes in Prosperity for All

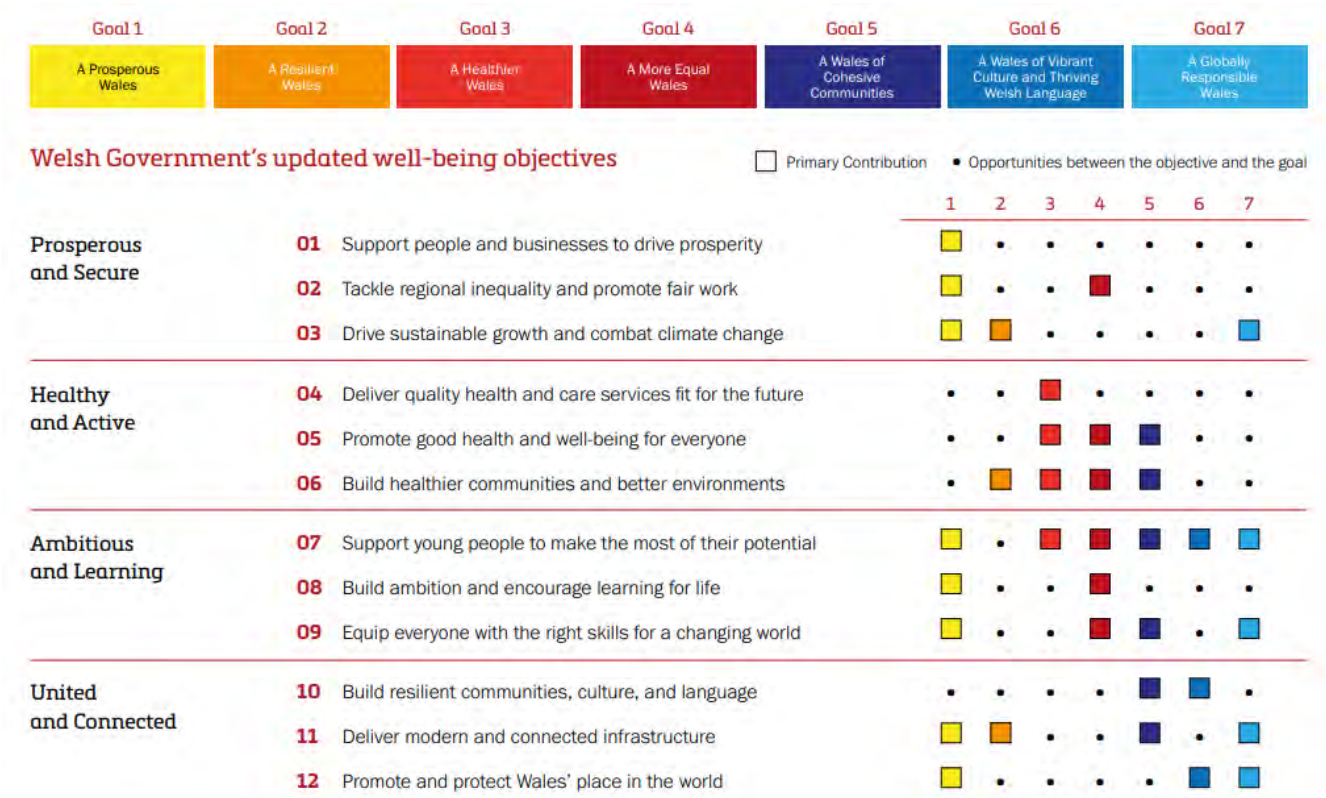
Theme	Description
Prosperous and Secure	Our aim is to drive a Welsh economy which spreads opportunity and tackles inequality, delivering individual and national prosperity. We will enable people to fulfil their ambitions and enhance their well-being through secure and sustainable employment. We will break down the barriers many face to getting a job, and create the right environment for businesses to grow and thrive.
Healthy and Active	Our aim is to improve health and well-being in Wales, for individuals, families and communities, helping us to achieve our ambition of prosperity for all, taking significant steps to shift our approach from treatment to prevention.
Ambitious and Learning	Our aim is to instil in everyone a passion to learn throughout their lives, inspiring them with the ambition to be the best they can possibly be. A prosperous Wales needs creative, highly skilled and adaptable people, so our

Theme	Description
	education from the earliest age will be the foundation for a lifetime of learning and achievement.
United and Connected:	Our aim is to build a nation where people take pride in their communities, in the Welsh identity and language, and in our place in the world. We are building the vital links that make it easier for people to come together, for the economy to grow, and for us to become a confident nation at ease with itself.

In developing this national strategy, the Welsh Government has amended the Well-being Objectives previously identified in *Taking Wales Forward* and reduced their number from 14 to 12. The way in which the amended Well-being Objectives relate to the Key Themes set in *Taking Wales Forward*, and the Well-being of Future Generations (Wales) Act 2015 is shown in Figure 3.1 below, this also sets out the revised Well-being Objectives.

The Well-being Statement also sets out how the revised objectives relate to the Well-being Goals in the Well-being Act. *Prosperity for All: a national strategy* is a programme for Government. Since it covers a range of issues, not all of the objectives are relevant to transport infrastructure projects. The Well-being Objective of most relevance is to 'deliver modern and connected infrastructure'. Figure 3.1 shows how the updated Well-being Objectives relate to the Well-being Goals.

Figure 3.1: **How the Welsh Government's update Well**-being Objectives align with the Well-being Goals



3.4.3 Prosperity for All: Economic Action Plan

The *Prosperity for All: Economic Action Plan* (Welsh Government, 2017a) sets out how the Welsh Government intends to pool resources, expertise and knowledge to strengthen the economic foundations and future proof the Welsh economy. A key element of this action plan that is relevant to the proposed scheme is an aim to see "all parts of Wales to benefit from economic growth and a fairer distribution of wealth and opportunity."

The economic action plan notes that *Prosperity for All* identified five priority areas for cross-government working which have the greatest potential contribution to long-term prosperity and well-being. These are: early years; housing; social care; mental health; and skills and employability. The plan contributes to each of these.

Under the 'drive sustainable growth and combat climate change' objective the Welsh Government wants '*Wales to benefit from opportunities arising from the shift from a fossil fuel to a low carbon based economy and for this transition to support a transformation in our prosperity, health and well-being. We need to transform our economy to use fewer resources per unit output and keep products and material resources in high value use for as long as possible'*. Amongst the ways that the Welsh Government aims to achieve this objective set out in the Economic Action Plan are to work with the construction sectors to take advantage of the need to replace higher carbon materials with lower carbon alternatives where appropriate, and deliver on the Welsh Government's ambition for the public sector to become carbon neutral by 2030.

Under the 'deliver modern and connected infrastructure' objective, the Welsh Government aims to build connected infrastructure to support growth and investment. Through this new infrastructure, including roads, the Government will enable the provision of modern sites and premises to allow businesses to grow as well as attracting investment opportunities. There are four key reasons why they are doing this:

- It is an important driver of productivity and growth. This is supported by evidence demonstrating how better connected people, businesses and places are generally more productive and successful in delivering growth.
- It is vital to inclusion and well-being. The quality of infrastructure underpins cohesive and connected communities, enabling people to access services they need to stay healthy, to learn and to engage with others.
- It is essential to place-building, maximising the economic impacts of place, acting as a catalyst for regeneration. Places with good infrastructure are capable of supporting a range of economic activities and are attractive places to live, learn, work and invest.
- It supports the economies of scale and network effects associated with agglomeration – quality infrastructure enables people to be closer to jobs and make business to business contact easier, supporting the transfer of ideas, diffusion of innovation and the better matching of skills to jobs, which all have a significant influence on productivity and growth.

Key to this is the Welsh Government's commitment to maximise the efficiency of the existing transport network by addressing bottlenecks and pinch points; and connecting people and communities by ensuring new transport infrastructure is planned alongside other infrastructure including homes, employment land and public services. The strategic approach to development will include the provision of better more integrated and reduced carbon public transport, together with walking and cycling.

3.4.4 Identification of Relevant Welsh Government Well-being Objectives

The A483 Llandeilo Transport Study is a transport project for Welsh Government and on this basis all of the Well-being Objectives in Prosperity for All are at least partially relevant. Table 3-4 sets out the Well-being Objectives and highlights those that are considered to be directly or partially relevant to the A483 Llandeilo Transport Study.

Table 3-4: Relevance of Welsh Government Well-Being Objectives

Overarching Objective	Objective	Directly Relevant	Partially Relevant	Not Relevant
Prosperous and Secure	Support people and businesses to drive prosperity		¡	
	Tackle regional inequality and promote fair work		¡	
	Drive sustainable growth and combat climate change		¡	
Healthy and Active	Delivery quality health and care services fit for the future		¡	
	Promote good health and well-being for everyone		¡	
	Build healthier communities and better environments		¡	
Ambitious and Learning	Support young people to make the most of their potential		¡	
	Build ambition and encourage learning for life		¡	
	Equip everyone with the right skills for a changing world		¡	
United and Connected	Build resilient communities, culture, and language	¡		
	Deliver modern and connected infrastructure	¡		
	Promote and protect Wales' place in the World		¡	

3.5 Natural Resources Wales

3.5.1 Natural Resources Wales' Well-being Objectives (2017)

Natural Resources Wales (NRW) published their Well-being Statement in 2017, this document sets out their Well-being Objectives and provides a narrative of why these align with the Well-being Goals. Their Well-being Objectives are set out in Table 3-5, which also states the extent to which they are considered relevant to the A483 Llandeilo Transport Study.

Table 3-5: Relevance of Natural Resources Wales' Well-Being Objectives

Objective	Directly Relevant	Partially Relevant	Not Relevant
Champion the Welsh environment and the sustainable management of natural resources		¡	

Objective	Directly Relevant	Partially Relevant	Not Relevant
Ensure land and water in Wales is managed sustainably and in an integrated way		i	
Improve resilience and quality of ecosystems		i	
Protect people and communities from environmental hazards like flooding and pollution		i	
Help people live healthier and more fulfilled lives		i	
Promote successful and responsible business, using natural resources without damaging them			i
Develop NRW into an excellent organisation, delivering first class customer service			i

3.6 Public Health Wales

Public Health Wales first published their Well-being Objectives in 2017 and these have been subsequently updated with their current Well-being Statement published in March 2018, further information regarding the priorities within each of these objectives is set out in Annex 1 of the Well-being Statement. Table 3-6 sets out the extent to which each of these are relevant to the A483 Llandeilo Transport Study, which this assessment is informed by the additional text in Annex 1 each Well-being Objective has been considered in its broadest sense in deciding the extent to which the A483 Llandeilo Transport Study solutions could positively contribute or undermine these objectives.

A key issue that Public Health Wales has identified as a specific indicator, health issues associated with air pollution. They have produced guidance focussed on reducing the public health risks associated with transport-generated air pollution, aimed at a multi-agency audience to stimulate collaborative action. The guidance also advised where interventions provide a good return on investment (e.g. speed management, preventing engine idling and active travel).

Public Health Wales have also been working together with Natural Resources Wales to demonstrate the important role that natural resources can play in protecting and improving the health of present and future generations as described in Table 3-6.

Table 3-6**: Relevance of Public Health Wales' Well**-Being Objectives

Objective	Directly Relevant	Partially Relevant	Not Relevant
Influencing the wider determinants of health		i	
Improving mental well-being and building resilience		i	
Promoting healthy behaviours	i		
Securing a healthy future for the next generation	i		

Objective	Directly Relevant	Partially Relevant	Not Relevant
Protecting the public from infection and environmental threats to health	¡		
Supporting the development of a sustainable health and care system focused on prevention and early intervention			¡
Building and mobilising knowledge and skills to improve health and well-being across Wales			¡

3.7 Carmarthenshire County Council

3.7.1 Carmarthenshire County Council Well-being Objectives (2017)

Carmarthenshire County Council has identified 14 local Well-being Objectives, these are listed in Table 3-7. Each of these objectives have been assessed to consider the extent to which they are relevant to the A483 Llandeilo Transport Study.

In Carmarthenshire County Council's Well-being Assessment they note that Well-being Objective 9 links to the 'united and connected' objective of the Welsh Government in 'Taking Wales Forward'. Well-being Objective 12 has links across to the duty to 'maintain and enhance biodiversity' in the Environment (Wales) Act 2016. Well-being Objective 13 is key to the A483 Llandeilo Transport Study as it relates directly to transport infrastructure. The report states that this is important because '*transportation and highway play a key role in sustaining our community. A modern, successful economy is reliant upon the safe and efficient movement of people and goods; providing opportunities for people to gain access to employment, education, health, leisure, social and retail services'*.

Table 3-7: Relevance of **Carmarthenshire County Council's** Well-Being Objectives

Objective	Directly Relevant	Partially Relevant	Not Relevant
Help to give every child the best start in life and improve their early life experiences		¡	
Help children live healthy lifestyles		¡	
Continue to improve learner attainment for all			¡
Reduce the number of young adults that are Not in Education, Employment or Training			¡
Tackle poverty by doing all we can to prevent it, helping people into work and improving the lives of those living in poverty			¡
Creating more jobs and growth throughout the county			¡
Increase the availability of rented and affordable homes			¡
Help people live healthy lives (tackling risky behaviours and obesity)		¡	

Objective	Directly Relevant	Partially Relevant	Not Relevant
Supporting good connections with friends, family and safe communities		¡	
Support the growing numbers of older people to maintain dignity and independence in their later years		¡	
A Council-wide approach to supporting Ageing Well in the County			¡
Looking after the environment now and for the future		¡	
Improving the highway and transport infrastructure and connectivity	¡		
Promote Welsh Language and Culture		¡	

3.8 Brecon Beacons National Park Authority

The Brecon Beacons National Park Authority has identified 34 projects / actions that form the structure of their Well-being Objectives. These are set out under four Key Work Areas:

- Heritage
- Landscapes and Biodiversity
- Resilient Communities; and
- Sustainable Economic Development.

Details of the 32 projects are set out in Table 3-8, along with an assessment of whether or not they are relevant to the A483 Llandeilo Transport Study.

Table 3-8: **Relevance of Brecon Beacons National Park Authority's Well**-Being Objectives

Key work area	Objective	Directly Relevant	Partially Relevant	Not Relevant
Heritage	Protect and enhance the Park's archaeology	¡		
	Conserve and enhance the Park's most vulnerable listed buildings	¡		
	Respond to consultations on planning, listed building consent and other relevant applications			¡
	Review Crickhowell and Llangattock Conservation Area			¡
	Complete an appraisal for 1 new Conservation Area within the Park Area			¡
Landscape and Biodiversity	Reducing land-based carbon emissions and restoring upland habitats: • Commence and continue peat restoration projects			¡

Key work area	Objective	Directly Relevant	Partially Relevant	Not Relevant
	Waterfall Country: - Service Level Agreement with NRW • Implement the SLA and undertake improvements to Gwaun Hepste Car Park			i
	Black Mountains: - Black Mountains Land Use Partnership Sustainable Management Scheme • Implement the programme of actions which we are the lead partner during this financial year.			i
	Research Programme and Strategic Research Partnerships • Co-host a joint BBNPA research conference with strategic research partners.			i
	Local Biodiversity Action Plan (Local Nature Recovery Plan) • Finalise agreement with local and regional partners on the aims and sources of funding for the Local Nature Recovery Plan.			i
	Maintaining and improving access to the countryside • Commission and implement Welsh Government Capital Grant-funded projects • Commence review of Rights of Way Improvement Plan and development of an integrated access management plan.			i
Resilient Communities	Agree revised Rights of Way Delegation Agreements with the 6 Unitary Authorities			i
	Delivery Rights of Way Improvement Plan projects			i
	We will provide opportunities for disadvantaged groups to visit the park through the Fairplay programme (6 groups a year from schools with 20% or more pupils on Free School Meals).			i
	We will deliver the Sustainable Development Fund			i
	We will deliver a Volunteer Development programme			i
	Deliver Place Plans			i
	We will deliver Health and Wellbeing actions		i	
	We will deliver the Inspironment Programme			i

Key work area	Objective	Directly Relevant	Partially Relevant	Not Relevant
	We will deliver the Geocaching project			i
	We will continue to develop our activity tourism products			i
	Deliver Interpretation			i
	We will assist 4 schools in achieving the Ambassador Schools award			i
	We will support 50 community resilience projects			i
Sustainable Economic Development	We will deliver 12,500 hours of participant learning (5,000 learners x 2.5 hours)			i
	We will maintain activity in the UNESCO Global Geopark, our Ambassadors programme, business training events and engaging with businesses			i
	We will develop Craig y Nos as the new UNESCO Global Geopark Hub and we will support at least 5 local communities in their work for the Geopark			i
	We will maintain and enhance our Dark Sky designation		i	
	Heritage Lottery Fund Skills in Action Training Project			i
	We will seek funding by identifying major projects that the Authority has prioritised as key strategic goals and submit at least three funding applications			i
	We will install a micro hydro system on the Afon Clydach by the end of September 2017			i
	We will deliver a tea rooms franchise at the National Park Visitor Centre			i

3.9 Carmarthenshire Public Services Board

Carmarthenshire Public Services Board (PSB) has identified four local Well-being Objectives in its Carmarthenshire Well-being Plan (Carmarthenshire PSB,2017). These are listed in Table 3-9. Each of these objectives have been assessed to consider the extent to which they are relevant to the A483 Llandeilo Transport Study.

Table 3-9: **Relevance of Carmarthenshire Public Services Board's Well**-Being Objectives

Objective	Directly Relevant	Partially Relevant	Not Relevant
Healthy Habits – People have a good quality of life, and make healthy choices about their lives and environment.		¡	
Early Intervention – To make sure that people have the right help at the right time; as and when they need it.			¡
Strong Connections – Strongly connected people, places and organisations that are able to adapt to change		¡	
Prosperous People and Places – To maximise opportunities for people and places in both urban and rural parts of the county.		¡	

Key factors that are highlighted in the plan are that Carmarthenshire has some of the worst transport-related CO_2 emissions in Wales. It acknowledges that the Carmarthenshire PSB cannot prevent climate change on its own but that it can collaborate at a strategic level to adopt changes in order to soften the impact on the county. Key issues relating to climate change highlighted were the effects of rising sea levels, flooding, increased numbers of extreme weather events and the loss of habitats and ecosystems.

It notes that nature has a positive effect on well-being; it improves levels of happiness, lowers stress levels and increased environmentally sustainable attitudes and behaviours. While 40% of the population are within walking distance of green space the Well-being Plan states that Carmarthenshire could have a better 'connection to nature'. In the medium term the PSB has a plan to strengthen the connection with nature with the PSB promoting these spaces and educating an understanding of the importance of and a love for nature. The longer term ambition is that Carmarthenshire residents are actively engaged in their own health and, with greater connection to nature, have increased well-being, lower stress levels and have more environmentally sustainable attitudes and behaviours.

The Well-being Plan focusses on making sure that the challenges that individuals face throughout their lives, including deteriorating physical and mental health, the breakdown of social networks and relationships, changing economic circumstances and becoming trapped in a cycle of poverty.

It confirms that social networks and communities are crucial for well-being throughout our lives. Many people are much more involved and engaged in their communities but the Well-being Plan identifies that the PSB could do better at supporting these networks.

The Well-being Plan notes that the majority of people living in poverty in Carmarthenshire were located in rural areas. Part of the reason for this is that people in rural communities experience higher fuel costs and significant additional costs and challenges that come from lack of access to services, transport and employment.

In the short term, the PSB is aiming to develop opportunities for work experience and apprenticeships and to provide other support and training to enable individuals to develop skills for life. In the medium term it looks to improvements in infrastructure, including a fully integrated sustainable transport system that meets the needs of the communities.

3.10 Hywel Dda Health Board

Hywel Dda Health Board has identified 4 Well-being Objectives in its Well-being Statement & Objectives 2017/18 (Hywel Dda Health Board, 2017). These are listed in Table 3-10. Each of these objectives have been assessed to consider the extent to which they are relevant to the A483 Llandeilo Transport Study.

Table 3-10: Relevance of Hywel Dda University Health **Board's Well**-Being Objectives

Objective	Directly Relevant	Partially Relevant	Not Relevant
Improve population health through prevention and early intervention		¡	
Support people to live active, happy and healthy lives	¡		
Improve efficiency and quality of services through collaboration with people, communities and partners		¡	
Ensure a sustainable, skilled and flexible workforce to meet the changing needs of the modern NHS			¡

3.11 Mid and West Wales Fire and Rescue Service

The Mid and Wales Fire and Rescue Service has identified 11 Well-being Objectives, these are listed in Table 3-11. Each of these objectives have been assessed to consider the extent to which they are relevant to the A483 Llandeilo Transport Study.

Table 3-11: Relevance of Mid and West Wales Fire and Rescue Services Well-Being Objectives

Objective	Directly Relevant	Partially Relevant	Not Relevant
To deliver a holistic home safety intervention to those most at risk within the communities of mid and west Wales			¡
To reduce the incidence of arson across mid and west Wales			¡
To delivery our part of the Welsh Government Road Safety Framework	¡		
The Well-being of Future Generations (Wales) Act 2015 and our role in Public Service Boards.			¡
To contribute to and implement the new Emergency Services Network (ESN)			¡
Further develop the findings of the Service's Risk Review and Strategic Assessment			¡
Review and develop our response to flooding incidents		¡	
To invest in our people			¡
To make best use of our assets and resources		¡	
Digitisation – to use technology to innovate, collaborate and empower.			¡
To improve the way we resolve operational incidents through innovation and the use of technology		¡	

Commentary on their well-being objectives states that the Mid and West Wales Fire and Rescue Service rescue more people from Road Traffic Collisions (RTCs) that from burning premises. Key objectives align with the Welsh Government's Road Safety Framework which aims to achieve:

- A 40% reduction in the total number of people killed or seriously injured on Welsh Roads by 2020;
- A 25% reduction in the number of motorcyclists killed and seriously injured on Welsh roads by 2020; and
- A 40% reduction in the number of young people (aged 16-24) killed and seriously injured on Welsh roads in 2020.

They note that even though road safety has improved considerably in recent years, in 2014, there were a total of 8,208 reported casualties as a result of RTCs - 103 people were killed and 1,160 people were seriously injured in Wales.

4. Baseline Environment

4.1 Journey Time and Reliability

The A483 through Llandeilo and Ffairfach is a single-carriageway trunk road which, in parts, is narrower than standard width and therefore vehicles can have difficulty passing each other, resulting in pinch-points on the trunk road network. The A483 has designated parking bays for people accessing local services and loading bays for servicing vehicles, as well as sections which are not restricted and are used by visitors, and residents due to a lack of driveways: this results in congestion issues. Mapping of Traffic Regulation Orders in place within Llandeilo are included in the Appendix B.

Further to this, the visibility of oncoming vehicles is reduced due to the parked vehicles which presents a safety issue. There are also numerous junctions along the A483, which side roads enter/exit from the A483, the visibility splays of some of these junctions is insufficient and raises further concerns of safety.

Speed limit signs along the A483 are frequent and there are variable speed limit signs in place on the approach to the primary schools within Llandeilo. However, there are some instances where speed limit signs are contradictory which could confuse drivers. Signing upon approaches to junctions is sufficient, however warning signs to reduce speeds towards roundabouts could be improved.

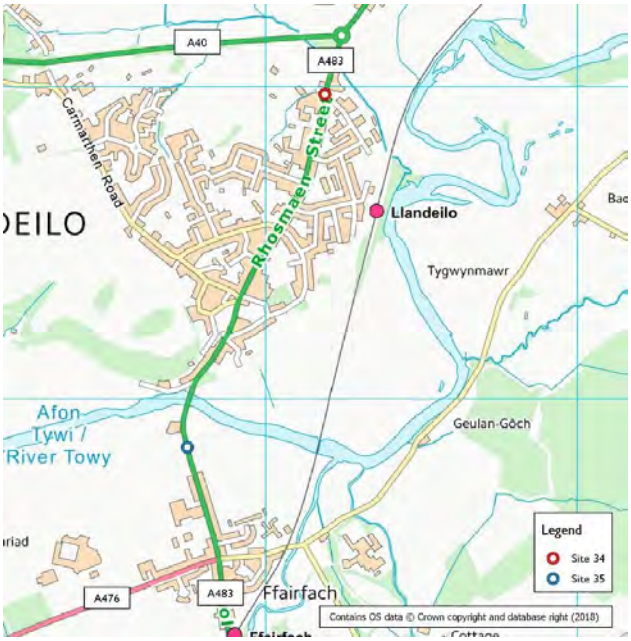
The A483 Llandeilo bridge is a single-arch Grade II* listed road bridge which provides access from Llandeilo to Ffairfach over the River Towy. Traffic crossing the A483 Llandeilo bridge is limited to 30mph. Vehicles park outside residential houses immediately to the north and south of the bridge.

The A476, which is not a trunk road, carries the majority of north-south traffic travelling south of Llandeilo, joining the A483 at the crossroads in Ffairfach.

Without intervention there would be no change to this baseline situation.

This section provides a summary of the traffic flows along the A483/Rhosmaen Street within Llandeilo. Traffic count data has been provided by South Wales Trunk Road Agent for two sites, one in Llandeilo and one in Ffairfach. The locations of the two sites are illustrated in Figure 4.1 overleaf.

Figure 4.1: Location of Site 34 and 35 within Llandeilo



Site 34 is located along the A483/Rhosmaen Street to the north of Llandeilo in close proximity to Station Road, it collected 12 months of data from January 2014 to December 2014. Site 35 is located along the A483 to the north of Ffairfach, it collected 12 months of data from January 2017 to December 2017. Table 4-1 below presents average daily flows across the year for both sites.

Table 4-1: Average Daily Traffic Flows

	Site 34		Site 35	
	Northbound	Southbound	Northbound	Southbound
January	3455	3466	4000	4036
February	3607	3601	4210	4215
March	3855	3838	4501	4548
April	3962	3912	4500	4497
May	4053	3992	4546	4568
June	4190	4143	4576	4601
July	4179	4139	4538	4575
August	3882	2444	4412	4447
September	3982	3811	4570	4595
October	3948	2071	4509	4530
November	3776	2675	4552	4589
December	3572	3560	4059	4058

As can be seen from Table 4-1, traffic flows in each direction are generally even, with southbound traffic roughly equalling northbound traffic for example. There is some variation in flow across the year, with June the busiest month and January the quietest. Generally, there are greater vehicle flows during May, June, July, August and September, reflecting the tourist season and an increase in potential visitors to Llandeilo, Dinefwr National Trust Park and the Brecon Beacons National Park.

Across the year traffic flows vary by around 10% - 12%.

Figure 4.2 illustrates how average traffic flow varies across the day at Site 34 northbound, with Figure 4.3 illustrating the corresponding southbound movements.

Figure 4.2: Flow profile across the day Site 34 NB

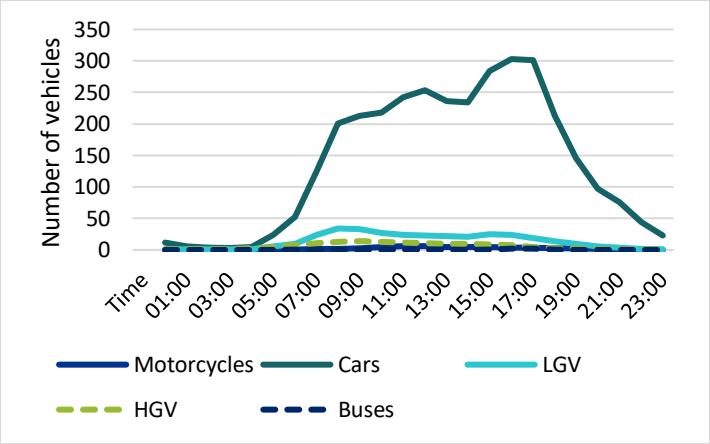


Figure 4.3: Flow profile across the day Site 34 SB

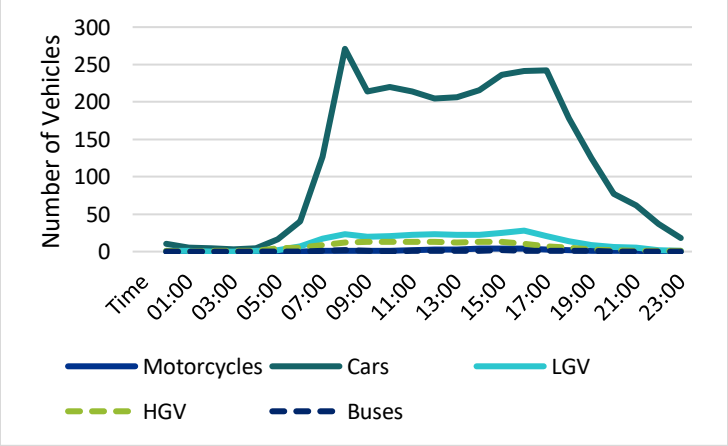


Figure 4.2 illustrates that traffic flow in the northbound direction has an unusual profile with a single peak, in the PM period with traffic flow growing steadily over the day. Figure 4.3 shows that in the southbound direction a more traditional two-peak profile is present but there is a pronounced AM peak. The data therefore indicates that there is likely to be some tidality in traffic flows.

The two figures indicate that around 4% of all traffic using the A483/Rhosmaen Street are HGVs, with 86% cars and the remaining 10% LGVs.

Figure 4.4 illustrates the northbound profile at Site 35 and Figure 4.5 illustrates the corresponding southbound profile.

Figure 4.4: Flow profile across the day Site 35 NB

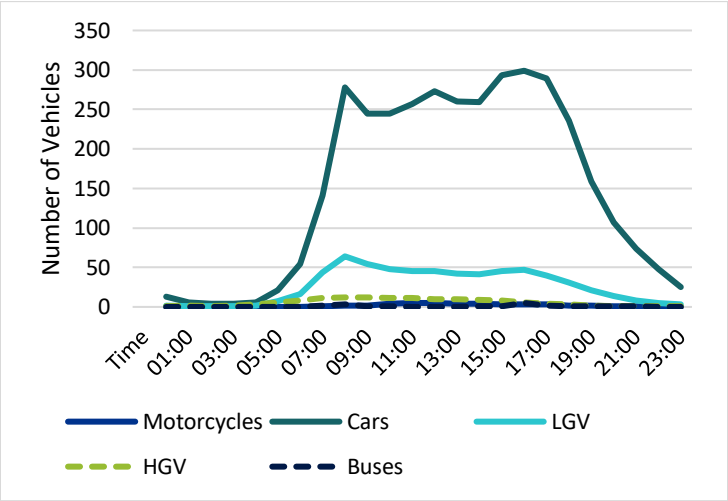
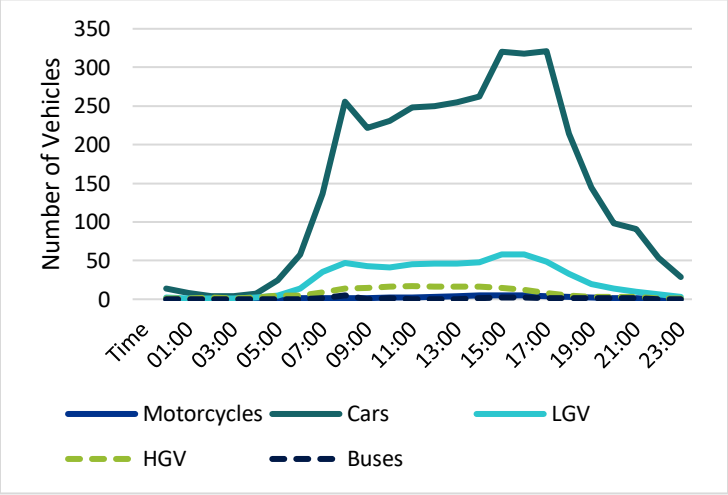


Figure 4.5: Flow profile across the day Site 35 SB



The two profiles for site 35 are similar, with clear AM and PM peak periods. In both cases the PM peak is slightly busier and also covers a longer period of time. The traffic flows of Site 35 comprise around 3% to 4% HGVs, 80% cars with the remainder being LGVs.

Traffic flows across the two sites are fairly constant through the year but are higher in the summer months indicating an increase in tourist traffic. There are identifiable peak periods although flows are not notably lower in the inter-peak periods. HGV traffic comprises a relatively small proportion of vehicles at around 4% compared to the Welsh national average (2016) for rural trunk roads of 5.9%[1].

4.2 Local Economy and Culture

Llandeilo is a market town which is important for the surrounding rural economy as well as for businesses within the town itself. There are wide range of shops, including small boutique premium shops but also local supermarkets. There are also takeaway food shops and cafes, pubs and guest houses and hotels. As the local

[1] http://gov.wales/docs/statistics/2017/171108-road-traffic-2016-en.pdf

service centre there are also GPs, dentists, the library and vets. Ffairfach is located to the south of Llandeilo and is a small village which benefits from a local convienience store and agricultural warehouse.

Dinefwr House, a National Trust property is located to the north western extent of the town and is a major tourist draw to the town. In addition, there is a vibrant culture within the town with a range of festivals and events taking place throughout the year. These include the Llandeilo Festival of Music, the Llandeilo Jazz Festival, Llandeilo Festival of the Senses, Llandeilo Litfest (a literary festival). There is a weekly market in the town square. There is an annual agricultural show that is hosted in Llandeilo, which is located in the fields behind Ysgol Bro Dinefwr. While not in Llandeilo, there are various cultural events that take place in Carreg Cennen Castle, and access to this venue is through Ffairfach.

Religion is important within Llandeilo, with the churches and chapels supporting parishes beyond the town boundary. The Welsh language is also very important to this area of Carmarthenshire with the default language spoken in the town shops being Welsh.

4.3 Noise

The study area is largely rural, apart from the town of Llandeilo itself. The dominant noise source for much of Llandeilo is predominantly from local road traffic with infrequent additional noise sources from trains passing to the east of the town.

4.4 Air Quality

As a result of the congestion created by the above issues in Section 4.1, the area also suffers from poor air quality, with the A483 within Llandeilo and to the north of Ffairfach declared an Air Quality Management Area (AQMA). The Carmarthenshire Llandeilo Air Quality Management Area (AQMA) covers the length of the A483 from the roundabout at the intersection of the A476 at Ffairfach, north along Towy Terrace, across Llandeilo Bridge, and then Rhosmaen Street through the town centre until the roundabout junction of the A483 with the A40(T). It was declared an AQMA by Carmarthenshire County Council in 2011 for exceedances of annual mean Nitrogen Dioxide (NO_2). An action plan is currently in place to assess proposals for their potential to improve the air quality within the town.

Carmarthenshire County Council have designated the towns of Llandeilo and Ffairfach an AQMA in order to manage and improve local air quality. The area was declared an AQMA in 2011 due to annual mean Nitrogen Dioxide (NO_2) concentrations that exceed European and national air quality standards. Carmarthen County Council developed the Local Air Quality Management Area Action Plan (November 2014) which detailed proposals to reduce air pollution within the AQMA and aimed to achieve an air quality objective of 40µg/m^3 or less. Several transport interventions were proposed within the plan, including both bypass and non-bypass options.

Without intervention it is likely that the problem with air quality within the study area would continue to decline, due to increases in traffic flows that are forecast nationally, considered against the improvements in engine design to reduce emissions and the increased use of electric vehicles over the next decade.

4.5 Landscape and Townscape

The centre of Llandeilo is a Conservation Area with many listed buildings located along Rhosmaen Street, this results in the townscape being of particular historic interest. To the east of the town lies the Brecon Beacons National Park. The study area is also set within a Landscape of Outstanding Historic Interest.

4.6 Historic Environment

As mentioned in Section 4.5, the centre of Llandeilo is a Conservation Area and there are numerous listed buildings within the town. In addition, or particular relevance to this transport study, Llandeilo Bridge is a listed building. To the west of the town lies Dinewfr Park and Old Dinefwr Castle. This National Trust / Cadw property is within a Historic Park and Garden. There are also scheduled monuments within the study area, including a Roman fort, a burnt mound and the Maen Hir standing stone.

4.7 Biodiversity

The study area is rich in biodiversity and there are several ecological designations. These include the Afon Tywi Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI), a Woodland Trust reserve, Wildlife Trust of South and West Wales reserves, and several areas of ancient woodland.

4.8 Water Environment

Flooding is a big problem in the Tywi valley, with the land on the flood plain regularly unindated, though due to the topography of the town it is not at risk of flooding events. Flood Zone 3 is located within in the valley, Ffairfach is within Flood Zone 2.

In 2018 during the period of dry weather there were reports of people's personal water supplies drying up, leaving residents resorting to bottled water. Furthermore, significant flooding events occurred on the Llandeilo stretch of the River Tywi on 13th and 14th October 2018.

4.9 Soils and Geology

The land in the Tywi valley within the study area is largely Grade 3a Agricultural land, which is regarded as one of the most versitle land types[2]. In addition, the land is underlain with sand and gravels, which are an important safeguarded aggregate. However, minerals are unlikely to be won in close proximity to the town of Llandeilo even if a planning application for quarrying were to be submitted.

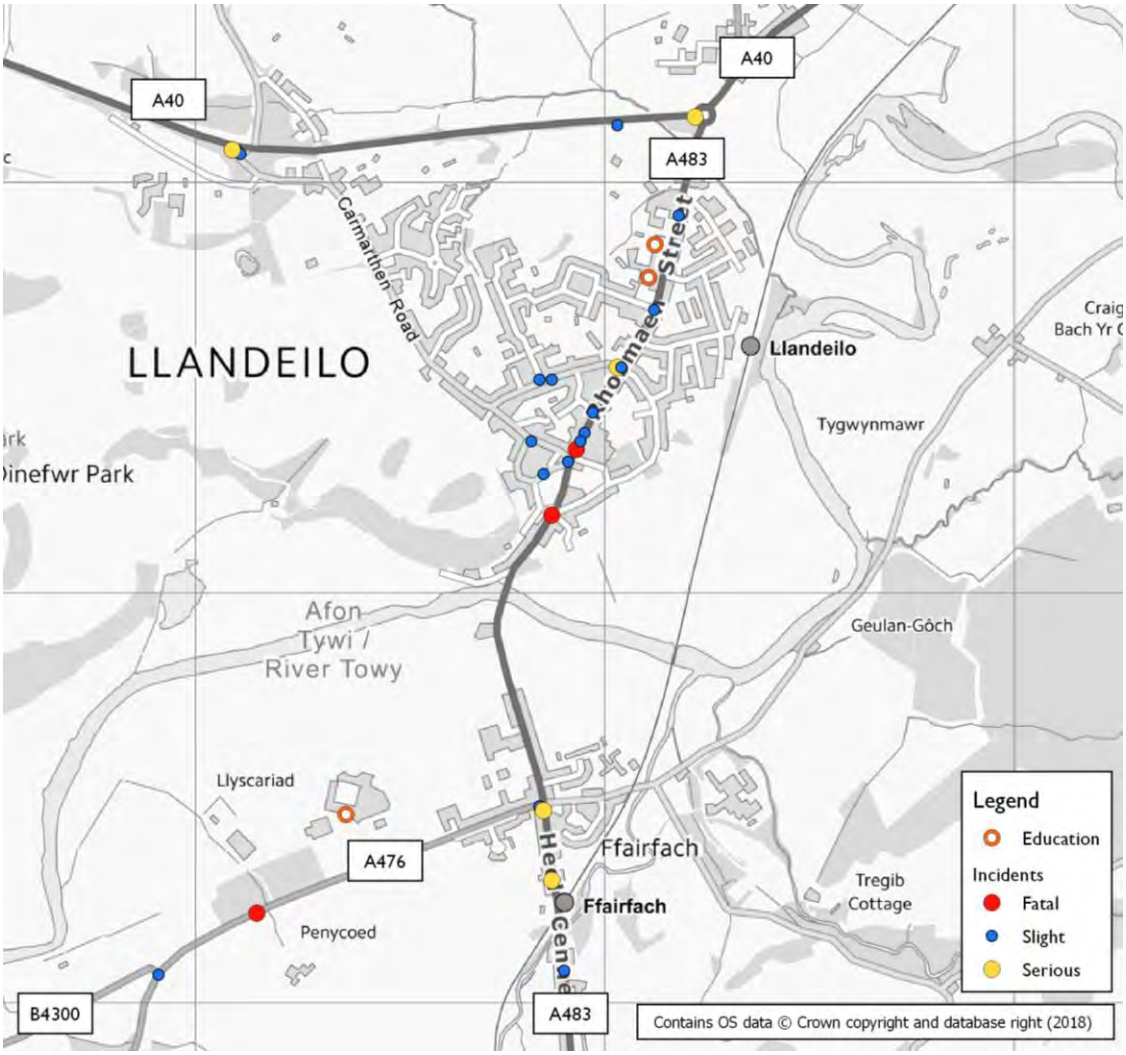
4.10 Accidents

4.10.1 Accident Data Analysis

Personal Injury Accident (PIA) data was obtained from Welsh Government over a five-year period (2012 – 2016) covering key roads within Llandeilo and Ffairfach such as the A483, A476 and the A40. This was the most up to date information available at the time of accident analysis. The accident data is illustrated in Figure 4.6

[2] http://lle.gov.wales/map/alc#m=-3.96969,51.88065,13&b=europa&l=908h;893h;1326; (accessed 15-11-18)

Figure 4.6: PIA Locations within Llandeilo and Ffairfach



The majority of accidents within Llandeilo and Ffairfach occurred along the A483/Rhosmaen Street in Llandeilo, with two additional clusters of accidents occurring at the A40/Carmarthen Road junction and the A483/A476 roundabout within Ffairfach.

Consultation feedback at the workshops and public forums strongly suggests that minor collisions between pedestrians and motor vehicles are significantly underreported.

The data obtained from Welsh Government has been analysed in the below sections and outlines where collision 'clusters' have occurred as well as identifying the severity level associated with those accidents. A total of 34 accidents occurred from 2012 to 2016, with the greatest number of accidents occurring in 2012, 2015 and 2016.

Accidents are categorised as either fatal, serious or slight, these are defined as follows:

- *Fatal – Includes only those cases where death occurs in less than 30 days as a result of the collision. Fatal does not include death from natural causes or suicide.*

- *Serious – examples are: Fracture, internal injury, severe cuts, crushing, burns (excluding friction), concussion, severe general shock requiring hospital treatment, detention in hospital as an in-patient (either immediately or later), injuries to casualties who die 30 or more days after the collision from injuries sustained in that collision.*
- *Slight – examples are: Sprains that do not necessarily require medical treatment, neck whiplash injury bruises, slight cuts and shock requiring roadside attention*.

The number of serious accidents increased over the five-year period, with four serious accidents occurring in 2016, the greatest number of fatal accidents occurred in 2014. Details of these accidents is set out in Table 4-2.

Table 4-2: Personal Injury Accident Severity Summary

Year	Slight	Serious	Fatal	Total
2012	6	2	0	8
2013	3	0	0	3
2014	4	1	2	7
2015	6	1	1	8
2016	5	3	0	8
Total	**24**	**7**	**3**	**34**

4.10.2 Detailed PIA Analysis

A review of PIA data outlined that a total of 34 accidents occurred from 2012 to 2016, with accidents with the greatest severity occurring in 2014. The majority of accidents occurred in March, with accidents predominantly occurring on a Saturday. Analysis also determined that there is no particular concentration of accidents at a particular time of day - 21 of the accidents occurred in daylight, with the majority of accidents happening in fine weather conditions without high winds. However, there was no particular pattern between the time of day, day of the week or particular month where accidents occurred more regularly. Further to this, road surface does not appear to be an issue as the majority of accidents occurred when the road surface was dry, it is therefore anticipated that accidents occur due to driver error and potentially due to nature of the highway network.

Of the accidents recorded, 15 out of 34 occurred along the A483, with eight out of 34 accidents occurring along the A40. This demonstrates the scale of the issue of accidents occurring along the A483. Analysis identified that all accidents with the severity level of serious occurred on either the A483 or the A40, fatal accidents occurred on the A483 and A476.

It was also identified that a total of nine pedestrians and three cyclists were involved in the 34 accidents indicating conflict between motorised and non-motorised road users.

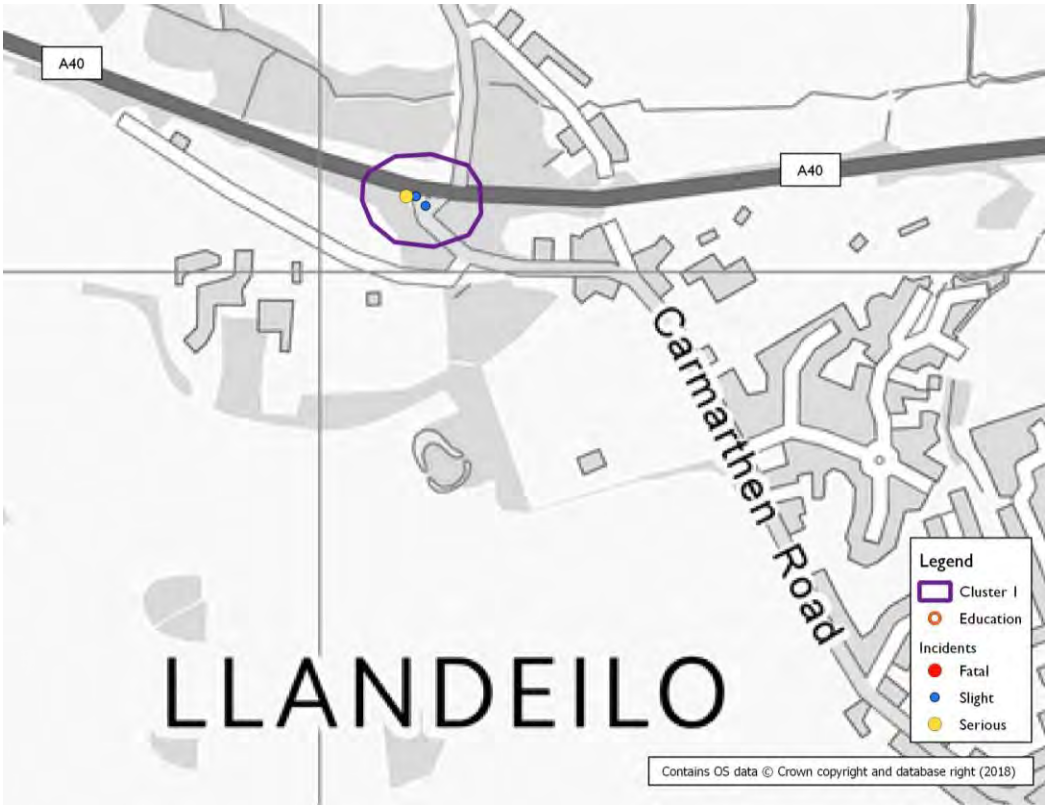
4.10.3 Cluster Analysis

Analysis of the PIA data identified three accident ‘clusters’, these are detailed below with an accompanying detailed PIA data table and a figure detailing the location of the accident clusters.

Accident Cluster 1: A40/Carmarthen Road Junction, Llandeilo

The junction is a staggered crossroad, with separate lanes for vehicles turning across the carriageway from the A40 into adjoining roads. The A40 is signed as national speed limit. Heading eastbound, vehicles turning into Carmarthen Road cross one lane of oncoming traffic, this manoeuvre is signed as a route into Llandeilo and the National Trust property within Dinefwr Park. Cluster 1 is illustrated in Figure 4.7 below.

Figure 4.7: Accident Cluster 1 - Map



Error! Reference source not found. presents the information regarding these accidents.

Table 4-3: Detailed PIA Cluster Table, Cluster 1: A40/Carmarthen Road junction, Llandeilo

Date of PIA	Day of Week	Time	Road	Accident No.	Accident Severity	Number of vehicles	Number of Casualties	Pedestrian	Cycling	Lighting	Weather conditions	Road Surface
29/03/12	Thursday	09:02	A40	AC10812	Slight	3	1	0	0	Daylight: No street lighting	Fine (without high winds)	Dry
18/08/14	Monday	23:16	A40	AC24114	Serious	2	4	0	0	Darkness: Street lights present and lit	Fine (without high winds)	Dry
28/09/14	Sunday	10:57	A40	AC23814	Slight	2	2	0	0	Daylight	Fine (without high winds)	Dry
18/02/15	Wednesday	14:19	A40	AC02515	Serious	2	3	0	0	Daylight	Fine (without high winds)	Dry

All accidents in this cluster occurred in fine weather without high winds with a dry road surface. The majority of the accidents also occurred in daylight. As identified in Table 4-3, two of the four accidents were classed as slight

severity, with the remaining classed as serious. No pedestrians were involved in the accidents however there were a total of 10 casualties which involved nine vehicles.

Accident Cluster 2: A483/Rhosmaen Street, Llandeilo

A 'cluster' of accidents has also been identified along the A483/Rhosmaen Street within Llandeilo's town centre. There are two primary schools located off the A483/Rhosmaen Street, shopping facilities and St. Teilo's Church. Rhosmaen Street enforces a 30mph speed limit, as well as variable speeds of 20mph during school opening and closing times. There is also a pinch-point to the south of Rhosmaen Street close to the Cawdor Hotel which has a number of junctions, narrow carriageway and on-street parking, all of which introduce conflict for road users.

Cluster 2 is illustrated in Figure 4.8.

Figure 4.8: Accident Cluster 2 - Map

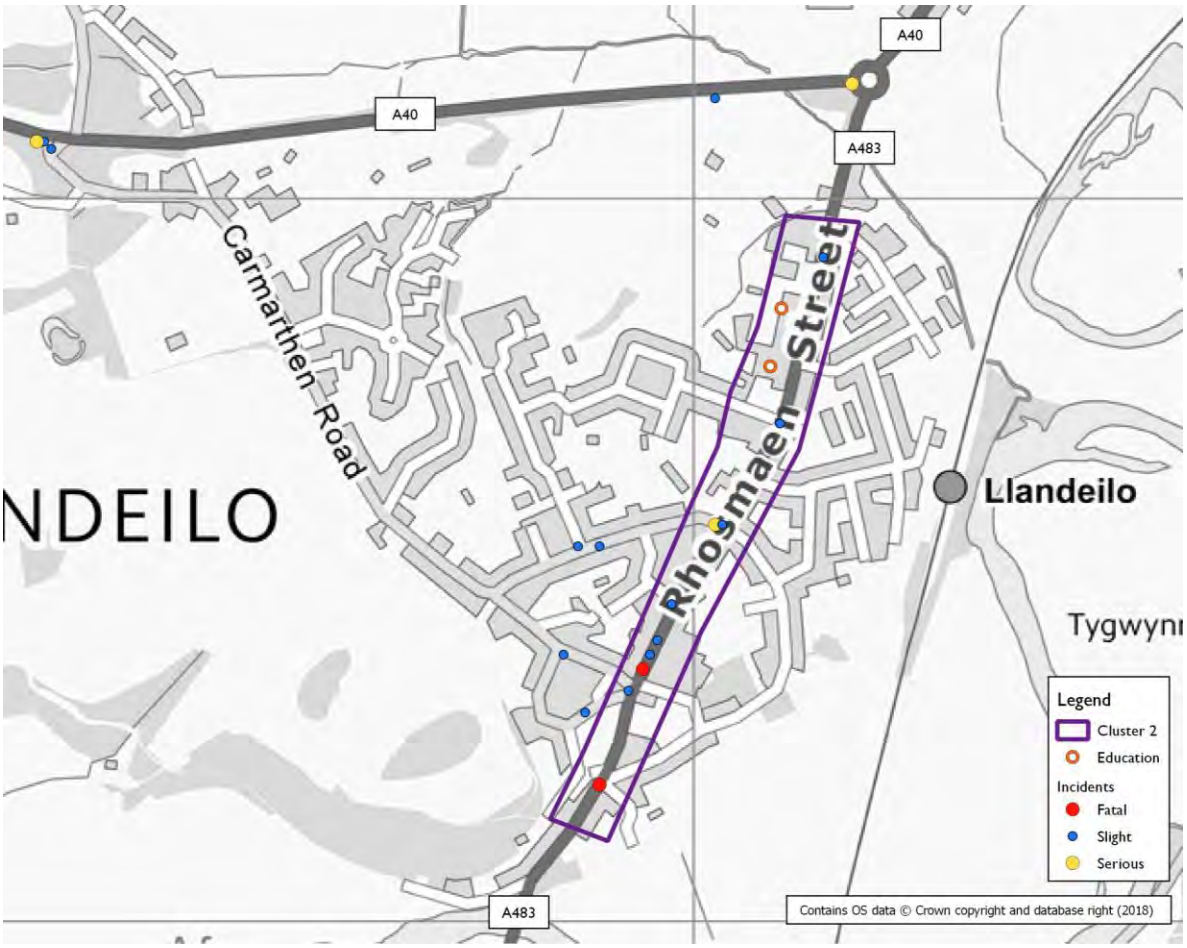


Table 4-4 presents the detailed information regarding the accidents within this cluster.

Table 4-4: Detailed PIA Cluster Table, Cluster 2: A483 Rhosmaen Street, Llandeilo

Date of PIA	Day of Week	Time	Road	Accident No.	Accident Severity	Number of vehicles	Number of Casualties	Pedestrian	Cyclist	Lighting	Weather conditions	Road Surface
16/03/12	Friday	12:30	A476	AC10512	Slight	1	1	1	0	Daylight: Street lights present	Fine (without high winds)	Dry
25/03/12	Sunday	17:20	A483	AC08212	Slight	2	1	0	0	Daylight: Street lights present	Fine (without high winds)	Dry
19/11/12	Monday	16:00	A483	AC41012	Serious	2	1	1	0	Darkness: Street lighting unknown	Raining with high winds	Wet/ Damp
17/04/13	Wednesday	08:45	U	AC07813	Slight	1	2	1	0	Daylight: Street lights present	Raining (without high winds)	Wet/ Damp
02/03/14	Sunday	11:35	A483	AC06414	Fatal	2	3	0	0	Daylight	Fine (without high winds)	Dry
05/04/14	Saturday	14:15	A483	AC06814	Slight	3	2	0	0	Daylight	Raining (without high winds)	Wet/ Damp
29/11/14	Saturday	10:35	A483	AC33414	Fatal	1	1	1	0	Daylight	Fine (without high winds)	Wet/ Damp
12/02/15	Thursday	11:45	A483	AC05415	Slight	2	2	0	0	Daylight	Fine (without high winds)	Dry
14/08/15	Friday	10:56	U	AC27215	Slight	2	1	0	0	Daylight	Fine (without high winds)	Wet/ Damp
18/12/15	Friday	11:30	A483	AC44015	Slight	1	1	1	0	Daylight	Fine (without high winds)	Dry
02/01/16	Saturday	13:50	A483	AC00916	Slight	2	1	0	0	Daylight	Raining (without high winds)	Wet/ Damp

As identified in Table 4-4, there were a total of 11 accidents across the five-year period. Eight of the 11 accidents identified within this cluster are in close proximity to the local amenities along the high street within Llandeilo. All accidents occurred during the daytime, with 10 occurring in daylight and one in darkness where the presence of street lighting was unknown. There was a total of 19 vehicles involved in the 11 accidents resulting in 16 casualties, five pedestrians were also involved.

Two accidents had the severity level of fatal, one accident was classed as serious and eight accidents were classed as slight. Both fatal accidents occurred at the weekend in the morning, weather conditions were fine without high winds and in daylight, the road surface however differed. One accident occurred when the road surface was dry, and the other when the road surface was wet/damp. One fatal accident occurred outside the Cawdor Hotel - a recognised pinch-point within Llandeilo - where the street narrows and three streets lead onto/off.

Visibility at this pinch-point is poor due to a loading bay and queuing traffic. The other fatal accident occurred at a staggered four-arm junction which has poor visibility and on-street parking outside of St. Teilo's Church.

Accident Cluster 3: A483/A476 roundabout, Ffairfach

The A483/A476 roundabout situated within Ffairfach is a four-arm mini-roundabout. Sign posts display access to areas such as Cross Hands, Llandovery and Ammanford, as well as to local points of interest such as Castell Carreg Cennen Castle and Ysgol Tregib Primary School. The roundabout is also used to access Ysgol Bro Dinefwr, a secondary school and sixth form. The accidents contained within this cluster are presented in Figure 4.9.

Figure 4.9: Accident Cluster 3 - Map

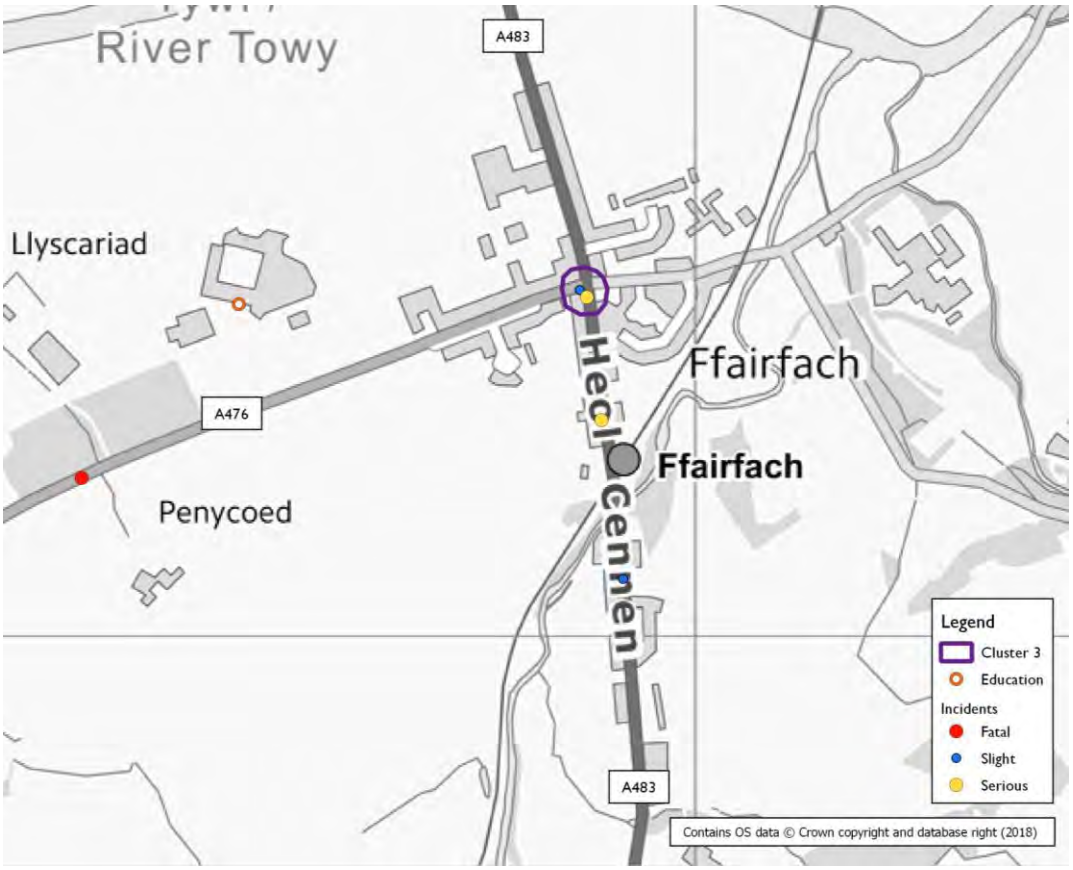


Table 4-5 overleaf presents the detailed information regarding these accidents.

Table 4-5: Detailed PIA Cluster Table, Cluster 3: Ffairfach

Date of PIA	Day of Week	Time	Road	Accident No.	Accident Severity	Number of vehicles	Number of Casualties	Pedestrian	Cyclist	Lighting	Weather conditions	Road Surface
27/08/12	Monday	07:10	A483	AC30012	Slight	2	3	0	0	Daylight: Street lights present	Raining (without high winds)	Wet/ Damp
03/12/14	Wednesday	09:45	A483	AC37714	Slight	2	1	0	1	Daylight	Fine (without high winds)	Dry
28/05/16	Saturday	16:30	A483	AC17316	Slight	2	1	0	0	Daylight	Raining (without high winds)	Wet/ Damp
01/07/16	Friday	15:00	A483	AC16616	Slight	2	1	0	1	Daylight	Raining (without high winds)	Wet/ Damp
29/09/16	Thursday	16:50	A483	AC31016	Serious	1	1	1	0	Daylight	Fine (without high winds)	Dry

The 'cluster' of accidents identified at the A483/A476 roundabout within Ffairfach (approximately 400m east of Ysgol Bro Dinefwr) totalled five accidents which involved nine vehicles and resulted in seven casualties, one pedestrian was also involved within the cluster further to this, three children were involved in the accidents.

All accidents occurred during daylight, two of which were in fine weather conditions without high winds. The other three accidents occurred when it was raining, without high winds. Four of the accidents were classed as a slight severity and the remaining accident was classed as serious.

PIA data from Welsh Government over a five-year period has been analysed to identify whether there are any clusters of accidents within the area of concern and whether the volume of accidents are an issue. A total of 34 accidents occurred between 2012-2016 on key roads such as the A483, A476 and the A40. Three clusters were identified and further description has been provided, detailing the type of accidents.

Overall it has been determined that there is an issue of road safety within parts of Llandeilo/Ffairfach with the majority of accidents occurring in good weather during daylight hours and a relatively high number resulting in serious or fatal injury. Furthermore, a number of accidents involve pedestrians. This therefore indicates that road geometry including carriageway and footway widths are contributing to the number of accidents. This has also been raised through Stakeholder Engagement Workshops and Public Forums.

Without intervention it can be assumed that the study area would continue to experience a higher than average number of accidents, with pedestrians, cyclists and motorists put at risk.

4.11 Journey Quality

As referenced above, the road geometry is poor through Llandeilo and there are numerous occasions where drivers have to stop / start and give way to other traffic to drive through the town. This results in a poor journey quality for drivers.

4.12 Severance

While the traffic flows through Llandeilo are not so high as to create severe severance there is a perception of severance within the community. There are several designated crossing points, including pedestrians lights and a zebra crossing. However, many people attempt to cross the A487 at other locations and due to the width of the pavements along some sections of Rhosmaen Street the imposing nature of the traffic,being so close to pedestrians, makes crossing intimidating. It is possible that the through traffic along Rhosmaen Street depresses the number of people walking from residential properties within the town to reach services within the town centre.

4.13 Security

There are no significant security issues within Llandeilo.

4.14 Physical Activity

4.14.1 Active travel

Footways within Llandeilo and Ffairfach are narrow due to the width of space available as a result of the historic townscape of the settlements. Difficulties arise for people using a pram/pushchair or wheelchair. There are also issues for people walking with children because of the narrow footways as these result in pedestrians having to walk in single-file.

In addition to this, the quantity and quality of crossing points within Llandeilo and Ffairfach along the A483 are of poor quality with many not equipped with tactile paving/dropped kerbs.

The traffic that travels through Llandeilo is imposing and a safety issue for people walking and cycling, which means that it is not an attractive location for these non-motorised users. This is further exacerbated by the poor air quality within the town for people walking and cycling.

There is also a lack of wayfaring information for visitors from Llandeilo or Ffairfach railway stations into Llandeilo town centre.

Little cycling infrastructure is present within both settlements, there are no designated on-road or off-road cycleways present and few cycle parking facilities. There were however cycle route signs located sporadically through Llandeilo and Ffairfach, primarily providing directions to the railway station.

Children from Llandeilo, Rhosmaen and Ffairfach typically walk to the secondary school but children from the rest of the catchment either travel by car or school transport. While some children walk to the various primary schools in the study area many more are driven to the school gates.

The path from the station in Llandeilo to the town centre is not suitable for less able walkers and is step and narrow in places. It is poorly signed through the housing of the town.

4.14.2 Sport

The Tregib Sports Facilities are an important asset within Llandeilo, facilities include all weather floodlit astroturf pitches, sports hall, gymnasium, two grass football pitches and two grass rugby pitches. This is supplemented with a range of other sports facilities and clubs that take place at other locations.

A new cycle path is being built linking Carmarthen and Llandeilo and the National Cycle Network is currently routed through the town, though this is an on-road section of the network.

4.15 Access to Employment and Services

4.15.1 Public Transport

The Heart of Wales railway line runs between Swansea and Shrewsbury and there are two railway stations on this line within the study area: Ffairfach and Llandeilo. Journey times are approximately three hours to Shrewsbury and one hour to Swansea, with Ffairfach two minutes' journey time from Llandeilo, and closer to Swansea. Rail patronage at Llandeilo railway station in 2015 and 2016 comprised a total of 17,562 entries and exits, this was considerably greater than Ffairfach railway station which totalled 2,842 entries and exits. These totals were a slight increase from 2014 – 2015, Llandeilo railway station experienced a 1.01% increase and Ffairfach railway station experienced a 0.78% increase.

Llandeilo railway station has recently been modernised, it provides 23 car parking spaces, two disabled car parking spaces, cycle parking, Real-Time Information (RTI) displays for train times, information boards and shelters which provide some seating (but are in need of maintenance) and litter bins. The access has also been resurfaced and has sufficient footway widths and dropped kerbs. The frequency of trains however is limited, Llandeilo railway station offers five services each way Monday - Friday, four services each way on a Saturday and two services on each way a Sunday. Track crossings at Llandeilo railway station is via an uncontrolled level crossing which is a safety issue.

Ffairfach railway station has limited facilities, which include a shelter which provides seating and a litter bin and a RTI display for train times. The railway station has one platform which becomes inaccessible if the level-crossing barriers are down (as there is no underpass available). Further to this, the footways approaching the railway station are narrow and unsuitable for prams/wheelchair users. Additionally, there is no tactile paving or adequate pedestrian crossing points to access the railway station. The frequency of trains the same as for Llandeilo station.

The quantity and quality of bus stops in Llandeilo and Ffairfach are of a good standard, usually providing a shelter, seating, lighting, bus timetable information and a raised kerb for ease of access onto the buses.

Bus services offer transport to local areas such as Carmarthen, Ammanford, Llandovery and Swansea. However the frequency of buses is limited, with several services running on only certain days. There are approximately 20 services each way in total for Monday to Saturday, with none on Sundays. Table 4-6 summarises the bus services available within Llandeilo and Ffairfach.

Table 4-6: Bus Services within Llandeilo/Ffairfach

Route No.	Route	Services per day (weekday)	Of which 8:00-9:00	Of which 17:00-18:00	Services per day (Saturday)	Services per day (Sunday)
103	Llandeilo – Rhydaman/Ammanford	3	0	0	3	0
276	Llandeilo – Caerfyrddin/Carmarthen (Tuesday only)	1	1	0	0	0
277	Llandeilo – Caerfyrddin/Carmarthen (Wednesday & Saturday only)	1	1	0	1	0
278	Llandeilo – Caerfyrddin/Carmarthen (Monday & Thursday only)	1	1	0	0	0
279	Llandeilo – Caerfyrddin/Carmarthen	1	0	0	2	0

	(Monday-Thurs & Saturday only)					
280/81	Llandeilo - Caerfyrddin/Carmarthen (Monday – Saturday)	8	0	1	8	0
283	Llandeilo – Caerfyrddin/Carmarthen (Wednesday & Saturday only)	1	0	0	2	0
284	Crug-y-bar – Llandeilo – Rhydama/Ammanford (Friday only)	1	0	0	0	0
X13	Llandeilo – Abertawe/Swansea	6	1	1	6	0
X14	Llandeilo – Builth Wells/Carmarthen (Friday only)	1	0	0	0	0
TOTAL		N/A	N/A	N/A	22	0

Source: http://www.carmarthenshire.gov.wales/bus-timetables

There is a general trend that has resulted in the loss of public transport services that are not cost effective. At the moment there is no reason to suppose that there would be a significant improvement in services, though it is possible that as a result of Welsh Government initiatives there would not be a further reduction in services through Llandeilo.

5. Appraisal Methodology

5.1 Introduction

The approach to the WelTAG Stage One level of appraisal is intended to initially assess the expected level to which each of the long list of options will achieve the objectives of the scheme. The WelTAG 2017 guidance outlines that at this stage "the assessment will be based predominately on currently available evidence" such as passenger, pedestrian, cyclist or traffic counts and surveys.

A qualitative assessment has been undertaken to determine the potential impacts of each option, due to the absence of detailed data at this stage of the WelTAG appraisal. As stated in the WelTAG Guidance, assessment should be proportionate to the impact under consideration. As such, the objectives of this project are to address traffic and environmental issues.

Therefore, the appraisal has focused on these areas. The options have been scored on the WelTAG seven-point assessment scoring process, as outlined in Table 2.2 in the WelTAG Stage One Report. The assessment has been carried out to determine how the base line may change as a result of each option. Therefore, options that are anticipated to result in significant negative effects to the economic and social and cultural criteria within Llandeilo and Ffairfach have scored more negatively. Options which are likely to have a positive impact on the economic and social and cultural criteria when the scheme is in place, in comparison to the baseline, have scored more positively. Options which have no impact on the economic and social and cultural criteria have scored neutral.

A balanced approach using professional judgement has been applied for each economic and social and cultural criteria were both negative and positive impacts are anticipated to result in a level of significance, the assumptions made when determining the outcome of the assessment is outlined in Section 5.3. The criteria which has been qualitatively assessed are outlined below:

The first stage of the WelTAG process is Stage One. 'The purpose of Stage One is to 'understand the issue of concern, explore the context and to present a wide list of possible solutions, sufficient to be able to decide whether there are any possible solutions within the transport sector that are worth pursuing and to select a short list of options for more detailed consideration.' This SOC will therefore:

- Produce a clear, evidence based description of the issues and the subsequent problems;
- Analyse the factors which are contributing to the issues;
- Establish objectives;
- Produce a long list of options;
- Provide recommendations on the options that should be taken forward to WelTAG Stage Two appraisal by assessing the long list of options; and
- Produce a shortlist of options.

The decision as to which options are taken forward to Stage Two is based on information in the five 'cases' set out above on:

- Their ability to solve the problem;
- Their ability to meet the objectives set;
- Their short and longer term impacts;
- Their deliverability; and
- Their robustness to uncertainty.

At this stage this information is considered to be at a high level based on site visits and desk based research. Where an impact has not yet been assessed this is made clear in this report using the acronym NYA (not yet assessed).

5.2 Appraisal Criteria

The appraisal has been tabulated using Appraisal Summary Tables (AST) for comparison of the options performances against the appraisal criteria. Options which perform best will then be identified and recommended for further development or implementation.

ASTs extract the core economic, environmental and social impacts from each transport proposal, under the respective appraisal criteria as well as assessing how well a potential solution performs against the objectives. As this is an early stage of the WelTAG process, some criteria are 'Not Yet Analysed' due to a lack of data available. The WelTAG Appraisal criteria is outlined in Table 5-1.

Table 5-1 – WelTAG Appraisal Criteria – Assessed Topic Areas

Impact	Assessment
Economic	
Journey time changes	Assessed
Journey time reliability	Assessed
Land	Not Yet Analysed
Local Economy	Assessed
Transport Costs	Not Yet Analysed
Accidents	Not Yet Analysed
Changes in Productivity	Not Yet Analysed
Capital Costs	Not Yet Analysed
Revenue Costs	Not Yet Analysed
Environmental	
Noise	Assessed
Air Quality	Assessed
Landscape and Townscape	Assessed
Historic Environment	Assessed
Biodiversity	Assessed
Water Environment	Assessed
Greenhouse Gas Emissions	Assessed
Soils and Geology	Assessed
Social and Cultural	
Accidents	Assessed
Journey Quality	Assessed
Severance	Assessed
Security	Assessed
Physical Activity	Assessed
Access to Employment	Assessed
Access to Services	Assessed
Affordability	Not Yet Analysed
Active Travel	Assessed
Option and Non-use Values	Not Yet Analysed

At WelTAG Stage Two additional criteria will be assessed and these are described in more detail in Section 8.

The detailed appraisal tables for each option are presented within Section 9.

5.3 Assumptions

WelTAG 2017 identifies that the IAR should outline and detail the assumptions used within the WelTAG Report. The points below are a list of assumptions relating to the assessment of options with regards to traffic and the appraisal of Economic and Social and Cultural criteria:

- A bypass option and some non-bypass options would provide a free—flow alternative for vehicles, therefore Journey Time Changes would result in a positive impact, for both bypass users and users of the A483 as traffic would be reduced;
- A bypass and some non-bypass options would provide a free-flow alternative for vehicles, therefore Journey Time Reliability Changes would result in a positive impact;
- A bypass option and some non-bypass options would remove traffic from the A483 within Llandeilo/Ffairfach which may currently discourage visitors, therefore the Local Economy would result in a positive impact due to a reduction in traffic within the two areas;
- A bypass option and some non-bypass options would remove traffic from the A483 within Llandeilo/Ffairfach which may currently discourage people from walking/cycling in the area, therefore Physical Activity will increase as the reduction of vehicles within the two areas would reduce, resulting in a positive impact of this criteria;
- A bypass and some non-bypass options would remove traffic from the A483 within Llandeilo/Ffairfach and provide a free-flow traffic alternative which will improve Journey Quality, therefore resulting in a positive impact;
- A bypass option and some non-bypass options would remove a number of vehicles along the A483 within Llandeilo/Ffairfach, particularly at pinch points where accidents occur. Therefore, the impact on Accidents in the ‘Social and Cultural’ criteria will be positive as the number of accidents should reduce due to a reduction of traffic. Additionally, it is assumed that a bypass route option will include widening pavements along Rhosmaen Street and improve public realm, as a result, the criteria of Accidents within ‘Social and Cultural’ criteria will score positively;
- A bypass could provide a more direct and traffic-free route to employment areas, therefore Access to Employment will result in a positive impact;
- A bypass could provide a more direct and traffic-free route to employment areas, therefore Access to Services will result in a positive impact;
- A bypass option and some non-bypass options would remove traffic from the A483 within Llandeilo/Ffairfach, therefore Severance will reduce due to the reduction in vehicles, resulting in a positive impact;
- A bypass option would remove traffic from the A483 within Llandeilo/Ffairfach, which could promote/increase the uptake of Active Travel due to the reduction of vehicles in the two areas which could currently deter people walking/cycling. The scoring of this criteria would therefore score positively;
- Any bypass route option will become the A483 and Rhosmaen Street will be de-trunked, as a result, all bypass options fulfil Objective One - Preserve the strategic function of the A483;
- Link roads have been appraised on the basis that they will be implemented with a suitable bypass route option being constructed;

- TC1 options have been appraised on the basis that a bypass route option will be implemented, however the bypass route option is yet to be determined as such, Severance, Access to employment and Access to services have not yet been assessed, resulting in a score of Not Yet Analysed;
- Traffic modelling software such as TUBA or COBALT have not been used within this stage of assessment, as a result, Accidents and Travel Costs within 'Economy' of the AST has not yet been assessed; and
- A tunnel is assumed to be toll-free.

In accordance with WelTAG, the significance and scale of the impacts of each option will be presented using a seven-point scale, which is outlined in Table 5-2 below:

Table 5-2 - WelTAG Seven-point Assessment Scale

Large beneficial		**+++**
Moderate beneficial		**++**
Slight beneficial		**+**
Neutral		**0**
Slight adverse		**-**
Moderate adverse		**--**
Large adverse		**---**

The impact assessment will set out:

- A list of social, cultural, environmental and economic impacts considered;
- A summary of the methods used to assess the impacts, including the five ways of working (to the extent that they are relevant to this stage);
- Who / what is affected, and how;
- A summary of the key qualitative and quantitative supporting evidence;
- Consideration of how each option contributes to the Well-being Goals; and
- Consideration of how each option would resolve and potential conflicts.

6. Ways of Working – Thinking Long Term

6.1 Introduction

According to early guidance on the Well-being Act, public bodies were directed to look at least 10 years ahead, with best practice being looking 25 years ahead (Shared Purpose: Shared Future 1, Welsh Government, 2016). However, decisions on whether or not transport network improvements are required are better considered with reference to longer term trends. While the 'Future Generations framework for projects', published by the Future Generations Commissioner for Wales in 2017, does not specify the period of time that would be considered to be 'long term' it directs public bodies to consider global trends when undertaking initial project development.

Also, another key factor with regard to transport related projects is the period of time between initial inception and operation, and then the further period of time between opening and design year where new road construction is required. The design life of new infrastructure should also be considered over a longer period to ensure their durability.

The Future Trends Report, which was published by the Welsh Government in 2017, sets out six categories of future trends: population; health; economy and infrastructure; climate change; land use and natural resources; and society and culture. The future trends in each of these in respect of the study area around Llandeilo and Ffairfach, along with the county wide context, is briefly set out below.

The baseline environment set out in below is based on the findings of the various Well-being Assessments and Well-being Plans of the local public services boards, based on guidance contained in the Future Generations framework for projects, this is considered to be sufficient detail for initial project development.

6.2 Key features of Carmarthenshire

Carmarthenshire County Council has identified 14 Well-being Objectives for 2017/2018, these are:

- Help to give every child the best start in life and improve their early life experiences;
- Help children live healthy lifestyles;
- Continue to improve learner attainment for all;
- Reduce the number of young adults that are Not in Education, Employment or Training;
- Tackle poverty by doing all we can to prevent it, help people into work and improve the lives of those living in poverty;
- Create more jobs and growth throughout the county;
- Increase the availability of rented and affordable homes;
- Help people live healthy lives (tackling risky behaviours and obesity);
- Support good connections with friends, family and safe communities;
- Support the growing numbers of older people to maintain dignity and independence in their later years;
- A Council wide approach to support Ageing Well in Carmarthenshire;
- Look after the environment now and in the future;
- Improve the highway and transport infrastructure and connectivity; and
- Promote Welsh Language and Culture.

The Carmarthenshire Well-being Plan was published in May 2018 by the Carmarthenshire PSB, this sets out some background facts about the county of Carmarthenshire, many of which are of relevant to the A483 Llandeilo Transport Study. Key facts are:

- Carmarthenshire has a population of 185,610, of which 90,835 are male and 94,775 are female;
- 18% of the population are between 0 and 15;
- 59% of the population are of working age (16-64);
- 23% of the population are of pensionable age (65+);
- 3 out of 4 of Carmarthenshire's population were born in Wales;
- 1 in 4 have a limiting long-term illness;
- 4% of the population have a non-white ethnicity;
- Carmarthenshire has the highest number of Welsh speakers in Wales, 78,048 people;
- There are over 78,800 homes in Carmarthenshire;
- 30% of homes are single occupancy dwellings;
- 60% of the population live in rural areas (53% of the County);
- The three major towns in the County (Llanelli, Carmarthen and Ammanford) house 25% of the population;
- There are 44 crimes per 1,000 population, with 8,166 recorded crimes during 2015/2016;
- 79% of people feel safe in their area;
- 40% of the population live with 400m of natural or semi-natural greenspace;
- 66% of people participate in sport;
- 36% of the population are living in poverty (households with less than 60% of the GB median income);
- 28% of the population suffer from mental health issues; and
- 60% of adults reported being overweight or obese (based on BMI).

The Well-being Plan set out four Well-being Objectives:

- Health Habits;
- Early Intervention;
- Strong Connections; and
- Prosperous People and Places.

6.3 Future Trends

6.3.1 Population

Wales' population is projected to increase over the next 20 years, possibly by around 5%. Alongside this, the proportion of that population over the age of 65 is projected to increase from 20% to around 25%. A key contributory factor to this is an increase in life expectancy, though there is uncertainty around the extent of the increase due to this factor with estimates ranging from very little increase in life expectancy to a potential rise of around 15%. While a significant proportion of this population growth is likely to be in the capital there are also likely to be increases in all towns in the country as there is a general trend towards increased life expectancy in Wales. At the same time as this population increase, the percentage of households with single person occupancy is also increasing, with the need for new households greater than the overall population.

The Carmarthenshire Local Development Plan (LDP), which was adopted in December 2014, sets out the framework for the distribution and delivery of growth and development for the plan period up to 2021. The LDP has identified a housing requirement of 15,197 new dwellings over the plan period (with details of this breakdown set out in a Housing Clarification paper – Examination Document H2P). In the LDP, Llandeilo (including Ffairfach, Rhosmaen and Nanyrhibo) has been classed as a 'service centre' as part of the settlement framework. The number of house completions on allocated sites between 1st April 2007 and 31st March 2012 for Llandeilo is as follows:

- Windfall allowance (sites under 5 units) – 8;
- Completed – 0;
- Commitments – 6;
- Allocations (not committed) – 257; and
- Total – 263.

In addition to housing allocations, land at Beechwood Industrial Estate was identified for B1 [Business], B2 [General Industrial] or B8 [Storage or Distribution] development. This site is 2.33 hectares.

There is no suggestion that population trends will change over the near term and traffic modelling takes into account projected increases in traffic. At later stages in the WelTAG process 'committed development' will be taken into account in projecting traffic flows.

6.3.2 Health

Overall life expectancies are increasing across Wales, though there are differences between the most and least deprived areas. There are mixed trends in healthy lifestyle behaviours in Wales. Using demographic trends the Future Trends Report projected that smoking levels would continue to reduce, which obesity levels and the number of people eating less than five portions of fruit and vegetables per day look set to increase slightly.

Some illnesses such as heart conditions and arthritis demonstrate a slight decrease over the last ten years, while others such as diabetes and mental illnesses have demonstrated increases. Cancer rates have shown little change, although numbers have increased due to the growing and aging population.

This assessment anticipates that the current trends will continue. The potential for increased opportunities to undertake physical activity has been taken into account as this has the potential to reduce the future trends towards greater inhealth in some areas.

6.3.3 Economy and Infrastructure

There has been a long-term trend of global economic growth of around 2% per year. However, since the recession in 2008, a productivity slowdown has sharply reduced growth rates, with UK and Wales particularly affected. Wales is broadly keeping pace with the rest of the UK but there are limiting demographic factors and a lack of 'economic mass' in the country as a whole and particularly in more rural areas.

Current trends suggest that, despite a growth in rail use, private vehicles are set to remain the dominant mode of transport in Wales in the short to medium term at least.

In undertaking transport studies traffic modelling is undertaken, this looks to a period of at least 25 years.

6.3.4 Climate Change

The UK Climate Projections were published in 2009 (UKCP09). This provides projections of climate change for the 2020s, 2050s and 2080s compared with the period 1961-90. For each epoch, a range of climate change scenarios have been considered.

Key findings from the UKCP09 (which are published by the Met Office) are:

- All areas of the UK get warmer, and the warming is greater in summer than winter;
- There is little change in the amount of precipitation (rain, hail, snow etc.) that falls annually, but it is likely that more of it will fall in the winter, with drier summers for much of the UK; and
- Sea levels rise, and are greater in the south of the UK than the north.

For Wales, the projected changes under the 2050s Medium Emissions scenario include:

- An increase in mean winter temperatures of 2.0°C (very unlikely to be less than 1.1°C and very unlikely to be more than 3.1°C);
- An increase in mean summer temperatures of 2.5°C (very unlikely to be less than 1.2°C and very unlikely to be more than 4.1°C);
- An increase in mean winter precipitation of 14% (very unlikely to be less than 2% and very unlikely to be more than 30%);
- A decrease in mean summer precipitation of 17% (very unlikely to be less than a 36% decrease and very unlikely to be more than a 6% increase);
- Reduction in soil moisture and lower river flows, and an increase in the frequency and magnitude of droughts;
- Changes in soil organic carbon, although the ways in which it might be affected are not adequately understood at present;
- Changes in climate space and species migration patterns, which could result in significant changes to biodiversity;
- Increases in pests and diseases;
- Changes to coastal and estuarine habitats and species, including a reduction in intertidal area; and
- Changes to the marine environment, including an increase in disease hosts and pathogens, harmful algal blooms and invasive species.

The Climate Change Strategy for Wales (Welsh Assembly Government, 2010) contains specific actions for transport sector emission reduction. Of relevance to the A483 Llandeilo Transport Study are:

- Supporting behaviour change and placing greater emphasis on Smarter Choices. This includes better transport planning, the provision of personalised travel information and the development of strategic modal interchanges;
- Promotion of eco-driving.;
- Promotion and support for walking and cycling;
- Improved traffic management on the strategic road network, including average speed cameras and variable speed limits;
- Active promotion of infrastructure for electric and hydrogen vehicles; and
- Supporting the freight industry to reduce emissions.

The Future Trends Report sets out the following four areas of priority in respect of climate change:

- Flooding and coastal change risks to communities, businesses and infrastructure;
- Risks to health, well-being and productivity from high temperatures;
- Risk of shortages in the public water supply, and for agriculture, energy generation and industry, with impacts on freshwater ecology; and
- Risks to natural capital including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity.

Infrastructure across Wales is already exposed to a range of climate hazards, which are projected to increase in both frequency and severity, such infrastructure includes transport networks, both rail and roads. Flooding poses the greatest long-term risk to infrastructure performance from climate change, but the growing risks from heat, water scarcity and slope instability caused by severe weather could be significant.

Following on from this, the Highways Agency (now Highways England) published a Climate Change Adaptation Strategy and Framework in 2009. In the absence of a similar document prepared by the Welsh Government it provides useful input into the potential effects of climate change that are considered relevant to transport schemes that involve the construction of highways.

At Stage One climate change can be relevant in the selection of transport options as the expenditure of embedded carbon can be a determinant between options. This will be considered further at Stage Two along with the future trends relating to temperature and flood risk over the lifetime of a road, should options that involve a bypass be taken forward.

6.3.5 Land Use and Natural Resources

Wales' biodiversity and habitats will be under ever greater pressure, mirroring the global situation. It is likely that ecosystems across Wales have insufficient resilience to the challenges that they face, and this could impact on their capacity to provide services and benefits into the future. The Environment (Wales) Act 2016 seeks to address issues regarding ecosystem resilience and future losses of biodiversity by imposing duties on various public bodies when carrying out their functions, these are of relevance to the A483 Llandeilo Transport Study. Should new transport infrastructure be required some elements of the duty to maintain and enhance biodiversity would have to be included in the scheme design, while other elements may be able to be developed through collaboration with third party organisations.

By 2050 it is projected that average river flows in winter may rise by 10% – 15%. However, in the summer and early autumn they could reduce by over 50% and as much as 80% in some places. Droughts and flood events both have the potential to cause hazards for transport networks.

As some bypass options have been shortlisted as part of this assessment the future trends with regard to land use and flood risk over the design lifetime of a road will be taken into account at Stage Two.

6.3.6 Society and Culture

The number of households in Wales looks set to increase significantly. For example, the number of single person households is predicted to rise by over 30% in the next 20 years, growth in single occupancy dwellings is unlikely to be uniform across Wales and is more likely to be focussed primarily in the city regions.

Poverty levels remain suborn, particularly for working age people. Poverty levels are a little higher in Wales than across the rest of the UK. The percentage of the Welsh population in persistent poverty appears to be slightly falling, although there has been an increase in the amount of under 18s in persistent poverty over recent years.

Nearly half of the population of Carmarthenshire speak Welsh (this is the largest proportion of Welsh speakers in Wales) and it is important to the culture of Wales. The long term vision for the Welsh language is for there to be one million Welsh speakers by 2050.

Traffic modelling that is used in developing highway schemes takes into account projected traffic flows associated with increases in population and the changes to the structure of society. The importance of Llandeilo as a service centre and culturaly important town will be considered when assessing the potential impacts of contruction and operation of any bypass options that are taken forward as well as the potential effects on visitors to the town in the non-bypass options.

6.4 Scheme Specific Future Trends

6.4.1 Traffic Flows

Future traffic flow projections are typically assessed using the TEMPRO Programme. The growth in national traffic levels masks much more variation across area, road and vehicle types. While traffic growth may continue to be strong nationally there is a different picture locally. Growth is expected to be particularly strong on the Strategic Road Network - between 29% to 60% from 2010 to2040 while it is 2% to 51% on other principal roads and 10% to 54% on minor roads. while in most scenarios we expect traffic to grow strongly on local roads and in urban areas and cities, the lower end of the forecasts represents an outcome where the recent fall in trips continues over the next 30 years.

6.4.2 Air Quality

The key pollutants from road transport are:

- Nitrogen oxides (NO_X) – Compounds formed when nitrogen and oxygen combine. NO_X, which comprises nitric oxide (NO) and nitrogen dioxide (NO_2), is emitted from combustion processes. The main sources include power generation, industrial combustion and road transport. At high concentrations NO_2 is an irritant to the airways. NO_2 can also make people more likely to catch respiratory infections (such as flu), react to allergens, and over a long period, affect how well our lungs function.
- Particulate matter (PM) – Small airborne particles. PM may include materials such as soot, wind-blown dust or secondary components which are formed within the atmosphere as a result of chemical reactions. Some PM is natural and some is man-made. PM can be harmful to human health when inhaled, with the World Health Organization classifying it as carcinogenic to humans. In general, the smaller the particle the deeper it can be inhaled into the lungs, and the greater the risk that it is transferred to the bloodstream or body tissues. PM_{10} is particulate matter 10 micrometres or less in diameter, $PM_{2.5}$ is particulate matter 2.5 micrometres or less in diameter. By way of comparison, a human hair is about 100 micrometres in width. Ultrafine particles, classified as being 0.1 micrometres or less in diameter, are covered down to 0.023 micrometres in vehicle emissions regulation (the limit of the current detection technology), but there is increasing interest around the world in their effects and how they can be mitigated.
- Non Methane Volatile Organic Compounds (NMVOC) – Can cause irritation to eyes, nose & throat and organ damage. It reacts with other pollutants to produce ground level ozone and therefore cause inflammation of the respiratory tract, eyes, nose & throat.
- Ozone produced by VOCs can travel large distances and reach high concentrations far from the original source. It affects plant growth and can impact on biodiversity and climate change.
- Hydrocarbons (HC) – Organic compounds often found in fuels including crude oil and natural gas. Unburnt hydrocarbons react with NO_X to produce harmful pollutants.
- Carbon monoxide (CO) – A colourless, tasteless, odourless and toxic gas. Carbon monoxide vehicle emissions are produced through inefficient fuel combustion. Although outdoor concentrations do not generally reach dangerous levels, they may still have adverse health effects for vulnerable people.

There is an Air Quality Management Area along Rhosmaen Street and without intervention it is anticipated that the air pollution problems experienced within Llandeilo and Ffairfach would continue, these are projected to increase as traffic flows increase, but to decrease as more vehicles convert to zero emissions engines.

Without intervention it is projected that the existing air quality issues in Llandeilo would persist. However, the projected increase in electric vehicles could reduce harmful air quality emissions.

6.4.3 Electric Vehicles

The UK Government published 'The Road to Zero' in July 2018 which sets out the strategy for delivering zero emission vehicles on UK roads. Electric vehicles have been commercially available for a number of years but the switch away from petrol and diesel to electric is slow, in part due to the increase cost of the vehicles, but also due to the range that electric vehicles have between charges. In the report it states:

'Our mission is to put the UK at the forefront of the design and manufacturing of zero emission vehicles, and for all new cars and vans to be effectively zero emission by 2040. As set out in the NO_2 plan, we will end the sale of new conventional petrol and diesel cars and vans by 2040. By then, we expect the majority of new cars and vans sold to be 100% zero emission and all new cars and vans to have significant zero emission capability. By 2050 we want almost every car and van to be zero emission. We want to see at least 50%, and as many as 70%, of new car sales and up to 40% of new van sales being ultra low emission by 2030.'

Transport is the largest sector for UK greenhouse gas emissions (27%), of which road transport accounts for over 90%. Road transport is one of the biggest contributors to poor air quality in some of the UK's towns and cities. This is identified in Figure 6.1 below.

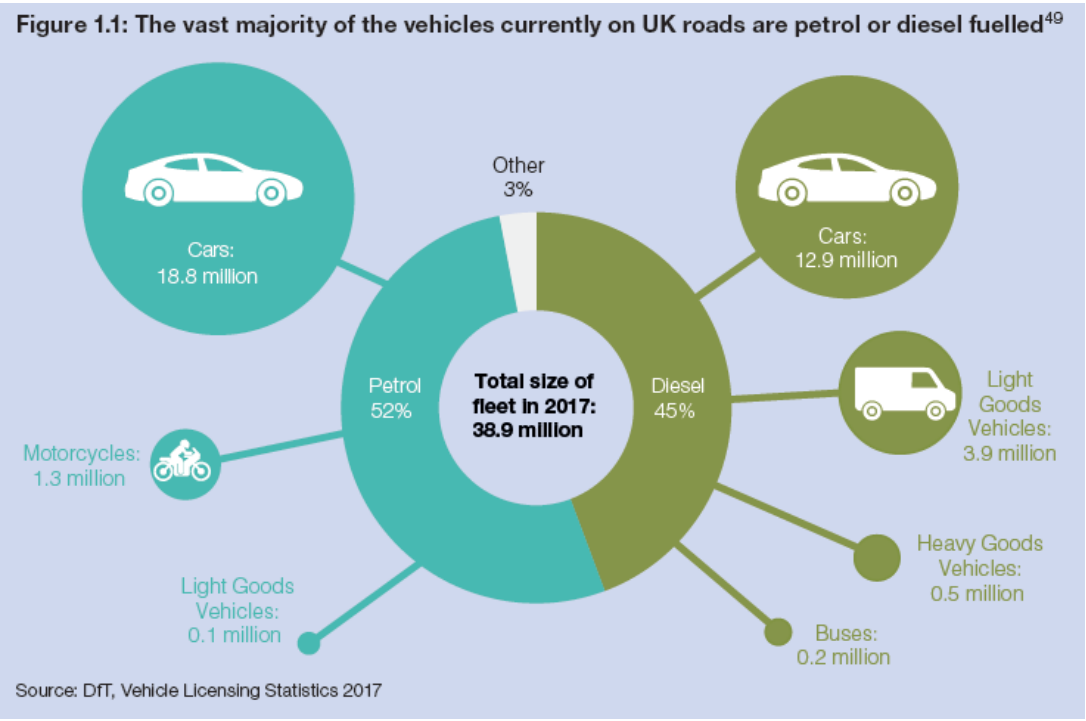


Figure 6.1 : DfT Vehicle Licensing Statistics

The Road to Zero report stated that the technology to deliver our ambitions for cars and vans exists and is being driven today: ultra low emission vehicles made up 1.8% of new car sales in 2017 and continue to gain market

share. The zero emission range of today's plug-in hybrid and range extender vehicles can already cover the vast majority of UK journeys. For example, based on the National Travel Survey, a 50 mile continuous zero emission range could cover up to 98% of all UK journeys and a 25 mile continuous zero emission range could cover up to 94%.

The Welsh government wants Wales to have a leading role in the development of the ultra low emission vehicle industry and has set out its aims in the Wales Economic Action Plan. The Wales Transport Strategy, in development, will set out how the transport sector can be decarbonised and maximise its contribution towards these aims.

Welsh government has the ambition for the public sector in Wales to be carbon neutral by 2030, and expects ultra low emission vehicles to have a key role in achieving this. Electric Vehicle (EV) charging points have been installed at Welsh Government offices, and are being planned for the wider Welsh Government estate, education establishments and hospitals. The Welsh government will be investing £2m in electric vehicle charging points over the next two years to improve publicly accessible provision throughout Wales.

As mentioned above, an increase in electric vehicles would reduce the levels of air pollution within Llandeilo even without a transport intervention. However, many of the issues relate to HGVs and these are less likely to transfer to being electric in the short to medium term.

7. Purpose of WelTAG 1 - Prevention

7.1 Introduction

One of the Ways of Working set out in the Well-being Act is 'prevention', the definition of this term is set out in the introduction to this report and defined in the Well-being Act. This way of working in inherent in the WelTAG Stage One approach to transport studies as they are undertaken to identify areas of concern and to identify potential options that would prevent them.

7.2 Identification of Issues of Concern

7.2.1 Introduction

A key part of Stage One is to understand the issues of concern. These issues were identified using the five ways of working set out in the Well-being of Future Generations (Wales) Act 2015 (thinking long-term, prevention, integration, collaboration, and involvement).

7.2.2 Site Visits

Site visits were conducted in November/December 2017 and January 2018 to observe the operation of the road network in Llandeilo and Ffairfach. These visits observed problems along the A483 such as on-road parking, lack of visibility, vehicle type and inadequate NMU infrastructure. Localised congestion was observed within Llandeilo town centre and at Ffairfach roundabout, however the sections of the A483 leading up to these areas performed adequately. The route however is vulnerable to congestion in areas where the historic environment narrows the infrastructure and at peak times due to higher volumes of traffic.

These site visits were undertaken by the project team to gain an understanding of the context of the area ahead of meetings with the public.

7.2.3 Consultation – Workshop 1

Early consultation has taken place as part of this study to identify where there are opportunities for collaboration within the Welsh Government, how solutions in Llandeilo proposed by the Welsh Government could address concerns of other public bodies and aid them in achieving their Well-being Objectives and to ensure the involvement of local people, including their elected representatives. A workshop was undertaken on 16/01/18 in Carmarthen Library where key stakeholders where invited. The following organisations were invited:

- Carmarthenshire County Council (officers of various departments and councillors);
- Llandeilo Town Council (councillors);
- Dyffryn Cennen Community Council (councillors);
- Manordeilo & Salem Community Council (councillors);
- Dyfed Powys Police;
- Mid and West Wales Fire and Rescue Service;
- Welsh NHS Ambulance Trust;
- Hywel Dda Public Health Team;
- Network Rail;
- Arriva Trains Wales;
- Local Business Forum;

- Carmarthenshire Disabled Access Group; and
- Sustrans.

This workshop outlined the scope of this new transport study and explained the changes to legislation and policy since previous studies had taken place. Key issues which had been identified by the project team were set out and attendees were asked to discuss those along with any other issues of concern that they had in respect of transport through Llandeilo and Ffairfach.

7.3 Identification of Issues of Concern

Following the workshop, the information provided by attendees and by the project team was considered and the issues of concern where summarised into sixteen key headings. The issues of concern raised by attendees at the workshop were:

- Access to railway station(s)
- Closure of local amenities
- Crossing Rhosmaen Street/A483 (severance)
- Crossing/visibility at Ffairfach roundabout
- Emergency service response time (on call)
- Future developments
- HGV traffic
- Journey reliability/resilience
- Noise levels
- Number of pedestrians
- Parking
- Pedestrian safety
- Poor air quality
- Poor cycling environment
- Public transport (insufficient)
- Road geometry Vs purpose (HGV)
- Road safety
- School traffic
- Traffic discouraging visitors (economic growth constraints)
- Vehicle speeds/acceleration on A483
- Vibration levels

These have been supplemented by issues of concern identified by the project team and are summarised in Table 7-1 below.

Table 7-1: Issues of Concern

Key Problems	Further Detail
Access to railway stations	There is a lack of pedestrian wayfinding information from Llandeilo Railway Station providing directions for visitors into Llandeilo town centre. In addition, the path down to the railway station is of poor quality and not suitable for less-mobile people and inaccessible to wheelchair users.
Closure of local amenities	There are concerns that the congestion in Llandeilo can depress visitor numbers within the town, which result in economic challenges for businesses.
Crossing Rhosmaen Street / A483 (severance)	The traffic flows through Llandeilo, especially HGVs at peak times can make crossing the A483 along Rhosmaen Street hazardous to pedestrians. There is a zebra crossing within the town as well as pedestrian lights but there is a concern that people crossing the road at other locations are at risk from collisions with through traffic.
Crossing / visibility at Ffairfach roundabout	The pavements at the Ffairfach roundabout are narrow particularly where children walk to get between Llandeilo and Ysgol Bro Dinefwr. Visibility is considered to be poor.
Emergency service response time (on call)	There were specific concerns regarding the length of time it can take on-call fire fighters to arrive at the fire station when there is congestion in Llandeilo and Ffairfach. The fire station is an on-call station, which means that fire fighters have to access the station using their own vehicles before they access the fire tenders, which have blue light priorities through congestion.
Future development	Concerns regarding how attractive Llandeilo is to future development and the ability of the local transport network to cope with any new development as set out in the Carmarthenshire Local Development Plan (there are land allocations within Llandeilo)
Type of vehicle (HGV traffic)	HGVs, cattle trailer's and coaches appear to use the A483 for access to businesses, schools and other towns such as Llandybïe and Ammanford which can cause congestion due to the slow vehicle speeds caused by gradients and width constraints and the amount of space they take up whilst manoeuvring within Llandeilo and Ffairfach.
Journey reliability / resilience	It has been identified that traffic flow is seasonal reflecting the status of Llandeilo as a tourist town with the further attraction of the National Trust park, Llandeilo therefore experiences an increase in vehicles during summer months to that of winter months.

Key Problems	Further Detail
Noise levels	Contributors to noise in the areas of Llandeilo and Ffairfach include the speed of which vehicles are driving at, the types of vehicle, flow of traffic and the proximity of the buildings to carriageways and lack of dispersion because of this.
Number of pedestrians	It is considered likely that the number of pedestrians accessing Llandeilo or Ffairfach on foot is reduced as a result of the traffic flows on the A483 and that improvements to the transport network would encourage active travel by pedestrians.
Parking	Vehicles parked on street conflict with moving traffic resulting in localised congestion. Long-stay parking on the A483 occurs due to a lack of off-street residential parking for many properties in Llandeilo. A combination of unused pay and display car parking at Crescent Road and free car parking at King Street suggest that drivers may be unwilling to pay charges. There also appears to be a lack of enforcement. This results in additional on-street parking, especially in 'Loading Only' bays.
Pedestrian Safety	Non-Motorised Users have to use narrow pavements throughout both Llandeilo and Ffairfach due to the width of space available. The proximity of HGVs to these narrow footways results in an intimidating experience for those walking or cycling. It is also difficult for pram/wheelchair users and people walking with children as the majority of footways would result in pedestrians having to walk in single-file. The quality and number of crossing points within the areas are frequently poor as many are not equipped with tactile paving/dropped kerbs.
Poor air quality	As a result of idling vehicles, stop/starting, manoeuvring around parked vehicles, hill starts (due to the gradient to the north of Llandeilo town centre) and the proximity of the buildings to the carriageway which reduces dispersion, pollution within Llandeilo town centre is problematic. An industrial estate is also located within Llandeilo where manufacturing businesses may contribute to pollution as well. The length of Rhosmaen Street in Llandeilo is currently identified as an Air Quality Management Area.
Poor cycling environment	When a site visit was conducted there were no cyclists observed in Llandeilo or Ffairfach arising from barriers to cycling such as the type of vehicles which use the A483 and the lack of cycling infrastructure in place such as on-road or off-road cycleway. There were also few cycle racks within Llandeilo and Ffairfach, with only Llandeilo railway station providing 3 racks for cyclists to secure their bikes to.
Public transport	The quality of bus stops available in Llandeilo and Ffairfach are of a good standard, however the frequency of buses is sporadic. Llandeilo and Ffairfach railway stations offer Real Time Information displays and information, however the shelters which are provided are in need of maintenance and modernisation. This, as well as the lack of facilities and the infrequency of train services to surrounding villages and towns, may discourage residents and visitors to use public transport.

Key Problems	Further Detail
Road geometry and strategic purpose of A483	A number of junctions and sections of the A483 do not comply with current standards which may reduce the overall capacity and safety of the network. In particular, there are pinch points due to the proximity of buildings which result in localised congestion and narrow footways. Lack of visibility for drivers exiting junctions onto the A483 has been highlighted as an issue which could result in accidents with other vehicles or pedestrians. Furthering this, there is limited rear access for retail properties which are located along the A483 and therefore servicing vehicles have to park and load on-street on the A483. The majority of residential properties within Llandeilo and Ffairfach do not have driveways and therefore have to park on the highway which adds to the congestion issues along the A483. The A483 has topographical constraints, particularly in regards to the incline on the A483 in both directions into Llandeilo town centre, which appears to reach a pinnacle at the zebra crossing. The River Towy as well as the single-arch Grade II* listed road bridge (Llandeilo Bridge) add to the topographical constraints. The Heart of Wales railway line which runs through Ffairfach village and skirt Llandeilo to the east of the town. Due to the historical nature of both Llandeilo and Ffairfach, each area is characterised by listed buildings and conservation areas which impact on the townscape. These impacts include reduced visibility, narrow streets, tight radii of corners and junctions, one-way streets, a listed bridge and a National Trust park parts of Llandeilo town centre are within a conservation area and the Brecon Beacons National Park boundary lies a short distance to the east. Servicing for businesses which line the A483 generally has to be carried from the highway at the front of the properties as there is a lack of rear servicing provision, this further contributing to the congestion issues in Llandeilo town centre. There is a lack of potential diversion routes which are suitable for HGVs around Llandeilo and Ffairfach.
Road safety	Safety concerns relate to the visibility of pedestrians attempting to cross the A483 and side streets which lead onto it. Furthering this, due to the historic street layout of Llandeilo and Ffairfach, visibility splays out of a number of key junctions onto the A483 are insufficient and are mainly blocked by historic buildings. There are also conflicting road signs in relation to speed limits which could cause confusion. Convex mirrors are not present in either settlement area which, if implemented, could prove to be beneficial in the future for drivers exiting junctions onto the A483.
School traffic	Ysgol Bro Dinewfr has a large catchment of children resulting in a significant number of coaches travelling to and from the school at the beginning and end of the school day. Many of these coaches are routed through Llandeilo and cause congestion due to the potential for them to cause a convoy. This traffic is also a hazard to children walking or cycling to the school from Llandeilo or Ffairfach.

Key Problems	Further Detail
	To a lesser extent there are problems with school traffic associated with the three primary schools in Llandeilo and Ffairfach. However, due to the small catchment to each of these schools the number of children coming to school by car is reduced and there are no coach movements required.
Traffic discouraging visitors (economic growth constraints)	The volume of traffic, especially the number of HGVs travelling on the A483 through Llandeilo detract from the attractiveness of the town and its streetscape. There are concerns that this is discouraging visitors from staying in the town to shop or access services.
Traffic speed	There are general observations that drivers do not always abide to speed limits when looking to manoeuvre around obstructions or to avoid congestion. This is also perceived to occur at approach arms to the A483/A40 roundabout Additionally, problems with vehicles driving at inappropriate speeds while passing parked vehicles have been highlighted, which could result in accidents. Conflicting/confusing speed limit signs could result in drivers exceeding speed limits.
Vibration levels	The traffic flows, particularly the HGV movements, cause vibration through Llandeilo. While vibration levels dissipate quickly there are concerns regarding the effect this is having on the listed buildings that are alongside the A483 along Rhosmaen Street.

8. Ways of Working - Involvement and Collaboration

8.1 Introduction

Under the Well-being Act, two of the five ways of working are involvement and collaboration.

Project teams should involve a diversity of the population in the decisions that affect them and also work with others in a collaborative way to find shared sustainable solutions. In determining who should be involved in the strategic options stage of the A483 Llandeilo Transport Study, the Welsh Government identified key representatives of the local population who could be affected as well as other organisations or individuals who could provide useful insight into the existing problems and potential solutions; this included organisations that the Welsh Government could potentially work with in a collaborative way to deliver shared goals and objectives.

As part of the Stage One WelTAG process two stakeholder workshops were carried out. Details of this is set out below. The proposed workshops aimed to address the stages required by both WelTAG Guidance and the Well-being of Future Generations (Wales) Act 2015 ways of working.

In advance of the proposed half day workshop information regarding the purpose of the workshop was provided to invitees alongside the invitation. This enabled those organisations who could attend to consult with others in advance as they deemed appropriate. Those organisations who could not attend were invited to provide their views so that they could be taken into account in finalising the scheme objectives. The period within which that could submit their comments was short in order to not delay programme.

It was important that those involved in the process were able to do so through the medium of Welsh should they so wish. Attendees were asked to confirm whether they are Welsh speakers and whether they would want to undertake the workshop in Welsh.

Should it be necessary, then translation services would be arranged (by the Welsh Government). Where there were those who wish to conduct the workshop in Welsh a Welsh speaking break out group could be identified so that there is no requirement for translation services in that break-out group. The introduction and conclusion of the event would be in English, which could be subject to simultaneous translation if required.

Minutes to the workshop were prepared in English, with feedback from Welsh speaking break out groups provided to Jacobs and Mott Macdonald by the Welsh Government.

8.2 Workshop 1 – Identification of Issues

Workshop 1 was held to identify the specific issues that exist in Llandeilo and Ffairfach. As set out above, there is a long history to a potential transport improvement scheme within Llandeilo and Ffairfach. At this workshop the extent to which the rationale for the scheme that had previously been identified still applies and whether or not there are additional factors that should be considered in reaching a decision on whether or not transport improvements are required.

At this stage it was important to involve other public bodies, and other departments within the Welsh Government to ensure that any proposals did not conflict with other projects or plans that are in progress or have a negative effect on the delivery of other identified issues in the area.

This workshop involved a broad range of attendees from the local authority and other public bodies, representatives of the local community and organisations with an interest is transport schemes. Table 8-1 lists

the proposed invitees to Workshop 1. It is likely that some of these organisations would decide not to attend the workshop but in accordance with the Involvement and Collaboration ways of working identified in the Well-being of Future Generations (Wales) Act 2015 it is important that these public bodies have the opportunity to input at this early stage.

Key issues that needed to be considered were the extent to which the objectives will prevent the identified issues and meet the long term needs of the community, taking into account the impacts of the scheme.

Aims

- To establish an up-to-date understanding of Llandeilo and Ffairfach's traffic problems, with insights from key members of the local community and public bodies;
- To establish what other issues exist within Llandeilo and Ffairfach that should be considered in developing scheme objectives;
- To establish community stakeholder expectations in terms of priorities, opportunities and concerns with tackling the problem; and
- To review the previous objectives in light of the above and current policy context, amend if necessary and agree the objectives for the option development and appraisal.

Table 8-1: Invitees to Workshop 1

Design Team	Public Sector	Private Sector	Third Sector (community and environmental groups)
Welsh Government Highways (Highways)	Carmarthenshire CC (Environmental Health (Air Quality))	Network Rail	Sustrans
Welsh Government Highways (Environment)	Carmarthenshire CC (Highways)	Arriva Trains Wales	Local Disability Group
Jacobs (Highways)	Carmarthenshire CC (Strategic Planning)	Local Business Forum	
Jacobs (Transport Planning)	Llandeilo Town Council		
Mott Macdonald (Environmental)	Dyfed Powys Police		
	Mid and West Wales Fire and Rescue Service		
	Welsh NHS Ambulance Trust		
	Public Health Wales		
	Hywel Dda University Health Board		
	County Councillors		

Design Team	Public Sector	Private Sector	Third Sector (community and environmental groups)
	Town and Community Councillors		

Following the workshop, the design team reviewed the information that was obtained from these stakeholders and used it to inform the rationale for the scheme.

Prior to the workshop the design team reviewed the Welsh Government Transport Objectives and considered the Scheme Objectives that had previously been identified. Based on feedback from stakeholders at the workshop, and a review of the changes to legislation and policy identified above, these Scheme Objectives were revised. These Scheme Objectives would be robust and stand up to scrutiny as they will be the basis of the assessment of options as they progress through to detailed design and implementation.

In advance of the proposed half day workshop information regarding the purpose of the workshop was provided to invitees alongside the invitation. This enabled those organisations who could attend to consult with others in advance as they deemed appropriate. Those organisations who could not attend were be invited to provide their views so that they can be taken into account in finalising the scheme objectives. The period within which that could submit their comments was be short in order to not delay programme.

8.3 Workshop 2 – Identification of Scheme Objectives and Potential Options

The purpose of this workshop was to identify a long-list of potential options. Previous studies have identified a range of options, including those across inalienable National Trust land which were subsequently dismissed. In the first instance attendees would be presented with environmental constraints plans (showing key environmental designations such as SACs, SSSIs, Nature Reserves, Scheduled Monuments, Conservation Areas, AONB, National Trust land etc. along with key land use features such as playgrounds and schools). These constraints plans were free of the previously identified option and a 'clean sheet' from which to consider options. However, the previously identified options were presented so that they can be adopted as options again should they be considered appropriate.

In the first instance the adopted Rationale and Scheme Objectives were presented. There was a wider invitee list for Workshop 2 and a brief summary of the key issues identified at Workshop 1 was provided as an introduction.

A list of the proposed invitees to Workshop 2 is set out in Table 8-2.

Table 8-2: Invitees to Workshop 2

Design Team	Public Sector	Private Sector	Third Sector (community and environmental groups)
Welsh Government Highways (Highways)	Carmarthenshire CC (Environmental Health)	Network Rail	National Trust

Design Team	Public Sector	Private Sector	Third Sector (community and environmental groups)
Welsh Government Highways (Environment)	Carmarthenshire CC (Highways)	Arriva Trains Wales	Wildlife Trust of South and West Wales
Jacobs (Highways)	Carmarthenshire CC (Education)	Local Business Forum	Dyfed Archaeological Trust
Jacobs (Transport Planning)	Carmarthenshire CC (Strategic Planning)		Sustrans
Mott Macdonald (Environmental)	Carmarthenshire CC (Biodiversity)		Local Disability Group
	Carmarthenshire CC (Landscape)		Local bypass pressure group
	Llandeilo Town Council		
	Ysgol Bro Dinefwr (the high school)		
	Ysgol Gynradd Ffairfach (primary school)		
	Ysgol Gynradd Llandeilo (primary school)		
	Ysgol Teilo Sant (primary school)		
	Natural Resources Wales (Ecology)		
	Natural Resources Wales (Landscape)		
	Natural Resources Wales (Flood Risk and Hydrology)		
	Cadw		
	Dyfed Powys Police		
	Fire and Rescue		
	NHS Ambulance Trust		

Key issues that needed to be considered were the extent to which the objectives would prevent the identified issues and meet the long term needs of the community, taking into account the impacts of the scheme.

The aim of the workshop was to identify any further options that are worthy of consultation. Attendees were advised regarding the range of options that can be presented. Options could be capital schemes such as a bypass, localised highway improvements, improvements to rail, provision of Park and Ride facilities, pedestrianisation etc. They could also be a combination of elements to present an option that contributed to the Scheme Objectives.

Following work in a number of small groups the workshop was brought together so that all of the identified options were presented at a high level to the workshop. By the end of the day options which were identified that the Jacobs / Mott MacDonald teams were taken forward to appraise and shortlist. A high level appraisal using a matrix was used to identify key pros and cons of these options as identified by the workshop attendees.

8.4 Identification of Scheme Objectives

As described in Section 3, the WelTAG guidance sets out that transport intervention proposals should be considered against a set of SMART Objectives. In addition to the Well-being Goals in The Well-being of Future Generations (Wales) Act 2015, national and local Well-being Objectives, and the objectives of the Wales Transport Strategy WelTAG guidance states that scheme specific objectives should be identified that address the particular issues of concern within the area of study.

Eight draft scheme specific objectives (Scheme Objectives) were identified by the project team having reviewed the key issues raised during stakeholder workshop and site visits. These were:

1. Preserve strategic function of A483;
2. Improve pedestrian and cyclist safety within Llandeilo and Ffairfach, including safe routes to school;
3. Reduce community severance within Llandeilo and Ffairfach;
4. Improve journey time reliability through Llandeilo and Ffairfach;
5. Reduce congestion through Llandeilo;
6. Contribute to sustainable economic growth and tourism opportunities in Llandeilo;
7. Reduce exposure to air pollution for sensitive receptors; and
8. Support transition to a low carbon society ensuring the solution is sustainable and resilient which minimises carbon emissions associated with the transport infrastructure which includes improving access to, and provision of public transport.

These draft Scheme Objectives were presented to stakeholders at a second workshop and they were asked to provide feedback as to whether or not they were the correct objectives or were in need of alteration. It was concluded that Objective 5 should be amended to address concerns regarding congestion in Ffairfach as well as in Llandeilo. As a result of the public forums Scheme Objective 5 was amended to read:

5. Reduce congestion through Llandeilo **and Ffairfach**

The WelTAG Review Group met in October 2018 where the Scheme Options were considered further. As a result of this Panel Review, Objective 6 was amended to read:

6. Contribute to sustainable economic growth and tourism **and cultural** opportunities in Llandeilo;

8.5 Design and Environmental Objectives

At WelTAG Stage One the type of transport intervention has not been determined and options including those that conclude that no intervention is required are considered. On this basis it is not appropriate to consider key design and environmental objectives.

At WelTAG Stage Two the short-list of options will be considered further. At this stage key design and environmental objectives will be identified, against which each of the short-list options are assessed.

Table 8-3 below summarises how the Scheme Objectives relate to the key issues of concern which were identified at the workshops.

Table 8-3: Intervention Objectives and Key Issues Comparison

Key Issues	Objectives							
	1	2	3	4	5	6	7	8
	Preserve the strategic function of the A483.	Improve pedestrian and cyclist safety within Llandeilo and Ffairfach, including safe routes to school.	Reduce community severance within Llandeilo and Ffairfach.	Improve journey time reliability through Llandeilo and Ffairfach.	Reduce congestion through Llandeilo and Ffairfach.	Contribute to sustainable economic growth and tourism opportunities in Llandeilo.	Reduce exposure to air pollution for sensitive receptors.	Support transition to a low carbon society ensuring the solution is sustainable and resilient which minimises carbon emissions associated with the transport infrastructure which includes improving access to, and provision of public transport.
Access to railway station(s)	-	- P	-	-	-	- P	-	- P
Closure of local amenities	-	- P	-	-	-	- P	-	- P
Crossing Rhosmaen Street/A483 (severance)	-	- i	- i	- P	- i	-	- P	-
Crossing/visibility at Ffairfach roundabout	-	- i	- i	- P	-	-	-	-
Emergency service response time (on call)	- i	-	-	- i	- i	-	-	-
Future developments	- i	- P	-	-	- P	- i	-	- P
HGV traffic	- P	-	-	- P	- P	-	- P	- P

Journey reliability/resilience	. i	. P	. P	. i	. i	.	.	.
Noise levels	.	.	.	.	.	.	.	. P
Number of pedestrians	.	. i	. i	.	. P	.	. P	. P
Parking	. P	.	.	.	.	.	.	.
Pedestrian safety	. P	. i	. i	. P	. P	.	. P	. P
Poor air quality	.	.	.	.	. i	.	. i	. P
Poor cycling environment	.	. i	. i	. P	. i	. P	. i	. i
Public transport (insufficient)	.	.	.	.	.	.	.	. i
Road geometry Vs purpose (HGV)	. i	. i	. P	. i	. i	. P	. P	. P
Road safety	.	. i	. i	. P	. P	.	.	.
School traffic	.	. i	.	.	.	.	.	. P
Traffic discouraging visitors (economic growth constraints)	. P	. i	. i	. P	. i	. i	. i	. P
Vehicle speeds/acceleration on A483	. P	. P	. P	. P	. i	.	.	.
Vibration levels	.	.	.	.	. P	.	.	. P

Key		
	Fully meets objective	i
	Partially meets objective	P

8.6 Identification of Long List of Options

8.6.1 Introduction

This section outlines the long list of options that are appraised under WelTAG Stage One and the process by which they were identified.

8.6.2 Consultation – Workshop 2

There was a twin level approach to consultation at this stage. Initially, a workshop was held with key consultees to identify potential route options, or where relevant, constraints that should be considered when identifying route options. This workshop took place on 13 February 2018 and the following organisations attended:

- Carmarthenshire County Council;
- Llandeilo Town Council;
- Manordeilo and Salem Community Council;
- Ysgol Bro Dinefwr;
- Ysgol Gynradd Ffairfach;
- Sustrans;
- Mid and West Wales Fire and Rescue Service;
- Carmarthenshire Cycling Forum;
- Llandeilo and District Civic Trust;
- Towy Environment Group;
- SWTRA;
- Network Rail;
- Fisher German on behalf of Mainline Pipelines Ltd.;
- Dyffryn Cennen; and
- Coleg Sir Gar / Carmarthenshire College.

8.6.3 Consultation – Public Forums

This workshop was followed by two public forums where members of the public were asked for their views on the current issues within Llandeilo and Ffairfach, and what potential options could resolve the issues. Mapping showing constraints within Llandeilo, Ffairfach and the surrounding areas were provided as well as blank maps which the public could annotate, identifying where the issues were located and what options could resolve the issue.

The first public forum was attended by 356 people, with a further 52 attendees at the second public forum. Following the public forums, 167 comments forms were completed and 86 drawings (seven alternative route options were identified) were produced, these have been considered when identifying the potential long list of options.

Subsequent to identifying the objectives within Section 4.5 influenced by stakeholder engagement at previous workshops and public forums, potential options have been identified which aim to address the key issues outlined previously. For each option the following is provided:

- A description of the option;
- An explanation of the mechanisms by which the option would address the problem, prevent the problem from getting worse or occurring in the first place;
- The likely social and cultural, environmental and economic impacts of each option, with sufficient detail to rule out options and to allow for the selection of a short list of options for further consideration (the transport case); and
- Key issues and potential 'deal breakers' under the headings of the delivery, financial and commercial cases.
    - Public Forums – Identification of Potential Options

Two public forums were undertaken with information presented in Welsh and English and supported by a design team who were a minimum of 50% Welsh speakers. Four hundred and six people attended the public forums, though there was some duplication with some people attending on both dates. The information presented at the public forums is set out in the Appendices to this report along with environmental constraints mapping. The public were asked to come forward with any options that they thought were worth considering as part of the long-list of solutions and 86 drawings were completed. Having reviewed the responses, seven broad alternative route options were identified, taking into account feedback at the events the need to consider options for a no-bypass solution were also produced. Having refined the options presented a total of seven non-bypass solutions, two options for links between the A487 and A483, four town centre improvement options (to be considered alongside a bypass) and 27 bypass route options were considered as long-list options.

8.7 Option Appraisal

A summary of the appraisal of each option is provided below. The tables show the summarised option appraisal and states the extent to which the option fulfils the scheme specific objectives set out in section 4 of this report. This option appraisal has not been assessed against the Well-being Objectives of Natural Resources Wales, Public Health Wales or Carmarthenshire County Council at this stage. Short-listed options will be assessed against these at WelTAG Stage 2, it is considered unlikely that any contribution to these third party well-being objectives would be a determining factor in identifying an appropriate short-list of options.

The options have been grouped and are categorised below:

- Town Centre Options;
- Non-Bypass Options;
- Eastern Bypass Options;
- Additional Links;
- Western Bypass Options; and
- Tunnel.

8.7.1 Road Links associated with some Options

Some of the identified long list options will require an additional road link to provide a bypass which will have an optimum beneficial impact on Llandeilo and Ffairfach. The road links would therefore not be constructed in isolation, but only in association with a bypass option. The road links are mainly associated with bypass options located to the east.

8.7.2 Consideration of Non-Transport Sector Solutions

Issues of concern were identified during consultation workshop 1 which included areas such as safety, volume of traffic, road geometry and HGV traffic. It was also confirmed that there are air quality issues within Llandeilo and Ffairfach, as well as environmental constraints. It has been concluded that in order to resolve the issues within Llandeilo and Ffairfach, vehicles which are too large for the inadequate highway such as HGVs and coaches would need to be removed from the current A483 trunk road.

Acoustic barriers are not feasible due to limited space, however there could be scope for secondary insulation/mechanical ventilation to residential properties that are most affected by road traffic noise, although this could affect the setting of listed buildings or the Conservation Area. Air quality solutions could include the installation of electric charging points and implementing a travel plan. However, the most suitable way to alleviate noise and air quality effects would be to smooth the traffic flow by optimising speeds and reducing or removing traffic flows away from residential receptors.

The townscape and cultural heritage of Llandeilo is currently affected by congestion on Rhosmaen Street, therefore removing or reducing congestion is the most suitable solution. Some small scale improvements could be made to provide a beneficial effect to the appearance and setting of the Conservation Area and listed buildings, by decluttering and removing street signs and making the streetscape more usable for pedestrians. However, the improvements would be minimal without alleviating the congestion that is the predominantly affecting the Conservation Area.

Due to this, it has been determined that public transport and non-transport solutions will not resolve the issues within Llandeilo and Ffairfach due to the magnitude of change required. As a result, the long list options do not include public transport and non-transport solutions. The existing environmental constraints caused by traffic congestion on Rhosmaen Street is due to the start-stopping and idling of road vehicles, particularly HGVs. There are few feasible non-transport related solutions that would mitigate the existing situation with regards to noise, air quality, townscape and cultural heritage, and none that would alleviate all adverse environmental effects.

8.7.3 Assumptions used in the Appraisal

Due to the high-level and qualitative approach used in the appraisal, a series of assumptions have been made which are detailed below:

- All town centre options are appraised on the basis of a bypass being constructed, and are being proposed to enhance the active travel and economic potential of the town;
- Any bypass route will become the A483, with the existing road being de-trunked;
- Additional links are appraised on the basis of a suitable bypass being constructed; and
- The tunnel option is assumed to be toll-free.

Indicative plans of all options except the Do-Minimum are in the WelTAG Stage One IAR.

9. Long-list Options

A summary of the long list options are set out below in tables Table 9-1to Table 9-7. These tables also detail the extent to which each option complies with the Scheme Objectives as defined in section 8.4.

9.1 Do Minimum Options

A do-minimum option was considered to provide a baseline for further assessment.

Table 9-1: Do Minimum Options

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	Do-Minimum The Do-Minimum option does not include any improvements to the current scenario of the A483 within Llandeilo and Ffairfach	✓	×	×	×	×	×	×	×

9.2 Non-Bypass Options

There are benefits of transport intervention that would not require the construction of a bypass, there would be less disruption, reduced embedded carbon expenditure and it would not cost as much money. However, any non-bypass option would need to be considered against the scheme objectives to see whether it could deliver a suitable solution.

As this WelTAG One Study is looking afresh at the problems in Llandeilo and Ffairfach it has not assumed that a bypass option is required. Table 9-2 sets out the different non-bypass options that were considered.

Table 9-2: Non-Bypass Options

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
NB1	**Traffic Lights** Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.	Partial	×	×	✓	✓	×	Partial	×
NB2	**Removal of Parking** Removal of parking along Rhosmaen Street enforced through double yellow lines. Restrictions of 'Loading Only' from 18:00 to 07:00, and then from 10:00 – 15:00 with no parking between 08:00 – 18:00 will be enforced.	Partial	×	×	✓	✓	×	Partial	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
NB3	**HGV Restriction (legal sanction)** Restriction on HGVs through Llandeilo between 08:00 – 20:00, all HGVs to be routed along the A40 to Carmarthen which will be enforced through traffic cameras. This restriction will apply from the A40 roundabout within Rhosmaen to the roundabout within Ffairfach.	×	✓	✓	✓	✓	×	✓	×
NB4	**HGV Restriction with permit/emissions charge** Restriction on HGVs with the exception of businesses within a certain distance which would be entitled to a free permit. The permit for other businesses will be priced at a cost that makes it more economically viable to go via Carmarthen rather than through Llandeilo and/or Ffairfach. This option would be a similar scheme to congestion charge/emission zone areas.	×	✓	✓	×	✓	×	✓	×
NB5	**HGV Restriction (legal sanction) plus one-way system** One-way system where there would be limited access for HGVs travelling southbound from the A40 onto the A483, with access permitted for deliveries only. Rhosmaen Street would be one-way southbound and traffic directed to King Street onto Carmarthen Road and back onto the A40. HGVs would be restricted from crossing Llandeilo Bridge crossing the Afon Tywi in a northbound direction and the A483 will be de-trunked.	×	✓	✓	×	✓	×	✓	×
NB6	**Combined No-bypass Option (with HGV restriction)** This option is a package of works representing a combination of NB1, NB2 and NB3.	×	✓	✓	×	✓	×	✓	×
NB7	**Combined No-bypass Option (No HGV restriction)** This option is a package of works representing a combination of NB1 and NB2.	✓	✓	✓	×	✓	×	✓	×

9.3 Town Centre Options

Many of the transport issues that were identified at Stage One relate to the environment within Llandeilo town itself. It was identified at an early stage that a bypass alone would not alleviate this problem and therefore any bypass that were to be taken forward would also include works within the town centre. Table 9-3 sets out details of the town centre options that were considered.

Table 9-3: Town Centre Options

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
TC1A	**One Way System and a Bypass Option (A)** Town Centre routing restrictions will be installed. Two-way traffic will remain from the junction of the A40 and junction of New Road/Carmarthen Street. New Road to remain open to two-way traffic. Rhosmaen Street from New Road/Crescent Road junction to Carmarthen Street and Abbey Terrace changed to one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout is weight restricted. Permitted traffic going north would turn left into King Street then George Street, then onto Carmarthen Street/Carmarthen Road to join the A40 at the existing junction with a potential roundabout. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi.	✓	✓	✓	Partial	Partial	✓	×	×
TC1B	**One Way System and a Bypass Option (B)** Two-way traffic from the junction of A40 and junction of New Road/Carmarthen Street. New Road to remain open to two-way traffic. Rhosmaen Street from New Road/Crescent Road junction to Carmarthen Street and Abbey Terrace is one way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout is weight restricted. Permitted traffic going north would turn left into Carmarthen Street then Carmarthen Road to join the A40 at the existing junction with a possible roundabout. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi.	✓	✓	✓	Partial	Partial	✓	×	×
TC1C	**One Way System and a Bypass Option (C)** One-way system using Crescent Road for southbound traffic and Rhosmaen Street for northbound traffic. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.	✓	✓	✓	Partial	Partial	✓	×	×
TC2	**Traffic Light System and a Bypass Option** Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Pavements to be widened within the one-way	✓	×	×	×	×	✓	×	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	section of Rhosmaen Street to enable safer use by pedestrians.								

9.4 Eastern Bypass Options

Table 9-4 sets out the bypass options that were identified that are located to the east of the town of Llandeilo.

Table 9-4: Eastern Bypass Options

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
BE1A	**Eastern Bypass Option 1 (A)** Eastern Bypass Option 1 (A) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west, crossing the Afon Tywi then joins the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then heads further west and joins the A476 to the east of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed on the A476 where the route then heads south east and joins the A483 to the south of Heol Pen Storom.	✓	Partial	Partial	✓	✓	✓	✓	✓
BE1B	**Eastern Bypass Option 1 (B)** Eastern Bypass Option 1 (B) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line, heading west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge.	✓	✓	✓	✓	✓	✓	✓	✓
BE1C	**Eastern Bypass Option 1 (C)** Eastern Bypass Option 1 (C) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then	✓	✓	✓	✓	✓	✓	✓	✓

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	heads further west and joins the A476 to the west of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed at the junction of the B4300/A476.								
BE1D	**Eastern Bypass Option 1 (D)** Eastern Bypass Option 1 (D) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then heads further west and joins the A476 to the west of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed at the junction of the B4300/A476 and a link from the proposed roundabout at B4300/A476 to the A483 south of Heol Pen Storom.	✓	✓	✓	✓	×	✓	×	×
BE2	**Eastern Bypass Option 2** Eastern Bypass Option 2 leaves the A40 at the A40/A483 roundabout, heading south-east around the boundary of Llandeilo before crossing the railway and following the railway line south to Bethlehem Road. From Bethlehem Road, the route then heads south to join the A483 to the north of Heol Pen Storom. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE3A	**Eastern Bypass Option 3 (A)** Eastern Bypass Option 3 (A) leaves the A40 at the A40/A483 roundabout, heading south-east around the boundary of Llandeilo before crossing the railway and following the railway line south for a short distance before crossing the Afon Tywi, joining Bethlehem Road around Geulan-Goch. From this location the road would continue south avoiding the former secondary school, and link to the A483 to the south of Heol Pen Storom. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE3B	**Eastern Bypass Option 3 (B)** Eastern Bypass Option 3 (B) leaves the A40 at the A40/A483 roundabout, heading south east to cross the railway line and the Afon Tywi, and wraps around to the north-east of Llandeilo.	✓	✓	✓	Partial	✓	✓	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	From this point to the east of the railway line the route would head south over multiple river crossings. The route would then cross Bethlehem Road between Ffairfach and the former secondary school, linking to the A483 to the north of Heol Pen Storum. This option would require a link to the A476.								
BE3C	**Eastern Bypass Option 3 (C)** Eastern Bypass Option 3 (C) leaves the A40 at the existing A40/A483 roundabout, heading south east towards Bethlehem Road, crossing the Afon Tywi and railway using a single structure. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE3D	**Eastern Bypass Option 3 (D)** Eastern Bypass Option 3 (D) leaves the A40 at the existing A40/A483 roundabout, heading south east towards Bethlehem Road, crossing the Afon Tywi and railway using a single structure. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road towards Ffairfach, leaves Bethlehem Road to the west of the former secondary school to join the A483 to the north of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE4A	**Mid Rhosmaen Eastern Bypass Option 4 (A)** Mid Rhosmaen Eastern Bypass Option 4 (A) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-east towards Bethlehem Road, crossing the railway and Afon Tywi. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen	✓	✓	✓	✓	✓	✓	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	Storum. This option would require a link to the A476.								
BE4B	**Mid Rhosmaen Eastern Bypass Option 4 (B)** Mid Rhosmaen Eastern Bypass Option 4 (B) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-east towards Bethlehem Road, crossing the railway and Afon Tywi. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE4C	**Mid Rhosmaen Eastern Bypass Option 4 (C)** Mid Rhosmaen Eastern Bypass Option 4 (C) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-west towards Llandeilo Railway Station before crossing the railway and Afon Tywi using a single structure. The route then links to Bethlehem Road to the south of Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE4D	**Mid Rhosmaen Eastern Bypass Option 4 (D)** Mid Rhosmaen Eastern Bypass Option 4 (D) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-west towards Llandeilo Railway Station before crossing the railway and Afon Tywi using a single structure. The route then links to Bethlehem Road to the south of Craigle Bach Yr Onnen, follows Bethlehem Road towards Ffairfach, leaves Bethlehem Road to the west of the former secondary school, to join the A483	✓	✓	✓	✓	✓	✓	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	to the north of Heol Pen Storom. This option would require a link to the A476.								
BE5A	**Far Eastern Route 5 (A)** Far Eastern Route 5 (A) leaves the A40 to the east of Rhosmaen, crosses the railway line and Afon Tywi at a single crossing point, and crosses the estuary to meet Bethlehem Road near to Pentre Parr Lodge. Bethlehem Road will be upgraded towards Ffairfach and the route will leave Bethlehem Road near Geulan Goch and link to A483 to the south of residential properties to avoid Heol Pen Storom. The route would avoid playing fields associated with the former secondary school. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE5B	**Far Eastern Route 5 (B)** Far Eastern Route 5 (B) leaves the A40 to the east of Rhosmaen, crosses the railway line and Afon Tywi at a single crossing point and crosses the river to meet Bethlehem Road near to Pentre Parr Lodge. Bethlehem Road will be upgraded towards Ffairfach and the route will leave Bethlehem Road to the west of the former secondary school (to the east of the railway line) and wraps to the east of residential properties along Heol Cennen linking to A483 before Heol Pen Storom.	✓	✓	✓	✓	✓	✓	✓	×
BE6	**Option formerly known as the Refined Protected Route** This option leaves the A40 at the A40/A483 roundabout, heading south-east around the boundary of Llandeilo, to the west of the railway line and follows the railway line, before passing closer to the escarpment than options BE1A – BE1D. It joins the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge.	✓	✓	✓	✓	✓	✓	✓	×

9.5 Road Links Required for Eastern Bypass Options

The transport study has identified that much of the traffic heading through Llandeilo heads towards Cross Hands and does not remain on the A487. In order to ensure that any traffic on an eastern bypass option were able to link on their chosen route a road link would be required. Table 9-5 sets out the two road link options that were considered.

Table 9-5: Road Links Required for Eastern Bypass Options

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
ARL1	**A Road Link (1)** ARL1 connects the A476 and A483 without the need to pass through Ffairfach. The route starts at the junction between the B4300 and A476 and follows the slight valley, crossing the railway line at approximate NGR SN625 205 then joins the A483 south of Caemen Cottage.	✓	×	×	✓	✓	✓	×	×
ARL2	**A Road Link (2)** ARL2 connects the A476 to the A487 without the need to pass through Ffairfach. The route would leave the A476 south of Cwm at approximate NGR BN610 189 crossing the gorge over the railway line and links to A487 at approximately NRG SN 614 191.	✓	×	✓	✓	✓	✓	×	×

9.6 Western Bypass Options

Table 9-6 sets out the bypass options that were identified that are located to the west of the town of Llandeilo.

Table 9-6: Western Bypass Options

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
BW1	**Western Bypass Option 1** Western Bypass Option 1 leaves the A40 at the existing junction with Carmarthen Road at a new junction. The route then follows Carmarthen Road south to the entrance to the National Trust Dinefwr property and follows the slight dip between mounds south-west of the junction of the B4300 and A476.	✓	✓	✓	✓	✓	×	✓	×
BW2	**Western Bypass Option 2** Western Bypass Option 2 leaves the A40 at the existing junction with Carmarthen Road at a new junction. The route then follows an alignment to the west of Carmarthen Road south of the entrance to National Trust Dinefwr property, then runs to the west of residential properties on Carmarthen Road, Carmarthen Street, George Street, Bank Terrace and Bridge Street before crossing the Afon Tywi to the	✓	✓	×	✓	✓	×	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	west of Llandeilo Bridge. The route then wraps west along the route of the Afon Tywi, north of Ysgol Bro Dinefwr and links to the A476 at the existing junction with the B4300.								
BW3A	**Western Bypass Option 3 (A)** Western Bypass Option 3 (A) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west in a southern direction to the entrance to the National Trust Dinefwr property and follows the 'protected route' to the east of Ysgol Bro Dinefwr and links to the A483 within Ffairfach to the south of Heol Pen Storom.	✓	✓	Partial	✓	✓	×	✓	×
BW3B	**Western Bypass Option 3 (B)** Western Bypass Option 3 (B) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west in a southern direction to the entrance to the National Trust Dinefwr property and follows the 'protected route' to the east of Ysgol Bro Dinefwr.	✓	×	×	✓	Partial	×	✓	×
BW3C	**Western Bypass Option 3 (C)** Western Bypass Option 3 (C) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west, in a southern direction to the entrance to the National Trust Dinefwr property then passes to the north of Ysgol Bro Dinefwr and links to the junction of the B4300 and A476.	✓	✓	✓	✓	✓	×	✓	×
BW4	**West of Dinefwr (East)** West of Dinefwr Bypass Option (East) leaves the A40 prior to King's Lodge, wraps around the western boundary of National Trust Dinefwr Park property, links to A476 at the junction of the A476 and B4300.	✓	Partial	Partial	✓	Partial	×	✓	×
BW5A	**West of Dinefwr (A)** West of Dinefwr Bypass Option (A) leaves the A40 near Lletty Cottage and heads south along local roads which will be upgraded between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi and links to the B4300. The route also involves an upgrade of the	✓	×	×	✓	×	×	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	B4300 and the existing junction with the A476, proposed to be a roundabout.								
BW5B	**West of Dinefwr (B)** West of Dinefwr Bypass Option (B) leaves the A40 near Lletty Cottage and heads south along local roads which will be upgraded between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi estuary and links to the B4300. The route continues south to link to the A476 at approximate NGR SN 613200.	✓	×	×	✓	×	×	✓	×
BW5C	**West of Dinefwr (C)** West of Dinefwr Bypass Option (C) leaves the A40 near Lletty Cottage, heads south, including an upgrade of local roads between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi estuary, links to the B4300 and continues south to link to the A476 at approximate NGR SN 610198 (wrapping around the boundary of Turner's wood).	✓	×	×	✓	×	×	✓	×
BW6	**Far West Route via Dryslwyn** Far West Route via Dryslwyn is located approximately 6km west of Llandeilo. The route leaves the A40 at the junction with the B4297, near Cross Inn Cottage. The B4297 will be upgraded to an A road standard single carriageway (7.3m) which passes through Felindre, Dryslwyn, Penrhiwgoch and Maesybont. The route will then connect into A476 at Castyll-y-rhingyll/The Gate to the north of Cross Hands. It should be noted that Active Travel provision for this option not specified at this point.	✓	×	×	×	×	×	×	×

9.7 Tunnel Options

Table 9-7: Tunnel Option

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
BT1	**Tunnel**	✓	✓	✓	✓	✓	✓	✓	✓

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	The tunnel is proposed from the A40 to A476 under Dinefwr Park to the east of King's Lodge.								

10. Cost Estimates

10.1 Cost Estimate Report

A Cost Estimate Report was compiled by Corderoy in June 2018, providing estimated capital costs for selected long list options. Those options which were costed were generally the shortest/least expensive within an option series, and also those elements which form part of several options. This provides sufficient information to allocate the estimated cost of each long list option, into the following bands:

Green (Low) Less than £50m

Amber (Medium) £50m to £60m

Red (High) Greater than £60m

Table 10-1: Capital Cost Estimates

Route Option	Construction Cost	**Employer's Agent &** Detailed Design	Non-Recoverable VAT	Total Coat
BE1A(1)	£56,152,573	£5,615,257	£11,539,354	£73,307,184
BE1A(2)	£61,992,466	£6,199,247	£12,739,452	£80,931,165
BE1B(1)	£36,743,488	£3,674,349	£7,899,850	£48,317,687
BE1B (2)	£42,584,387	£4,258,436	£9,115,638	£55,998,436
BE1C (1)	£43,144,023	£4,314,402	£9,362,253	£56,820,679
BE1C(2)	£48,985,387	£4,898,539	£10,629,829	£64,513,755
BE3D*	£63,024,362	£6,302,456	£10,116,495	£79,443,514
BE3D**	£61,378,362	£6,137,836	£9,782,967	£77,299,165
BE4D*	£78,600,881	£7,860,088	£12,353,923	£98,814,892
BE4D**	£76,954,680	£7,695,468	£12,020,395	£96,670,543
BW3C	£73,937,122	£7,393,712	£15,970,418	£97,301,253

* Including the cost of Option ARL1 which is required in both cases.
** Including the cost of Option ARL2 which is required in both cases.
Those options which show two versions of the cost, (1) and (2), different assumptions have been made for structure lengths.

The above costs include an allowance for the town centre options which would combine with the bypass options.

The discrete estimates for these individual Options are as follows in Table 10-2.

Table 10-2: Capital Cost Estimates of discrete elements of options

Route Option	Construction Cost	**Employer's Agent &** Detailed Design	Non-Recoverable VAT	Total Cost
BE3D	£37,550,362	£3,755,036	£4,881,547	£46,186,945

Route Option	Construction Cost	**Employer's Agent &** Detailed Design	Non-Recoverable VAT	Total Cost
BE4D	£53,126,679	£5,312,668	£7,118,975	£65,558,322
ARL1	£25,474,200	£2,547,420	£5,234,948	£33,256,568
ARL2	£23,828,000	£2,382,800	£4,901,420	£31,112,220

* Including the cost of Option ARL1 which is required in both cases.
** Including the cost of Option ARL2 which is required in both cases.
Those options which show two versions of the cost, (1) and (2), different assumptions have been made for structure lengths.

The above costs include an allowance for the town centre options which would combine with the bypass options.

The estimated costs contain costs for all known items and also contain assumptions for land purchase, unscheduled items, risk and optimism bias.

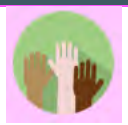
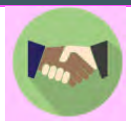
The estimated costs will be refined throughout the scheme development stages as the above aspects become known and there is less uncertainty and risk (because the details of the scheme itself is becoming better defined). The estimated costs will also be considered against quantifiable scheme benefits to establish the Benefits Cost Ration (BCR).

The report sets out assumptions, exclusions, and the allowance for risk and optimism bias. The report is in Appendix C.

11. Collaboration and Engagement

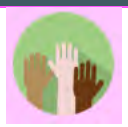
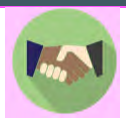
The Stakeholder Engagement Strategy would set out the key stakeholders for the A483 Llandeilo Transport Study, which would be informed by feedback from the Future Generations Commissioner to the WelTAG Stage One Report. However, in the first instance the key statutory and non-statutory organisations set out in Table 11-1 and Table 11-2 have been identified, along with details of the subject areas that they would contribute to the project teams understanding of. We have also identified which bodies or organisations would be involved with or collaborate on the design and which public bodies' Well-being Objectives need to be integrated into the project development.

Table 11-1: Statutory Bodies

Statutory Bodies	Ways of Working			Subject Areas
Carmarthenshire County Council				• Biodiversity Officer • Strategic Planning • Highways • Environmental Health • Education • Cycling Officer • Disaster Management team • Social Services (disability needs)
Brecon Beacons National Park				• Strategic Planning • Biodiversity • Landscape
Town and Community Councils				• Llandeilo Town Council • Manordeilo and Salem Community Council • Dyffryn and Cennen Community Council
Natural Resources Wales				• Flood Risk • Biodiversity • Landscape
Royal Commission on the Ancient and Historical				• Cultural heritage

Statutory Bodies	Ways of Working			Subject Areas
Monuments of Wales				
Cadw				• Cultural heritage
Network Rail				• Design implications for railway and stations
Health Organisations				• Public Health Wales • Hywel Dda Public Health Team • NHS Ambulance Trust
Dyfed Powys Police				• Community policing • Traffic policing
Mid and West Wales Fire and Rescue Services				• Design • Management of access
Welsh Government				• Network Management • Active Travel • Environmental
SWTRA				• Network Management
Future Generations Commissioner's Office				• Review of consideration of the Well-being of Future Generations (Wales) Act 2015 and the sustainability principle

Table 11-2: **Non-Statutory Organisations**

Topic Areas	Ways of Working			Non-Statutory Consultee
Ecology				• Wildlife Trust of South and West Wales • Woodland Trust • Butterfly Conservation • National Trust
Cultural Heritage				• National Trust • Dyfed Archaeological Trust
Active Travel				• Local Disability Groups • RNIB • Sustrans • Ramblers Cymru • Local walking and cycling groups • British Horse Society
Education				• Ysgol Bro Dinefwr • Llandeilo Primary School • Ysgol Gymraeg Teilo Sant • Ysgol Ffairfach
Community and other interests				• Local angling clubs (x 4) • Objector groups (as applicable)
Design Commission for Wales				• Design review at key design freeze stages

12. Conclusions

12.1 Introduction

The 41 long list options have been appraised through the WelTAG Stage One process against the following criteria:

- Their ability to prevent, or solve the problem now and in the future;
- Their ability to meet the objectives set and improve the social, cultural, environmental and economic well-being of Wales;
- Their short and longer term impacts to deliver multiple benefits across the four aspects of well-being and maximise contribution to all seven well-being goals;
- Their deliverability; and
- Their robustness to uncertainty and potential to drive long lasting change.

12.2 Short list options

On the basis of the appraisal, those options that perform best against these criteria have been recommended for further consideration at WelTAG Stage Two. These short list options are:

- TCA1 – One-way system and bypass;
- NB1 – Traffic Lights;
- NB2 - Removal of Parking;
- NB5 – HGV Restriction (legal sanction) plus one-way system;
- NB6 – Combined No-bypass Option (with HGV restriction);
- NB7 – Combined No-bypass (No HGV restriction);
- BE1A – Eastern Bypass Option;
- BE1B – Eastern Bypass Option;
- BE1C – Eastern Bypass Option;
- BE4D – Eastern Bypass Option; and
- BE6 – Eastern Bypass Option.

13. Information Required to Undertake WelTAG Stage Two

13.1 Introduction

Information regarding some of the key data requirements for WelTAG Stage Two is set out below.

13.2 Census 2011 Data

Employment Data

Employment data would identify the economic activity within the area in relation to local, regional and national areas which would inform whether there may be a large amount of journeys going to/from employment sites.

Travel to Work Data

Travel to work data will identify where residents are currently located and where they travel to for work. This data will also identify the method of journey to work to help determine the current baseline of transport movements undertaken from home to work. As a result, this information could inform which of the shortlisted options would be most suitable to reflect the proportions of travel to work methods.

13.3 Employment and Housing Allocations

Identifying proposed developments will help determine potential trips in the future and understand which routes may be used to access future development. This would help determine which of the shortlisted options would be most suitable to fulfil the potential future journeys.

13.4 Public Rights of Way

Public Rights of Way mapping will outline walking and cycling routes within Llandeilo and Ffairfach and could be used to identify whether any of the potential shortlisted options may segregate the community. It is recommended that any shortlisted option would not increase severance within Llandeilo and Ffairfach.

13.5 Tourism

It is recommended for specialist advise to be sourced which will investigate each shortlisted option and whether it could impact on tourism in Llandeilo and Ffairfach, particularly in Llandeilo's town centre and Dinefwr Park.

13.6 Traffic Data

In order to accurately predict the benefits of a scheme it is important to gain an accurate understanding of traffic volumes and trip patterns. Therefore, it is recommended that an extensive data collection programme is undertaken across Llandeilo and Ffairfach including but not necessarily limited to:

- Automatic traffic counters at regular intervals long the A483;
- Manual classified turning counts at key junctions in the area;
- Automatic Number Plate recognition surveys;
- Wi-fi, Bluetooth or Mobile Phone data;
- Video surveys of pinch points on the network including by the Cawdor Hotel;
- Parking beat and dwell time surveys;

- Pedestrian footfall surveys across Llandeilo town centre; and
- Roadside interviews.

13.7 Traffic Model

The assessment of traffic in Stage One has solely been based on two sets of available data. Therefore, to gain a true representation of baseline conditions and hence a more accurate prediction of the benefits of any intervention, a detailed traffic model should be built of Llandeilo, Ffairfach and its surrounding area.

Use of a formal traffic model will allow a detailed appraisal of the economic impacts of the shortlisted options.

13.8 Geotechnical and Topographical data

In order to inform the highways engineering requirements of any options to construct a bypass geotechnical and topographical data would be required.

13.9 Accident Data

The accident data used in the Stage One report indicates that there are a number of locations in Llandeilo and Ffairfach where there are clusters of accidents. A more detailed assessment of full Stats19 data should be obtained from the Police, with full contributory factors to allow further investigation of injury accidents and their economic and social cost. This should also be supported by non-motorised user audits as a number of the accidents involved pedestrians.

13.10 Environmental Data

Environmental surveys are necessary in order to assess the potential effects of the scheme upon the local environment and receptors and provide a robust environmental assessment of the existing conditions of the study area surrounding the shortlisted options. The results of these surveys will inform detailed design and reduce environmental impacts through refinement of the design and mitigation.

The following environmental surveys may be required to be undertaken at Stage 2:

- Ecology surveys:
  - Phase 1;
  - Dormouse;
  - Great crested newt;
  - Bat;
  - Badger;
  - Otter;
  - Water vole;
  - Breeding bird;
  - Invertebrate;
  - Hedgerow;
- Landscape;
- Heritage;
- Noise baseline surveys; and,
- Water environment.

13.11 Cost Estimate Information

In future stages, when more information is available regarding the environmental constraints that would require mitigation and the engineering requirements associated with each option, the estimated costs of each of the short-list options can be upated.

14. Data Store

The sources of data used within this Stage One appraisal are as follows:

- Carmarthenshire County Council - Bus timetables https://www.carmarthenshire.gov.wales/home/council-services/travel-roads-parking/bus-services/bus-timetables/#
- Carmarthenshire County Council – Local Development Plan (2014)
- CH2M - A483 Llandeilo Eastern Bypass, Review and Cost Estimate Report (February 2016)
- Environmental (Wales) Act 2016
- Google Maps (2018)
- Jacobs - Report on Public Workshop and Consultation (March 2007)
- Jacobs Babtie - Planning Objectives and Pre-Appraisal Report (November 2005)
- Office of Rail and Road Estimates of Station Usage 2015-2016 www.orr.gov.uk/statistics/published-stats/station-usage-estimates
- Ordnance Survey Data (2018)
- South Wales Trunk Road Agent – 2014 and 2017 Traffic Flow and Classification Data
- South Wales Trunk Road Agent – Traffic Regulation Orders
- South West Wales - Joint Transport Plan for South West Wales 2015-2020
- Welsh Assembly Government - One Wales: Connecting the Nation: Wales Transport Strategy
- Welsh Assembly Government - The Wales Spatial Plan (2008)
- Welsh Government - Accident Data (2012 – 2016)
- Welsh Government - National Transport Finance Plan 2017 Update
- Welsh Government - Prosperity for All: Economic Action Plan
- Welsh Government - Prosperity for All: The National Strategy
- Welsh Government - Revised Well-being Objectives – Prosperity for All: The National Strategy
- Welsh Government - Taking Wales Forward: The Welsh Government's Well-being Objectives
- Welsh Government - The Active Travel (Wales) Act 2013
- Welsh Government - Well-being of Future Generations (Wales) Act 2015
- Welsh Government - WelTAG 2017 Guidance

Appendix A. Appraisal Tables

A summary of the appraisal of each option is provided below. The tables show the summarised option appraisal and states the extent to which the option fulfils the scheme specific objectives set out in section 8 of this report. This option appraisal has not been assessed against the Well-being Objectives of Natural Resources Wales, Public Health Wales or Carmarthenshire County Council at this stage. Short-listed options will be assessed against these at WelTAG Stage 2, it is considered unlikely that any contribution to these third party well-being objectives would be a determining factor in identifying an appropriate short-list of options.

Each option was considered against the Welsh Government's Well-being Objectives set out in Prosperity for All: A National Strategy, with particular reference to 'United and Connected' Well-being Objectives at this stage.

Appendix A. Long List Summary Appraisal Tables

The 41 options which are included in Appendix A are outlined below, followed by detailed tables:

- Do-Minimum;
- NB1 – Traffic Lights;
- NB2 – Removal of Parking;
- NB3 – HGV Restriction (legal sanction);
- NB4 – HGV Restriction with permit/emissions charge;
- NB5 – HGV Restriction (legal sanction) plus one-way system;
- NB6 – Combined No-bypass Option (with HGV restriction);
- NB7 – Combined No-bypass Option (No HGV restriction);
- TC1A – One Way System and a Bypass Option (A);
- TC1B – One Way System and a Bypass Option (B);
- TC1C – One Way System and a Bypass Option (C);
- TC2 – Traffic Light System and a Bypass Option;
- BE1A – Eastern Bypass Option 1 (A);
- BE1B – Eastern Bypass Option 1 (B);
- BE1C – Eastern Bypass Option 1 (C);
- BE1D – Eastern Bypass Option 1 (D);
- BE2 – Eastern Bypass Option 2;
- BE3A – Eastern Bypass Option 3 (A);
- BE3B – Eastern Bypass Option 3 (B);
- BE3C – Eastern Bypass Option 3 (C);
- BE3D – Eastern Bypass Option 3 (D);
- BE4A – Mid Rhosmaen Eastern Bypass Option 4 (A);
- BE4B – Mid Rhosmaen Eastern Bypass Option 4 (B);
- BE4C – Mid Rhosmaen Eastern Bypass Option 4 (C);
- BE4D – Mid Rhosmaen Eastern Bypass Option 4 (D);
- BE5A – Far Eastern Route 5 (A);
- BE5B – Far Eastern Route 5 (B);
- BE6 – Option formerly known as the Refined Protected Route;
- ARL1 – A Road Link (1);
- ARL2 – A Road Link (2);
- BW1 – Western Bypass Option 1;
- BW2 – Western Bypass Option 2;
- BW3A – Western Bypass Option 3 (A);
- BW3B – Western Bypass Option 3 (B);
- BW3C – Western Bypass Option 3 (C);

- BW4 – West of Dinefwr (East);
- BW5A – West of Dinefwr (A);
- BW5B – West of Dinefwr (B);
- BW5C – West of Dinefwr (C);
- BW6 – Far West Route via Dryslwyn; and
- BT1 – Tunnel.

Do-Minimum

Description

The Do-Minimum option does not include any improvements to the current scenario of the A483 within Llandeilo and Ffairfach.

Location

Not applicable.

How it tackles the problem

The Do-Minimum Option would not solve problems within Llandeilo and Ffairfach as it anticipated that traffic flows will continue to increase, HGVs would still use the A483 trunk road and thus congestion at the pinch point within Llandeilo would worsen. As a result of this, the air quality within the AQMA is likely to increase.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	×	×	×	×	×	×	×

The Do-Minimum option would only meet objection 1 of preserving the strategic function of the A483.

Appraisal

Economy and Social and Cultural

As the A483 and surrounding road network will be unaltered, it is envisioned that traffic flows and have an adverse impact on current congestion issues, particularly at the pinch point in front of the Cawdor within Llandeilo. The appraisal of Economics and Social and Cultural impacts has therefore identified that this option will have a negative affect across all appraisal areas. Congestion issues at the A483/A476/Heol Bethlehem roundabout within Ffairfach will also escalate and larger volumes of vehicles could make the roundabout more dangerous for pedestrians/cyclists crossing adjoining arms. It is also anticipated that the increase in traffic flows would result in a higher percentage of HGVs using the A483 trunk road as well. As this is an identified area of concern, the Do-Minimum Scenario could have a large adverse image on safety within Llandeilo and Ffairfach. As a result, physical activity could experience an adverse impact as well as active travel.

Environment

A neutral effect is anticipated on biodiversity, soils and geology, landscape and the water environment. An adverse effect is anticipated to noise due to increasing congestion and idling vehicles immediately alongside residential areas. An adverse effect is anticipated to air quality as there is the potential for air quality to continue to worsen in this area as traffic flows increase within Llandeilo/Ffairfach. Adverse effects are anticipated to townscape and cultural heritage due to effects that increasing traffic flows would have within a Conservation Area and alongside listed buildings.

Who the Option impacts on

It is expected that there would be a slight adverse impact upon Journey time changes/reliability changes. Furthermore, it is anticipated that there would be a slight adverse impact upon Local Air Quality, Noise, Landscape and Townscape and Cultural Heritage. It is also expected that there will be a slight adverse impact upon Physical activity, Journey quality, Accidents, Access to employment/services, severance and Active Travel.

NB1 – Traffic Lights

Description

Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.

Location

How it tackles the problem

NB1 would improve journey time reliability due to providing traffic lights that would improve flows through the pinch points within Llandeilo. Pedestrian safety would also improve as result of the widening of the pavements.

This option would contribute to the Welsh Government achieving its Well-being Objectives and would help deliver some of the long-term outcomes set out in the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	Partial	×	×	✓	✓	×	Partial	×

This option fulfils the objectives of improving pedestrian and cyclist safety within Llandeilo and Ffairfach and reducing congestion through Llandeilo. However, it only partially meets objectives 1 and 7 and does not achieve objectives 2, 3, 6 or 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial, there are some slight negative results within the appraisal such as journey

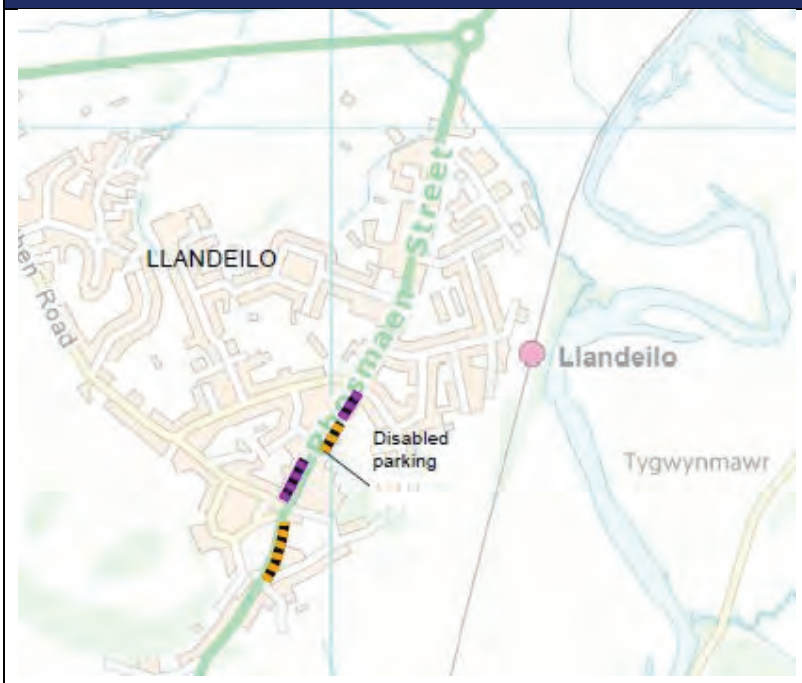
time changes, journey quality and severance. This reflects the nature of a traffic light system and potential time restraints within the traffic light signals as well as queuing.
Environment
It is anticipated that there would be a neutral effect upon biodiversity, noise, the water environment and soils and geology. Furthermore, it's predicted that there would be a slight beneficial effect on local air quality and to landscape and townscape and the historic environment.
Who the option impacts on
Some road users may dis-benefit from this option due to potential queuing from the proposed traffic lights in Llandeilo town Centre increasing severance and idling vehicles decreasing air quality. However, pedestrians would benefit due to the widening of pavements, this may also improve visitor experience which will benefit some businesses within Llandeilo and Dinefwr Park.

NB2 – Removal of Parking

Description

Removal of parking along Rhosmaen Street enforced through double yellow lines. Restrictions of 'Loading Only' from 18:00 to 07:00, and then from 10:00 – 15:00 with no parking between 08:00 – 18:00 will be enforced.

Location



How it tackles the problem

NB2 may reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. It is also anticipated that vehicle speeds/acceleration on the A483 would reduce due to the reduction in parked vehicles. There would be a slight beneficial effect on air quality within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and would help deliver some of the long-term outcomes set out in the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	Partial	×	×	✓	✓	×	Partial	×

This option fulfils the objectives of improving pedestrian and cyclist safety within Llandeilo and Ffairfach and reducing congestion through Llandeilo. However, it only partially meets objectives 1 and 7 and does not achieve objectives 2, 3, 6 or 8.

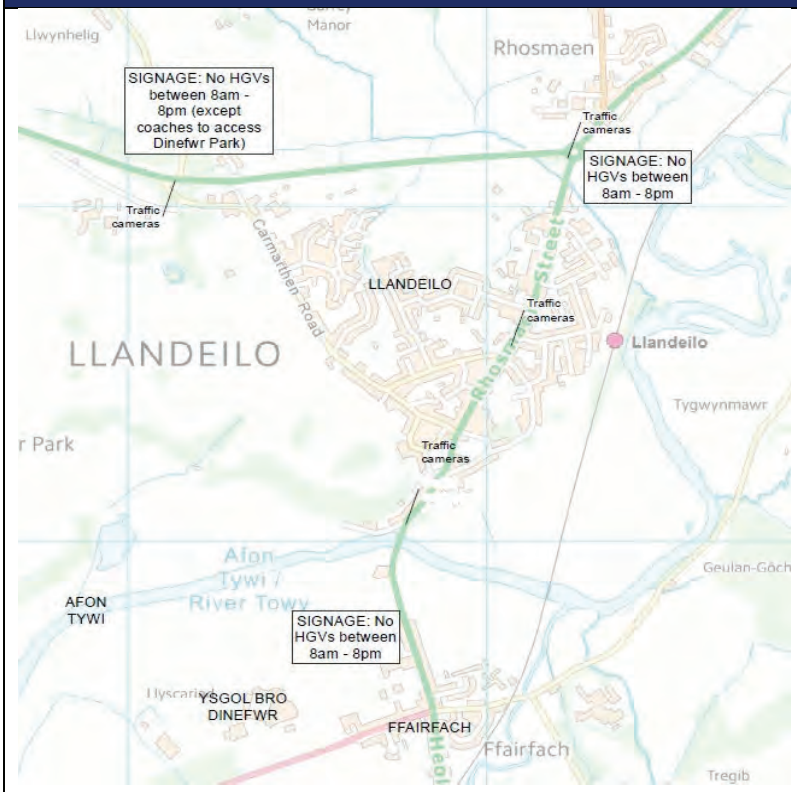
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option has a slight beneficial across the majority of the appraisal areas with some areas having a negligible impact such as local economy, security and access to employment and services.
Environment
It is anticipated that there would be a neutral effect upon biodiversity, noise, the water environment and soils and geology. Furthermore, it's predicted that there would be a slight beneficial effect on local air quality and to landscape and townscape and the historic environment.
Who the option impacts on
All road users might slightly benefit from this option however; the local economy may dis-benefit due to the removal of parking. The removal of parking with this option has a predicted slight beneficial effect on local air quality. Walkers and cyclists within Llandeilo town Centre may also benefit due to the reduction of parked vehicles along Rhosmaen Street.

NB3 – HGV Restriction (legal sanction)

Description

Restriction on HGVs through Llandeilo between 08:00 – 20:00, all HGVs to be routed along the A40 to Carmarthen which will be enforced through traffic cameras. This restriction will apply from the A40 roundabout within Rhosmaen to the roundabout within Ffairfach.

Location



How it tackles the problem

NB3 would reduce severance along the A483/Rhosmaen Street for pedestrians as traffic movements would be reduced. It would also improve journey reliability during the day when HGV movements are restricted as it would reduce the number of large vehicle pinch point delays. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journeys should decrease. Further to this, emergency service response times (on call) should improve due to a reduction in HGV traffic using Rhosmaen Street that can cause delays as a result of negotiating pinch points. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and would help deliver some of the long-term outcomes set out in the Wales Transport Strategy.

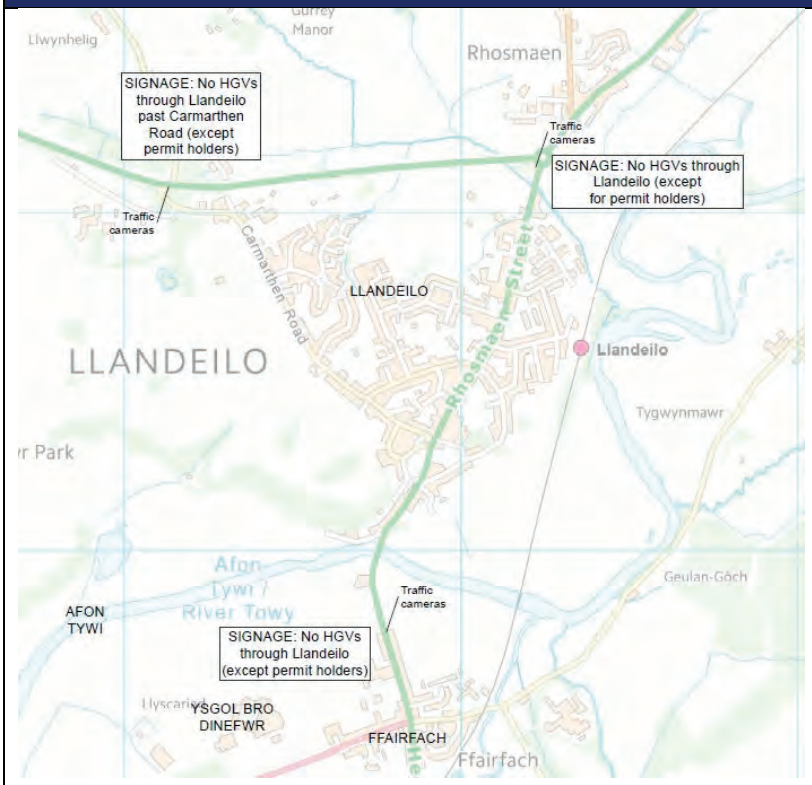
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	×	✓	✓	✓	✓	×	✓	×
This option does not preserve the strategic function of the A483, contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society. It does however improve pedestrian and cyclist safety within Llandeilo and Ffairfach, reduce community severance, improve journey time reliability, reduce congestion through Llandeilo and reduces the exposure to air pollution for sensitive receptors.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial across the appraisal areas, journey time changes and journey time reliability changes have a slight negative impact however.								
Environment								
It is anticipated that there would be a neutral effect upon biodiversity, noise, the water environment and soils and geology. In regards to air quality it is anticipated that this option would have a moderate beneficial impact. It has also been predicted that this option would have a slight beneficial impact on landscape and townscape and the historic environment.								
Who the option impacts on								
Heavy vehicles users may dis-benefit from this option due to a HGV restriction along the A483. There would however be a beneficial impact for residential properties and businesses situated along the A483 as air quality would improve due to the HGV restriction. Walkers and cyclists would benefit the most within Llandeilo's town Centre due to the reduction of HGVs during certain hours of the day.								

NB4 – HGV Restriction with permit/emissions charge

Description

Restriction on HGVs with the exception of businesses within a certain distance which would be entitled to a free permit. The permit for other businesses will be priced at a cost that makes it more economically viable to go via Carmarthen rather than through Llandeilo and/or Ffairfach. This option would be a similar scheme to congestion charge/emission zone areas.

Location



How it tackles the problem

NB4 would reduce severance along the A483/Rhosmaen Street within Llandeilo due to the removal of the majority of HGV movements through the town. It would also improve journey reliability for car drivers through Llandeilo as delays at pinch points would be reduced. While journey time reliability for HGV drivers is likely to improve there would be a significant increase in journey time, therefore this cannot be seen as an advantage to these road users. This option would not preserve the strategic road network through Llandeilo due to the HGV restrictions. It would result in an improvement in air quality as a result of the reduction in HGV emissions and also reduce the amount of start / stop acceleration for other road users.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	×	✓	✓	×	✓	×	✓	×

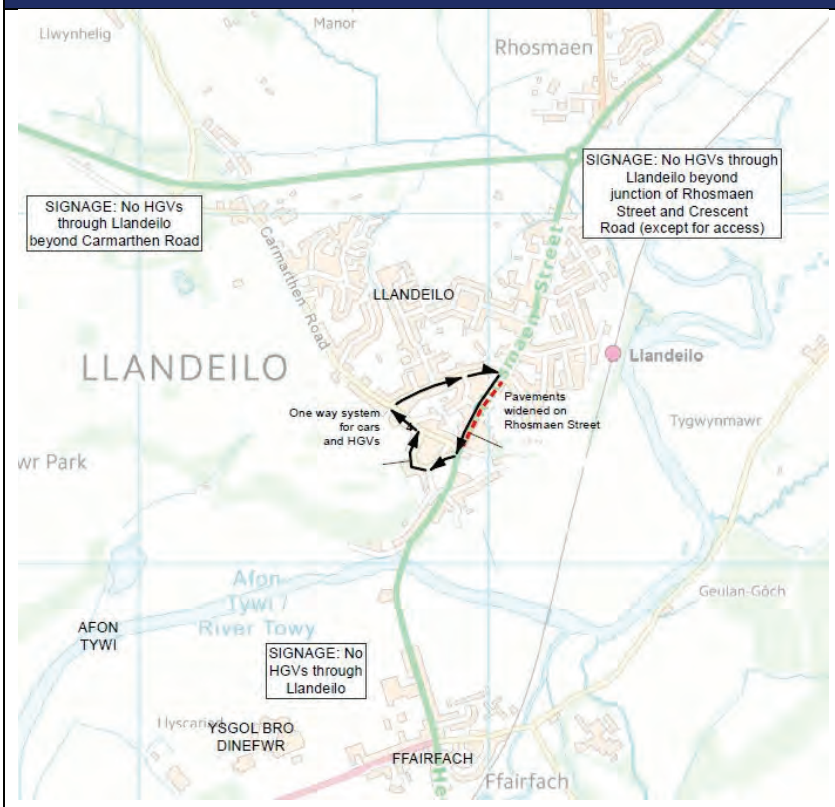
This option would not preserve the strategic function of the A483 or improve journey time reliability through Llandeilo and Ffairfach. Additionally, the option would not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial across the appraisal areas, journey time changes and journey time reliability changes have a slight negative impact however.
Environment
It is anticipated that there would be a neutral effect upon biodiversity, noise, the water environment and soils and geology. This option would have a moderate beneficial impact on air quality. It has also been predicted that this option would have a slight beneficial impact on landscape and townscape and the historic environment.
Who the option impacts on
Heavy vehicle users would dis-benefit from this option however, this would have a positive impact on residential properties and businesses. As a result of the reduction in HGVs in the town Centre there would be an improvement in air quality. Walkers and cyclists would also benefit due to the reduction of HGVs and the improvement to the walking environment.

NB5 – HGV Restriction (legal sanction) plus one-way system

Description

One-way system where there would be limited access for HGVs travelling southbound from the A40 onto the A483, with access permitted for deliveries only. Rhosmaen Street would be one-way southbound, and directed to King Street onto Carmarthen Road and back onto the A40. HGVs would be restricted from crossing Llandeilo Bridge crossing the Afon Tywi in a northbound direction and the A483 will be de-trunked**.**

Location



How it tackles the problem

NB5 may reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and would help deliver some of the long-term outcomes set out in the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	×	✓	✓	×	✓	×	✓	×

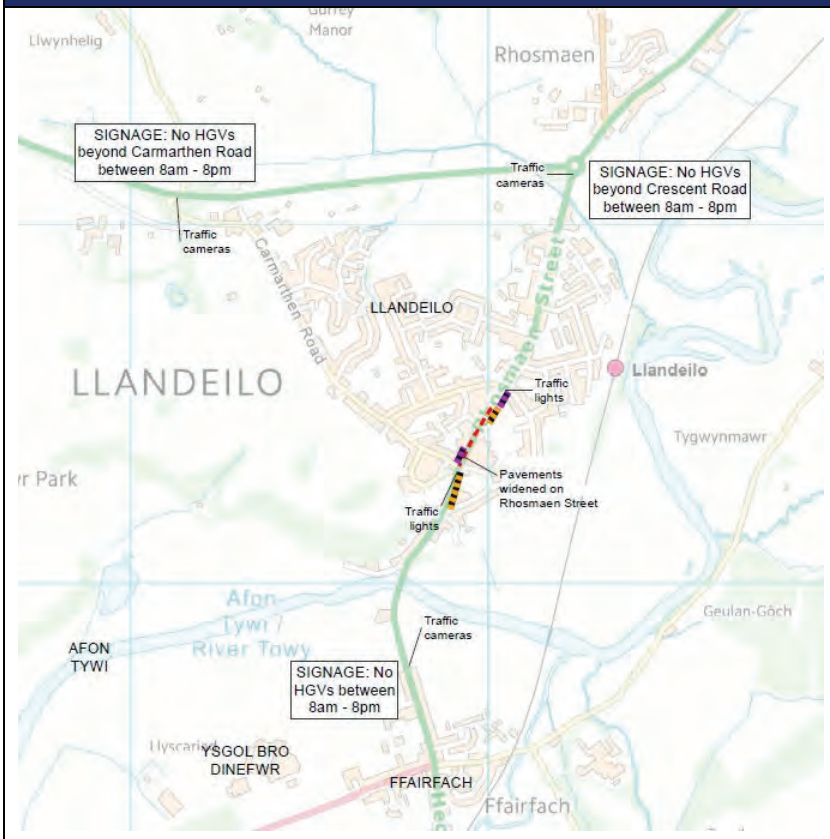
This option would not preserve the strategic function of the A483 or improve journey time reliability through Llandeilo and Ffairfach. Additionally, the option would not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial across the appraisal areas, journey time changes and journey time reliability changes have a slight negative impact however.
Environment
It is anticipated that there would be a neutral impact upon biodiversity, noise, the water environment and soils and geology. This option would have a moderate beneficial impact on air quality. It has also been predicted that this option would have a slight beneficial impact on landscape and townscape and the historic environment.
Who the option impacts on
Heavy vehicle users may dis-benefit from this option however this would have a slight beneficial impact on residential properties and businesses located along the A483 in terms of noise and local air quality. Walkers and cyclists would also benefit from this option due to the reduced volume of HGVs using the A483.

NB6 – Combined No-bypass Option (with HGV restriction)

Description

This option is a package of works representing a combination of NB1, NB2 and NB3.

Location



How it tackles the problem

NB6 would improve journey time reliability due to providing a direct, free-flow route (albeit with lights) which would reduce the pinch points within Llandeilo/Ffairfach. Pedestrian safety would also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease. It is also anticipated that vehicle speeds/acceleration on the A483 would reduce due to the reduction in parked vehicles.NB6 would reduce severance along the A483/Rhosmaen Street. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to Welsh Government achieving its Well-being Objectives and help deliver some of the long term outcomes set out in the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	×	✓	✓	×	✓	×	✓	×

This option would not preserve the strategic function of the A483 or improve journey time reliability through Llandeilo and Ffairfach. Additionally, the option would not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial across all appraisal areas.
Environment
It is anticipated that there would be a neutral effect upon biodiversity, noise, the water environment and soils and geology. This option would have a moderate beneficial impact on air quality. It has also been predicted that this option would have a slight beneficial impact on to landscape and townscape and the historic environment.
Who the option impacts on
Light and heavy vehicle users could dis-benefit from this option however, as a result of this it is anticipated that there would be a slight beneficial effect on residential properties and businesses along the A483 in regard to air quality. Walkers and cyclists would probably benefit the most from this option due to the widening of the pavements and reduction of HGVs in the town Centre.

NB7 – Combined No-bypass Option (No HGV restriction)

Description

This option is a package of works representing a combination of NB1 and NB2.

Location

How it tackles the problem

NB7 may reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. It is also anticipated that vehicle speeds/acceleration on the A483 would reduce due to the reduction in parked vehicles. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of the long term outcomes set out in the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	✓	✓	✓	×	✓	×	✓	×

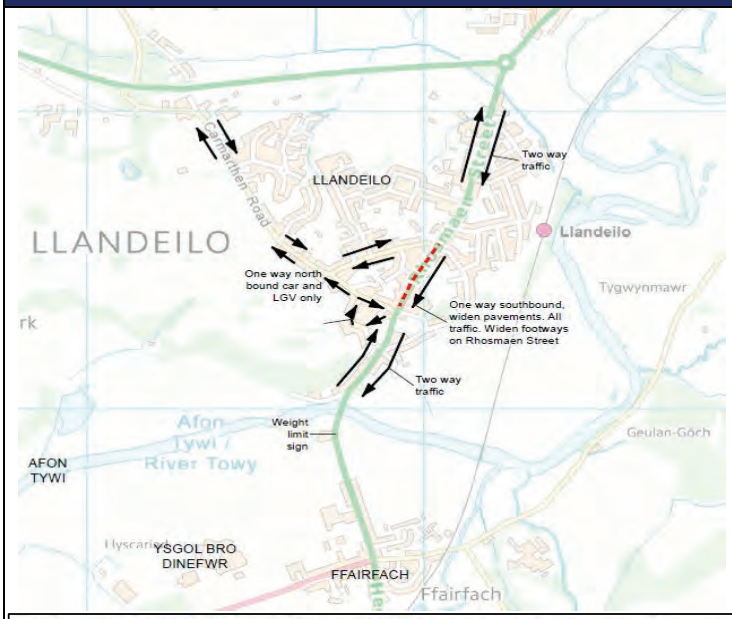
This option fulfils the majority of the objectives. It does not however improve journey time reliability through Llandeilo and Ffairfach, contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial, with a higher score for social and cultural appraisal and a slightly lower score for economic appraisal.
Environment
It is anticipated that there would be a neutral effect upon biodiversity, noise, the water environment and soils and geology. This option would have a moderate beneficial impact on air quality. It has also been predicted that this option would have a slight beneficial impact on landscape and townscape and the historic environment.
Who the option impacts on
It is anticipated that there would be a slight adverse impact on light and heavy vehicle users. However, as a result of this, it is anticipated that there will be a slight beneficial effect on residential properties and businesses in terms of local air quality. Walkers and cyclists would most benefit from this option due to the widening of the footways and the reduction of HGVs in the town Centre.

TC1A – One Way System and a Bypass Option (A)

Description

Town Centre routing restrictions will be installed. Two-way traffic will remain from the junction of A40 and junction of New Road/Carmarthen Street. New Road to remain open to two-way traffic. Rhosmaen Street from New Road/Crescent Road junction to Carmarthen Street and Abbey Terrace changed to one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout is weight restricted. Permitted traffic going north would turn left into King Street then George Street, then onto Carmarthen Street/Carmarthen Road to join the A40 at the existing junction with a potential roundabout. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi.

Location



How it tackles the problem

It should be noted that option TC1A is dependent on the construction of a bypass, the bypass would remove through traffic and improve the resilience of the trunk road network. The following assessment assumes that the bypass option chosen would result in the intended benefits of the removal of through traffic and that the existing through traffic flows would divert onto the bypass and not continue to flow through the town.TC1A would reduce severance for pedestrians along the A483/Rhosmaen Street within Llandeilo but there would be a slight increase in severance on Carmarthen Road as northbound traffic is re-routed. Pedestrian safety would also improve as well as the cycling environment, the improvement to the streetscape for visitors may result in increased numbers of people shopping in the town and should make the town more attractive for people who pass through it on the way to Dinefwr Park. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and support the outcomes of the Wales Transport Strategy.

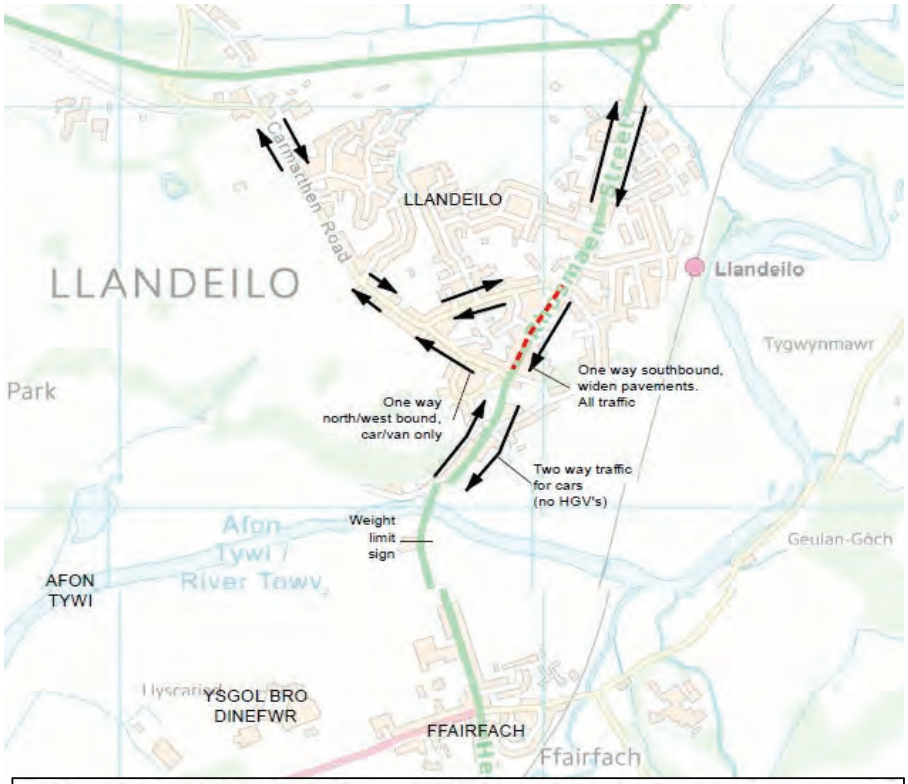
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	✓	✓	✓	Partial	Partial	✓	×	×
This option fulfils the majority of the objectives; however, it does not reduce exposure to air pollution for sensitive receptors or support the transition to a low carbon society. Further to this, the option partially meets the objectives of improving journey time reliability through Llandeilo and Ffairfach as well as reducing congestion within Ffairfach.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option has a benefit across the majority of the appraisal areas, varying from slight to moderate beneficial with a negligible impact on security, access to employment and access to services and affordability. The option scores positively for both journey time changes and journey time reliability changes.								
Environment								
A neutral effect is anticipated upon biodiversity, noise, the water environment and soils and geology. Further to this, a slight beneficial effect is anticipated to landscape and townscape and the historic environment. Additionally, a moderate beneficial effect is anticipated on local air quality.								
Who the Option impacts on								
All road users should experience benefits with this option with businesses in Llandeilo's town Centre and Dinefwr Park also benefiting as the widening of pavements in the town Centre should improve visitor experience.								

TC1B – One Way System and a Bypass Option (B)

Description

Two-way traffic from the junction of A40 and junction of New Road/Carmarthen Street. New Road to remain open to two-way traffic. Rhosmaen Street from New Road/Crescent Road junction to Carmarthen Street and Abbey Terrace is one way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout is weight restricted. Permitted traffic going north would turn left into Carmarthen Street then Carmarthen Road to join the A40 at the existing junction with a possible roundabout. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi.

Location



How it tackles the problem

It should be noted that option TC1B is dependent on the construction of a bypass.TC1B would reduce severance for pedestrians along the A483/Rhosmaen Street within Llandeilo but there would be a slight increase in severance on Carmarthen Road as northbound traffic is re-routed. Pedestrian safety would also improve as well as the cycling environment, the improvement to the streetscape for visitors may result in increased numbers of people shopping in the town and should make the town more attractive for people who pass through it on the way to Dinefwr Park. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and support the outcomes of the Wales Transport Strategy.

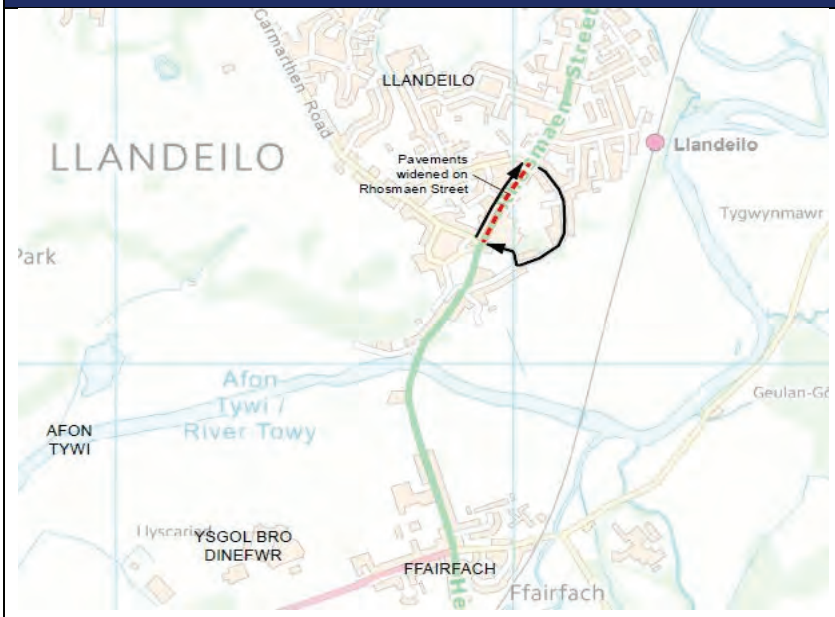
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	Partial	Partial	✓	x	x
This option fulfils the majority of the objectives; however, it does not reduce exposure to air pollution for sensitive receptors or support the transition to a low carbon society. Further to this, the option partially meets the objectives of improving journey time reliability through Llandeilo and Ffairfach as well as reducing congestion within Ffairfach.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option has a benefit across the majority of the appraisal areas, varying from slight to moderate beneficial with a negligible impact on security, access to employment and access to services and affordability. The option scores positively for both journey time changes and journey time reliability changes.								
Environment								
A neutral effect is anticipated upon biodiversity, noise, the water environment and soils and geology. Also there is a moderate beneficial effect is anticipated on local air quality. Further to this there is a slight beneficial effect is anticipated to landscape and townscape and the historic environment.								
Who the Option impacts on								
All road users should experience benefits with this option with businesses in Llandeilo's town Centre and Dinefwr Park also benefiting as the widening of pavements in the town Centre should improve visitor experience.								

TC1C – One Way System and a Bypass Option (C)

Description

One-way system using Crescent Road for southbound traffic and Rhosmaen Street for northbound traffic. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.

Location



How it tackles the problem

It should be noted that option TC1C is dependent on the construction of a bypass, the bypass would remove through traffic and improve the resilience of the trunk road network. The following assessment assumes that the bypass option chosen would result in the intended benefits of the removal of through traffic and that the existing through traffic flows would divert onto the bypass and not continue to flow through the town. TC1C would reduce severance for pedestrians along the A483/Rhosmaen Street within Llandeilo but there would be a slight increase in severance on Crescent Road as northbound traffic is re-routed. Pedestrian safety would also improve as well as the cycling environment, the improvement to the streetscape for visitors may result in increased numbers of people shopping in the town and should make the town more attractive for people who pass through it on the way to Dinefwr Park. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and support the outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	✓	✓	✓	Partial	Partial	✓	x	x

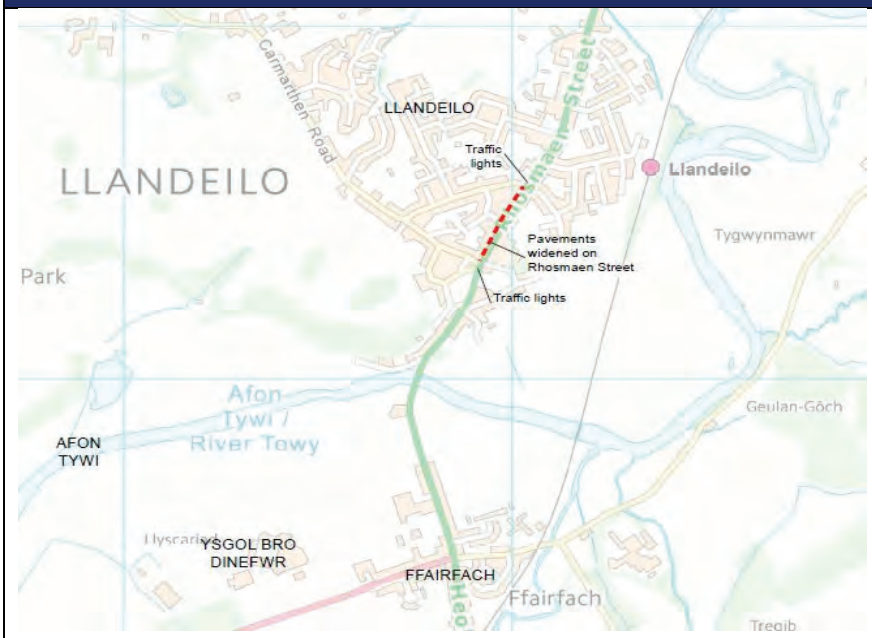
This option fulfils the majority of the objectives; however, it does not reduce exposure to air pollution for sensitive receptors or support the transition to a low carbon society. Further to this, the option partially meets the objectives of improving journey time reliability through Llandeilo and Ffairfach as well as reducing congestion within Ffairfach.
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option has a benefit across the majority of the appraisal areas, varying from slight to moderate beneficial with a negligible impact on security, access to employment and access to services and affordability. The option scores positively for both journey time changes and journey time reliability changes.
Environment
A neutral effect is anticipated upon biodiversity, noise, the water environment and soils and geology due. Further to this, a slight beneficial effect is anticipated for the landscape and townscape and the historic environment. Furthermore, there is a moderate beneficial effect anticipated on local air quality.
Who the Option impacts on
The local economy within Llandeilo's town Centre, including businesses, and Dinefwr Park should experience a positive impact with this option. Further to this, walkers and cyclists within Llandeilo's town Centre should experience a benefit due to proposed improvements within the town.

TC2 – Traffic Light System and a Bypass Option

Description

Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.

Location



How it tackles the problem

It should be noted that option TC2 is dependent on the construction of a bypass, the bypass would remove through traffic and improve the resilience of the trunk road network. The following assessment assumes that the bypass option chosen would result in the intended benefits of the removal of through traffic and that the existing through traffic flows would divert onto the bypass and not continue to flow through the town. TC2 would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the bypass option selected) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach (albeit with traffic lights for a short section of Rhosmaen Street). Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA

This option would contribute to the Welsh Government achieving its Well-being Objectives and support the outcomes of the Wales Transport Strategy.

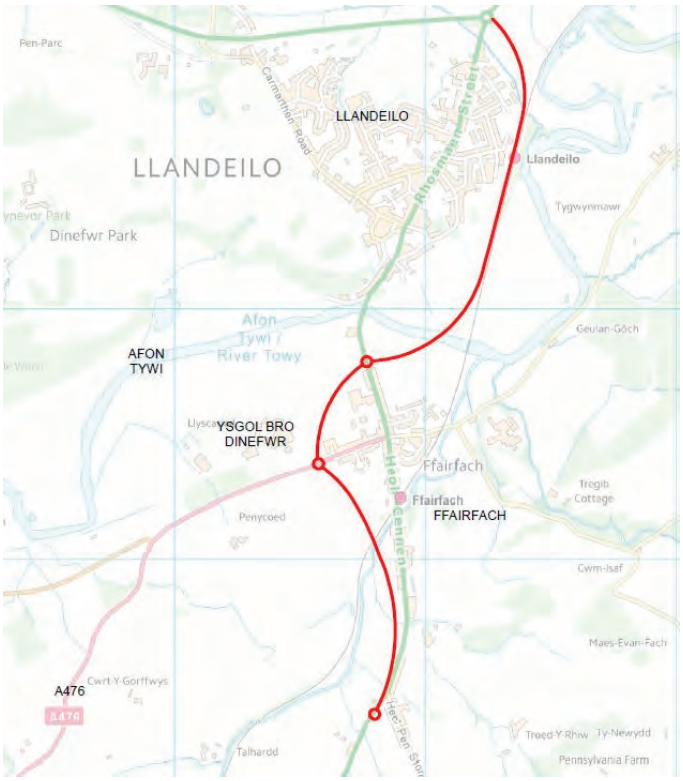
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	✓	×	×	×	×	✓	×	×
The majority of the objectives are not fulfilled with this option. It does however preserve the strategic function of the A483 and contribute to economic growth and tourism opportunities in Llandeilo.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall score of slight beneficial, there are some slight negative results within the appraisal such as journey time changes and journey quality. This reflects the nature of a traffic light system and potential time restraints within the traffic light signals as well as queuing.								
Environment								
A neutral effect is anticipated upon biodiversity, noise, the water environment and soils and geology. Also there is an anticipated slight beneficial effect to landscape and townscape and the historic environment. Furthermore, there is a moderate beneficial effect predicted for the local air quality.								
Who the Option impacts on								
All road users (light and heavy vehicles as well as bicycles) may benefit from the reduction in journey time changes with this bypass option. However, some users of the Rhosmaen Street may experience an increase in journey time changes due to the traffic light system. Businesses within Llandeilo town Centre and Dinefwr Park should also benefit.								

BE1A – Eastern Bypass Option 1 (A)

Description

Eastern Bypass Option 1 (A) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west, crossing the Afon Tywi then joins the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then heads further west and joins the A476 to the east of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed on the A476 where the route then heads south east and joins the A483 to the south of Heol Pen Storom.

Location



How it tackles the problem

BE1A would improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety within Llandeilo and Ffairfach and may promote visitors as the number of through-traffic journey should decrease with a bypass in place.

HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in

traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route.

This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	Partial	Partial	✓	✓	✓	✓	✓

This option fulfils scheme objectives 1, 4, 5, 6, 7 and 8, and partially meets scheme objectives 2 and 3.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores either beneficial or negligible across the assessment areas other than severance which scores moderate negative impact.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to large reduction of vehicle movements. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of a designated water feature and loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, local views and views from Brecon Beacons National Park.

Who the Option impacts on

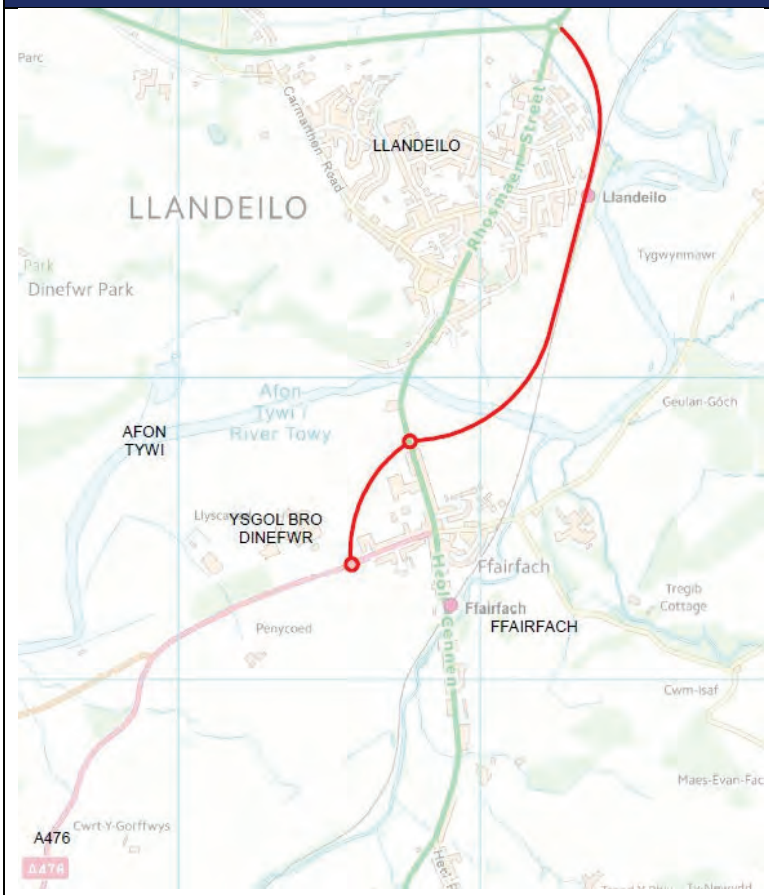
All road users are expected to have a moderate beneficial effect in relation to Journey times and Journey time reliability. The Local economy in Llandeilo's Town Centre is expected to have a slight benefit. A moderate beneficial impact is predicted in relation to Local Air Quality. Walkers and Cyclists are expected to benefit most as a reduction in vehicles using Rhosmaen street.

BE1B – Eastern Bypass Option 1 (B)

Description

Eastern Bypass Option 1 (B) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line, heading west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge.

Location



How it tackles the problem

BE1B would improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety would also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey would decrease with a bypass in place. HGV and school traffic would also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) would improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

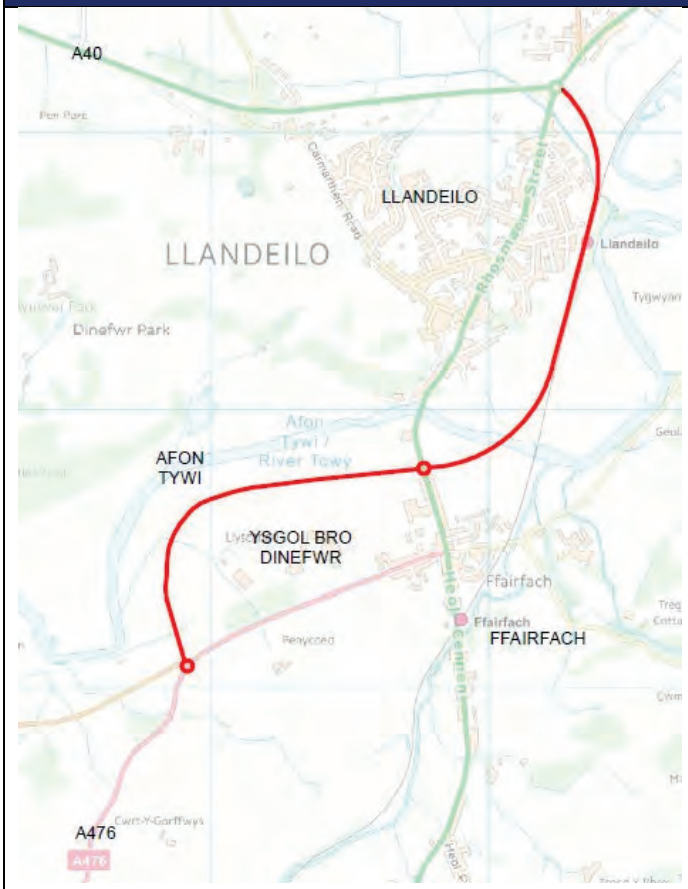
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x								
This option fulfils all scheme objectives.								
Appraisal								
Economy and Social and Cultural								
The majority of the appraisal areas for this option of Economics and Social and Cultural impacts score either beneficial or negligible with the exception of severance which scores slight negative.								
Environment								
A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a reduction of vehicle movements. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of two designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, local views and views from Brecon Beacons National Park.								
Who the option impacts on								
It anticipated a moderate beneficial impact upon Journey time and journey reliability for all road users. There is a slight beneficial impact upon the local economy and the local air quality. It is expected that there would be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. Furthermore, it is expected that there would be a slight beneficial impact on Active travel, Access to services and employment as well as on Accidents in the area.								

BE1C – Eastern Bypass Option 1 (C)

Description

Eastern Bypass Option 1 (C) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then heads further west and joins the A476 to the west of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed at the junction of the B4300/A476.

Location



How it tackles the problem

BE1C would improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety within the town would also improve as a result of the improvements in road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic within the town would also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or

emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	✓

This option fulfils all scheme objectives.

Appraisal

Economy and Social and Cultural

The majority of the appraisal areas for this option of Economics and Social and Cultural impacts score either slight beneficial or negligible with the exception of severance which scores slight negative.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a reduction of vehicle movements. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, local views and views from Brecon Beacons National Park.

Who the option impacts on

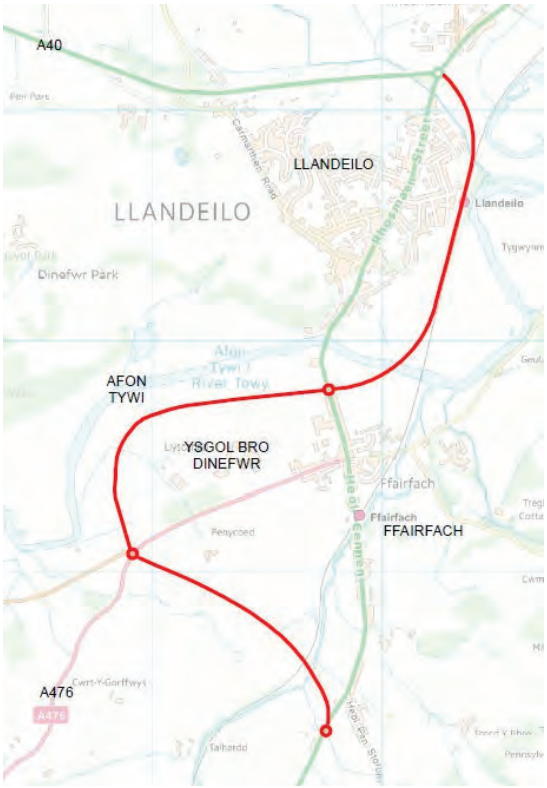
It is expected that there will be a slight beneficial impact on Journey time changes/reliability and also on the local economy. There is also a slight beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, Journey quality, accidents and access to employment and services.

BE1D – Eastern Bypass Option 1 (D)

Description

Eastern Bypass Option 1 (D) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then heads further west and joins the A476 to the west of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed at the junction of the B4300/A476 and a link from the proposed roundabout at B4300/A476 to the A483 south of Heol Pen Storom.

Location



How it tackles the problem

BE1D would reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. The bypass would remove through traffic from the A476 as it passes the entrance to Ysgol Bro Dinefwr. This option would result in a reduction in air pollution within the AQMA.

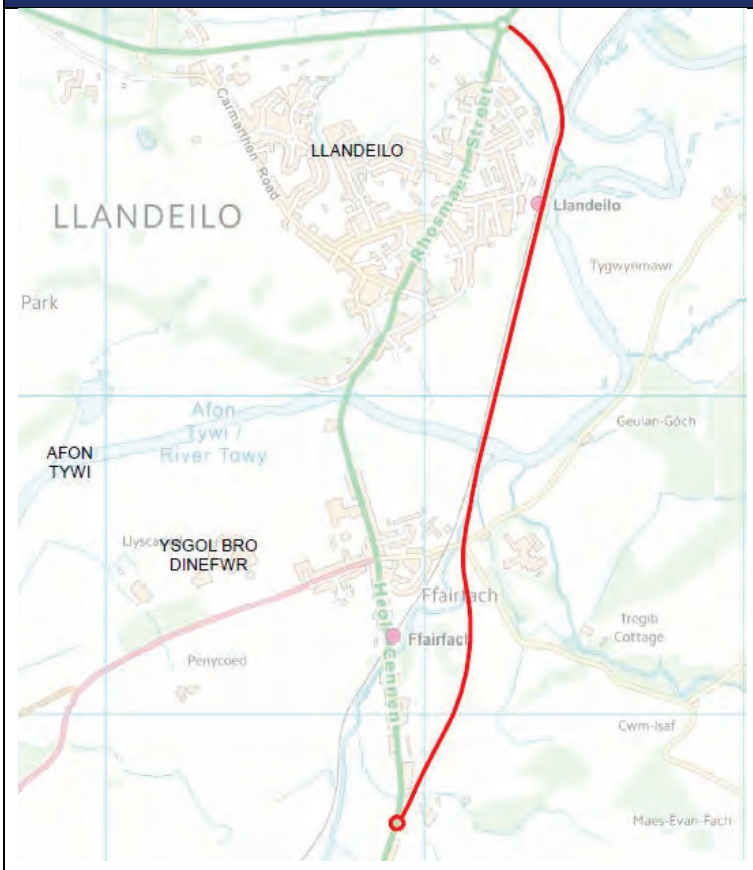
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	x	✓	x	x
This option fulfils scheme objectives 1, 2, 3, 4 and 6, however, does not meet scheme objectives 5, 7, 8.								
Appraisal								
Economy and Social and Cultural								
The majority of the appraisal areas for this option of Economics and Social and Cultural impacts score either slight beneficial or negligible with the exception of severance which scores slight negative.								
Environment								
A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings, local views and views from Brecon Beacons National Park.								
Who the option impacts on								
It is expected that there will be a slight beneficial impact on Journey time changes/reliability and also on the local economy. There is also a moderate beneficial impact on the Local air quality. There is also a slight beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, Journey quality, accidents and access to employment and services.								

BE2 – Eastern Bypass Option 2

Description

Eastern Bypass Option 2 leaves the A40 at the A40/A483 roundabout, heading south-east around the boundary of Llandeilo before crossing the railway and following the railway line south to Bethlehem Road. From Bethlehem road, the route then heads south to join the A483 to the north of Heol Pen Storom. This option would require a link to the A476.

Location



How it tackles the problem

Subject to the provision of a link between the A476 and A483, BE2 would reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

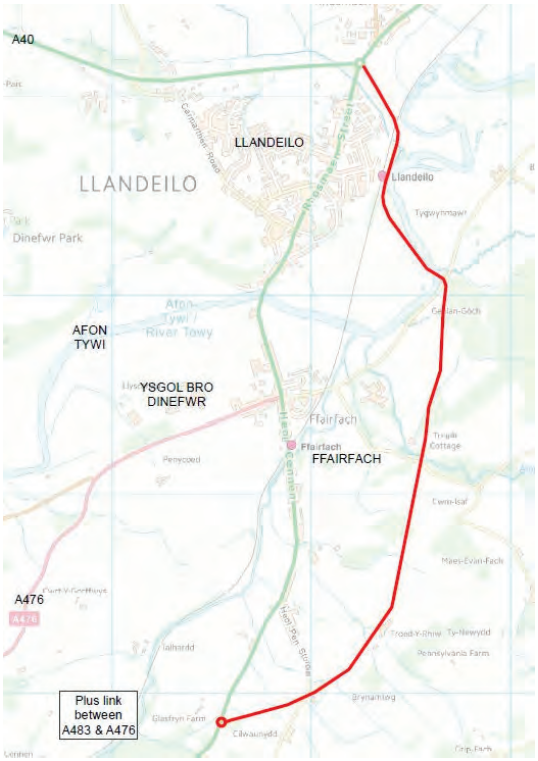
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x
This option meets all the objectives other than objective 8.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option scores for the majority of the appraisal areas of beneficial, particularly journey quality and severance, with a negligible impact on security and affordability, this option also scores a large beneficial for journey time changes.								
Environment								
A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening east of Llandeilo/Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings, local views and views from Brecon Beacons National Park.								
Who the option impacts on								
It is expected that there will be a large beneficial impact on Journey time changes and a slight beneficial impact on reliability and also on the local economy. There is also a large beneficial impact on the Local air quality. There is also a slight beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.								

BE3A – Eastern Bypass Option 3 (A)

Description

Eastern Bypass Option 3 (A) leaves the A40 at the A40/A483 roundabout, heading south-east around the boundary of Llandeilo before crossing the railway and following the railway line south for a short distance before crossing the Afon Tywi, joining Bethlehem Road around Geulan-Goch. From this location the road would continue south avoiding the former secondary school, and link to the A483 to the south of Heol Pen Storom. This option would require a link to the A476.

Location



How it tackles the problem

BE3A would reduce severance along the A483/Rhosmaen Street within Llandeilo (subject to the link between the A476 and A483 being provided) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

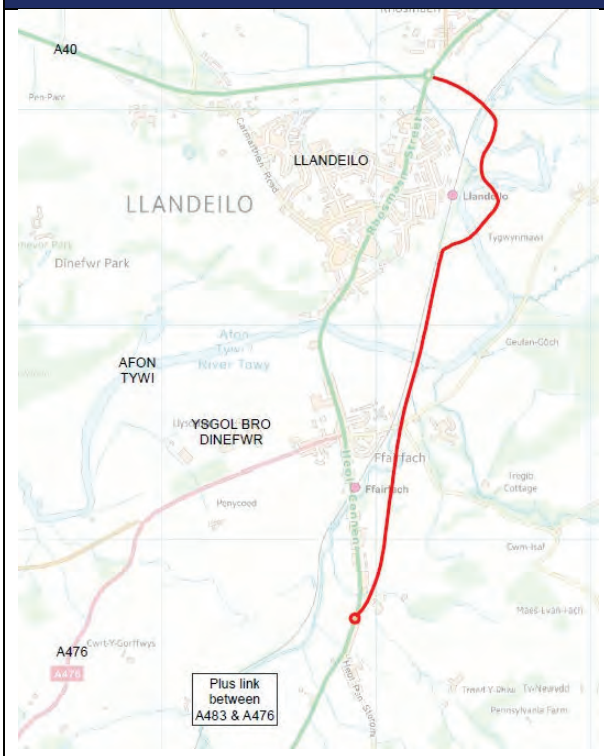
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x
This option meets all the objectives other than objective 8.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option scores beneficial across the majority of appraisal areas, particularly journey time quality and reliability with some negligible impact on security and affordability, large beneficial has been scored for severance.								
Environment								
A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening east of Llandeilo/Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow and ancient woodland habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings, local views and views from Brecon Beacons National Park.								
Who the option impacts on								
It is expected that there will be a moderate beneficial impact on Journey time changes/reliability and a slight beneficial impact on the local. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.								

BE3B – Eastern Bypass Option 3 (B)

Description

Eastern Bypass Option 3 (B) leaves the A40 at the A40/A483 roundabout, heading south east to cross the railway line and the Afon Tywi, and wraps around to the north east of Llandeilo. From this point to the east of the railway line the route would head south over multiple river crossings. The route would then cross Bethlehem Road between Ffairfach and the former secondary school, linking to the A483 to the north of Heol Pen Storum. This option would require a link to the A476.

Location



How it tackles the problem

In order to be effective this option would have to work in association with a link between the A476 and A483 to the south of Ffairfach. BE3B would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	Partial	✓	✓	✓	x

This option also scores highly for journey quality and severance, fulfilling scheme objectives 1, 2, 3, 5, 6 and 7, partially meeting scheme objective 4 however it does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores for the majority of the appraisal areas of beneficial with a negligible impact on security and affordability, this option also scores a large beneficial for journey time changes.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening east of Llandeilo/Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes through Brecon Beacons National Park.

Who the option impacts on

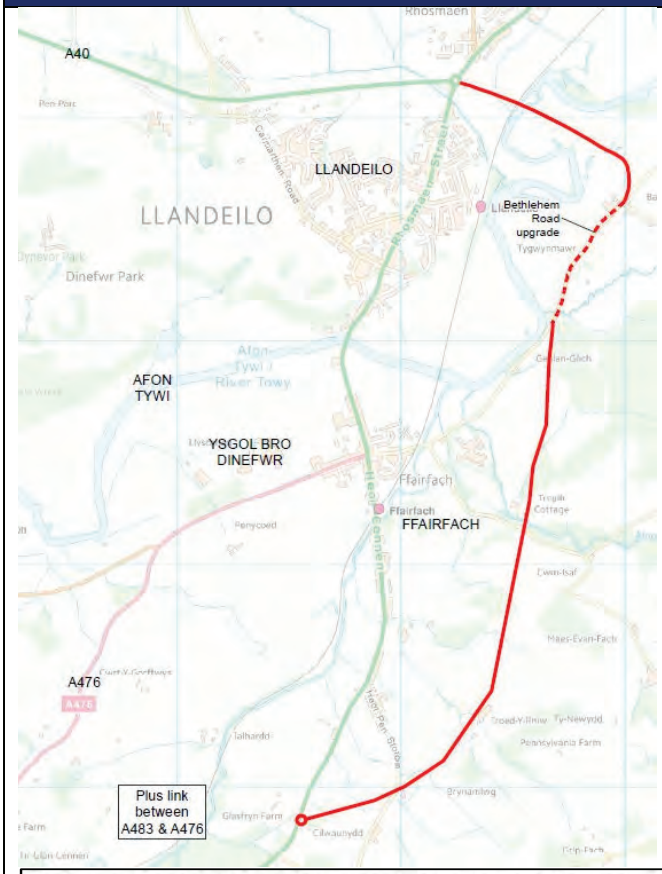
There is expected to be a Large beneficial impact on Journey time changes, a moderate beneficial impact on journey reliability and a slight beneficial impact upon the local economy. There is also a large beneficial impact expected upon Local air quality. Furthermore, it is expected that there will be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE3C – Eastern Bypass Option 3 (C)

Description

Eastern Bypass Option 3 (C) leaves the A40 at the existing A40/A483 roundabout, heading south east towards Bethlehem Road, crossing the Afon Tywi and railway using a single structure. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.

Location



How it tackles the problem

This option is dependent on a link between the A476 and A483 which would link to the A483 where the bypass links in. BE3C would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could

use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option meets all the objectives other than objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores for the majority of the appraisal areas of beneficial with a negligible impact on security and affordability, this option also scores a large beneficial for severance.

Environment

A neutral effect is anticipated to soils and geology. A beneficial effect is anticipated for noise due to noise decreases within Llandeilo/Ffairfach. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening east of Llandeilo/Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of a designated water feature and through loss of hedgerow and ancient woodland habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes through Brecon Beacons National Park.

Who the option impacts on

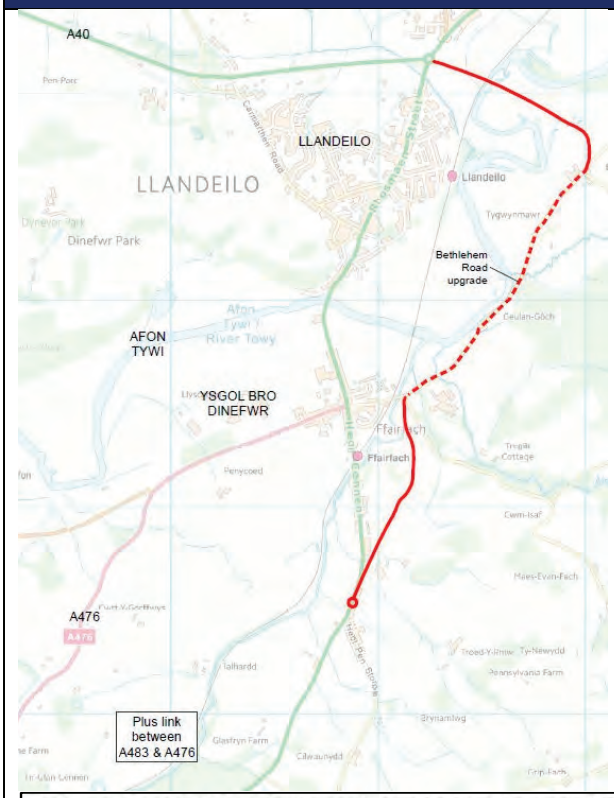
It is expected that there will be a moderate beneficial impact on Journey time changes/reliability and a slight beneficial impact on the local. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape, Bio-diversity and the Water environment. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE3D – Eastern Bypass Option 3 (D)

Description

Eastern Bypass Option 3 (D) leaves the A40 at the existing A40/A483 roundabout, heading south east towards Bethlehem Road, crossing the Afon Tywi and railway using a single structure. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road towards Ffairfach, leaves Bethlehem Road to the west of the former secondary school to join the A483 to the north of Heol Pen Storum. This option would require a link to the A476.

Location



How it tackles the problem

This option is dependent on the inclusion of a link between the A476 and A483 that would tie in at the point where the bypass joins the A476. BE3D would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

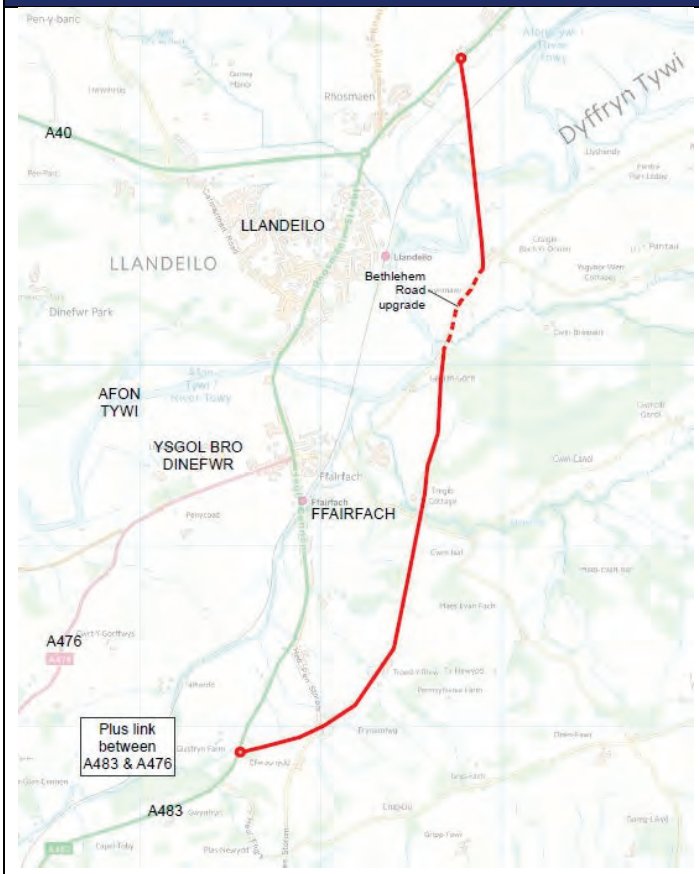
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x
This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option scores beneficial for the majority of the appraisal areas, scoring particularly highly on journey time changes, quality and reliability, and severance, with some negligible impacts for areas such as physical activity, security and affordability.								
Environment								
A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo/Ffairfach but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening east of Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of a designated waterbody and through loss of hedgerow habitat and indirect impacts to ancient woodland. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes through Brecon Beacons National Park.								
Who the option impacts on								
It is expected that there will be a moderate beneficial impact on Journey time changes/reliability and a slight beneficial impact on the local. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.								

BE4A – Mid Rhosmaen Eastern Bypass Option 4 (A)

Description

Mid Rhosmaen Eastern Bypass Option 4 (A) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south east towards Bethlehem Road, crossing the railway and Afon Tywi. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.

Location



How it tackles the problem

BE4A would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on a link between the A476 and A483 being provided) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would

provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores beneficial for the majority of the appraisal areas, with a large beneficial for severance.

Environment

A neutral effect is anticipated to soils and geology. A beneficial effect is anticipated for noise due to noise decreases within Llandeilo/Ffairfach. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening to rural properties. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow and ancient woodland habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes through Brecon Beacons National Park.

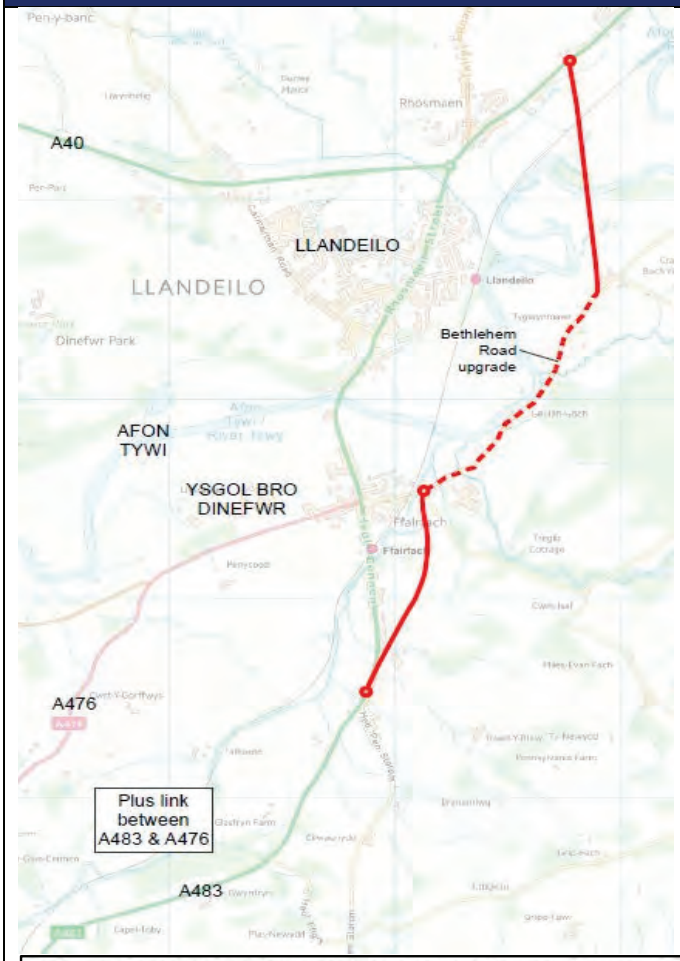
Who the option impacts on

It is expected that there will be a moderate beneficial impact on Journey time reliability and a slight beneficial impact on the journey time changes and local economy. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE4B – Mid Rhosmaen Eastern Bypass Option 4 (B)

Mid Rhosmaen Eastern Bypass Option 4 (A) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south east towards Bethlehem Road, crossing the railway and Afon Tywi. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.

Location



How it tackles the problem

This option is dependent on a link between the A476 and A483 in order for the bypass to avoid traffic through Ffairfach. BE4B would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than

Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial for the appraisal areas, scoring particularly highly on journey time changes and reliability, and severance, with negligible impacts on security and affordability.

Environment

A neutral effect is anticipated to soils and geology. A beneficial effect is anticipated for noise due to noise decreases within Llandeilo/Ffairfach. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening to the east of Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of a designated waterbody and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it is immediately adjacent to Brecon Beacons National Park.

Who the option impacts on

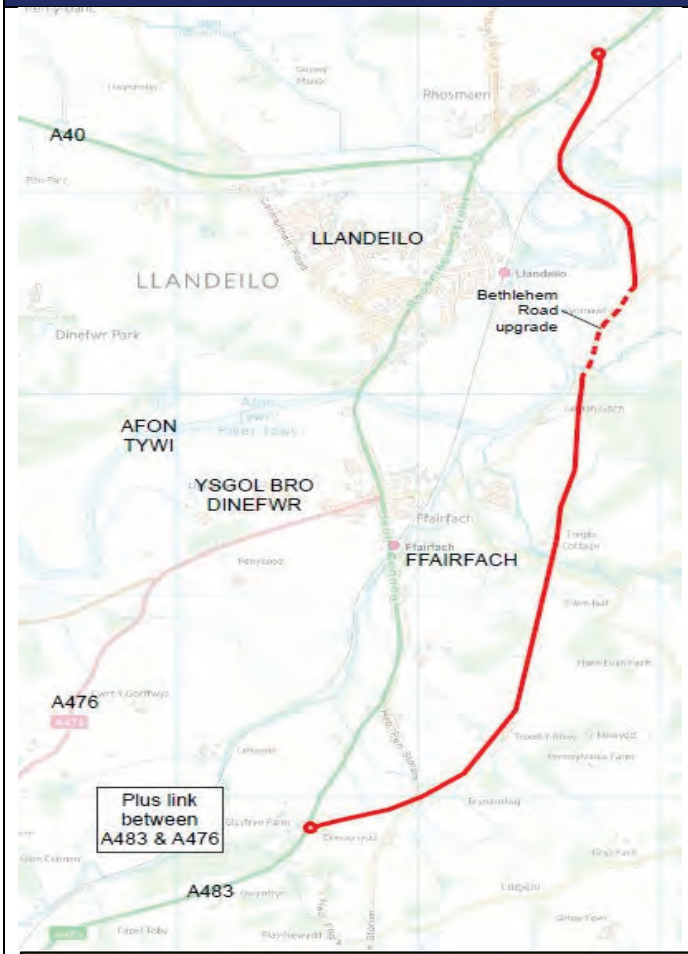
It is expected that there will be a moderate beneficial impact on Journey time changes/reliability and a slight beneficial impact on the local economy. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE4C – Mid Rhosmaen Eastern Bypass Option 4 (C)

Description

Mid Rhosmaen Eastern Bypass Option 4 (C) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south west towards Llandeilo railway station before crossing the railway and Afon Tywi using a single structure. The route then links to Bethlehem Road to the south of Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.

Location



How it tackles the problem

This option is dependent on a link between the A476 and A483 in order to bypass the village of Ffairfach. BE4C would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-

trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial impacts across the appraisal areas, with a large beneficial score for severance, and negligible impacts on security and affordability.

Environment

A neutral effect is anticipated to soils and geology. A beneficial effect is anticipated for noise due to noise decreases within Llandeilo/Ffairfach. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening to the east of Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow and ancient woodland habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument and as it passes through Brecon Beacons National Park.

Who the option impacts on

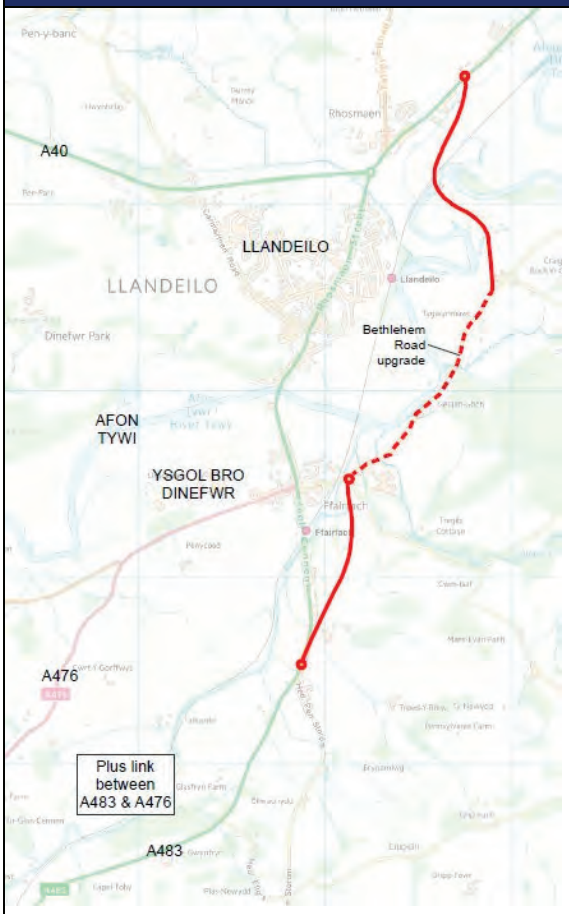
It is expected that there will be a moderate beneficial impact on Journey time reliability and a slight beneficial impact on the local economy and journey time changes. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE4D – Mid Rhosmaen Eastern Bypass Option 4 (D)

Description

Mid Rhosmaen Eastern Bypass Option 4 (D) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south west towards Llandeilo station before crossing the railway and Afon Tywi using a single structure. The route then links to Bethlehem Road to the south of Craigle Bach Yr Onnen, follows Bethlehem Road towards Ffairfach, leaves Bethlehem Road to the west of the former secondary school, to join the A483 to the north of Heol Pen Storom. This option would require a link to the A476.

Location



How it tackles the problem

This option is dependent on a link between the A476 and A483. BE4D would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should

improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores beneficial across the majority of the appraisal areas, scoring particularly highly for journey time changes, quality and reliability, and severance, with a negligible impact on security and affordability.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo/Ffairfach but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening to the east of Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes immediately adjacent to Brecon Beacons National Park.

Who the option impacts on

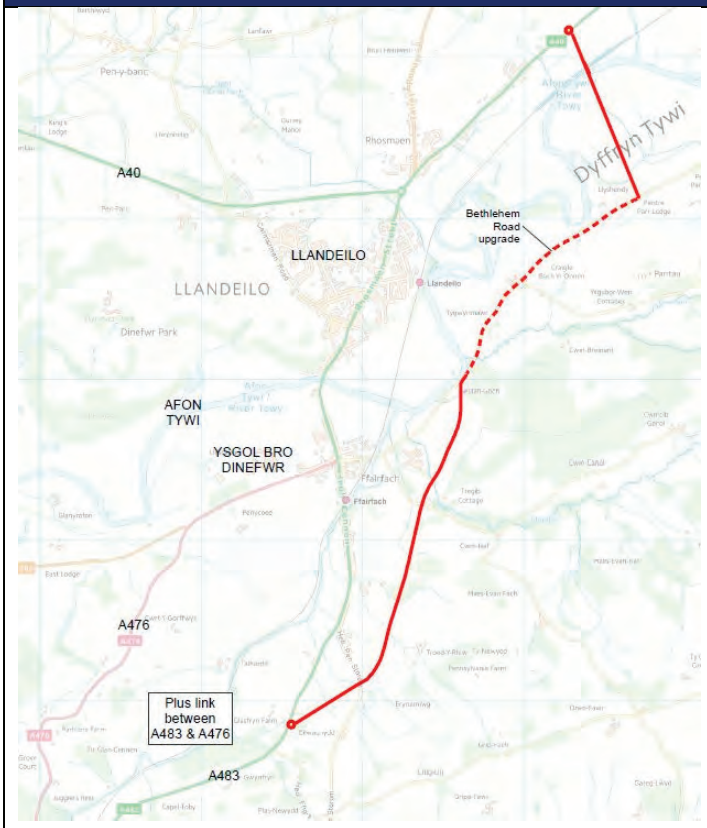
It is expected that there will be a moderate beneficial impact on Journey time changes/reliability and a slight beneficial impact on the local economy. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE5A – Far Eastern Route 5 (A)

Description

Far Eastern Route 5 (A) leaves the A40 to the east of Rhosmaen, crosses the railway line and Afon Tywi at a single crossing point, and crosses the estuary to meet Bethlehem Road near to Pentre Parr Lodge. Bethlehem Road will be upgraded towards Ffairfach and the route will leave Bethlehem Road near Geulan Goch and link to A483 to the south of residential properties to avoid Heol Pen Storom. The route would avoid playing fields associated with the former secondary school. This option would require a link to the A476.

Location



How it tackles the problem

This option is dependent on a link between the A476 and the A483 in order to reduce congestion and severance within Ffairfach. Without the link to the A476 vehicle drivers are unlikely to use the bypass and would instead continue to travel along Rhosmaen Street. BE5A would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using

Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial across the appraisal areas, with a large beneficial for severance and journey reliability and quality benefits, with a negligible impact on security and affordability.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo/Ffairfach but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening to the east of Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow and ancient woodland habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes through Brecon Beacons National Park.

Who the option impacts on

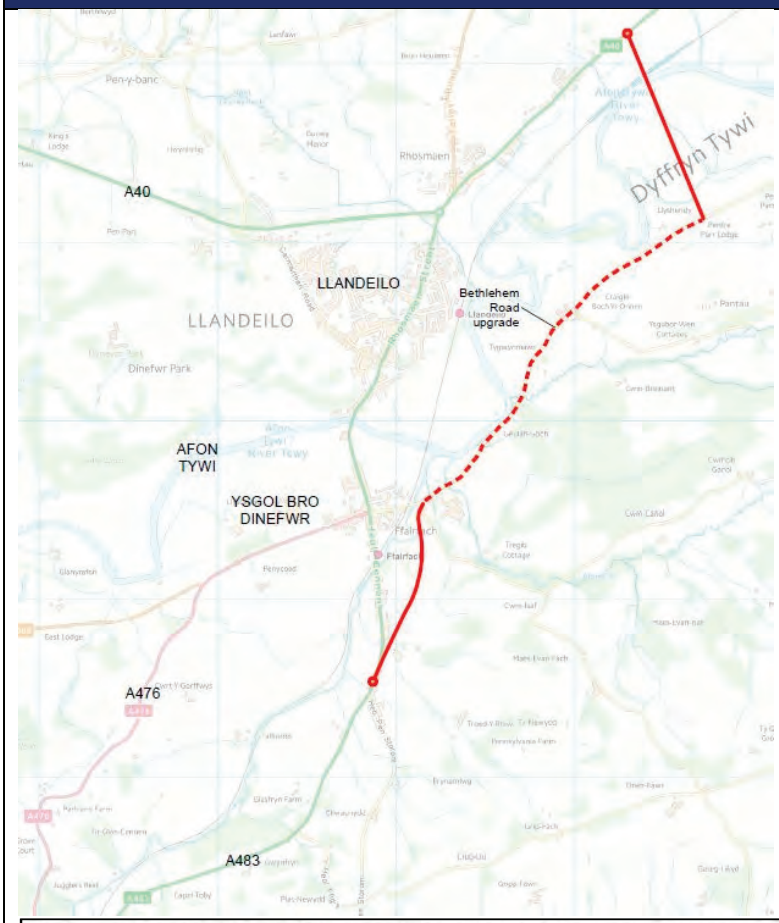
It is expected that there will be a moderate beneficial impact on Journey time reliability and a slight beneficial impact on the local economy and journey time changes. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE5B – Far Eastern Route 5 (B)

Description

Far Eastern Route 5 (B) leaves the A40 to the east of Rhosmaen, crosses the railway line and Afon Tywi at a single crossing point and crosses the river to meet Bethlehem Road near to Pentre Parr Lodge. Bethlehem Road will be upgraded towards Ffairfach and the route will leave Bethlehem Road to the west of the former secondary school (to the east of the railway line) and wraps to the east of residential properties along Heol Cennen linking to A483 before Heol Pen Storom.

Location



How it tackles the problem

This option is dependent on a link between the A476 and A483 to the south of Ffairfach in order to remove congestion and severance within the community of Ffairfach. Without the link traffic heading north from Cross Hands would probably continue to drive through Llandeilo. BE5B would reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use

the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial across the appraisal areas, scoring particularly highly for journey time reliability, journey quality and severance, with negligible impacts on security and affordability.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo/Ffairfach but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening to the east of Ffairfach. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and as it passes immediately alongside Brecon Beacons National Park.

Who the option impacts on

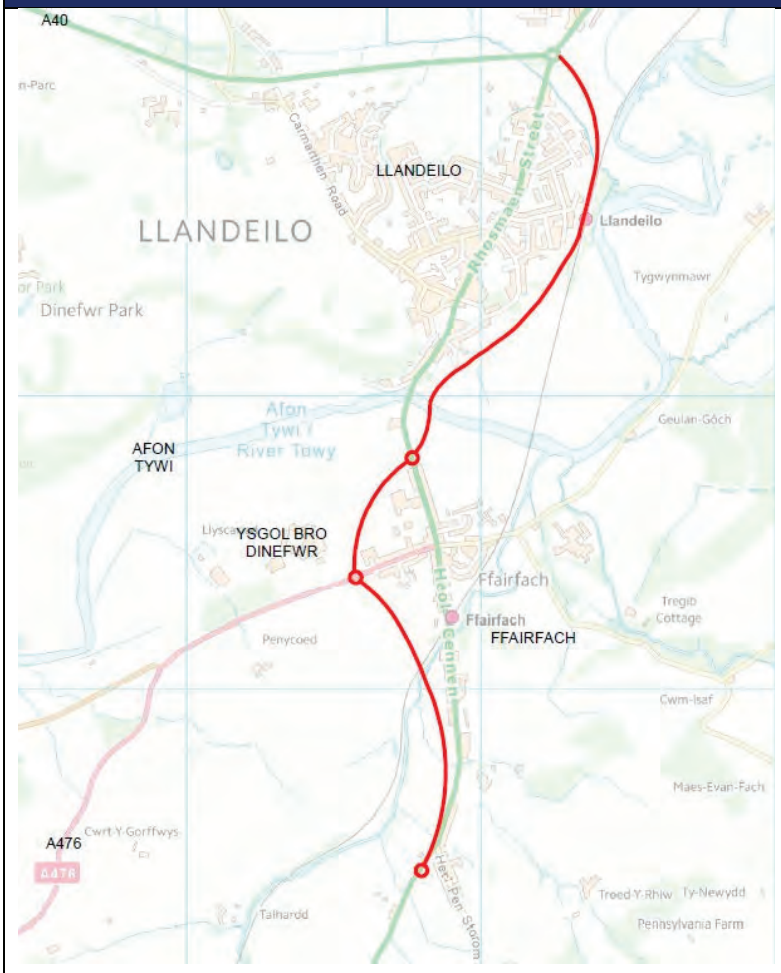
It is expected that there will be a moderate beneficial impact on Journey time reliability and a slight beneficial impact on the local economy and journey time changes. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

BE6 – Option formerly known as the Refined Protected Route

Description

This option leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line, before passing closer to the escarpment than options BE1A – BE1D. It joins the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge.

Location



How it tackles the problem

BE6 may reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass

which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	x

This option fulfils scheme objectives 1 to 7, however does not meet scheme objective 8.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores beneficial across the appraisal areas, scoring particularly highly for journey time reliability, journey quality and severance, with a negligible impact on security and affordability.

Environment

A neutral effect is anticipated to soils and geology. A neutral effect is anticipated for noise due to a balance of both noise decreases within Llandeilo/Ffairfach but increases in areas currently unaffected by road noise. A beneficial effect is anticipated for air quality due to a large reduction of vehicle movements through the AQMA, although there is potential for air quality worsening elsewhere. An adverse effect to the water environment and biodiversity is anticipated due to the crossing of several designated water features and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape and cultural heritage due to effects to a scheduled monument, listed buildings and the impact to local and Brecon Beacons National Park views.

Who the option impacts on

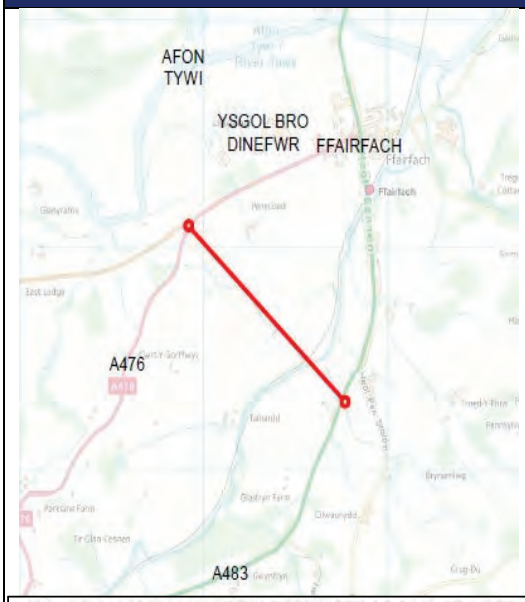
It is expected that there will be a moderate beneficial impact on Journey time reliability and a slight beneficial impact on the local economy and journey time changes. There is a large beneficial impact on the Local air quality. It is also expected that there will be a large adverse impact upon Landscape and Townscape and Bio-diversity. In relation to social and cultural there is a slight beneficial impact expected upon Physical activity, accidents and access to employment and services.

ARL1 – A Road Link (1)

Description

ARL1 connects the A476 and A483 without the need to pass through Ffairfach. The route starts at the junction between the B4300 and A476 and follows the slight valley, crossing the railway line at approximate NGR SN625 205 then joins the A483 south of Caemen Cottage.

Location



How it tackles the problem

ARL1 may improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. This option would result in the eastern bypass options avoiding Ffairfach which would mean that severance would be reduced, this is likely to encourage people to travel between Ffairfach (extending south past the station) to Llandeilo where they may currently drive. This link would mean that traffic flows past the entrance to Ysgol Bro Dinefwr could be controlled to avoid HGVs (with only buses allowed), this would apply even if there were not an eastern bypass by then routing traffic through Ffairfach as a north-south link). This route would encourage children to travel to Ysgol Bro Dinefwr by active travel means. By limiting HGV traffic past Ysgol Bro Dinefwr it would mean that HGV traffic would divert to the bypass and would therefore be less likely to switch on to the A483 and travel through Llandeilo. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and supports the Welsh Transport Plan.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or ×	✓	×	×	✓	✓	✓	×	×

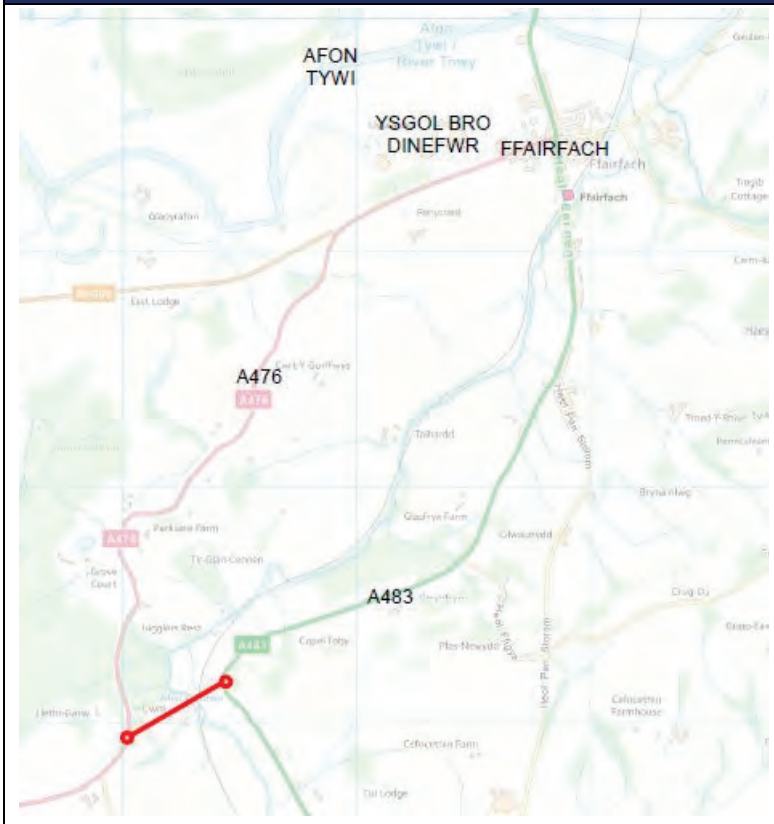
Option ARL1 does not improve pedestrian and cyclist safety within Llandeilo and Ffairfach or reduce community severance. Additionally, it does not fulfil the objectives of reducing exposure to air pollution or support the transition to a low carbon society. It does however preserve the strategic function of the A483, improve journey time reliability, reduce congestion through Llandeilo and contributes to sustainable economic growth and tourism in Llandeilo.
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option scores a large beneficial for journey time changes, with other beneficial impacts on journey time reliability changes, journey quality, accidents and severance. This option scores negligible for local economy, physical activity, security, access to employment and services, affordability as well as active travel.
Environment
It is anticipated that there will be a neutral effect upon noise, geology and soils with this option. Additionally, a moderate beneficial effect is anticipated on local air quality. However, a slight adverse effect is anticipated upon the water environment and cultural heritage. Furthermore, a moderate adverse effect is anticipated upon biodiversity and to the landscape and townscape.
Who the Option impacts on
All road users should benefit from this bypass link road. Users of Llandeilo train station and students of Ysgol Bro Dinefwr may benefit from this link road as it will divert traffic away from the school as well as Llandeilo and Ffairfach.

ARL2 – A Road Link (2)

Description

ARL2 connects the A476 to the A487 without the need to pass through Ffairfach. The route would leave the A476 south of Cwm at approximate NGR BN610 189 crossing the gorge over the railway line and links to A487 at approximately NRG SN 614 191.

Location



How it tackles the problem

ARL2 would provide a link between the A476 and A483 and would result in more HGV traffic using eastern bypass options, without either ARL1 or ARL2 there is a risk that traffic would stay on the existing A483 through Llandeilo rather than divert to the bypass. This option would result in a decrease in congestion and severance within Ffairfach and would also reduce severance between Ffairfach and Llandeilo. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and supports the Welsh Transport Plan.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8

Met ✓ or ×	✓	×	✓	✓	✓	✓	×	×

This option fulfils the majority of the objectives, however does not improve pedestrian and cyclist safety within Llandeilo and Ffairfach, reduce exposure to air pollution for sensitive receptors or support the transition to a low carbon society.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option scores large beneficial for journey time changes, and slight beneficial for journey time reliability changes, journey quality, accidents and severance. This option scores negligible for local economy, physical activity, security, access to employment and services, affordability and active travel.

Environment

A neutral effect upon geology and soils is anticipated and also noise as there are very few properties in the vicinity of this option. Further to this, a minor beneficial effect is anticipated on local air quality. However, a moderate adverse effect is anticipated upon biodiversity and landscape and townscape. Furthermore, there is a slight adverse effect anticipated upon the water environment and cultural heritage.

Who the option impacts on

All road users should benefit from this bypass link road. Users of Llandeilo train station and students of Ysgol Bro Dinefwr may benefit from this link road as it will divert traffic away from the school as well as Llandeilo and Ffairfach.

BW1 – Western Bypass Option 1

Description

Western Bypass Option 1 leaves the A40 at the existing junction with Carmarthen Road at a new junction. The route then follows Carmarthen Road south to the entrance to the National Trust Dinefwr property and follows the slight dip between mounds south west of the junction of the B4300 and A476.

Location

How it tackles the problem

BW1 would reduce traffic flows, and therefore severance, along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. This option would not take traffic from the A483 from Ammanford, or if it does then this traffic would be routed past the front of Ysgol Bro Dinefwr. Pedestrian safety should improve with Llandeilo and Ffairfach as well as the cycling environment, road safety and may promote visitors who are coming to Llandeilo as a destination town. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	×	✓	×

The majority of the objectives are fulfilled with this option, however this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.

Appraisal

Economy and Social and Cultural

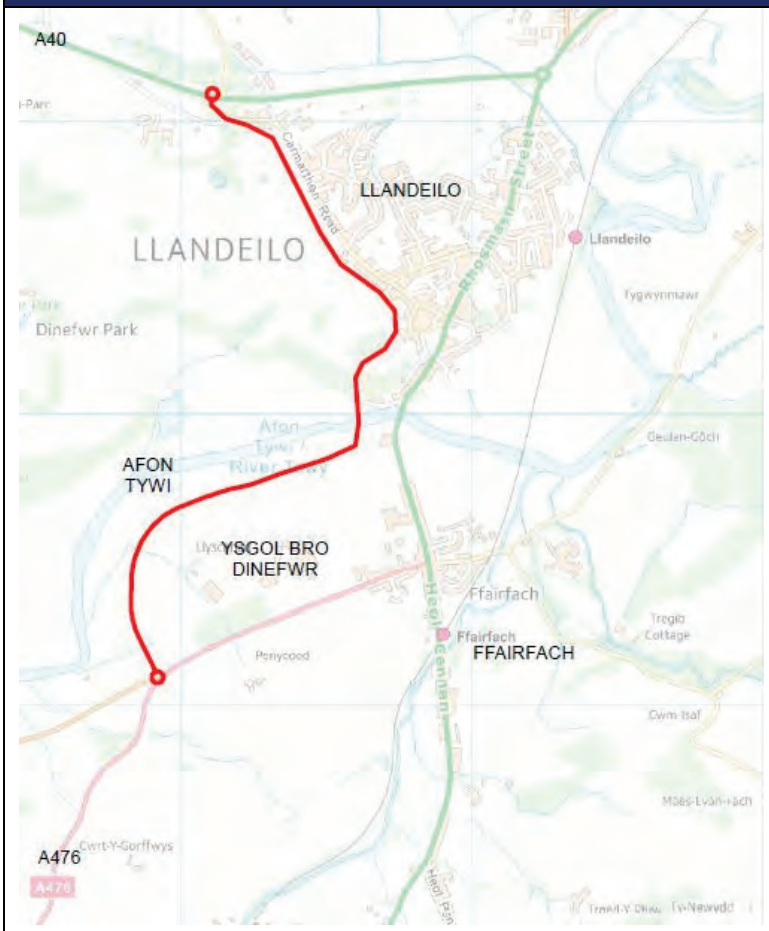
Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial for the appraisal areas, with negligible impacts on local economy, security, access to employment and services and affordability.
Environment
Overall, a neutral effect for noise and geology and soils is scored, with a moderate beneficial effect anticipated on local air quality. However, a moderate adverse effect is anticipated upon the water environment. Further to this, a large adverse effect is anticipated to landscape and townscape, cultural heritage and biodiversity.
Who the Option impacts on
All road users may benefit from this bypass, with businesses in Llandeilo and Dinefwr Park experiencing a neutral impact. Walkers, cyclists and students of Ysgol Bro Dinefwr should also benefit due to a reduction in traffic using the current A483 within Llandeilo/Ffairfach.

BW2 – Western Bypass Option 2

Description

Western Bypass Option 2 leaves the A40 at the existing junction with Carmarthen Road at a new junction. The route then follows an alignment to the west of Carmarthen Road south of the entrance to National Trust Dinefwr property, then runs to the west of residential properties on Carmarthen Road, Carmarthen Street, George Street, Bank Terrace and Bridge Street before crossing the Afon Tywi to the west of Llandeilo Bridge. The route then wraps west along the route of the Afon Tywi, north of Ysgol Bro Dinefwr and links to the A476 at the existing junction with the B4300.

Location



How it tackles the problem

BW2 may reduce severance along the A483/Rhosmaen Street within Llandeilo and within Ffairfach (for traffic on the A476) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call)

should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	×	✓	✓	×	✓	×

The majority of the objectives are fulfilled with this option, however this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial for the appraisal areas, with negligible impacts on local economy, security, access to employment and services and affordability.

Environment

A neutral effect upon geology and soils and noise is anticipated. Further to this, a moderate beneficial effect is anticipated on local air quality. However, a moderate adverse effect is anticipated upon the water environment with an expected large adverse impact for biodiversity, landscape and townscape as well as cultural heritage.

Who the Option impacts on

All road users may benefit from this bypass, however businesses in Llandeilo and Dinefwr Park may dis-benefit as the route proposes to go through National Trust land. Walkers, cyclists, students of Ysgol Bro Dinefwr and users of Llandeilo railway station are also likely to benefit due to a reduction in traffic using the current A483 within Llandeilo/Ffairfach.

BW3A – Western Bypass Option 3 (A)

Description

Western Bypass Option 3 (A) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west in a southern direction to the entrance to the National Trust Dinefwr property and follows the 'protected route' to the east of Ysgol Bro Dinefwr and links to the A483 within Ffairfach to the south of Heol Pen Storom.

Location

How it tackles the problem

BW3A may improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	Partial	✓	✓	×	✓	×

The majority of the objectives are fulfilled with this option, however this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option has some negative impacts on the local economy and severance however does have beneficial impacts on journey time reliability, physical activity, journey quality, accidents and active travel.

Environment

A large beneficial effect is anticipated on local air quality due to a large reduction of vehicle movements through the AQMA. Also, a neutral effect upon geology and soils is anticipated. However, a slight adverse effect for noise is anticipated as properties to the east of Carmarthen Road are likely to receive noise increases that would not be able to be mitigated. Additionally, a moderate adverse effect is anticipated upon the water environment as it crosses Rivers Tywi and Cennen, a WFD waterbodies along with three tributaries. Further to this, a large adverse effect is anticipated upon biodiversity, landscape and townscape and cultural heritage.

Who the Option impacts on

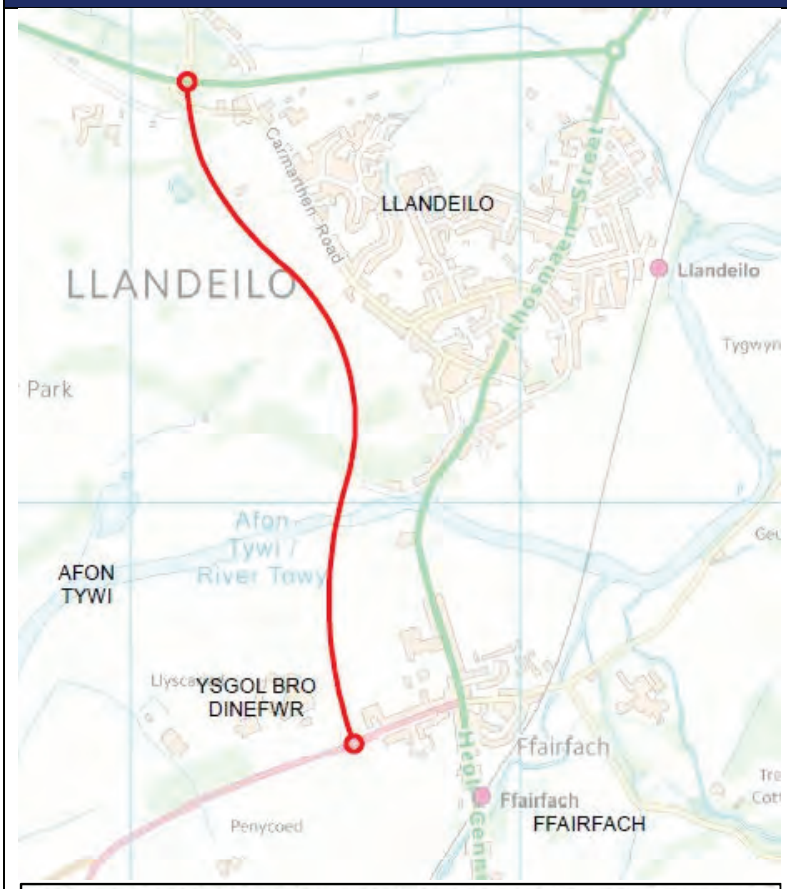
All road users may benefit from this bypass, as well as some businesses in Llandeilo. However, Dinefwr Park would dis-benefit due to the proposed bypass alignment. Properties on the west side of Ffairfach and the rear properties on the A482 to the south of Ffairfach may be negatively impacted upon in terms of noise. Walkers and cyclists should also benefit due to a reduction in traffic using the current A483 within Llandeilo/Ffairfach. However, students of Ysgol Bro Dinefwr would have a dis-benefit due to the proposed option bypass alignment.

BW3B – Western Bypass Option 3 (B)

Description

Western Bypass Option 3 (B) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west in a southern direction to the entrance to the National Trust Dinefwr property and follows the 'protected route' to the east of Ysgol Bro Dinefwr.

Location



How it tackles the problem

BW3B may improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs on the A476 would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked, traffic on the A483 would probably continue to use the route. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

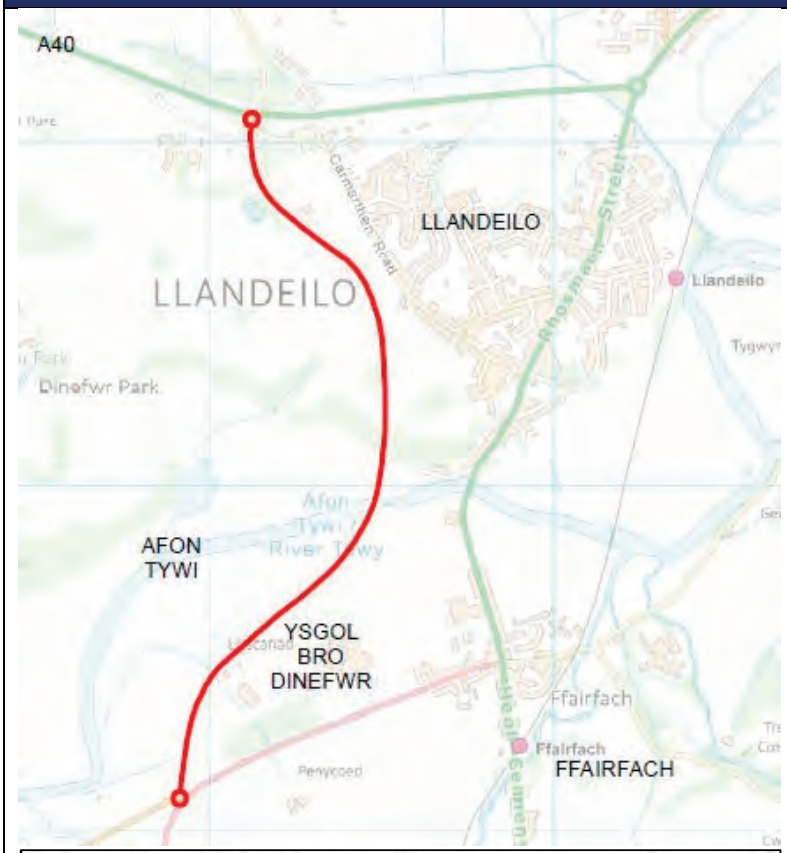
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	×	×	✓	Partial	×	✓	×
The majority of the objectives are not fulfilled with this option. For instance, this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society. Additionally, it does not improve pedestrian and cyclist safety or reduce community severance within Llandeilo and Ffairfach.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option has some negative impacts on the local economy and severance however does have beneficial impacts on journey time reliability, physical activity, journey quality, accidents and active travel.								
Environment								
A moderate beneficial effect is anticipated on local air quality due to a reduction of vehicle movements through the AQMA. Additionally, a neutral effect upon geology and soils is anticipated. A moderate adverse effect is anticipated upon the water environment as the route crosses the River Tywi, a WFD waterbody. Also, a slight adverse effect for noise is anticipated, although it is likely that increases would be partially offset by decreases on the existing road network resulting from re-assignment of traffic flows, without the additional link these may be correspondingly less. Further to this, a large adverse effect is anticipated to landscape and townscape, cultural heritage and biodiversity.								
Who the Option impacts on								
All road users may benefit from this bypass as well as walkers and cyclists within Llandeilo. However, Dinefwr Park and students of Ysgol Bro Dinefwr may dis-benefit due to the proposed bypass alignment.								

BW3C – Western Bypass Option 3 (C)

Description

Western Bypass Option 3 (C) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west, in a southern direction to the entrance to the National Trust Dinefwr property then passes to the north of Ysgol Bro Dinefwr and links to the junction of the B4300 and A476.

Location



How it tackles the problem

BW3C may reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route for traffic currently on the A476 which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	×	✓	×

The majority of the objectives are fulfilled with this option, however this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall has a beneficial impact across appraisal areas with a beneficial impact on journey quality, there is however a slight negative impact on the local economy.

Environment

A neutral effect upon geology and soils and noise is anticipated. Further to this, a moderate beneficial effect is anticipated on local air quality due to a reduction of vehicle movement through the AQMA. However, a moderate adverse effect is anticipated upon the water environment as the route crosses the River Tywi, a WFD waterbody and two minor tributaries. Also, a large adverse effect is anticipated upon biodiversity, landscape and townscape and cultural heritage.

Who the Option impacts on

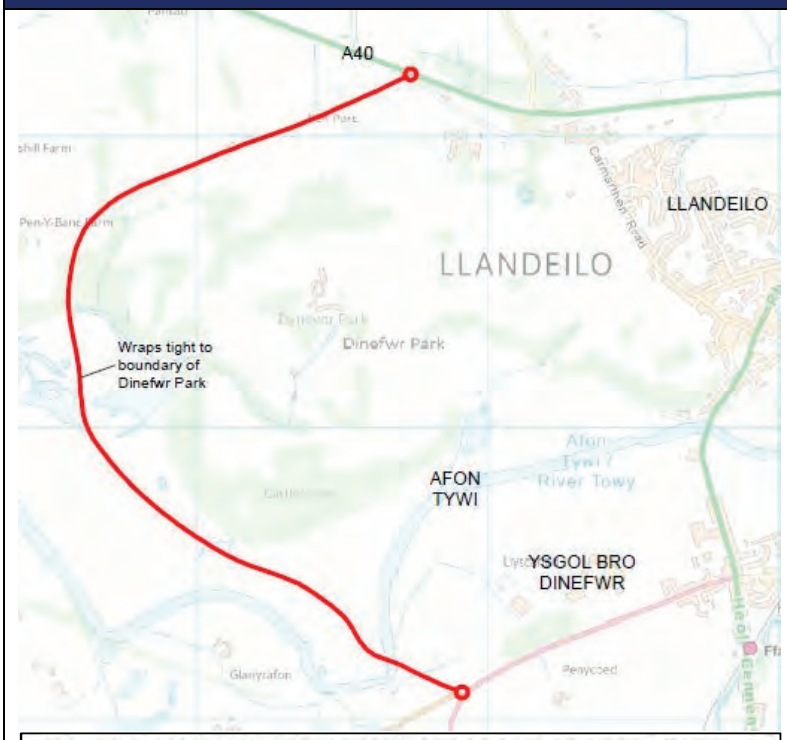
All road users may benefit from this bypass as well as businesses within Llandeilo. However, Dinefwr Park would dis-benefit due to the proposed bypass alignment. Walkers, cyclists and students of Ysgol Bro Dinefwr should benefit due to a reduction in traffic using the current A483 within Llandeilo/Ffairfach.

BW4 – West of Dinefwr (East)

Description

West of Dinefwr Bypass Option (East) leaves the A40 prior to King's Lodge, wraps around the western boundary of National Trust Dinefwr Park property, links to A476 at the junction of the A476 and B4300.

Location



How it tackles the problem

BW4 may reduce severance along the A483/Rhosmaen Street within Llandeilo as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. As a result of the removal of through traffic from the A476 and improvements in traffic flows there should be a decrease in air pollution within Llandeilo and Ffairfach.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8

Met ✓ or x	✓	Partial	Partial	✓	Partial	×	✓	×

The majority of the objectives are fulfilled with this option, however this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option has an overall beneficial impact across appraisal areas, with negligible impacts on security and affordability.

Environment

A neutral effect upon geology and soils is anticipated. A slight beneficial effect for noise is expected, as there are few properties close to the route, which are currently located in a low-noise environment. Further to this, a moderate beneficial effect is anticipated on local air quality due to a reduction of vehicle movements through the AQMA. However, a moderate adverse effect is anticipated upon the water environment as the route crosses the River Tywi, a WFD waterbody and two minor tributaries. Additionally, a large adverse effect is anticipated to landscape and townscape as the route passes through a Landscape of Outstanding Historic Interest, a Conservation Area and is along the edge of a Historic Park and Garden. Also, a large adverse effect is anticipated to cultural heritage and biodiversity.

Who the Option impacts on

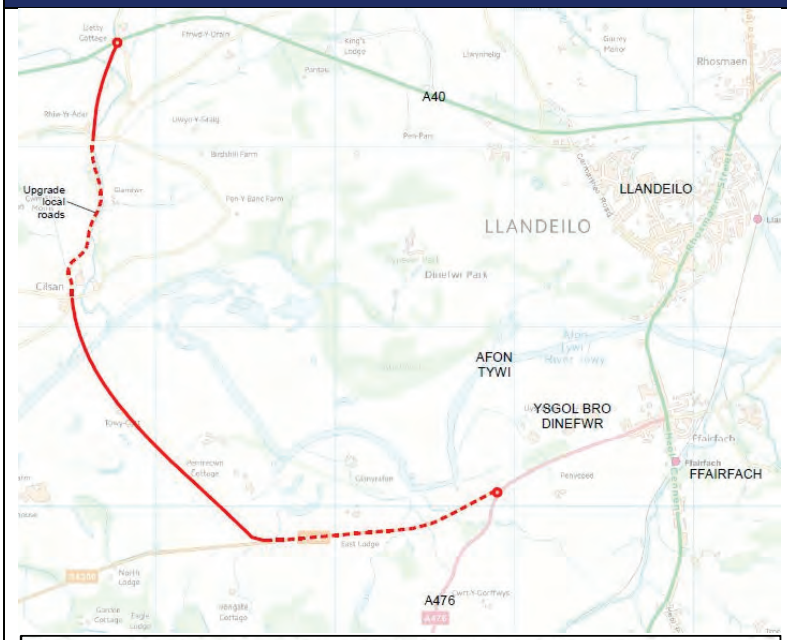
All road users may benefit from this bypass as well as businesses in Llandeilo and Dinefwr Park. However, properties located close to the proposed bypass would however experience increases in noise. Walkers, cyclists and students of Ysgol Bro Dinefwr should also benefit due to a reduction in traffic using the current A483 within Llandeilo/Ffairfach.

BW5A – West of Dinefwr (A)

Description

West of Dinefwr Bypass Option (A) leaves the A40 near Lletty Cottage and heads south along local roads which will be upgraded between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi and links to the B4300. The route also involves an upgrade of the B4300 and the existing junction with the A476, proposed to be a roundabout.

Location



How it tackles the problem

This option would not divert traffic from the A483 (except with a combination with ARL2) and is unlikely to divert traffic from the A476 due to the additional length of the route. Therefore, any potential benefits of removing through traffic from Llandeilo and Ffairfach are unlikely to be realised. If traffic did divert on to the bypass, there would be a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	×	×	✓	×	×	✓	×

The majority of the objectives are not fulfilled with this option. For instance, this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society. Additionally, it does not improve congestion through Llandeilo or pedestrian and cyclist safety, it also does not reduce community severance within Llandeilo and Ffairfach.

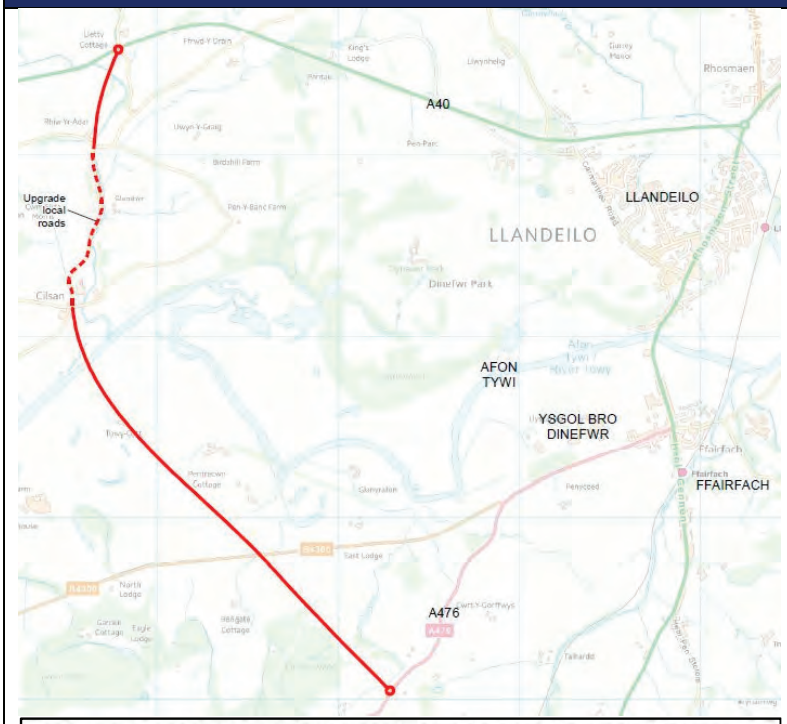
Appraisal
Economy and Social and Cultural
Appraisal of Economics and Social and Cultural impacts has identified that this option overall has a beneficial impact, with a slight negative impact on journey time changes, and negligible impacts on local economy, security and affordability.
Environment
A neutral effect upon geology and soils is anticipated, with a slight beneficial effect for noise. Further to this, a moderate beneficial effect is anticipated on local air quality due to a reduction of vehicle movements through the AQMA. However, a moderate adverse effect is anticipated upon the water environment and cultural heritage. Further to this, a large adverse effect is anticipated to landscape and townscape and biodiversity.
Who the Option impacts on
All road users may dis-benefit from this bypass due to the proposed alignment, with businesses in Llandeilo and Dinefwr Park experiencing a neutral impact. Users of Llandeilo train station and students of Ysgol Bro Dinefwr may benefit from this bypass option; however, some businesses may dis-benefit due to the significant diversion.

BW5B – West of Dinefwr (B)

Description

West of Dinefwr Bypass Option (B) leaves the A40 near Lletty Cottage and heads south along local roads which will be upgraded between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi estuary and links to the B4300. The route continues south to link to the A476 at approximate NGR SN 613200.

Location



How it tackles the problem

BW5B may reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	×	×	✓	×	×	✓	×

The majority of the objectives are not fulfilled with this option. For instance, this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society. Additionally, it does not improve congestion through Llandeilo or pedestrian and cyclist safety, it also does not reduce community severance within Llandeilo and Ffairfach.

Appraisal

Economy and Social and Cultural

Appraisal of Economics and Social and Cultural impacts has identified that this option overall has a beneficial impact, with a slight negative impact on journey time changes, and negligible impacts on local economy, security and affordability.

Environment

A neutral effect upon geology and soils, as well as noise, is anticipated. Also, a moderate beneficial effect is anticipated on local air quality due to a reduction of vehicle movements through the AQMA. However, moderate adverse effects are anticipated for cultural heritage and the water environment and large adverse effects are anticipated upon biodiversity and landscape and townscape.

Who the Option impacts on

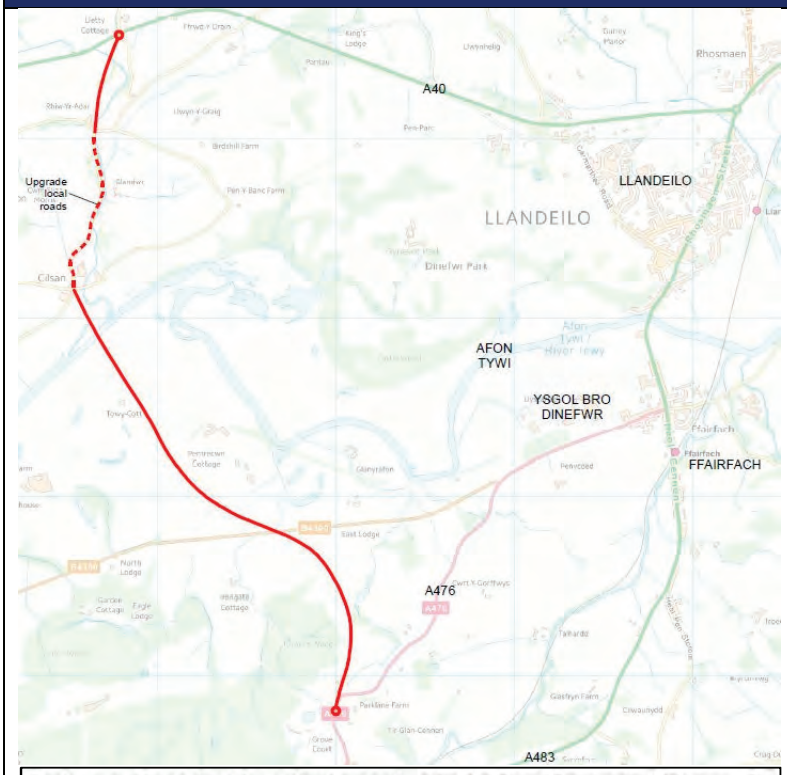
All road users may dis-benefit from this bypass due to the proposed alignment, with businesses in Llandeilo and Dinefwr Park experiencing a neutral impact. Users of Llandeilo train station and students of Ysgol Bro Dinefwr may benefit from this bypass option; however, some businesses may dis-benefit due to the significant diversion.

BW5C – West of Dinefwr (C)

Description

West of Dinefwr Bypass Option (C) leaves the A40 near Lletty Cottage, heads south, including an upgrade of local roads between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi estuary, links to the B4300 and continues south to link to the A476 at approximate NGR SN 610198 (wrapping around the boundary of Turner's wood).

Location



How it tackles the problem

BW5C may reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. If sufficient vehicles divert from Rhosmaen Street, there should be a decrease in air pollution within Llandeilo.

This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of outcomes of the Wales Transport Strategy.

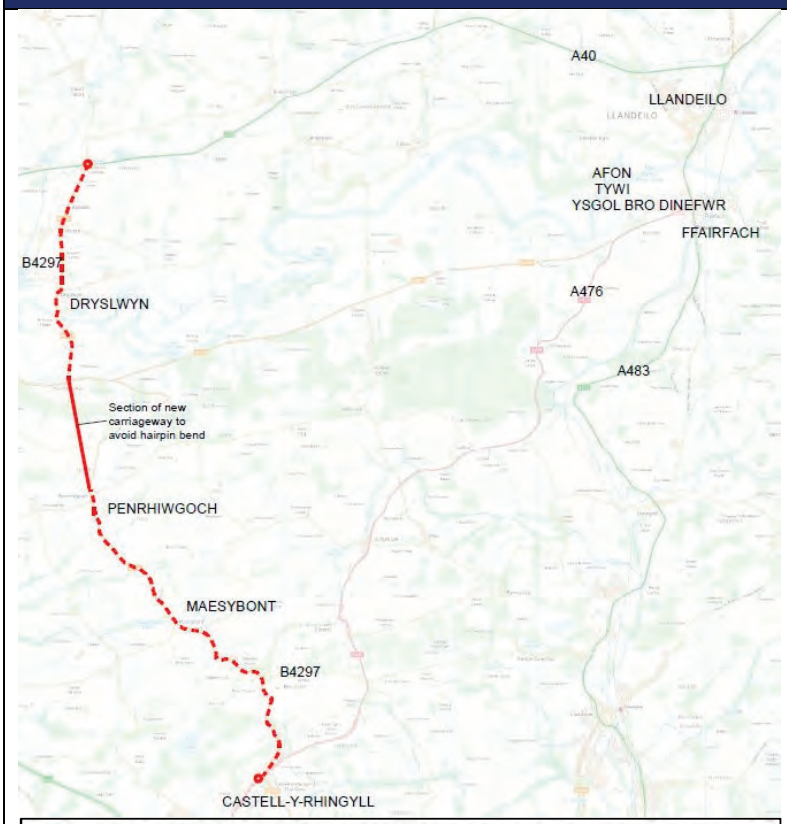
To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	×	×	✓	×	×	✓	×
The majority of the objectives are not fulfilled with this option. For instance, this option does not contribute to sustainable economic growth and tourism opportunities in Llandeilo or support the transition to a low carbon society. Additionally, it does not improve congestion through Llandeilo or pedestrian and cyclist safety, it also does not reduce community severance within Llandeilo and Ffairfach.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option overall has a beneficial impact, with a slight negative impact on journey time changes, and negligible impacts on local economy, security and affordability.								
Environment								
A neutral effect upon geology and soils, as well as noise, is anticipated. Aadditionally, a moderate beneficial effect is anticipated on local air quality due to a reduction of vehicle movements through the AQMA. However, a moderate adverse effect is anticipated upon the water environment and cultural heritage. Further to this, a large adverse effect is expected upon biodiversity and landscape and townscape.								
Who the Option impacts on								
All road users may dis-benefit from this bypass due to the proposed alignment, with businesses in Llandeilo and Dinefwr Park experiencing a neutral impact. Users of Llandeilo train station and students of Ysgol Bro Dinefwr may benefit from this bypass option; however, some businesses may dis-benefit due to the significant diversion.								

BW6 – Far West Route via Dryslwyn

Description

Far West Route via Dryslwyn is located approximately 6km west of Llandeilo. The route leaves the A40 at the junction with the B4297, near Cross Inn Cottage. The B4297 will be upgraded to an A road standard single carriageway (7.3m) which passes through Felindre, Dryslwyn, Penrhiwgoch and Maesybont. The route will then connect into A476 at Castyll-y-rhingyll/The Gate to the north of Cross Hands. It should be noted that Active Travel provision for this option not specified at this point.

Location



How it tackles the problem

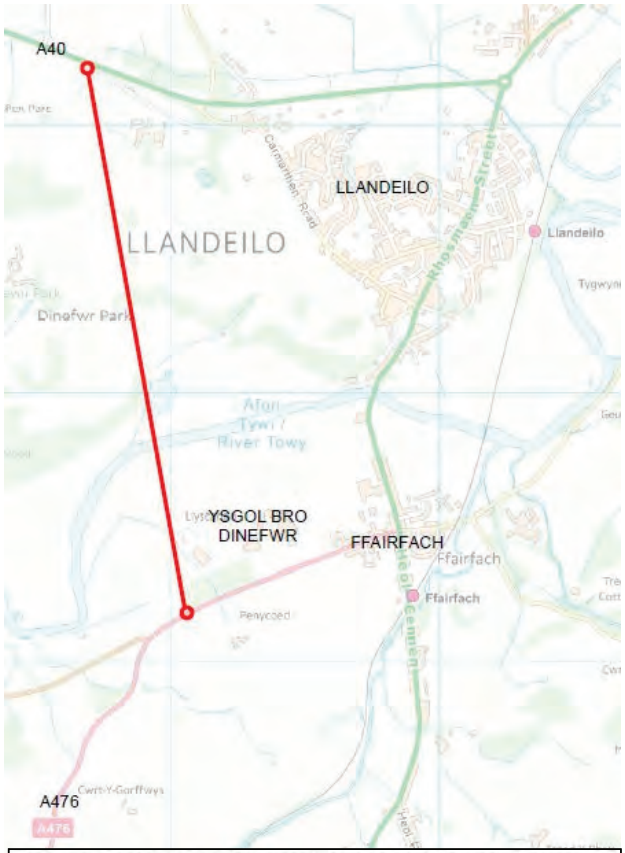
BW6 is unlikely to divert significant amounts of traffic off the A483 or A476 as they approach Llandeilo and therefore traffic flows on Rhosmaen Street would remain as they are currently. On this basis, there would not be any significant improvement to address the issues raised in respect of traffic in Llandeilo.

This option would not contribute to the Well-being Objectives of the Welsh Government and is considered not to contribute to any of the outcomes set out in the Wales Transport Plan.

To what extent it meets the objectives

Objective No	1	2	3	4	5	6	7	8

Met ✓ or x	✓	×	×	×	×	×	×	×
This option only fulfils objective 1 of preserving the strategic function of the A483.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option scores large negative on journey time changes, however the rest of the appraisal scores are either beneficial or negligible.								
Environment								
A neutral effect upon geology and soils is anticipated and a moderate beneficial effect is anticipated on local air quality. However, a slight adverse effect for noise is anticipated, as the majority of this route would be along existing minor roads but there is the potential for large increases at small communities and scattered rural properties. A slight adverse effect is also anticipated to landscape and townscape and cultural heritage. A moderate adverse effect is anticipated upon the water environment as the route crosses the River Tywi and several tributaries, all WFD waterbodies. Further to this, a large adverse effect is anticipated upon biodiversity.								
Who the Option impacts on								
All road users may dis-benefit from this bypass due to the proposed alignment, it is anticipated that businesses in Llandeilo and Dinefwr Park experiencing a neutral impact. Small communities and scattered rural properties may also experience a negative impact in terms of noise. It is anticipated that a neutral impact on users of Llandeilo train station and students of Ysgol Bro Dinefwr would occur; however, some businesses may dis-benefit due to the significant diversion.								

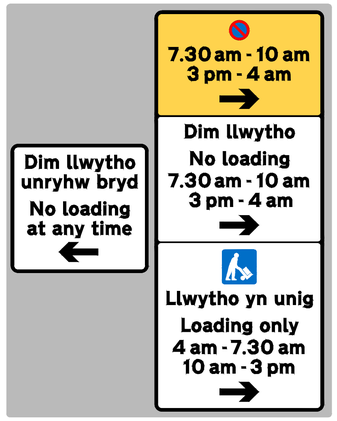
BT1 – Tunnel
Description
The tunnel is proposed from the A40 to A476 under Dinefwr Park to the east of King's Lodge.
Location

How it tackles the problem
BT1 may reduce severance along the A483/Rhosmaen Street within Llandeilo (depending on the chosen bypass) as well as improve journey reliability due to providing a direct, free-flow route which would avoid the pinch points within Llandeilo/Ffairfach. Pedestrian safety should also improve as well as the cycling environment, road safety and may promote visitors as the number of through-traffic journey should decrease with a bypass in place. This may also help reduce the closure of local amenities. HGV and school traffic should also reduce within Llandeilo/Ffairfach as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked. Further to this, emergency service response times (on call) should improve due to a reduction in traffic using Rhosmaen Street, or emergency service vehicles could use the bypass which would provide a direct, free-flow route. This option would result in a reduction in air pollution within the AQMA. This option would contribute to the Welsh Government achieving its Well-being Objectives and help deliver some of the long-term outcomes set out in the Wales Transport Strategy.

To what extent it meets the objectives								
Objective No	1	2	3	4	5	6	7	8
Met ✓ or x	✓	✓	✓	✓	✓	✓	✓	✓
Option BT1 passes all 8 of the objectives however is unlikely to be feasible when looking at the Land and Cost requirements for it. For this reason, the option wasn't shortlisted.								
Appraisal								
Economy and Social and Cultural								
Appraisal of Economics and Social and Cultural impacts has identified that this option overall scores beneficial for the appraisal areas, with negligible impacts on security and affordability.								
Environment								
It is anticipated that there is a neutral effect upon geology and soils and cultural heritage. Additionally, there is a slight beneficial effect for noise and a moderate beneficial effect on local air quality. However, it is anticipated that there is a slight adverse effect is anticipated to landscape and townscape, biodiversity and cultural heritage. Also, it is anticipated that a moderate adverse effect will occur upon the water environment.								
Who the Options impacts on								
All road users should benefit from this option, as well as businesses within Llandeilo's town Centre and Dinefwr Park. There would be no noise increases along the alignment and properties along the A483 within Llandeilo should also benefit. Further to this, walkers and cyclists, students of Ysgol Bro Dinefwr and users of Llandeilo railway station are likely to benefit from this option.								

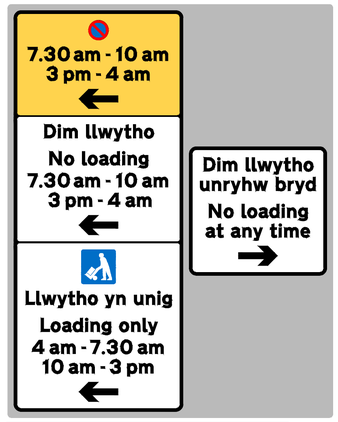
Appendix B. Existing Traffic Regulation Orders drawings

DO NOT SCALE

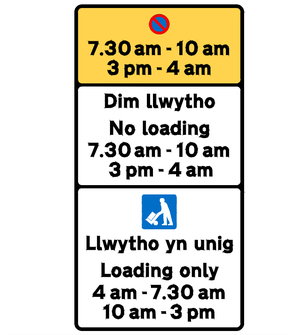
Millimetres 0 10 100



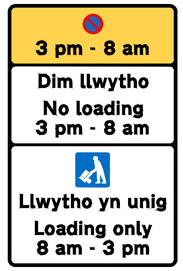
Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S1	x-height	15.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	500mm
Border	BLACK	Height	630mm
Material	Class RA2 (12899-1:2007)	Area	0.31sq.m



Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S2	x-height	15.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	500mm
Border	BLACK	Height	630mm
Material	Class RA2 (12899-1:2007)	Area	0.31sq.m



Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S3	x-height	15.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	260mm
Border	BLACK	Height	500mm
Material	Class RA2 (12899-1:2007)	Area	0.13sq.m



Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S4	x-height	15.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	260mm
Border	BLACK	Height	400mm
Material	Class RA2 (12899-1:2007)	Area	0.10sq.m

EXISTING SIGN TAKEN DOWN AND REMOVED TO TIP. NEW SIGN S1 PROVIDED ON EXISTING POST AT BACK OF FOOTWAY

EXISTING LOADING SIGN TAKEN DOWN AND REMOVED TO TIP. NEW SIGN S2 PROVIDED ON EXISTING POST AT BACK OF FOOTWAY.

EXISTING SIGN ON LIGHTING COLUMN REMOVED TIP. NEW SIGN S3 PROVIDED ON LIGHTING COLUMN.

EXISTING SIGNS TAKEN DOWN AND REMOVED TO TIP. NEW SIGN S4 PROVIDED ON EXISTING POSTS AT BACK OF FOOTWAY

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL SIGNS IN ACCORDANCE WITH TSRGD.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

NONE

MAINTENANCE/CLEANING

PROXIMITY TO HIGH SPEED TRAFFIC AND STATUTORY UTILITY PLANT.

DECOMMISSIONING/DEMOLITION

NONE

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

Rev.	Date	Description	By	Chk'd	App'd
Z1	19/06/17	AS BUILT ISSUE	F.T.	C.G.	J.R.

Drawing Status: AS BUILT

Suitability: AB

ATKINS
West Glamorgan House
12, Orchard Street
Swansea
SA1 5AD
Tel: +44 (0) 1792 641172
Fax: +44 (0) 1792 472019
www.atkinsglobal.com

Client: Yn gweithio ar ran **Llywodraeth Cymru** Working on behalf of the **Welsh Government**

Project Title: A483 LLANDEILO SPEED LIMIT AND TRO REVISIONS

Drawing Title: LOADING RESTRICTIONS

Scale	Designed	Drawn	Checked	Authorised
1:500	C.G.	F.T.	C.G.	J.R.
Original Size: A1	Date: 19/06/17	Date: 19/06/17	Date: 19/06/17	Date: 19/06/17

Drawing Number: JR03-301-ATK-HGN-SWTRA-DR-D-1003

Revision: Z 1

DO NOT SCALE

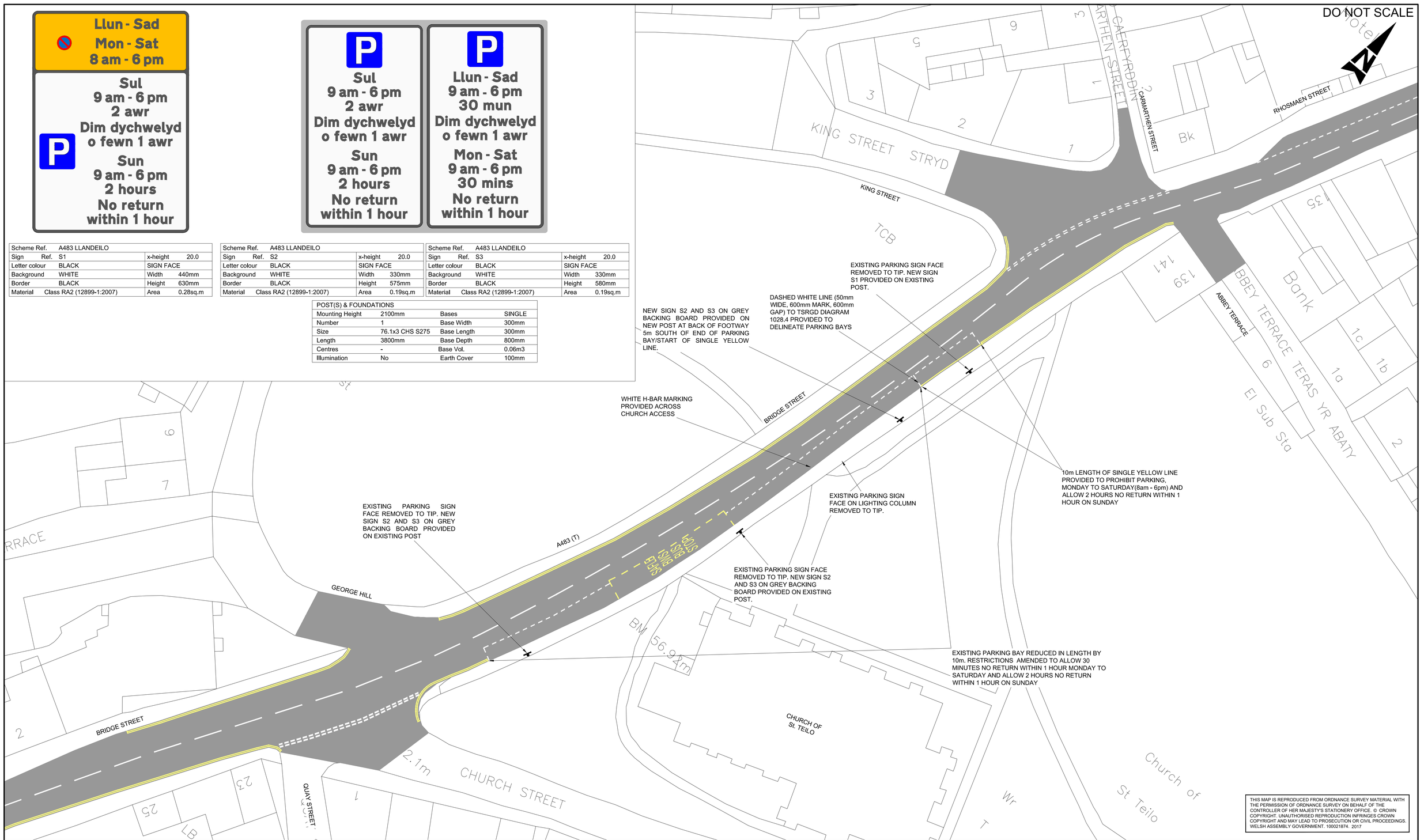
Millimetres 0 10 100

Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S1	x-height	20.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	440mm
Border	BLACK	Height	630mm
Material	Class RA2 (12899-1:2007)	Area	0.28sq.m

Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S2	x-height	20.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	330mm
Border	BLACK	Height	575mm
Material	Class RA2 (12899-1:2007)	Area	0.19sq.m

Scheme Ref.	A483 LLANDEILO		
Sign Ref.	S3	x-height	20.0
Letter colour	BLACK	SIGN FACE	
Background	WHITE	Width	330mm
Border	BLACK	Height	580mm
Material	Class RA2 (12899-1:2007)	Area	0.19sq.m

POST(S) & FOUNDATIONS			
Mounting Height	2100mm	Bases	SINGLE
Number	1	Base Width	300mm
Size	76.1x3 CHS S275	Base Length	300mm
Length	3800mm	Base Depth	800mm
Centres	-	Base Vol.	0.06m3
Illumination	No	Earth Cover	100mm



GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. EXISTING ROAD MARKINGS TO REMAIN AS EXISTING UNLESS NOTED OTHERWISE.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

PROXIMITY TO TRAFFIC AND STATUTORY UTILITY PLANT

MAINTENANCE/CLEANING

NONE

DECOMMISSIONING/DEMOLITION

NONE

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

Rev.	Date	Description	By	Chk'd	App'd
Z1	19/06/17	AS BUILT ISSUE	D.K.	J.R.	C.R.

Drawing Status: AS BUILT

Suitability: AB

ATKINS
West Glamorgan House
12, Orchard Street
Swansea
SA1 5AD
Tel: +44 (0) 1792 641172
Fax: +44 (0) 1792 472019
www.atkinsglobal.com

Client: Yn gweithio ar ran **Llywodraeth Cymru** Working on behalf of the **Welsh Government**

Project Title: A483 LLANDEILO SPEED LIMIT AND TRO REVISIONS

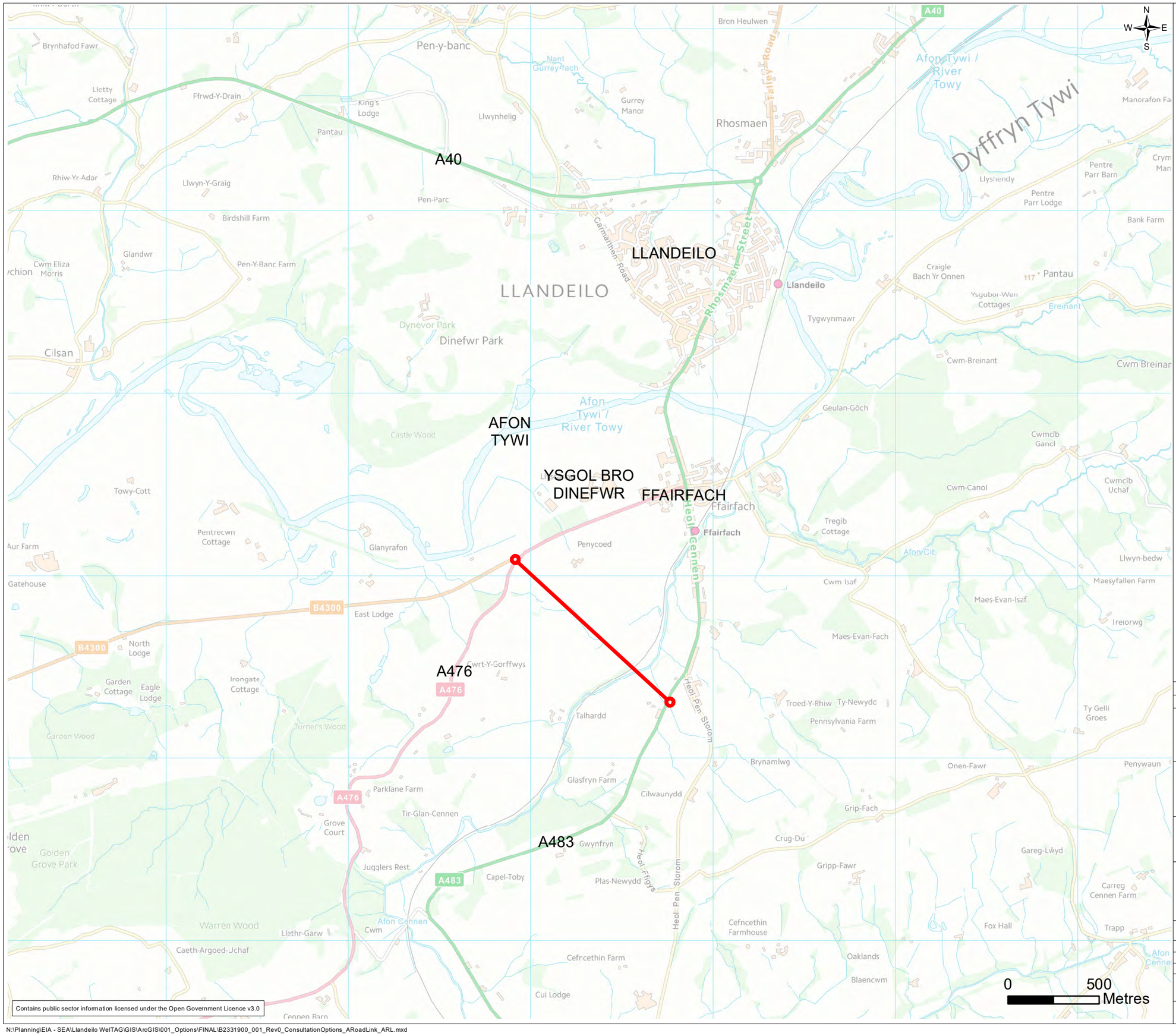
Drawing Title: BRIDGE STREET WAITING RESTRICTION TRAFFIC SIGNS

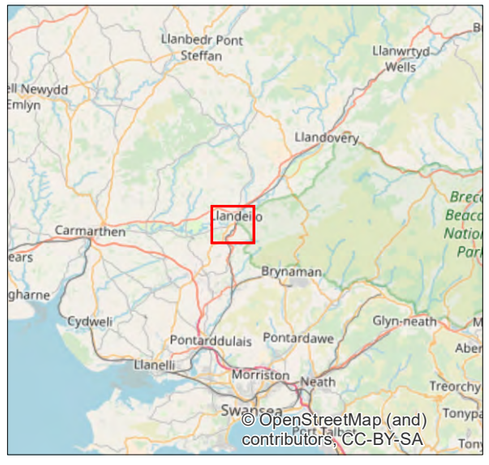
Scale	Designed	Drawn	Checked	Authorised
1:250	C.G	D.K.	J.R	C.R.
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/06/17	19/06/17	19/06/17	19/06/17

Drawing Number: JR03-301-ATK-HGN-SWTRA-DR-D-1005

Revision: Z 1

Appendix C. Option Drawings





Legend

- Option route
- Roundabout
- Upgrade

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0	15/06/2018	FINAL	FL	VC	VC	JH

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Churchill House, Churchill Way, Cardiff, CF10 2HH, UK
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www.jacobs.com

Client: Llywodraeth Cymru Welsh Government

Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: 'A' Road Link Option ARL1

FINAL

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Jacobs No.	B2331900	

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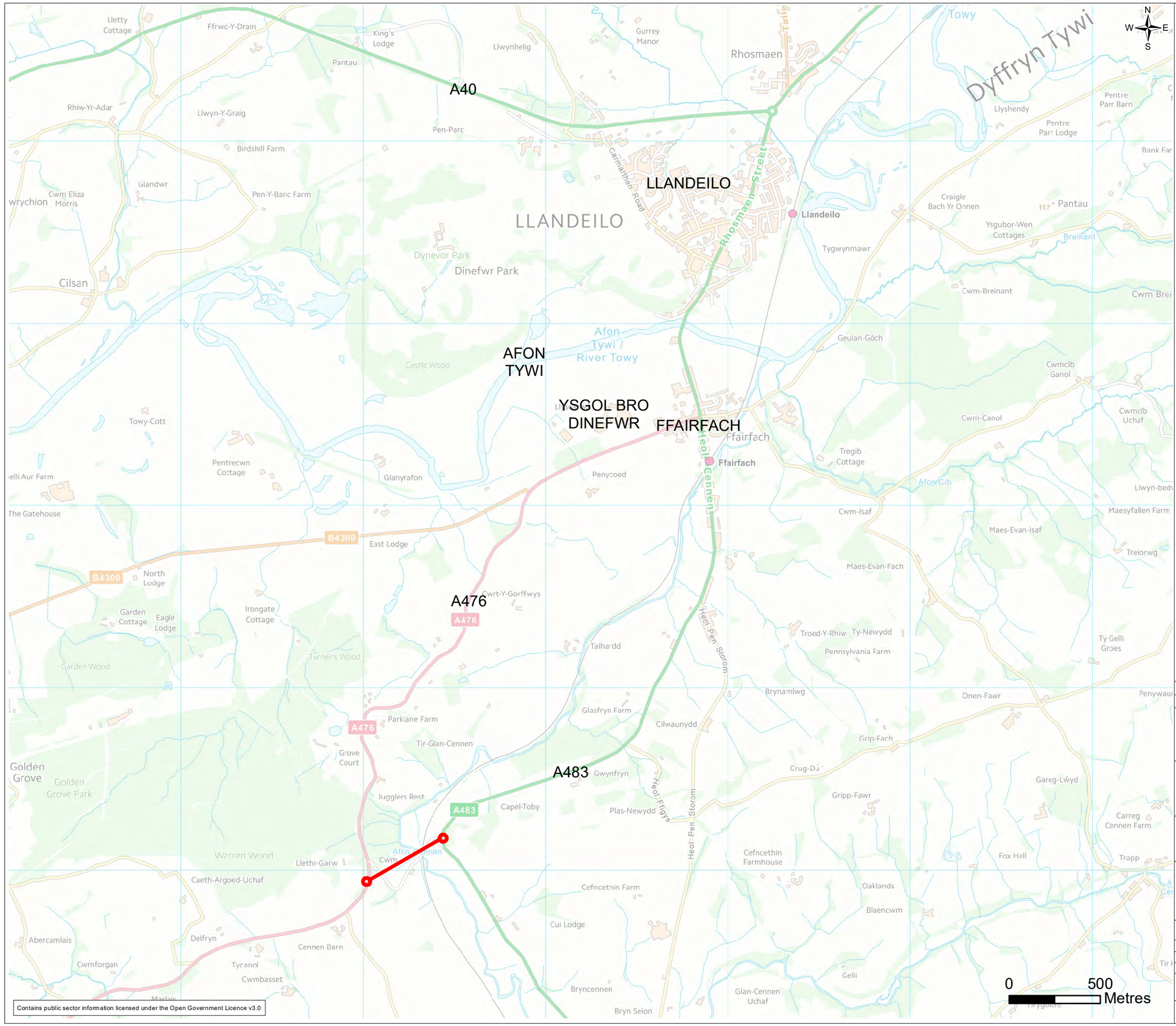
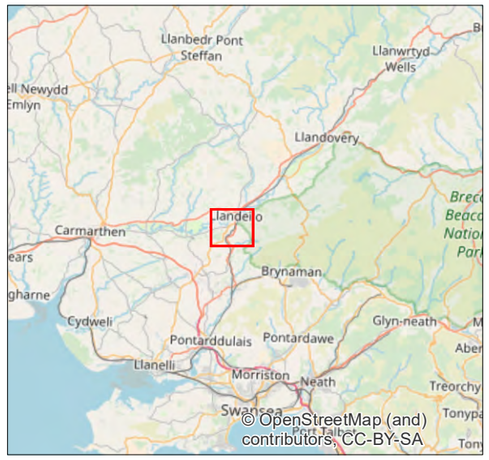


Legend

- Option route
- Roundabout
- Upgrade



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	15/06/2018	FINAL	FL	VC	VC	JH

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Welsh Government

Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

'A' Road Link
Option ARL2

FINAL

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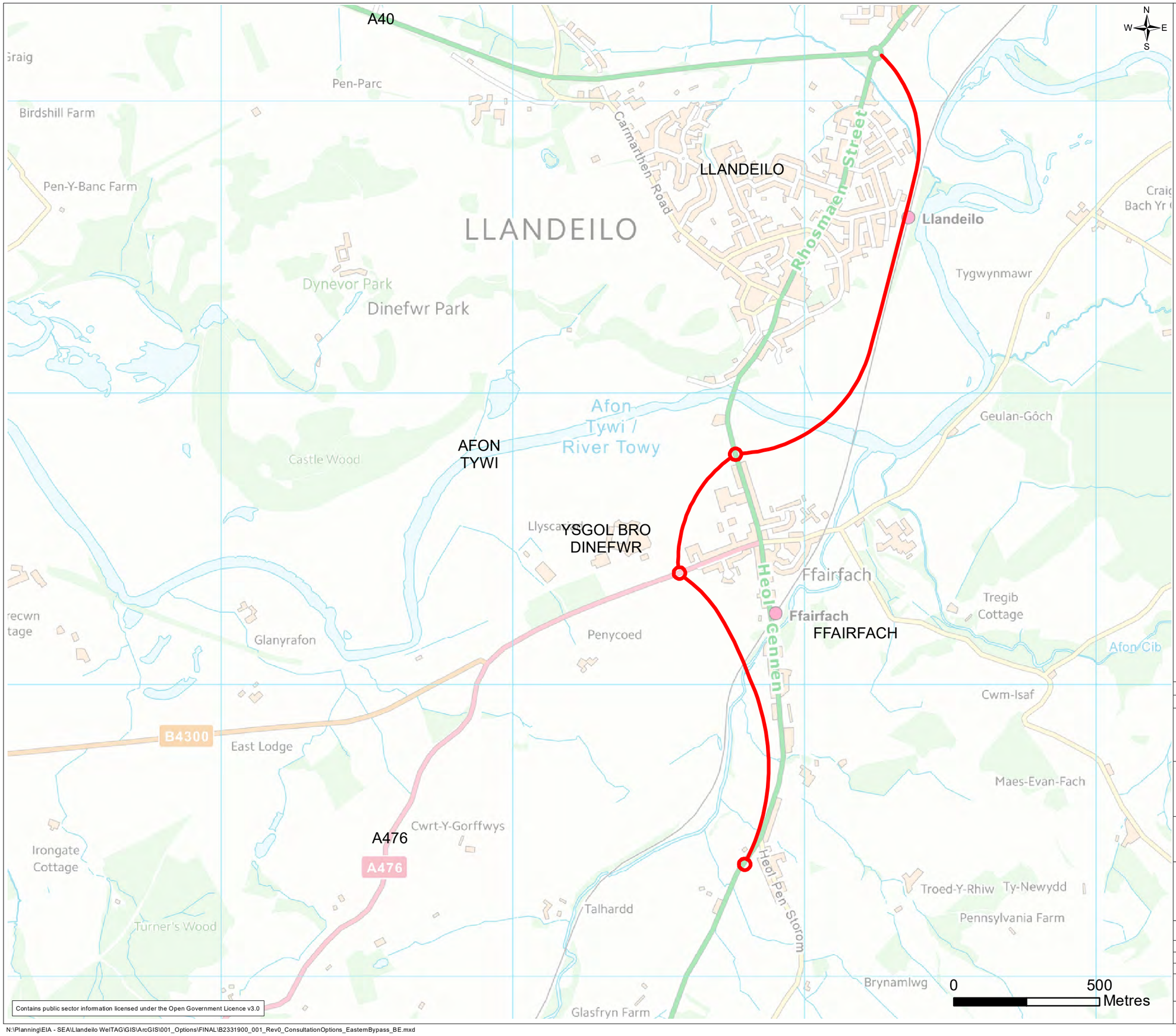
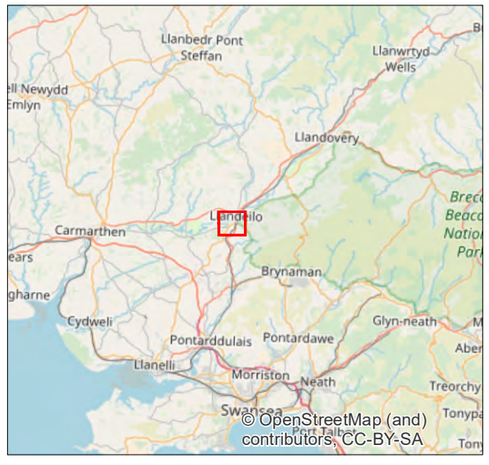


Legend

- Option route
- Roundabout
- Upgrade existing road



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Welsh Government

Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Eastern Bypass
Option BE1A

FINAL

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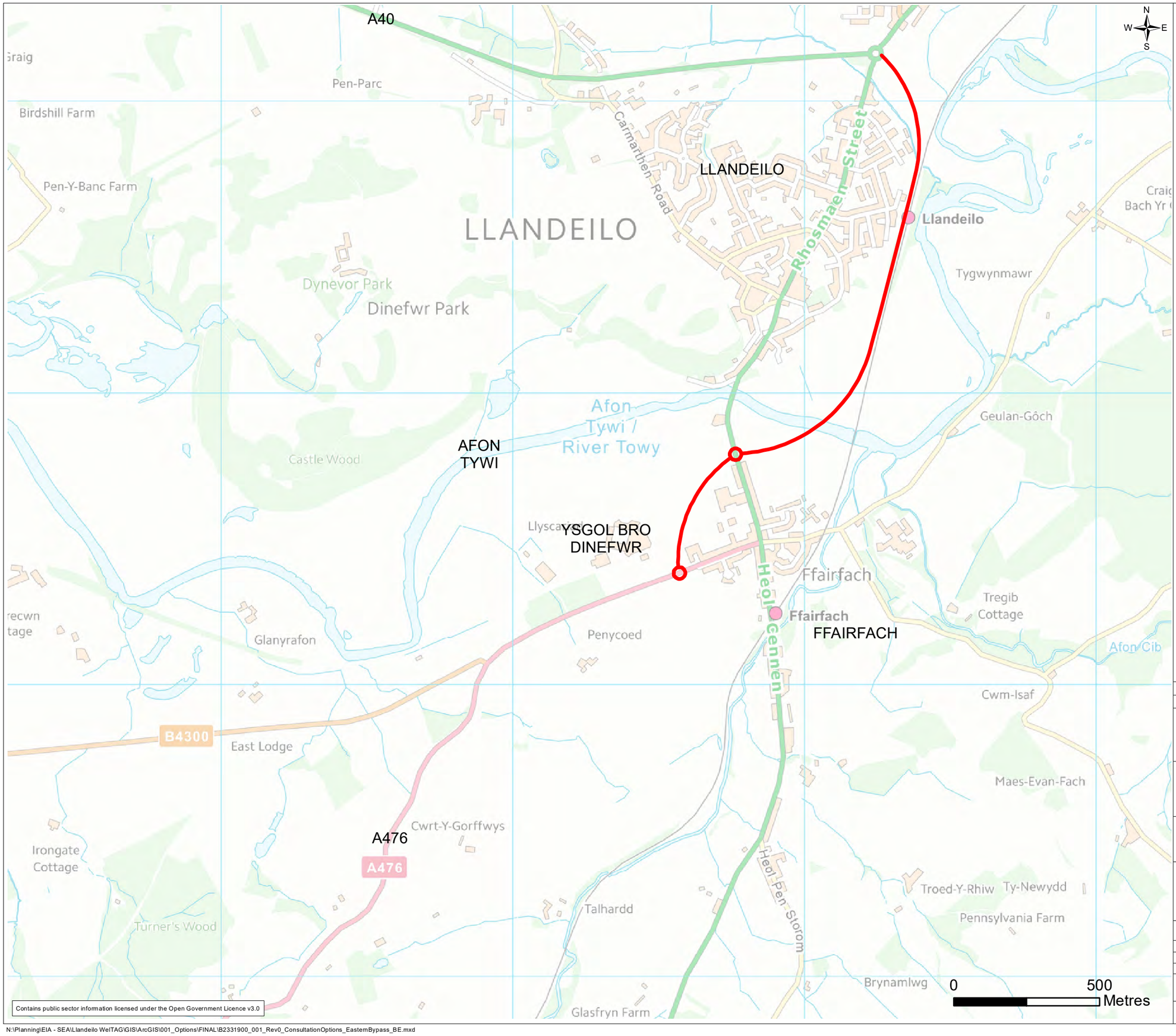
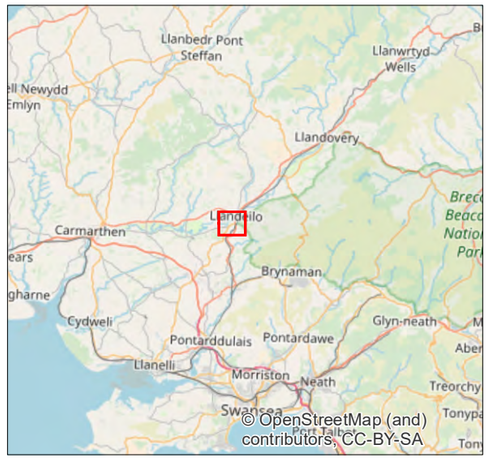


Legend

- Option route
- Roundabout
- Upgrade existing road



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A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Eastern Bypass
Option BE1B

FINAL

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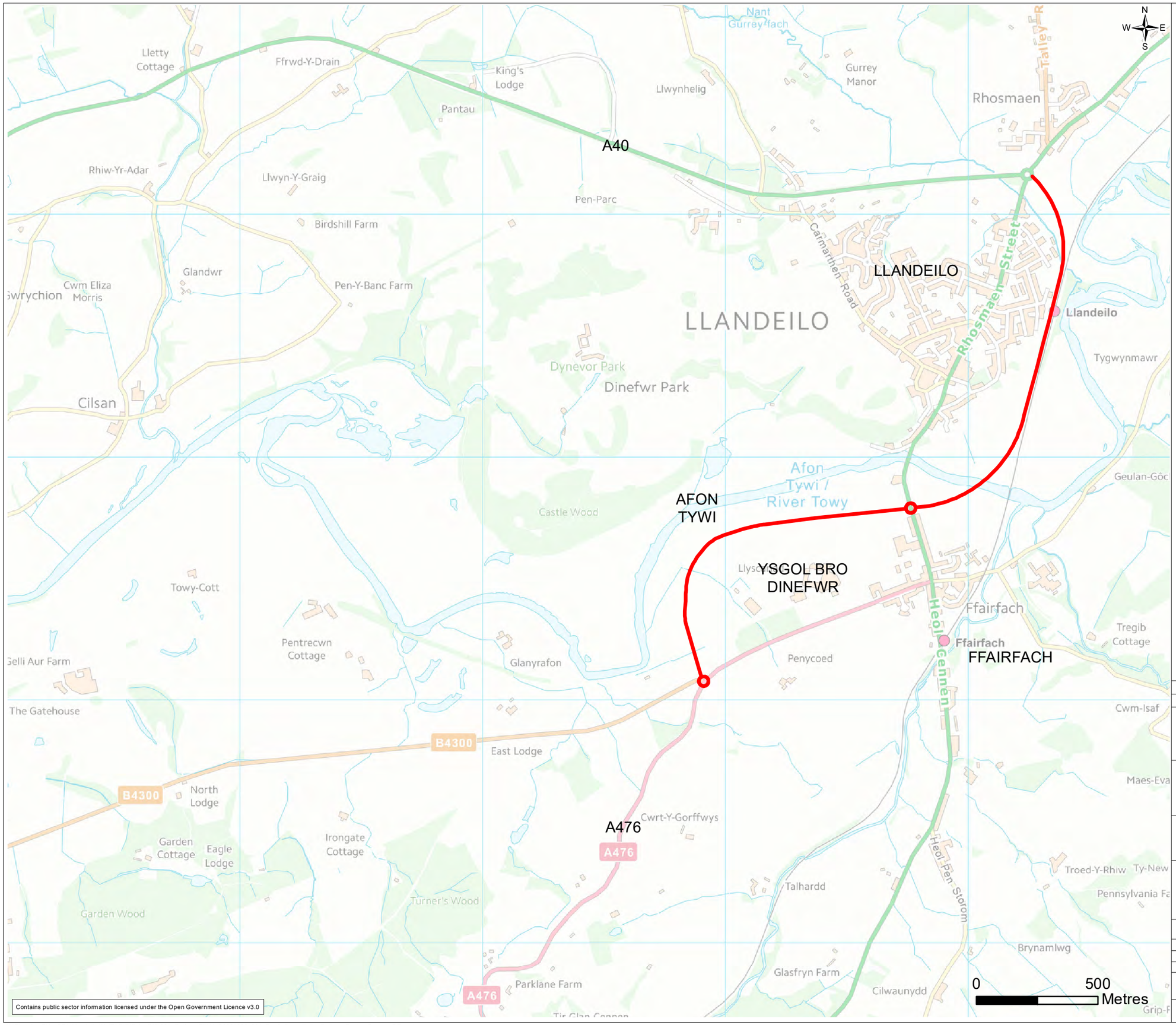
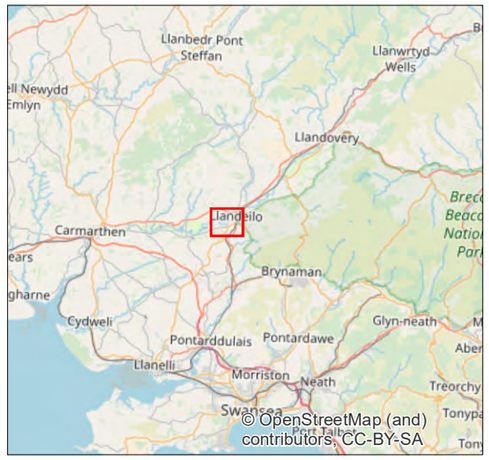


Legend

- Option route
- Roundabout
- Upgrade existing road



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Client: Llywodraeth Cymru / Welsh Government

Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Eastern Bypass Option BE1C

FINAL

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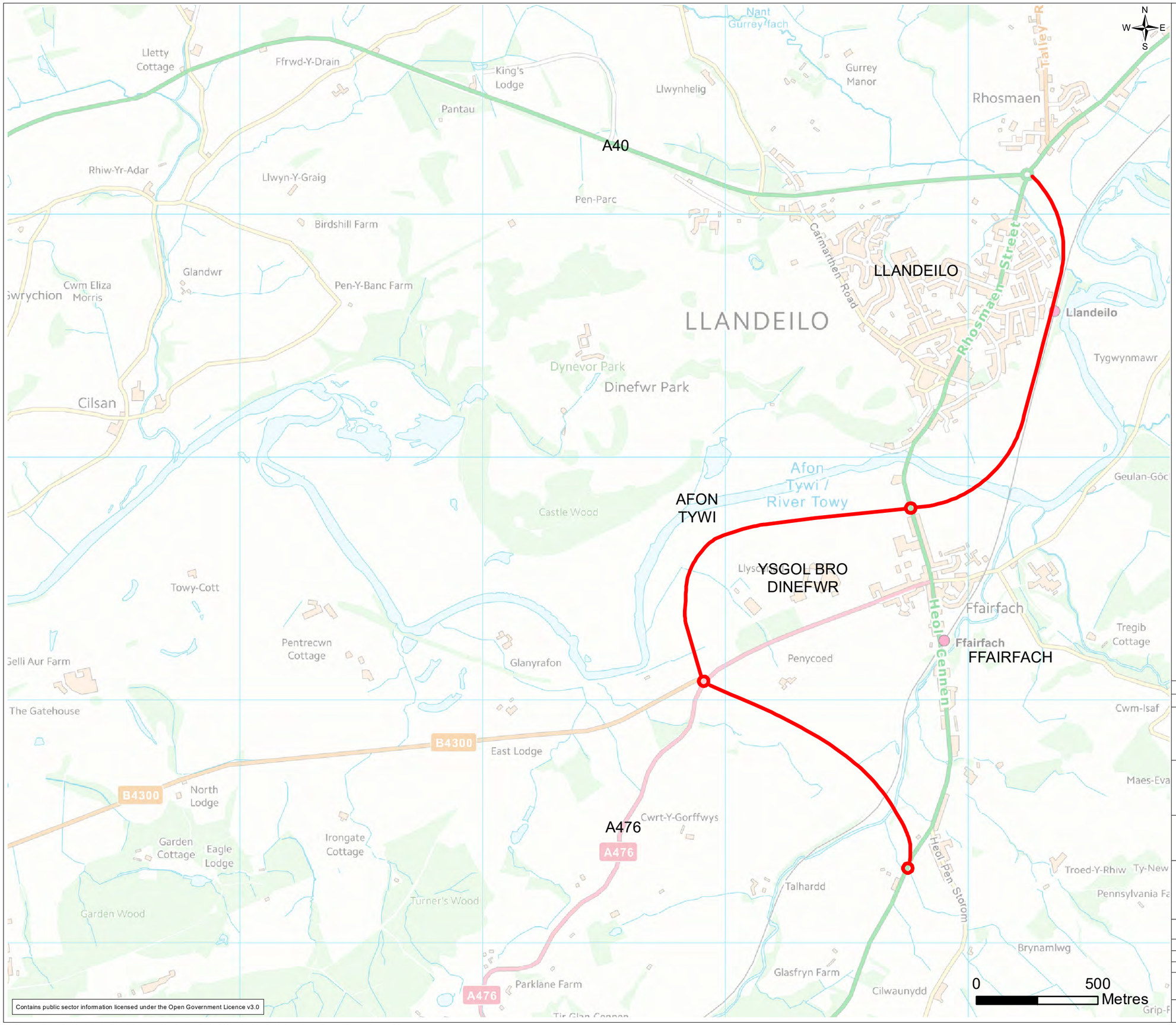
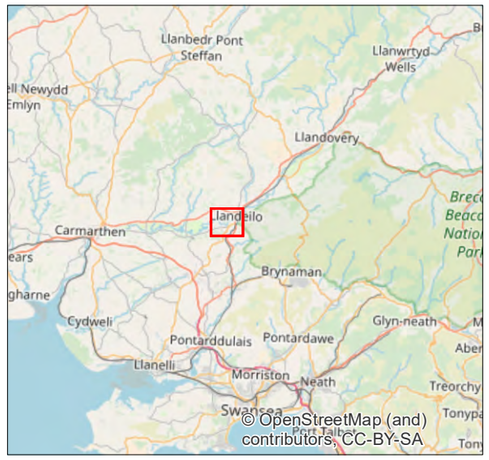


Legend

- Option route
- Roundabout
- Upgrade existing road



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Eastern Bypass Option BE1D

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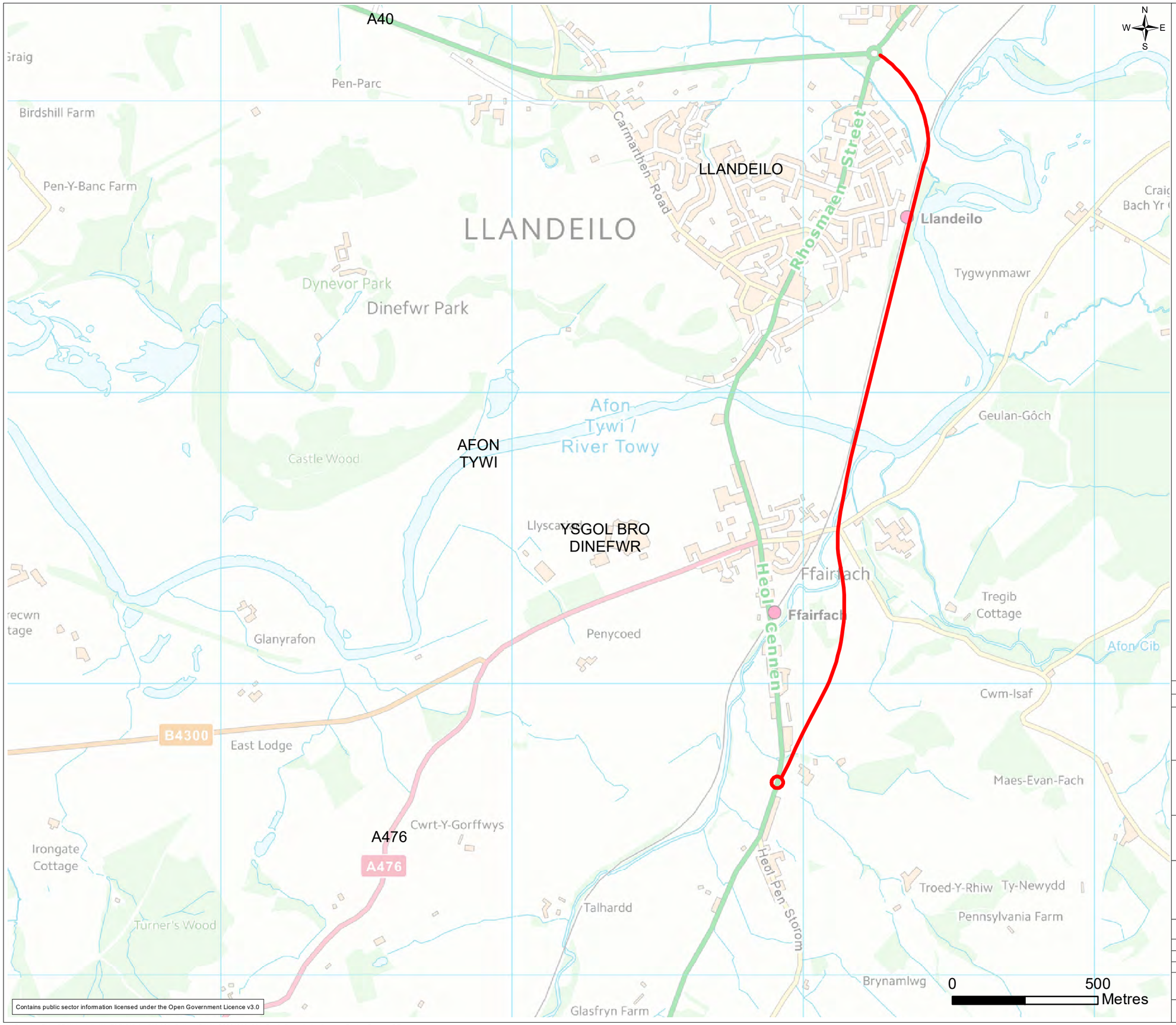
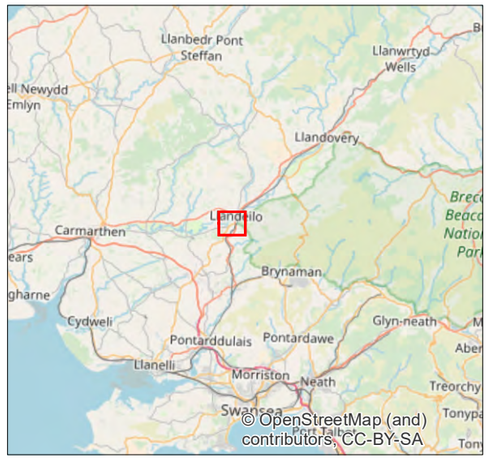


Legend

- Option route
- Roundabout
- Upgrade existing road



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Client

Llywodraeth Cymru
Welsh Government

Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Eastern Bypass
Option BE2

FINAL

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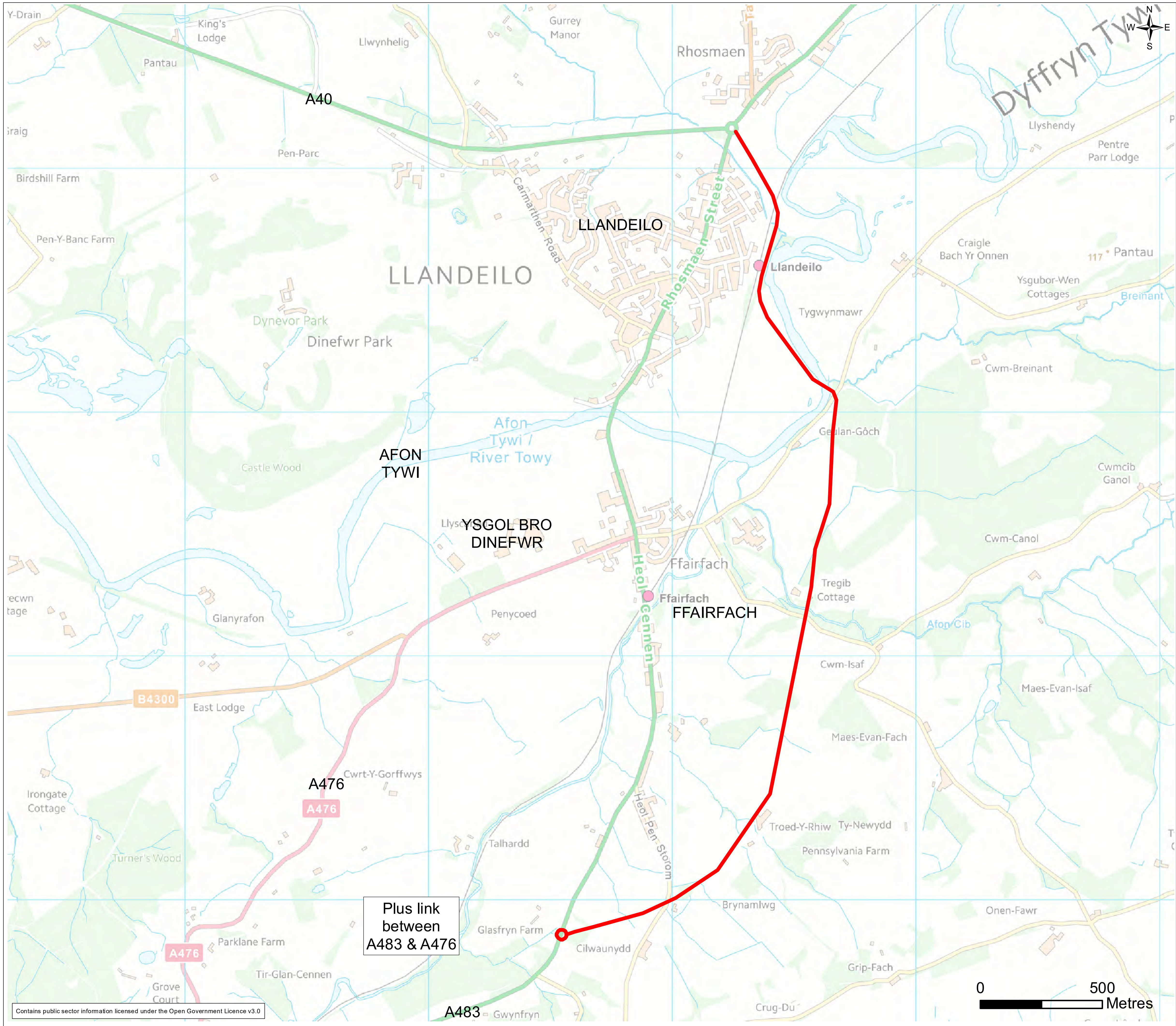
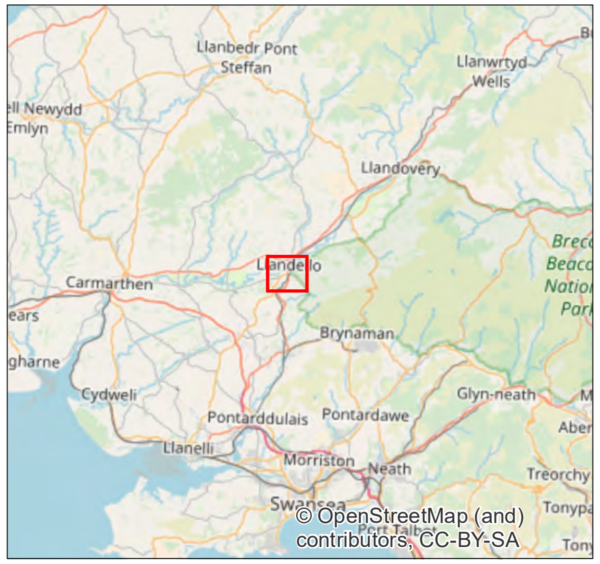


Legend

- Option route
- Roundabout
- Upgrade existing road



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	15/06/2018	FINAL	FL	VC	VC	JH

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Client
Llywodraeth Cymru
Welsh Government

Project
A483 LLANDEILO TRANSPORT STUDY

Drawing Title
Eastern Bypass
Option BE3A

FINAL

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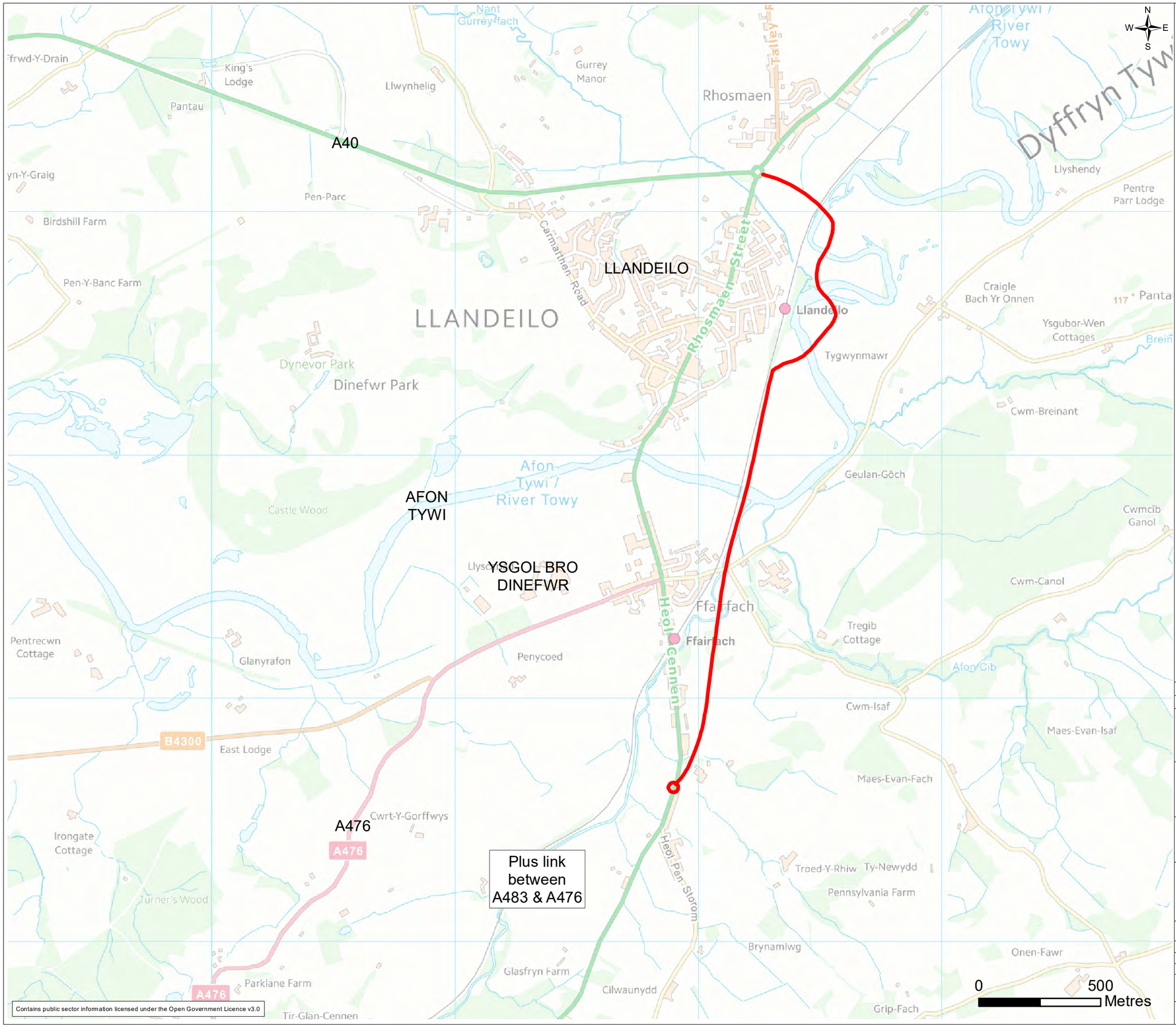
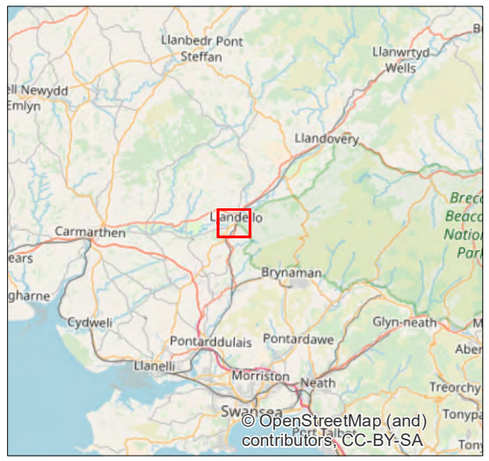


Legend

- Option route
- Roundabout
- Upgrade existing road



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Client: Llywodraeth Cymru / Welsh Government

Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Eastern Bypass Option BE3B

FINAL

Scale @ A3	1:15,000	DO NOT SCALE
Jacobs No.	B2331900	

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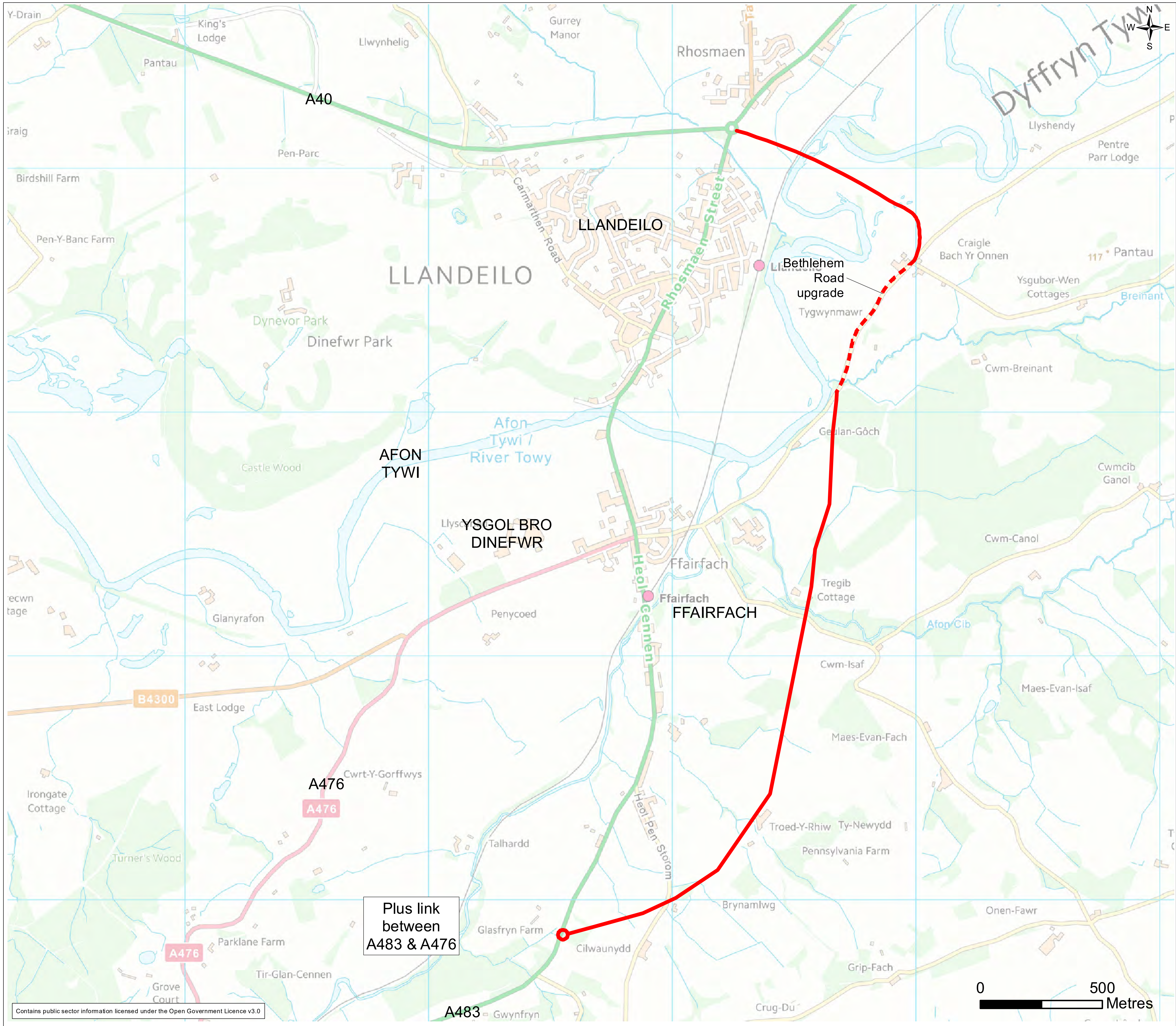

A40
LLANDEILO
Rhosmaen
Rhosmaen Street
Carmarthen Road
Bethlehem Road upgrade
Dyffryn Tywi
Dynevor Park
Dinefwr Park
Afon Tywi / River Towy
AFON TYWI
YSGOL BRO DINEFWR
Ffairfach
FFAIRFACH
Heol Cennen
Heol Pen-Storom
B4300
A476
Plus link between A483 & A476
A483
Gellan-Gôch
Cwm-Breinant
Craigle Bach Yr Onnen
Ysgubor-Wen Cottages
Pantau
Llyshendy
Pentre Parr Lodge
Gurrey Manor
King's Lodge
Llwynhelig
Pen-Parc
Birdshill Farm
Pen-Y-Banc Farm
Castle Wood
Glanyrafon
Penycoed
East Lodge
Cwrt-Y-Gorffwys
Irongate Cottage
Turner's Wood
Talhardd
Parklane Farm
Tir-Glan-Cennen
Grove Court
Glasfryn Farm
Cilwaunydd
Gwynfryn
Brynamlwg
Troed-Y-Rhiw
Ty-Newydd
Pennsylvania Farm
Maes-Evan-Fach
Maes-Evan-Isaf
Cwm-Isaf
Tregib Cottage
Afon Cib
Cwm-Canol
Cwmcib Ganol
Onen-Fawr
Grip-Fach
Crug-Du
Tygwynmawr
Breinant
0 500 Metres
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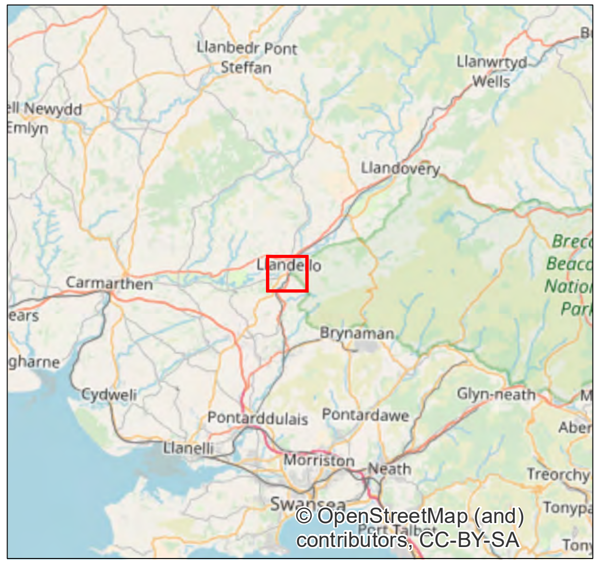
Legend

- Option route
- Roundabout
- Upgrade existing road



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Client

Llywodraeth Cymru
Welsh Government

Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Eastern Bypass
Option BE3C

FINAL

Scale @ A3	1:15,000	DO NOT SCALE
Jacobs No.	B2331900	

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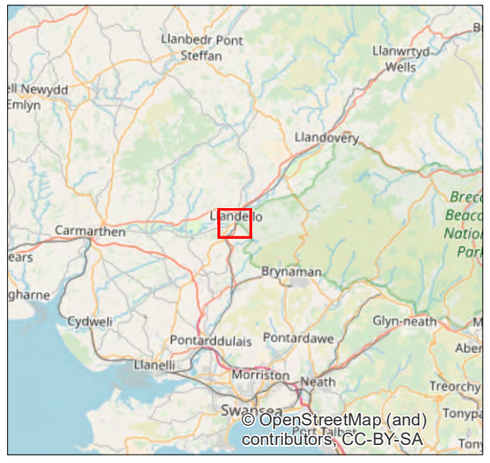
Legend

- Option route
- Roundabout
- Upgrade existing road



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Eastern Bypass Option BE3D

FINAL

Scale @ A3	1:15,000	DO NOT SCALE
Jacobs No.	B2331900	

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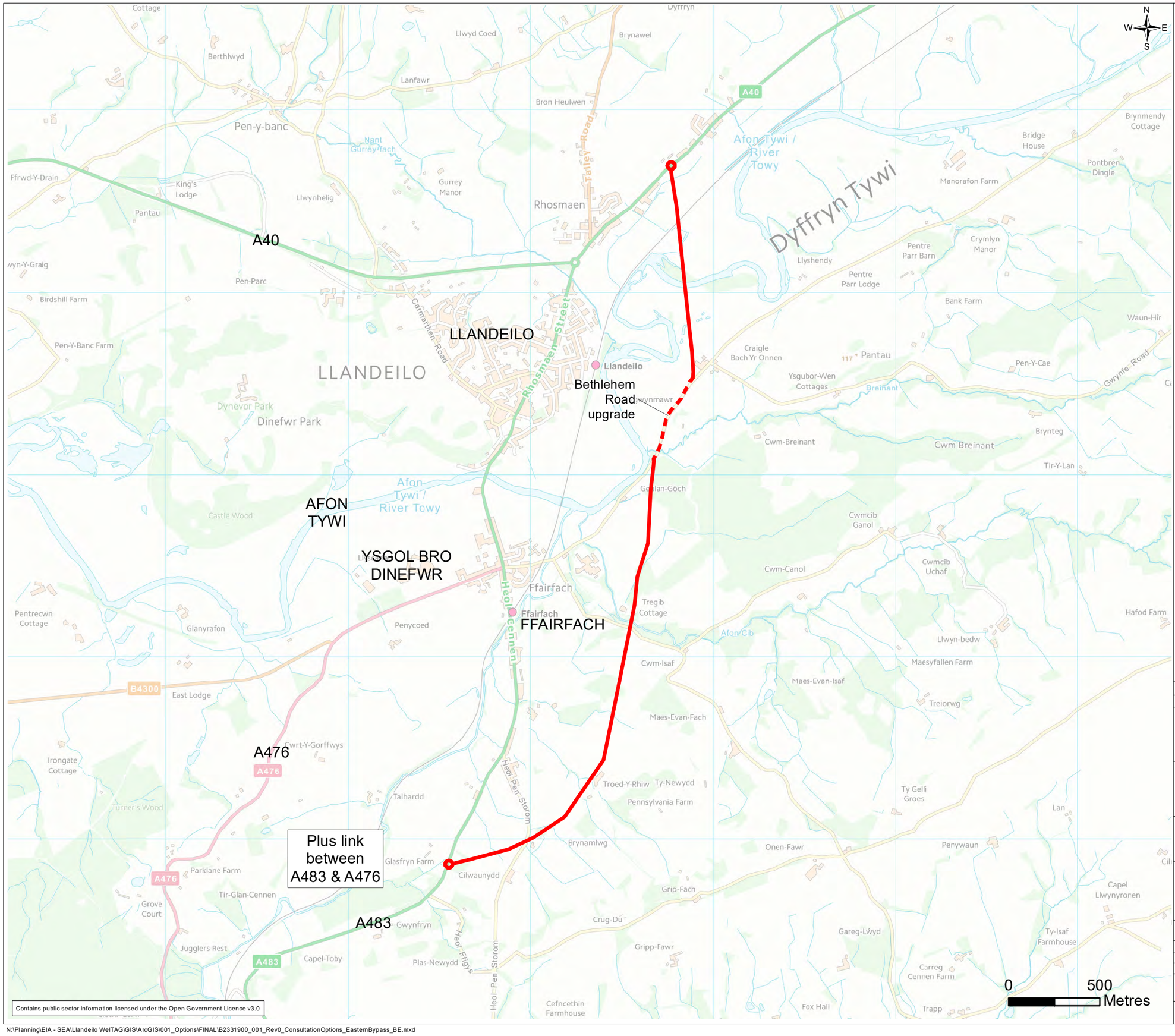
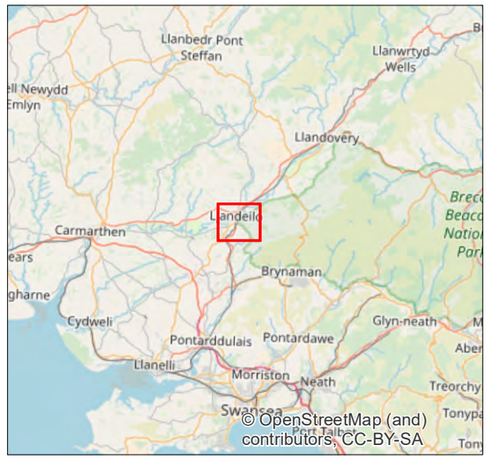


Legend

- Option route
- Roundabout
- Upgrade existing road



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Eastern Bypass Option BE4A

FINAL

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Jacobs No.	B2331900	

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Legend

- Option route
- Roundabout
- Upgrade existing road

A40

LLANDEILO

LLANDEILO

Bethlehem Road upgrade

AFON TYWI

YSGOL BRO DINEFWR

A476

Plus link between A483 & A476

A483

Dyffryn Tywi

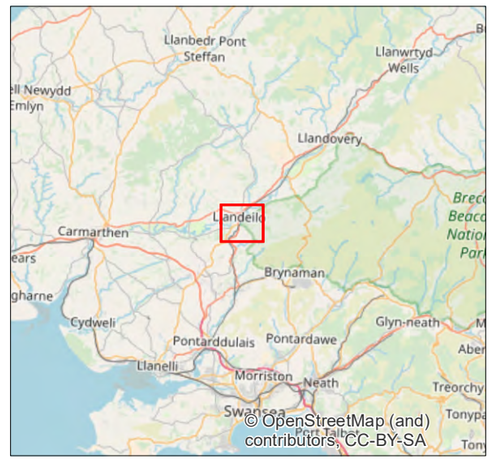
Afon Tywi / River Towy

Rhosmaen

Llandeilo

Ffairfach

0 500 Metres



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Eastern Bypass Option BE4B

FINAL

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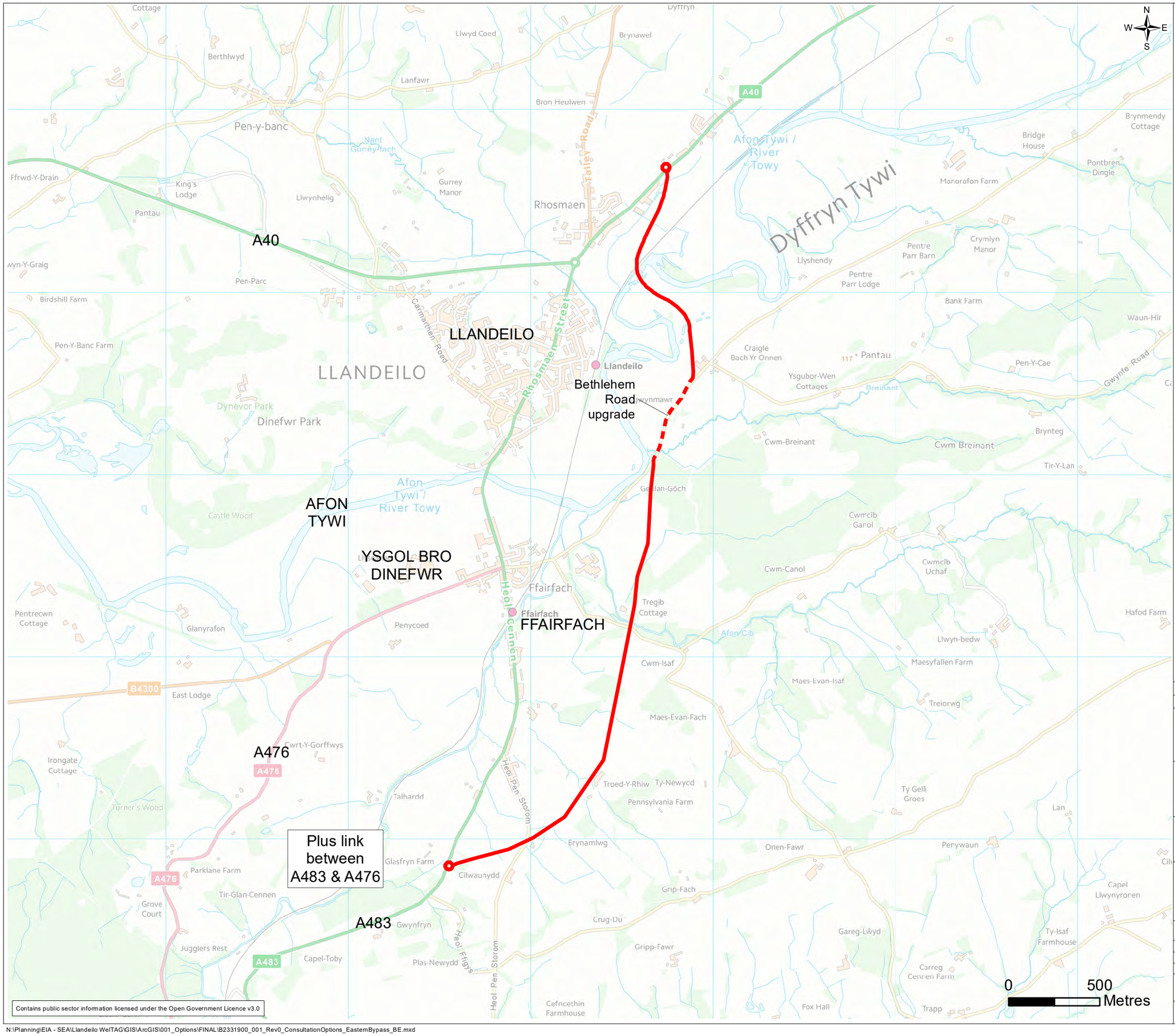
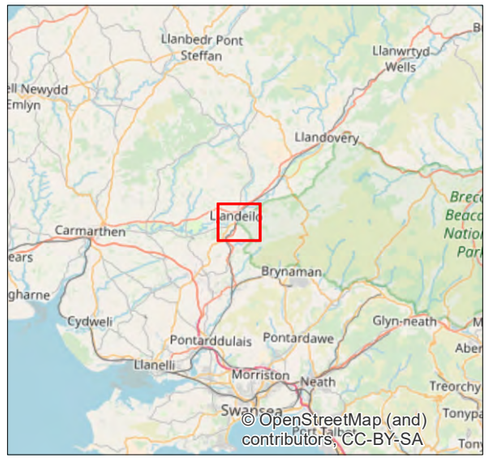


Legend

- Option route
- Roundabout
- Upgrade existing road



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Drawing Title: Eastern Bypass Option BE4C

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Legend

- Option route
- Roundabout
- Upgrade existing road

A40

LLANDEILO

Bethlehem Road upgrade

AFON TYWI

YSGOL BRO DINEFWR

A476

Plus link between A483 & A476

A483

Dyffryn Tywi

Afon Tywi / River Towy

Rhosmaen

Llandeilo

Pantau

Ffairfach

0 500 Metres

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Drawing Title: Eastern Bypass Option BE4D

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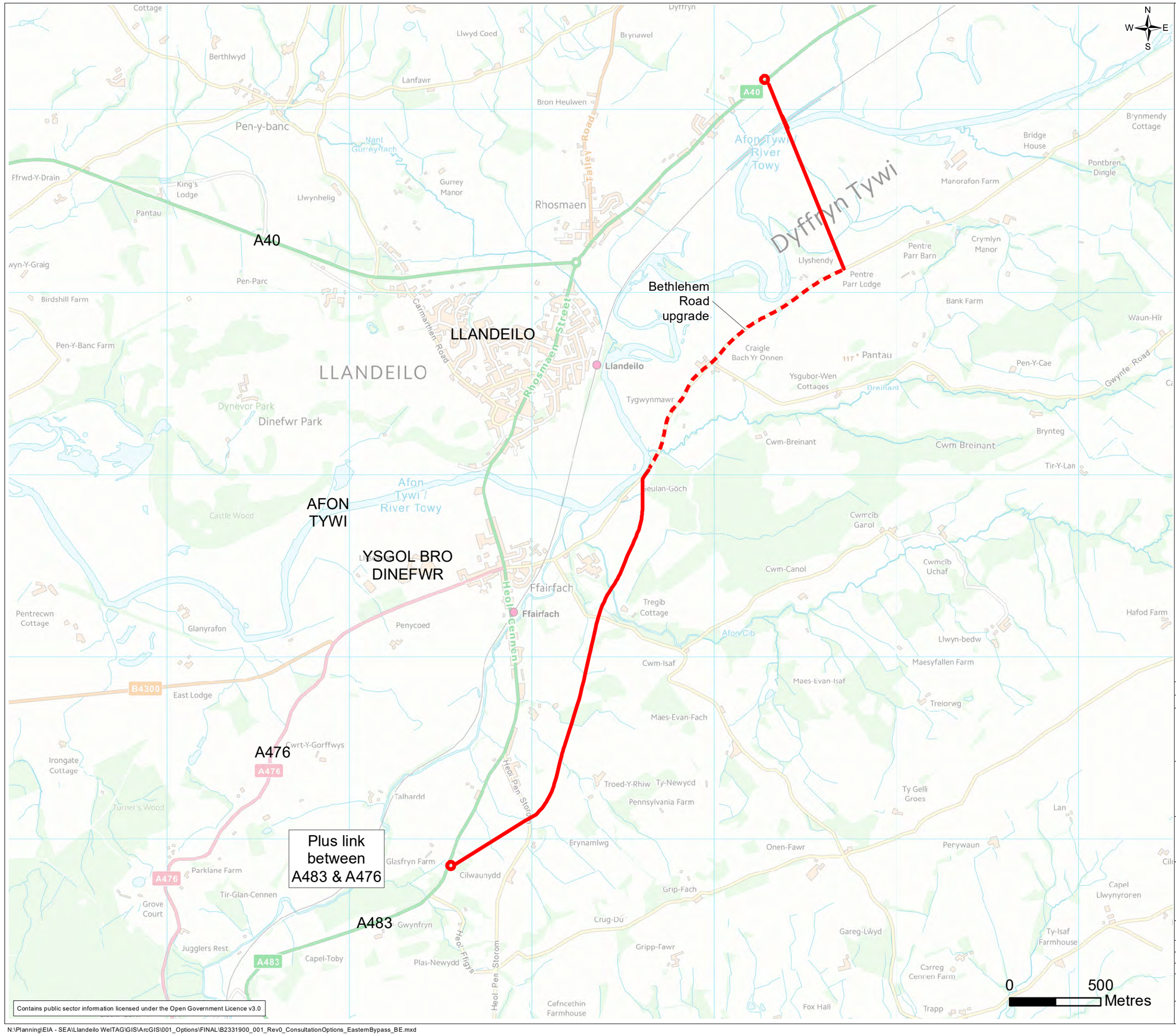

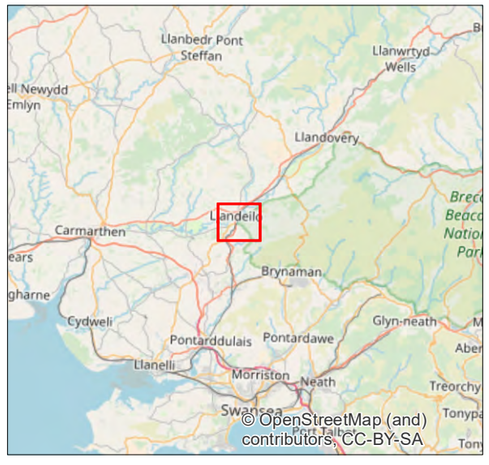

Legend

- Option route
- Roundabout
- Upgrade existing road

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Drawing Title: Eastern Bypass Option BE5A

FINAL

Scale @ A3	1:20,000	DO NOT SCALE
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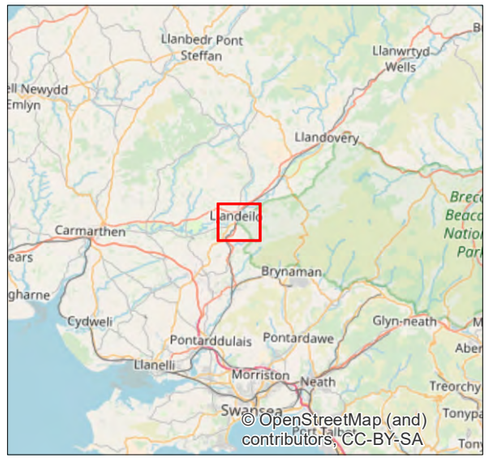
Legend

- Option route
- Roundabout
- Upgrade existing road



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Drawing Title: Eastern Bypass Option BE5B

FINAL

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0 500 Metres

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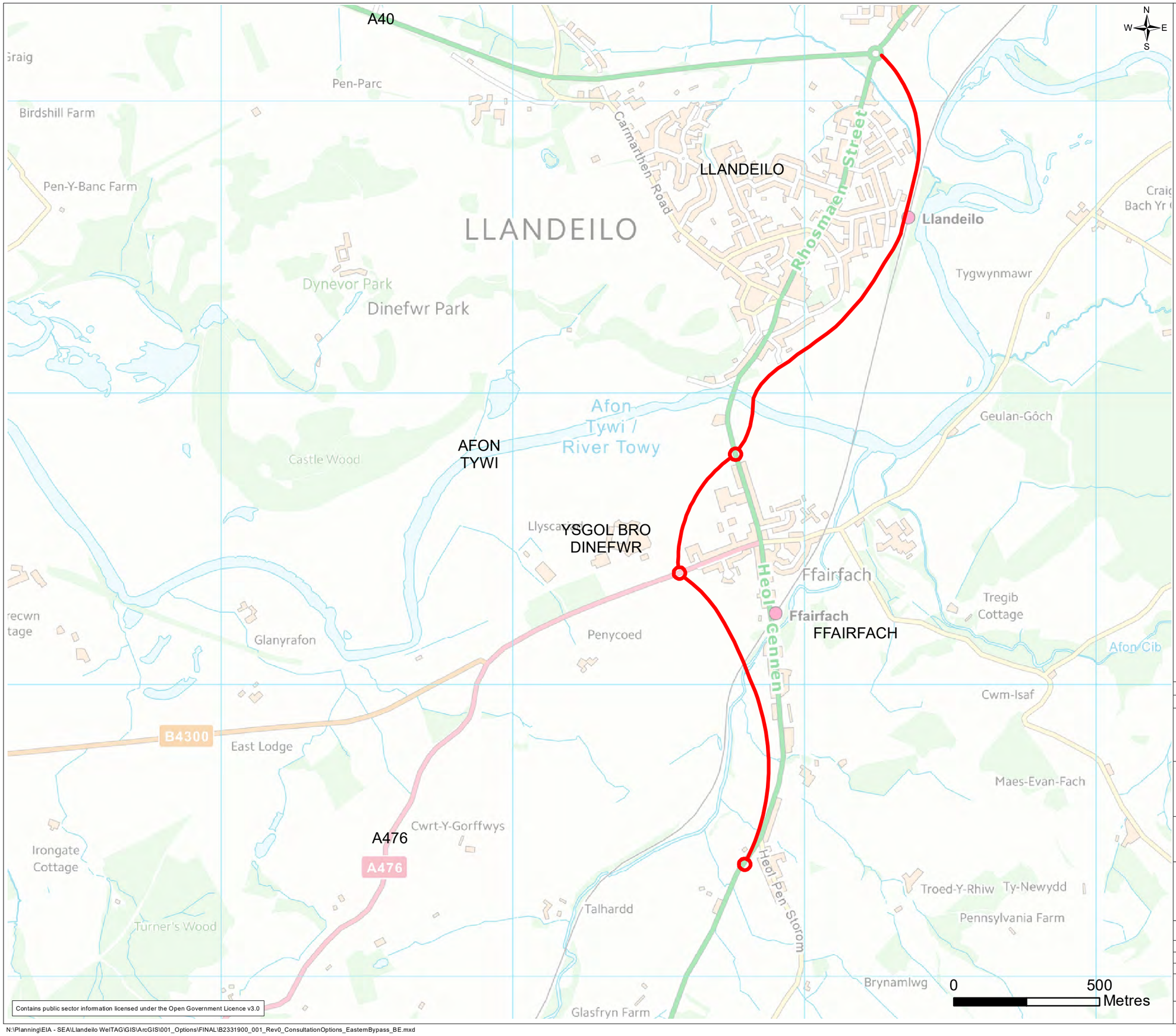
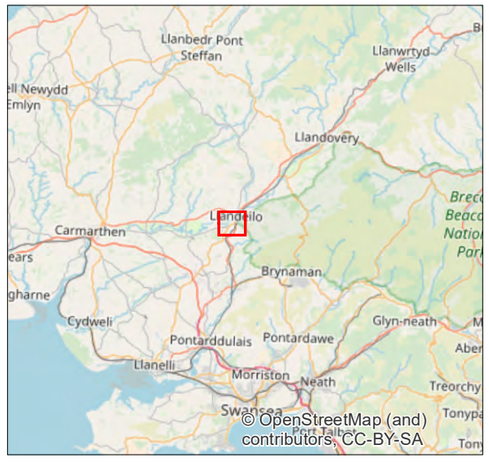


Legend

- Option route
- Roundabout
- Upgrade existing road



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Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Eastern Bypass
Option BE6

FINAL

Scale @ A3	1:12,500	DO NOT SCALE
Jacobs No.	B2331900	

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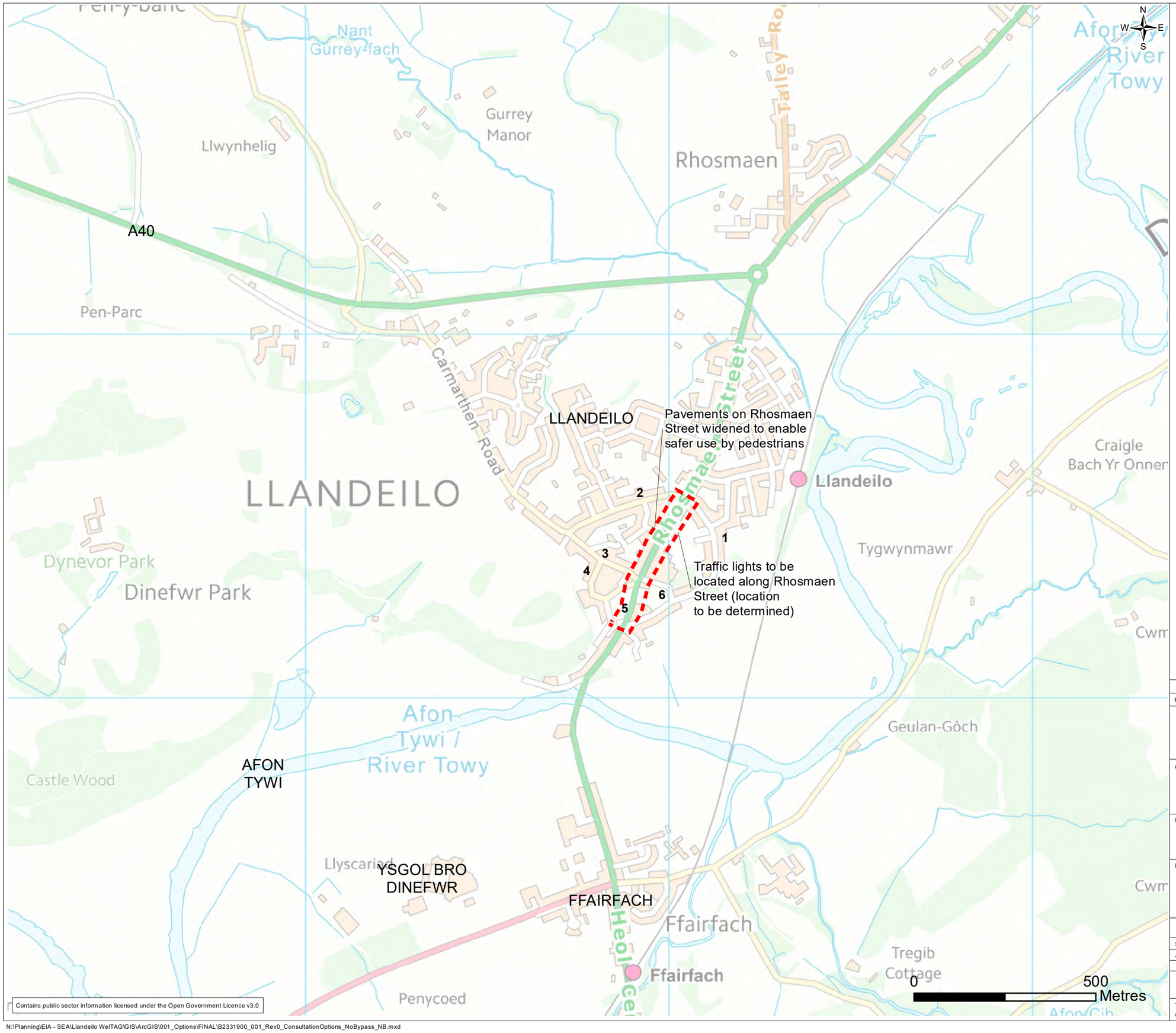
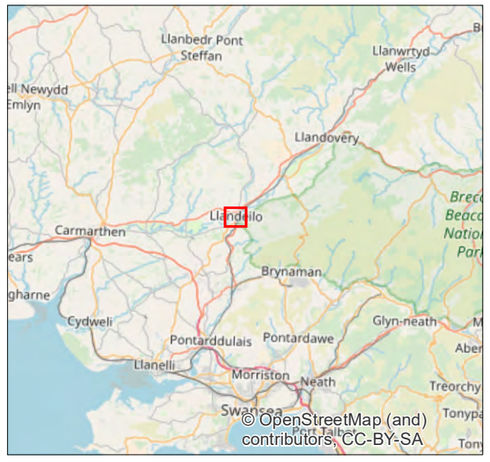


Legend

Upgrade existing road

1 - Crescent Road
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: No Bypass Option NB1

FINAL

Scale @ A3	1:10,000	DO NOT SCALE
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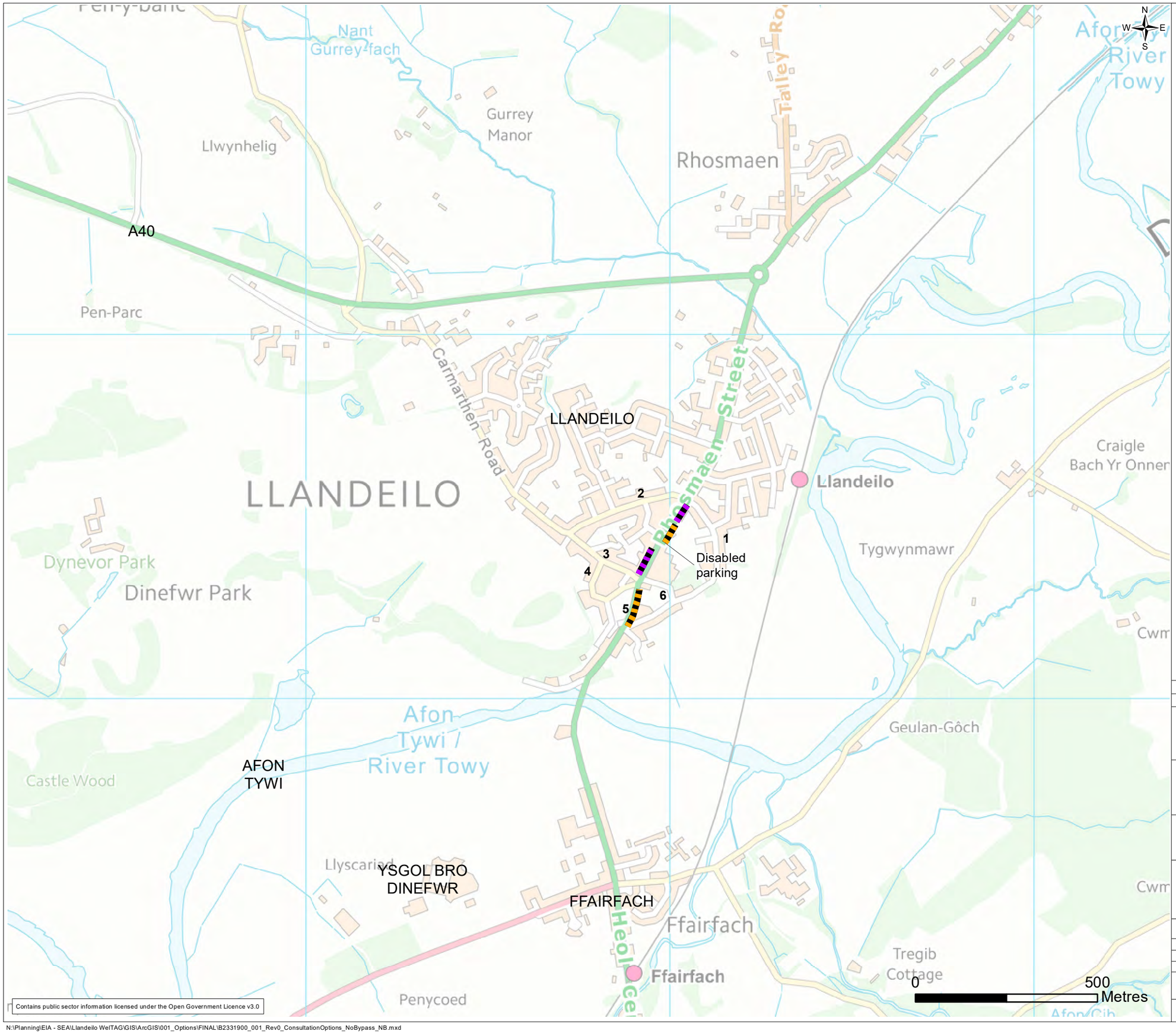
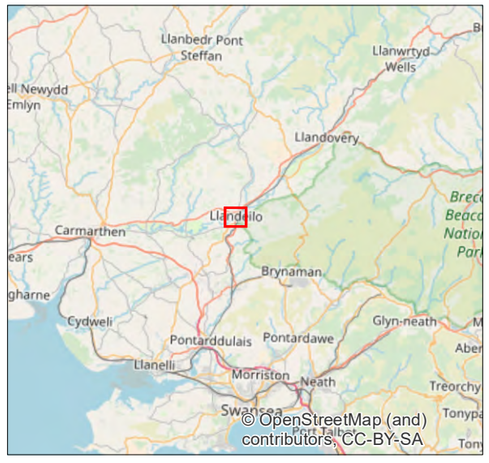


Legend

- Parking - only permitted between 6pm - 8am
- "Loading Only" bays restricted: No loading between 7am - 10am and 3pm - 6pm

1 - Crescent Road
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: No Bypass Option NB2

FINAL

Scale @ A3	1:10,000	DO NOT SCALE
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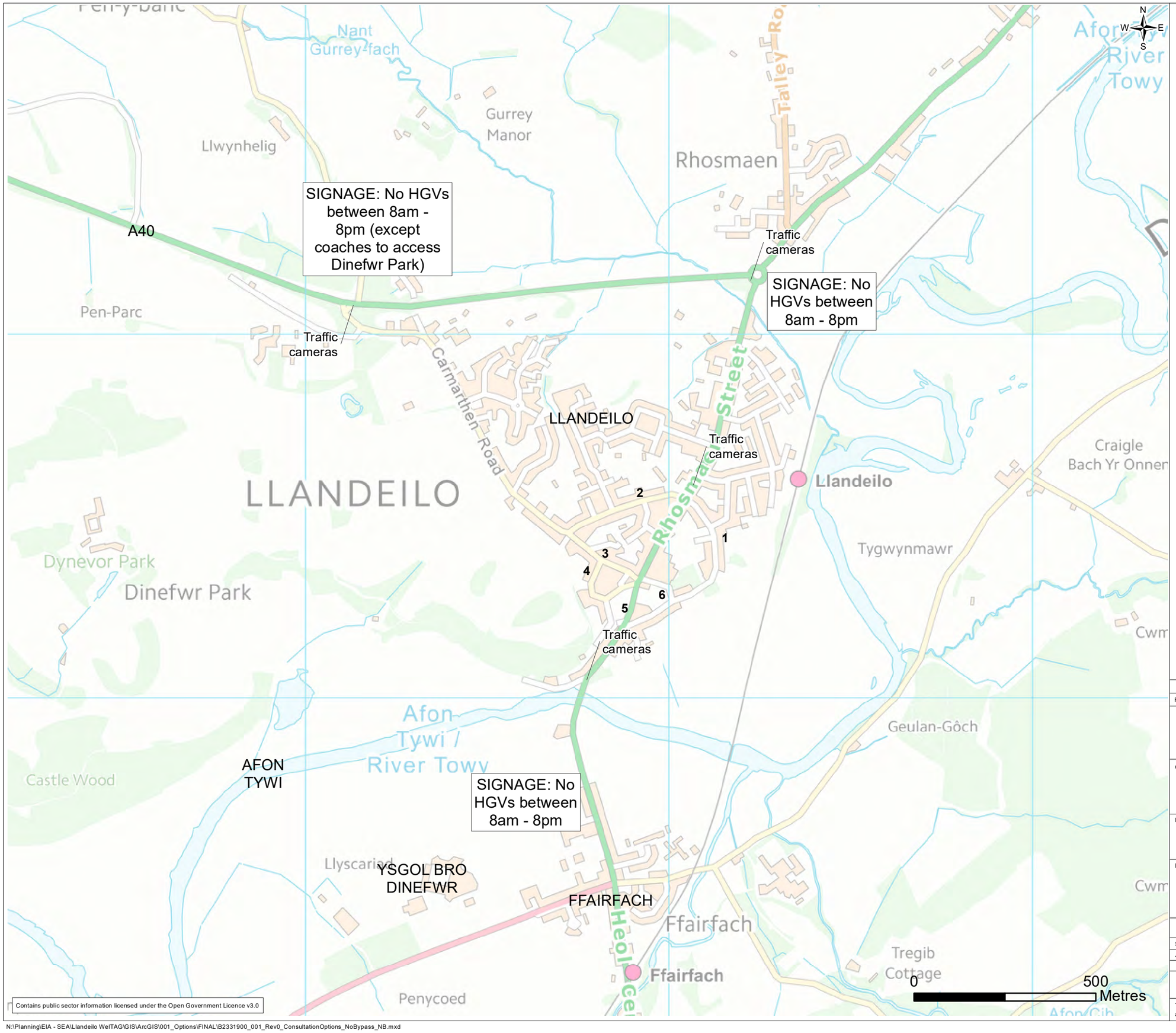
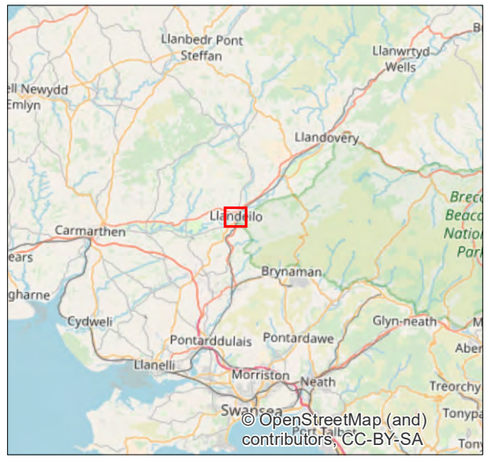


Legend

1 - Crescent Road
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: No Bypass Option NB3

FINAL

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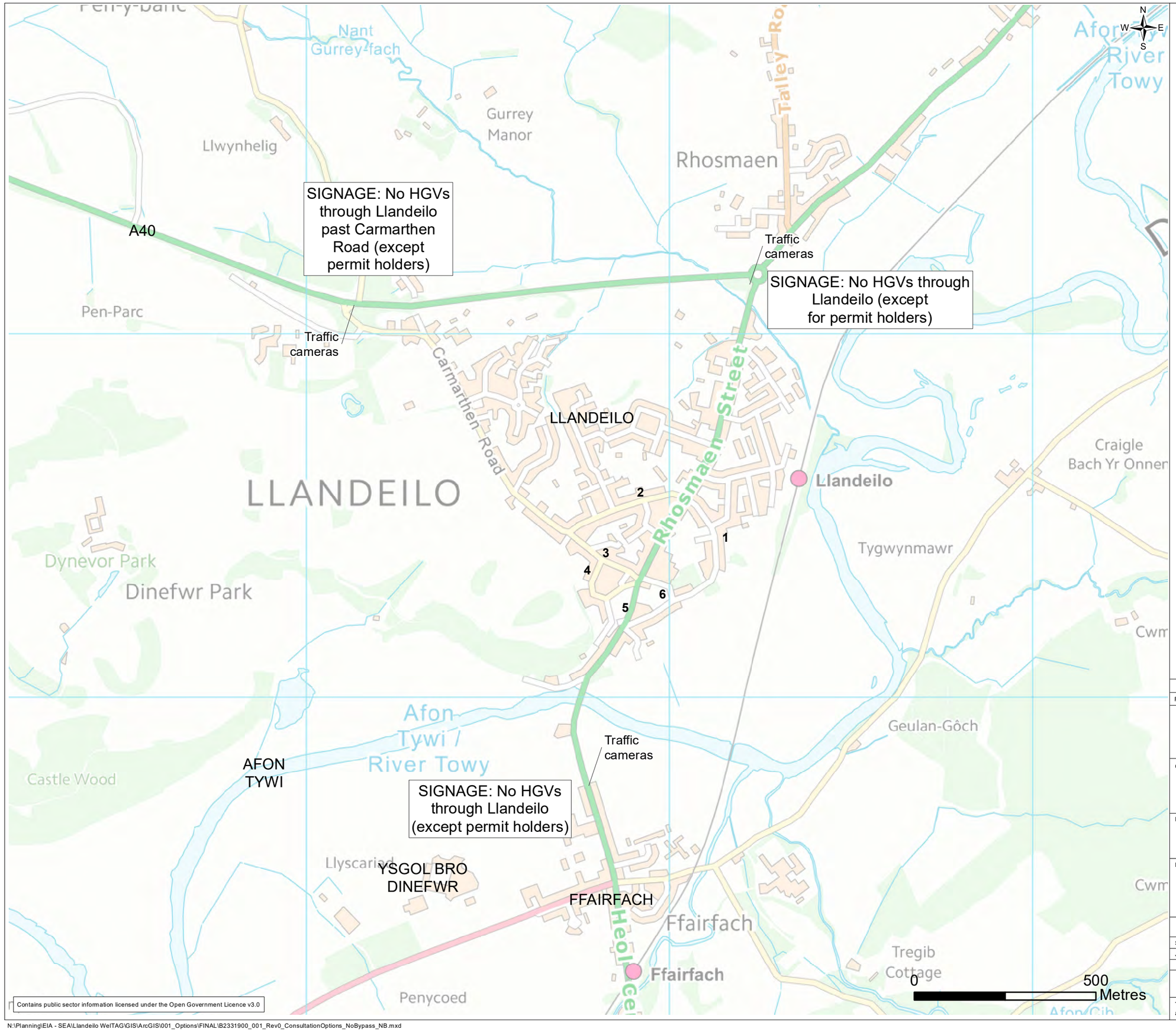
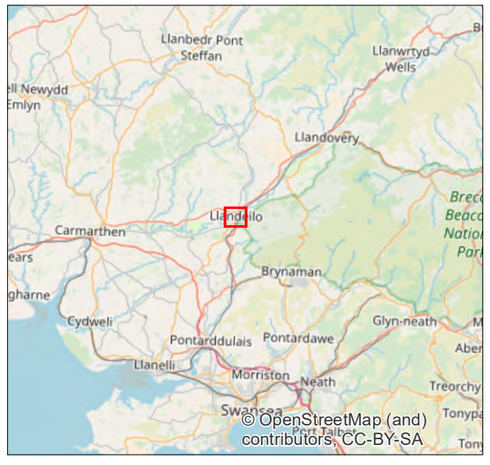


Legend

1 - Crescent Road
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Drawing Title: No Bypass Option NB4

FINAL

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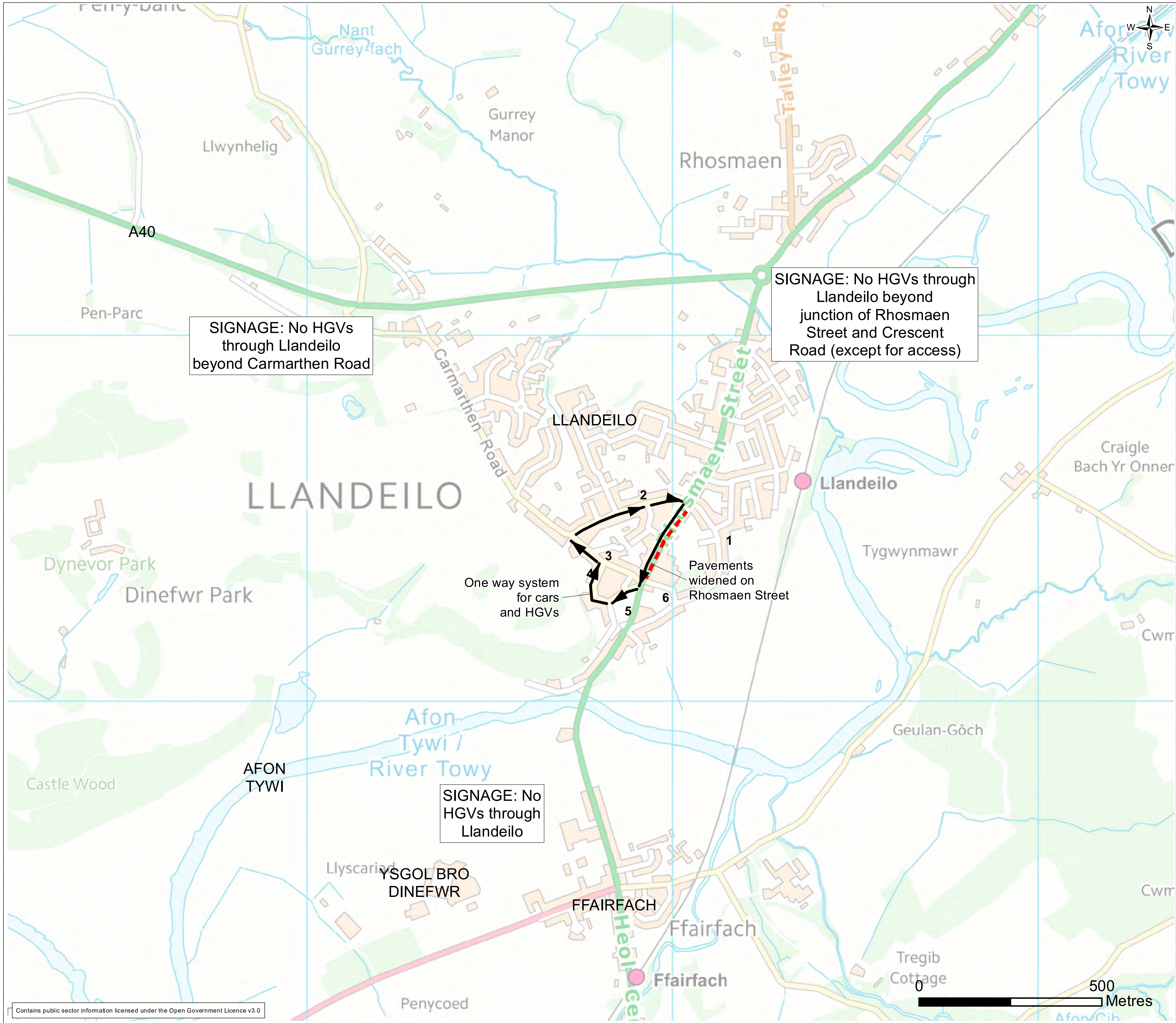
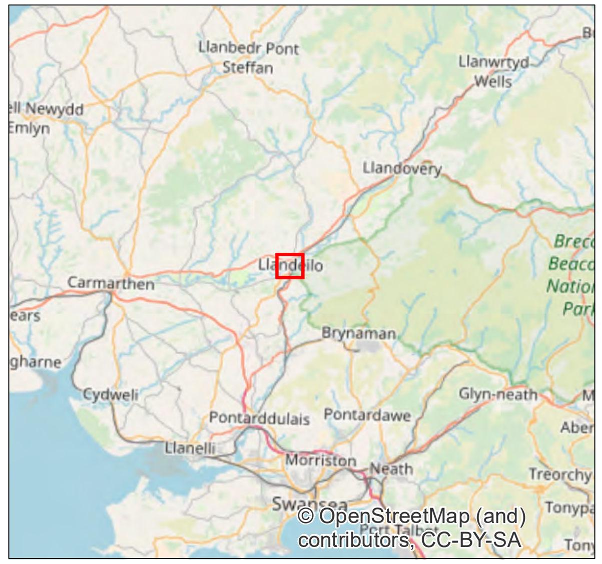


Legend

- Upgrade existing road
- Traffic direction

1 - Crescent Road
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Project
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Drawing Title
No Bypass
Option NB5

FINAL

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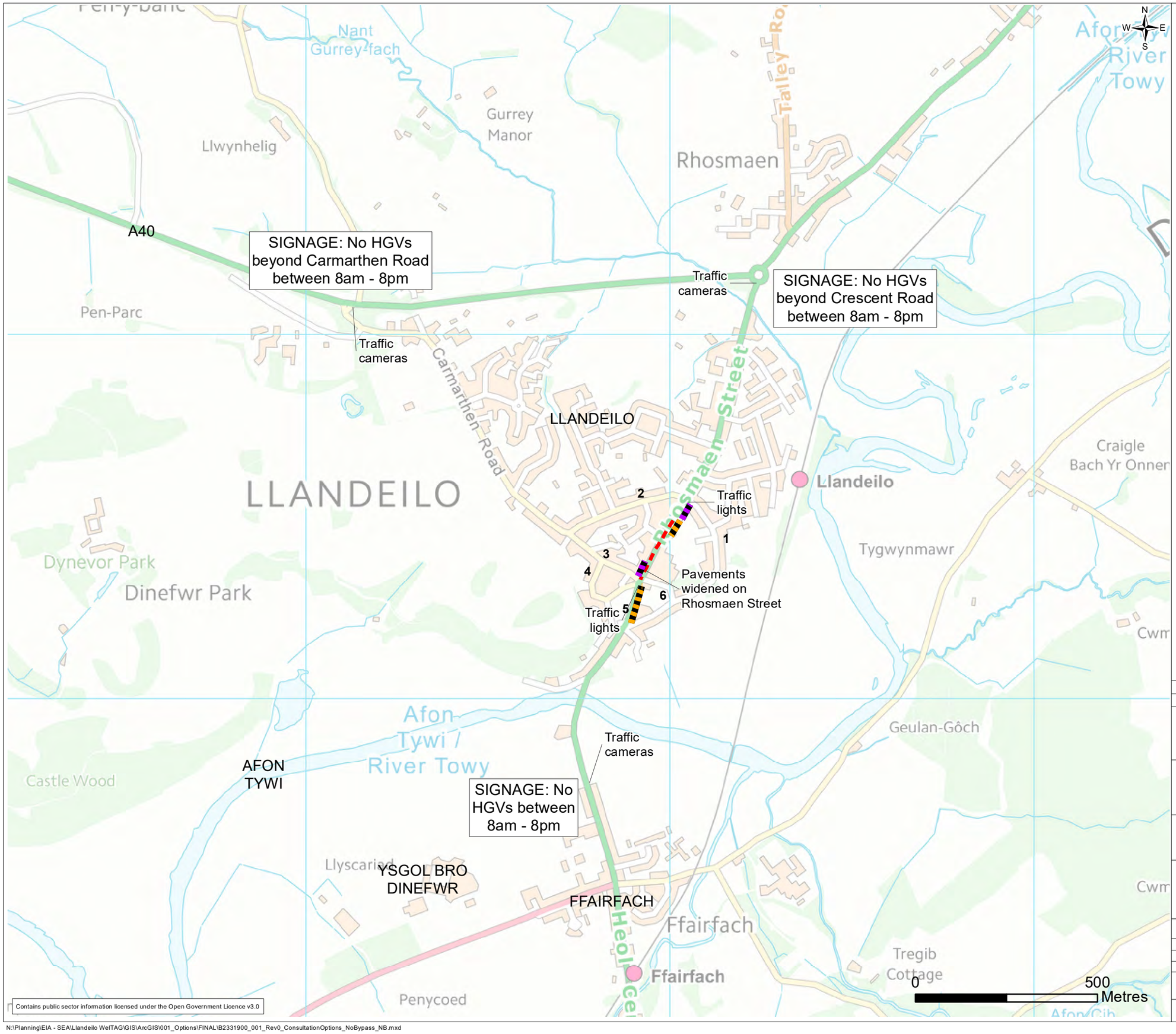
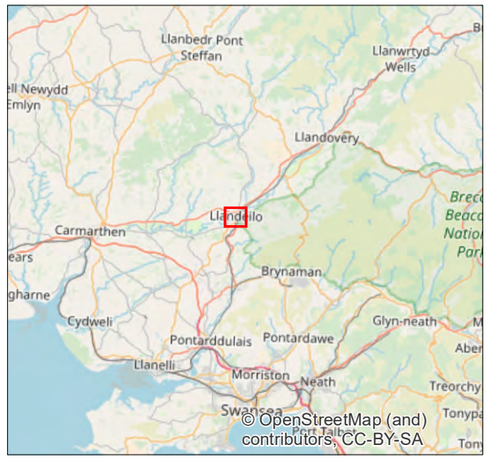


Legend

- Upgrade existing road
- Parking - only permitted between 6pm - 8am
- "Loading Only" bays restricted: No loading between 7am - 10am and 3pm - 6pm

1 - Crescent Road
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Drawing Title: No Bypass Option NB6

FINAL

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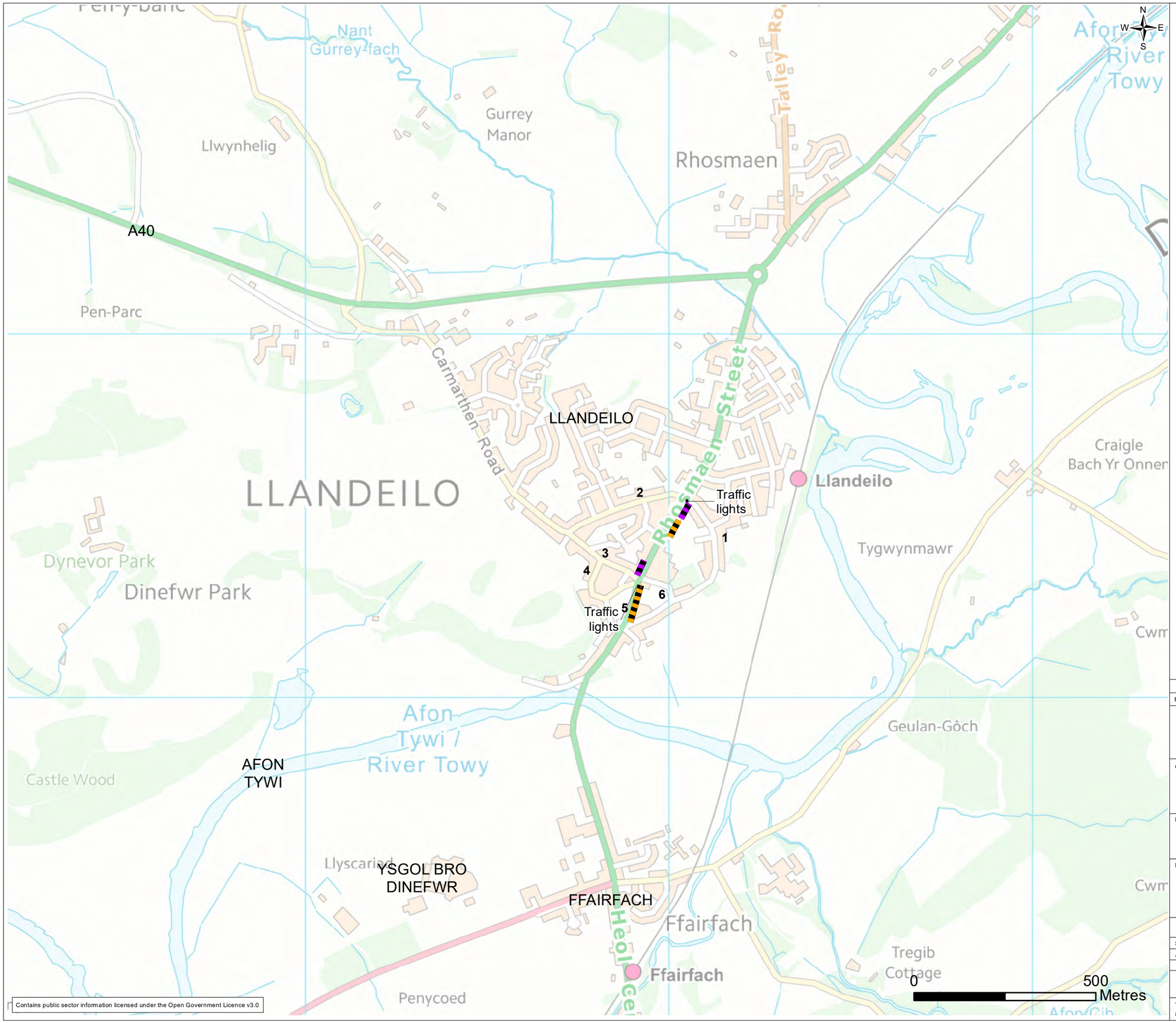

Legend

- Traffic direction
- Parking - only permitted between 6pm - 8am
- "Loading Only" bays restricted: No loading between 7am - 10am and 3pm - 6pm

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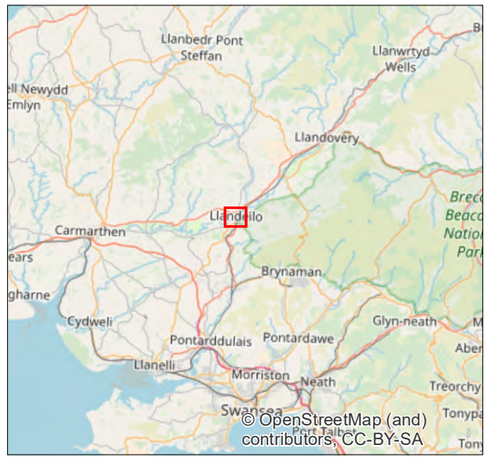
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: No Bypass Option NB7

FINAL

Scale @ A3	1:10,000	DO NOT SCALE
Jacobs No.	B2331900	

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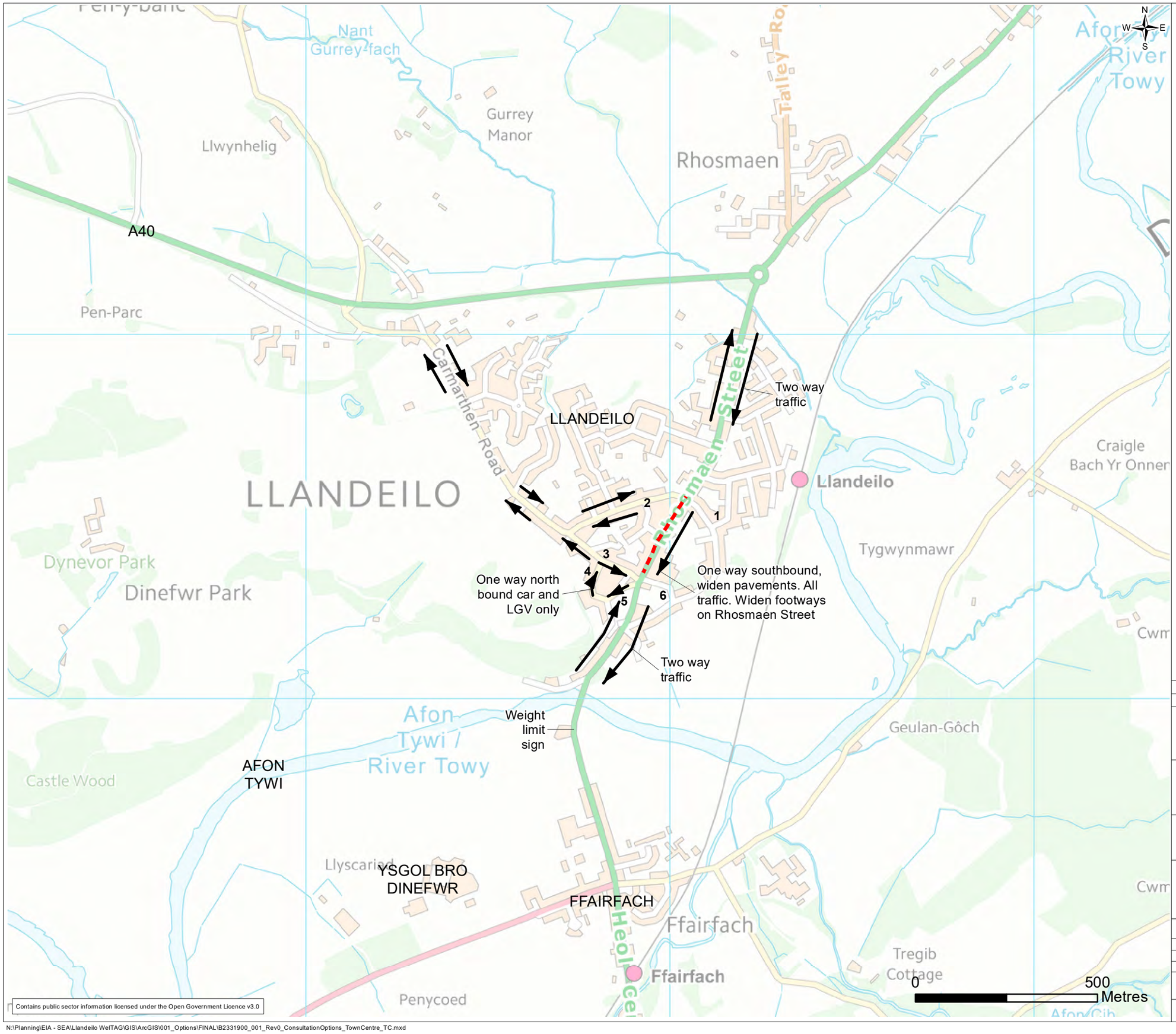

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- Traffic direction

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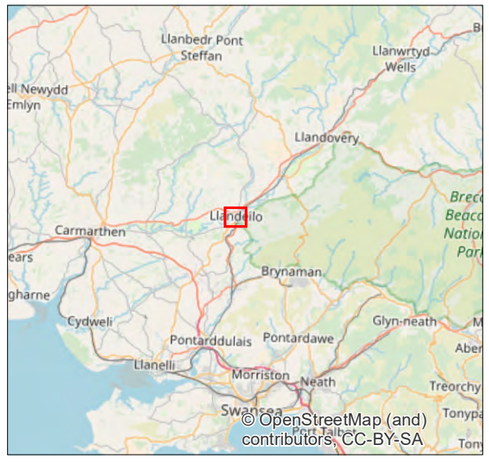
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Client: Llywodraeth Cymru Welsh Government

Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Town Centre Improvements Option TC1A

FINAL

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Jacobs No.	B2331900	

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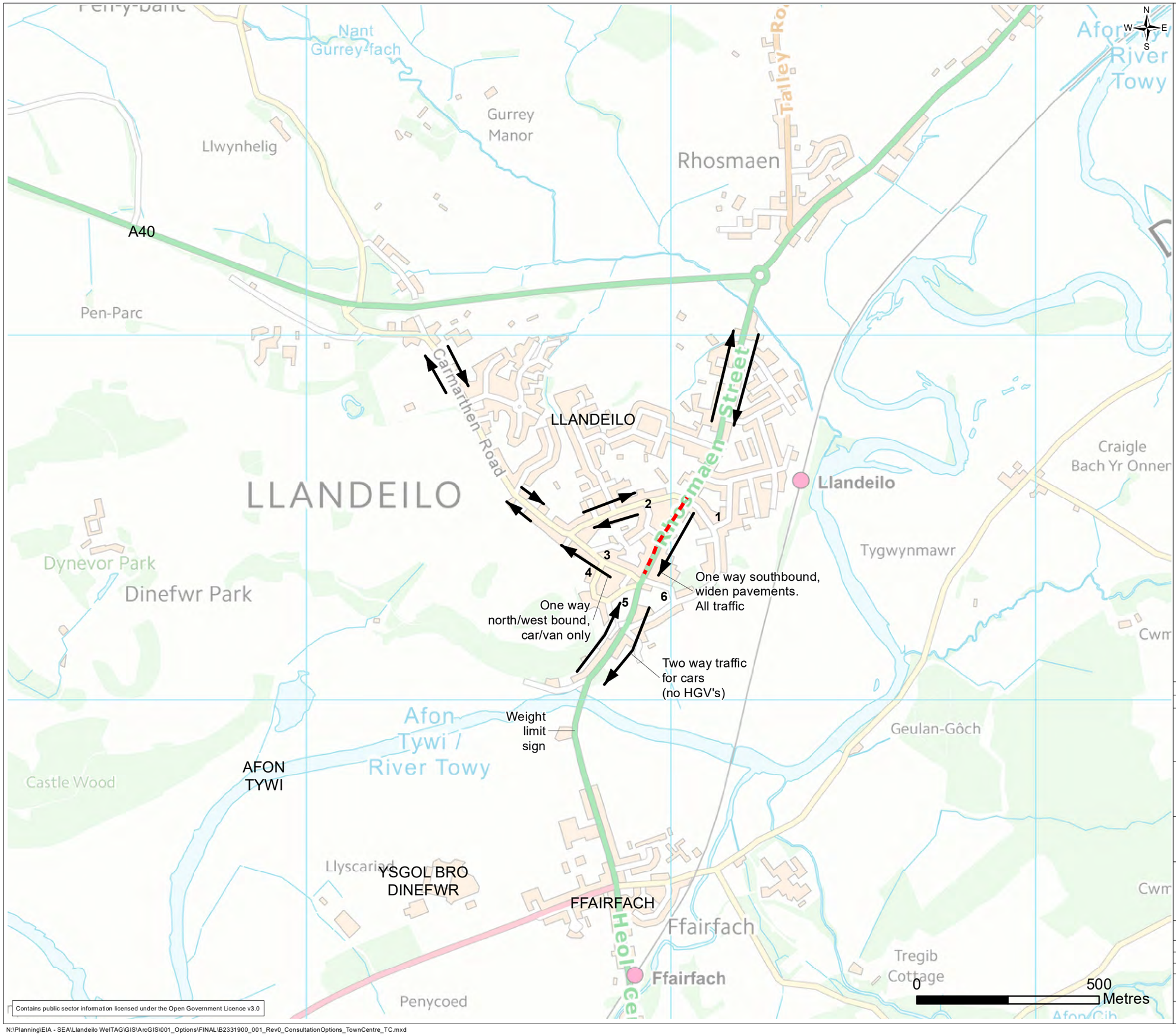

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Legend

- Upgrade existing road
- Traffic direction

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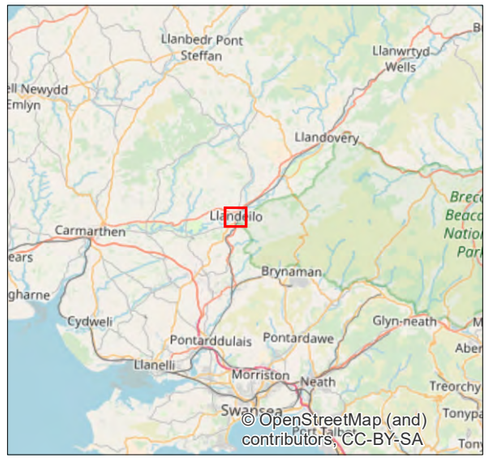
2 - New Road
3 - Carmarthen Street
4 - George Street
5 - King Street
6 - Abbey Terrace



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Drawing Title: Town Centre Improvements Option TC1B

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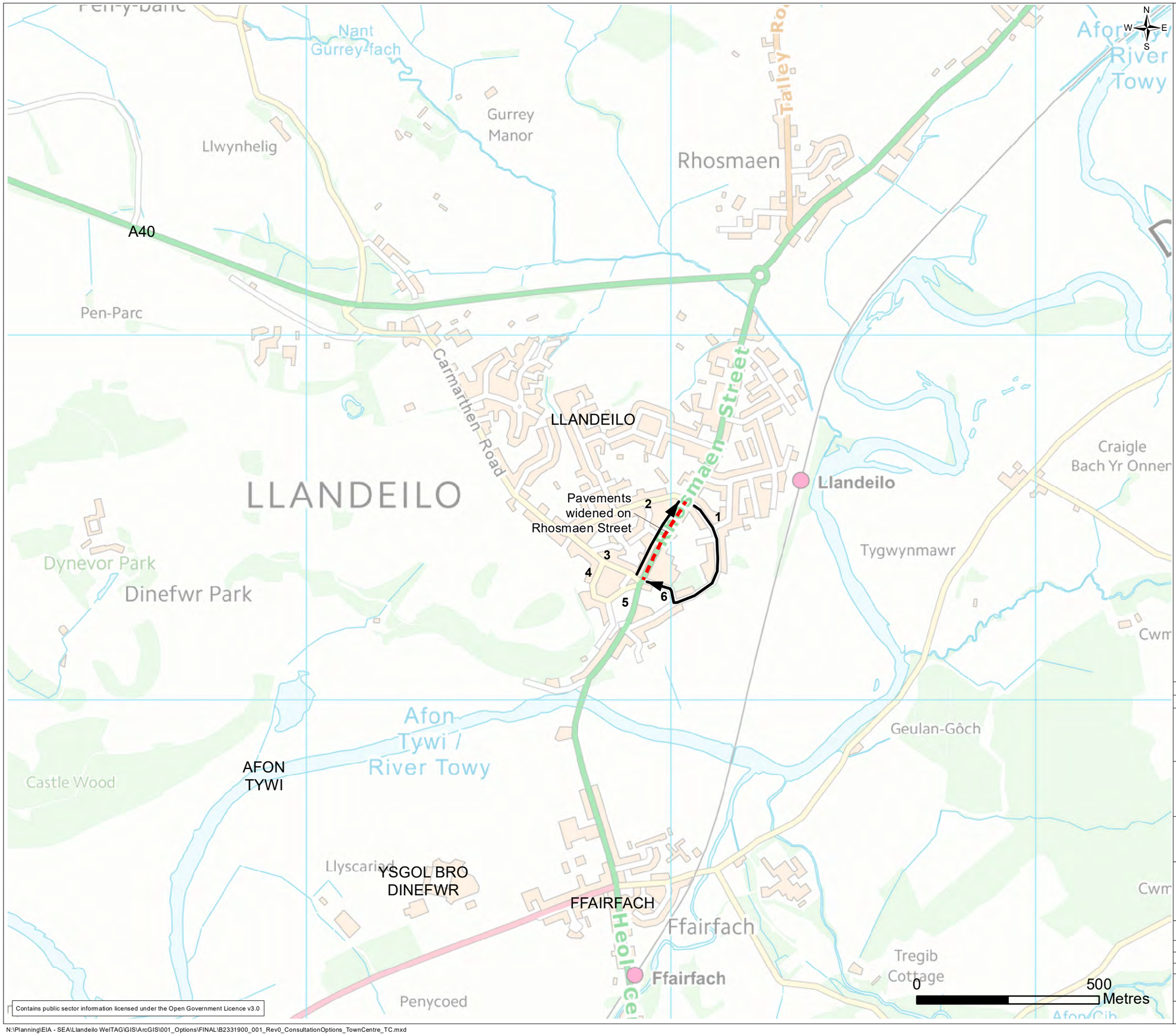

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- Upgrade existing road
- Traffic direction

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4 - George Street
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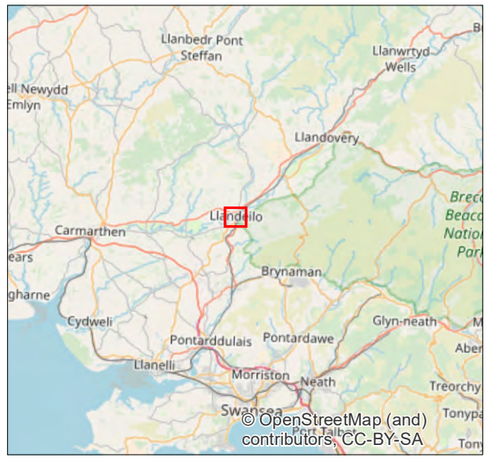
6 - Abbey Terrace



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Drawing Title: Town Centre Improvements Option TC1C

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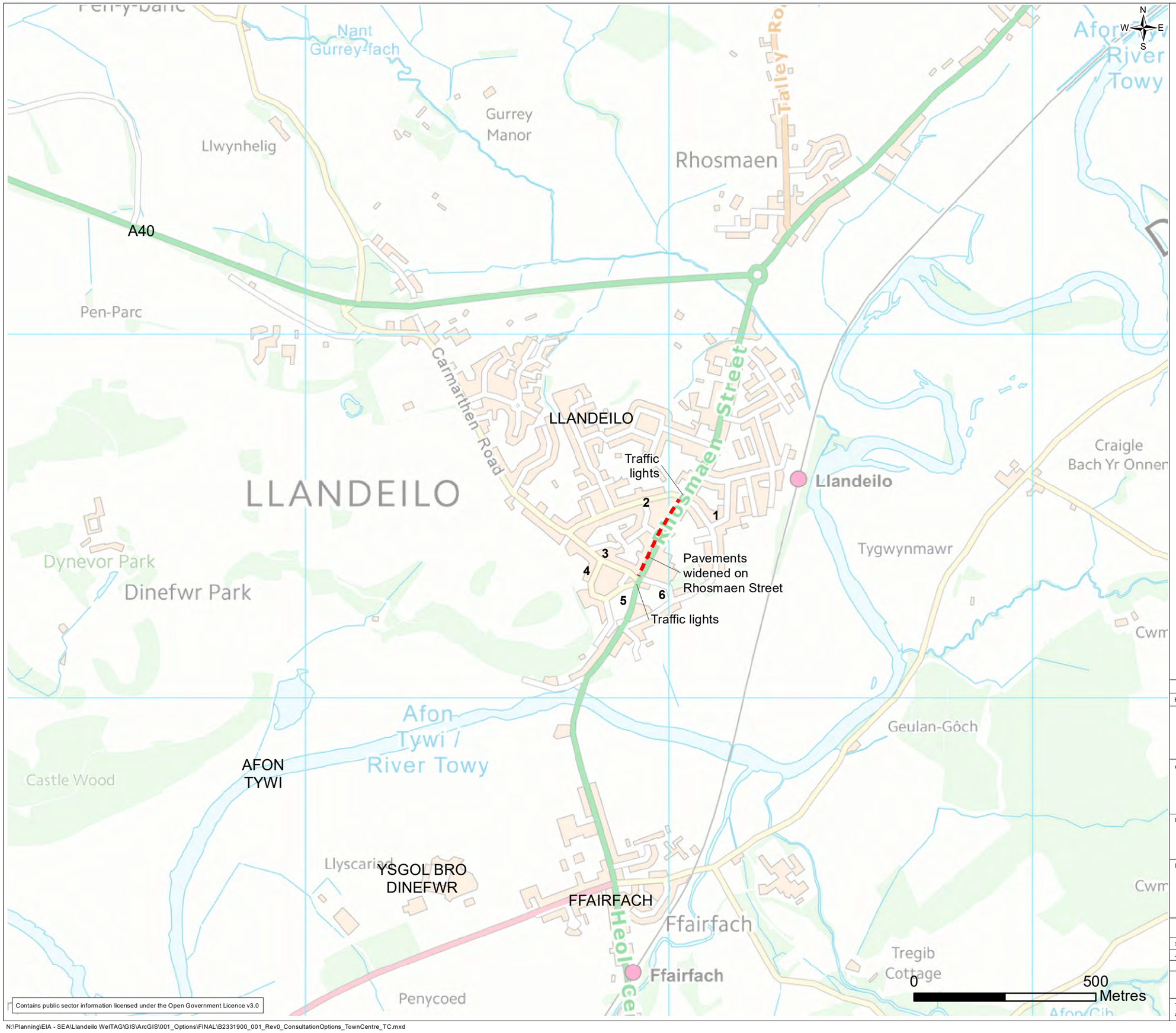

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Legend

Upgrade existing road

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2 - New Road
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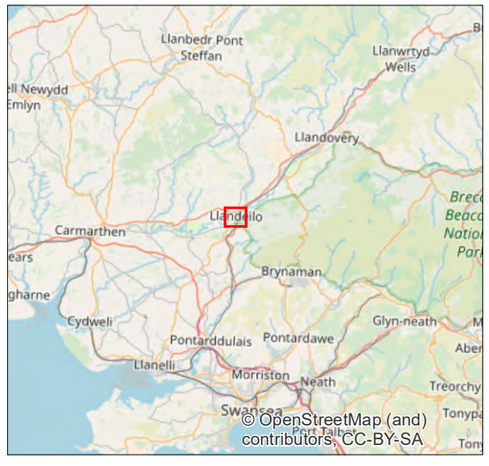
4 - George Street
5 - King Street
6 - Abbey Terrace



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Drawing Title

Town Centre Improvements
Option TC2

FINAL

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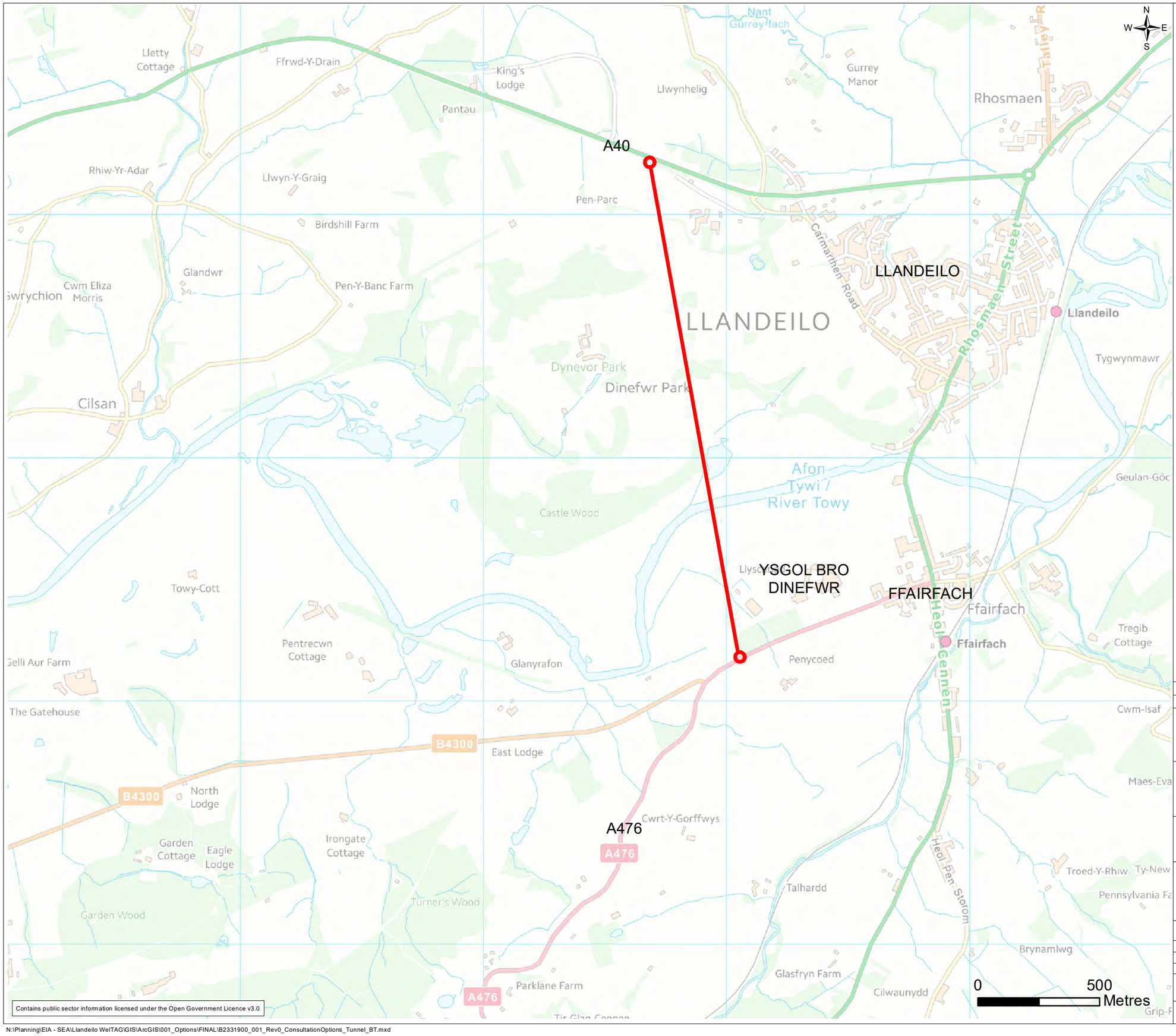

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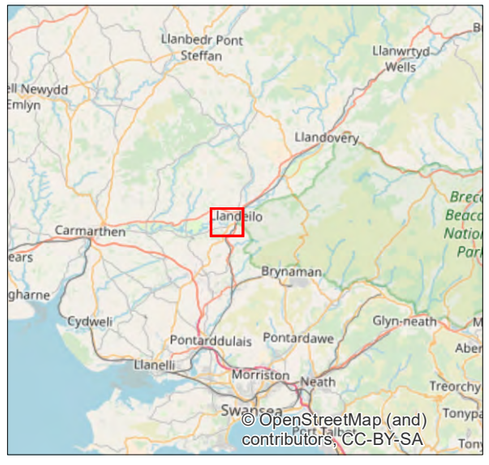
- Option route
- Roundabout



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Drawing Title

Tunnel
Option BT1

FINAL

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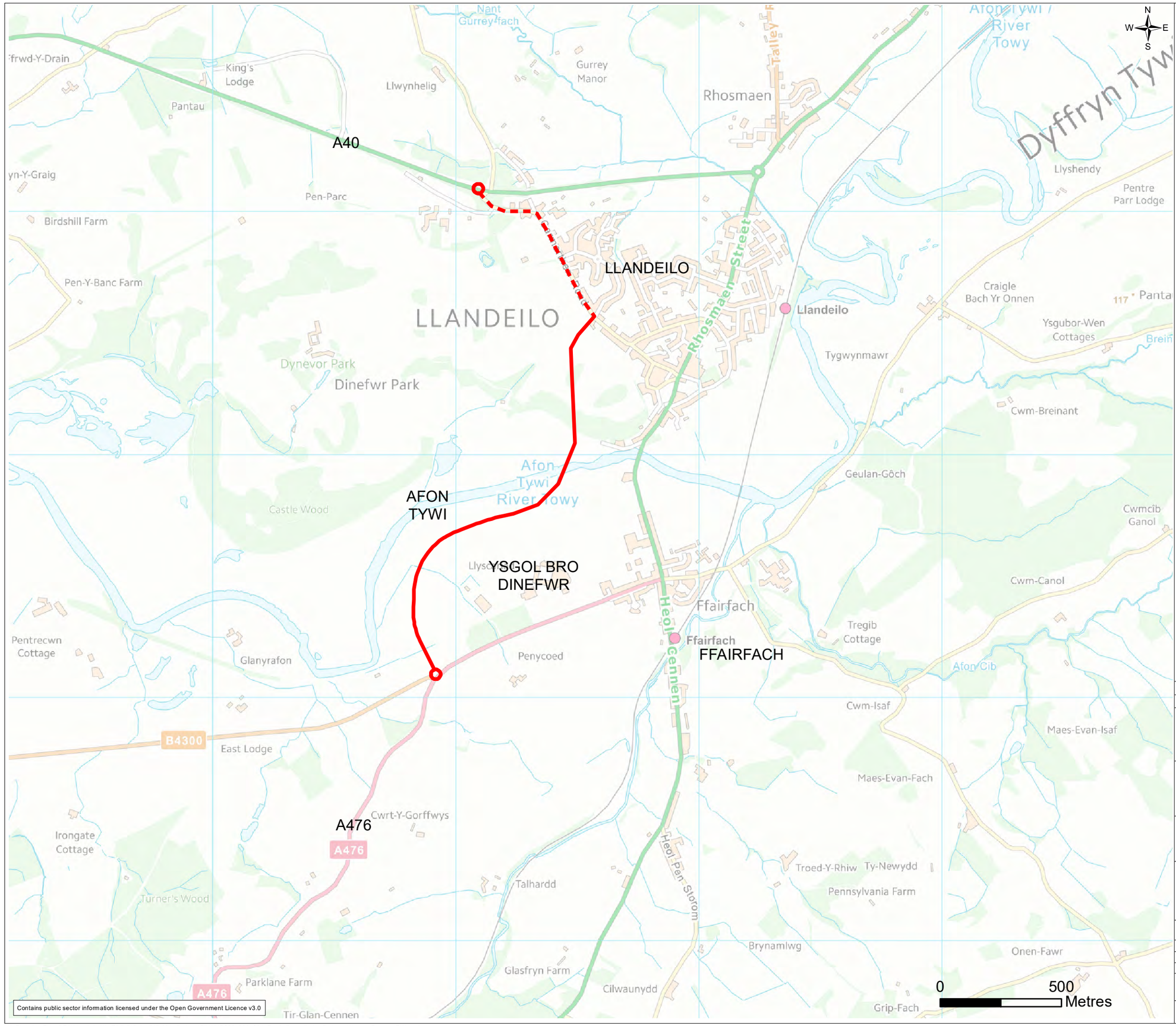
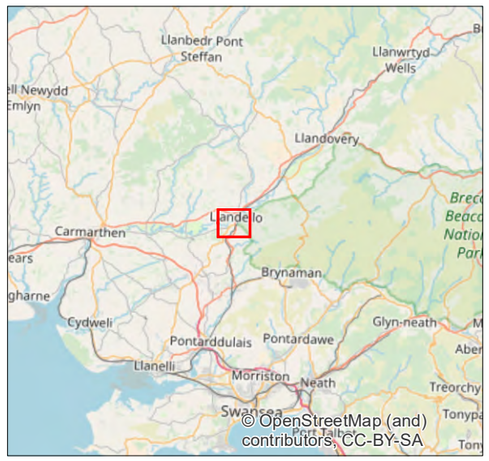


Legend

- Option route
- Roundabout
- Upgrade



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Western Bypass Option BW1

FINAL

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Jacobs No.	B2331900	

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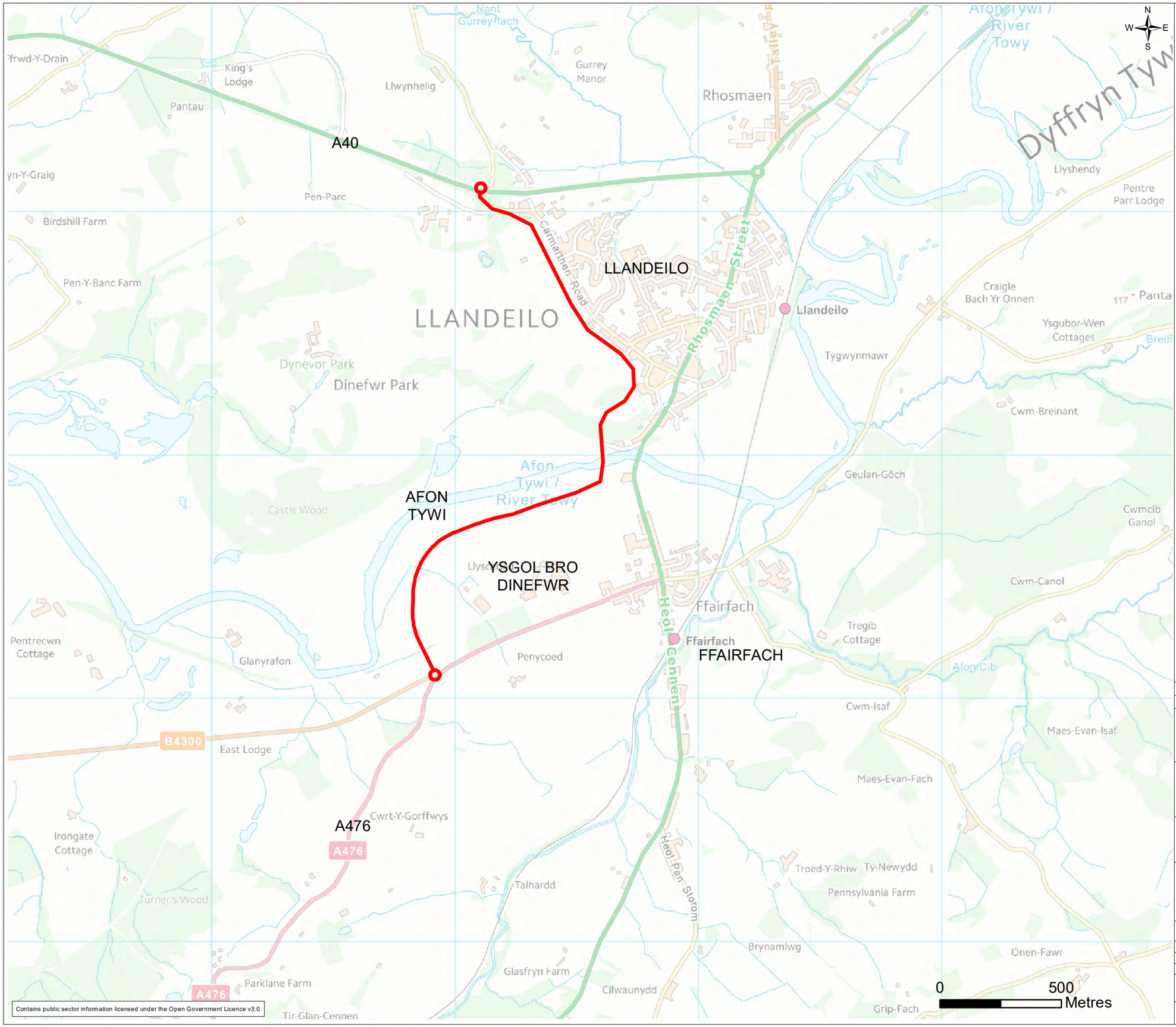
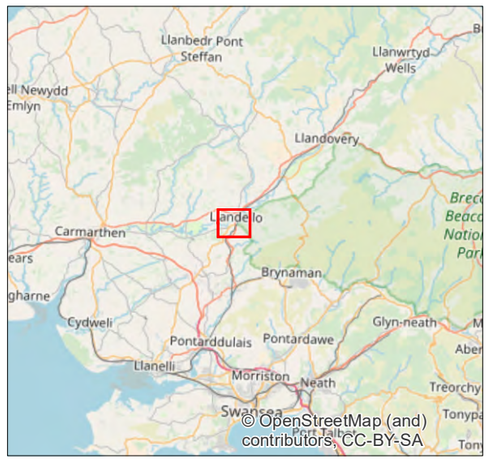


Legend

- Option route
- Roundabout
- Upgrade



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Drawing Title: Western Bypass Option BW2

FINAL

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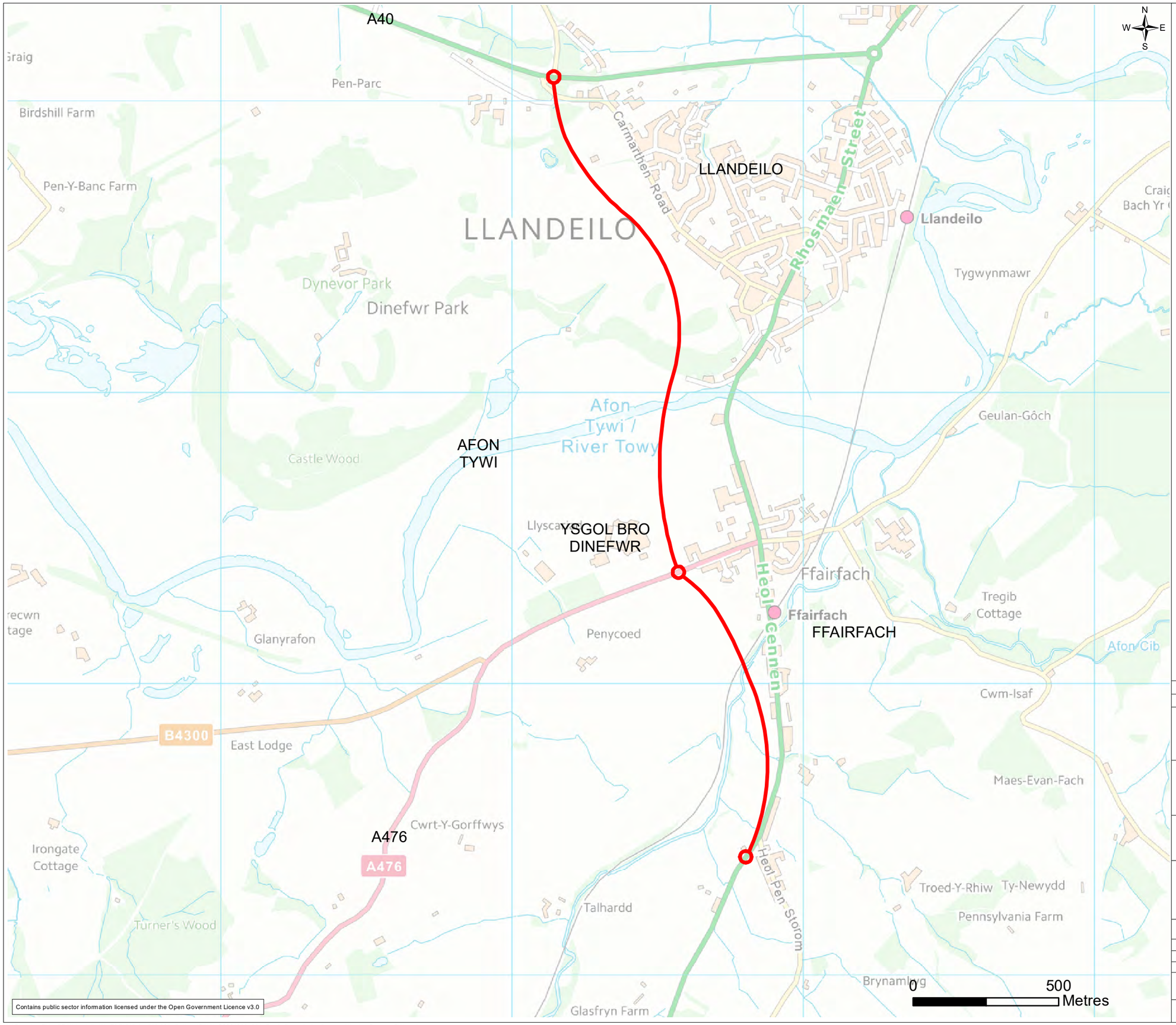
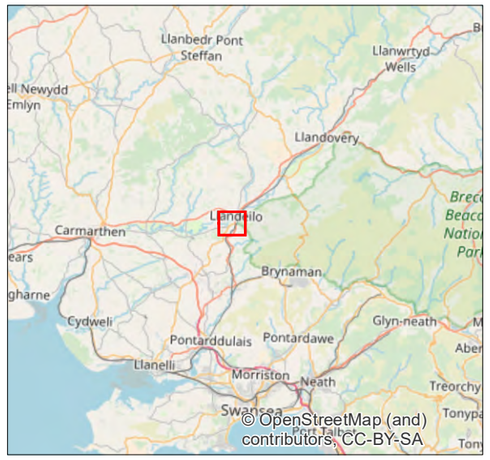


Legend

- Option route
- Roundabout
- Upgrade



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Western Bypass Option BW3A

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A40

Pen-Parc

Birdshill Farm

Pen-Y-Banc Farm

LLANDEILO

Carmarthen Road

LLANDEILO

Rhosmaen Street

Llandeilo

Tygwynmawr

Dynevor Park

Dinefwr Park

Afon Tywi / River Towy

AFON TYWI

Geulan-Gôch

Castle Wood

YSGOL BRO DINEFWR

Ffairfach

Ffairfach

FFAIRFACH

Heol Gennen

Tregib Cottage

Glanyrafon

Penycoed

Afon Cib

Cwm-Isaf

B4300

East Lodge

Maes-Evan-Fach

Cwrt-Y-Gorffwys

A476

A476

Irongate Cottage

Troed-Y-Rhiw

Ty-Newydd

Pennsylvania Farm

Talhardd

Heol Pen-Storom

Turner's Wood

Glasfryn Farm

N

W E

S

0 500 Metres

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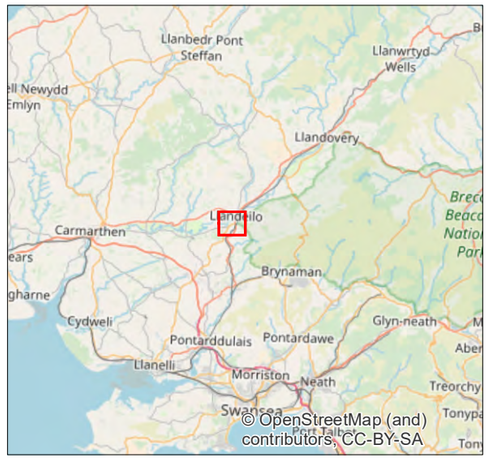
Legend

- Option route
- Roundabout
- Upgrade



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Project: A483 LLANDEILO TRANSPORT STUDY

Drawing Title: Western Bypass Option BW3B

FINAL

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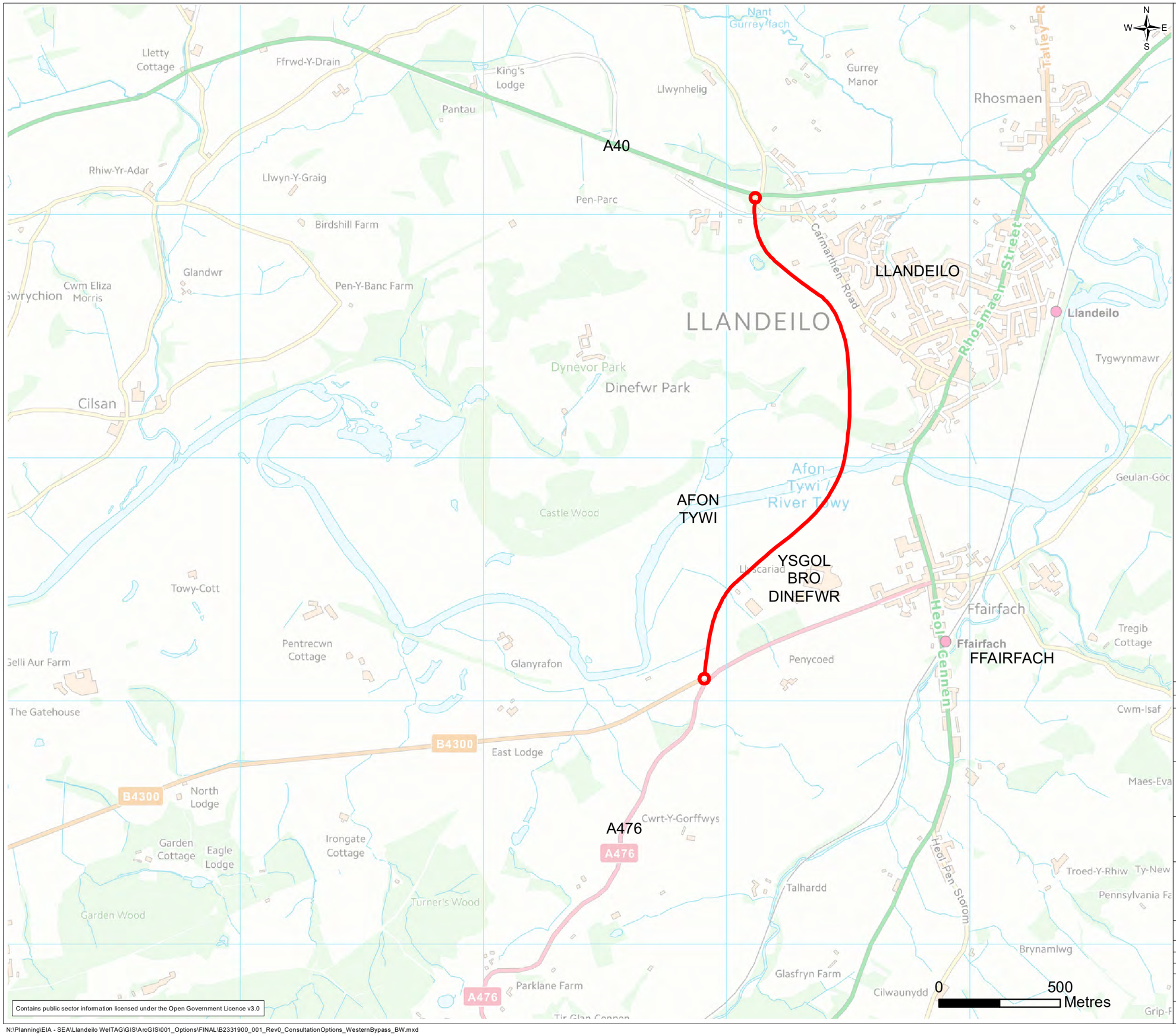
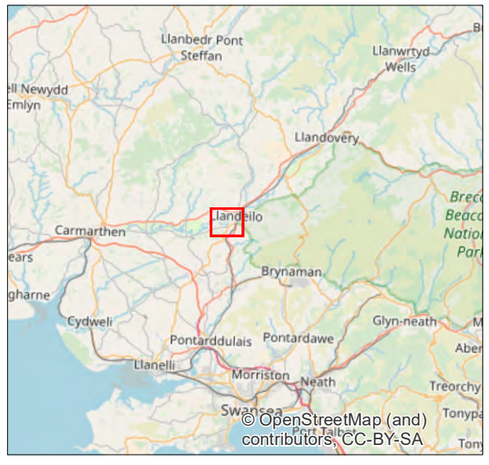


Legend

- Option route
- Roundabout
- Upgrade



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Drawing Title

Western Bypass
Option BW3C

FINAL

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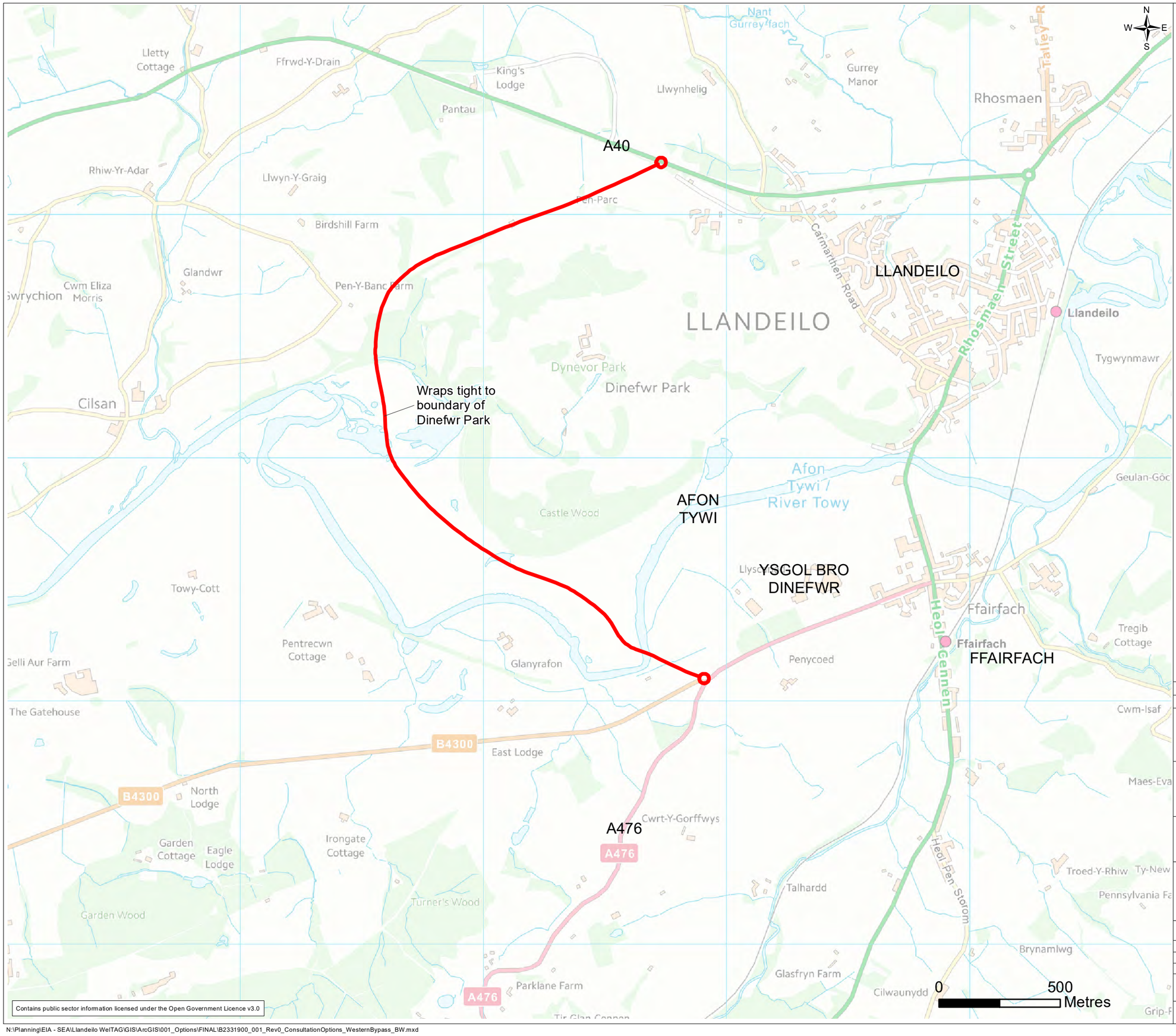

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- Roundabout
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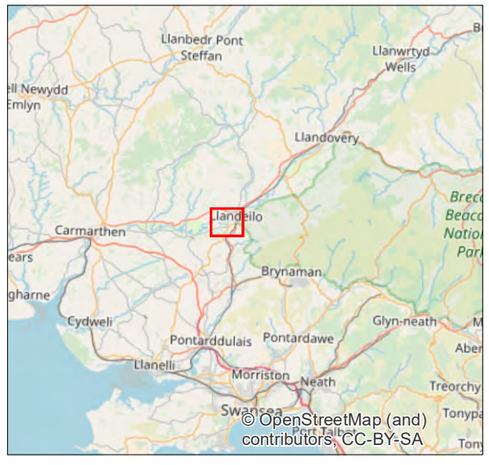

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A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Western Bypass
Option BW4

FINAL

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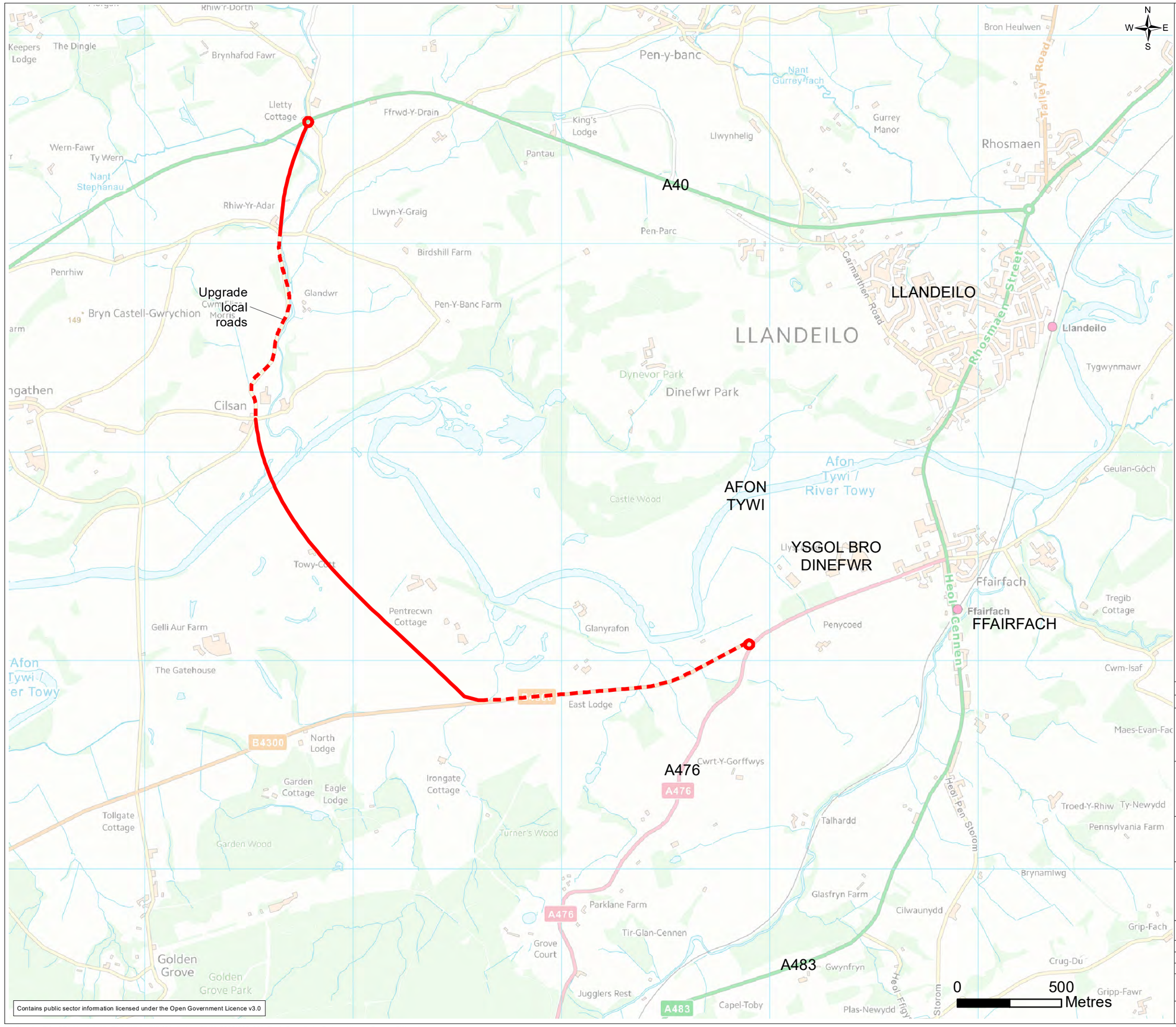
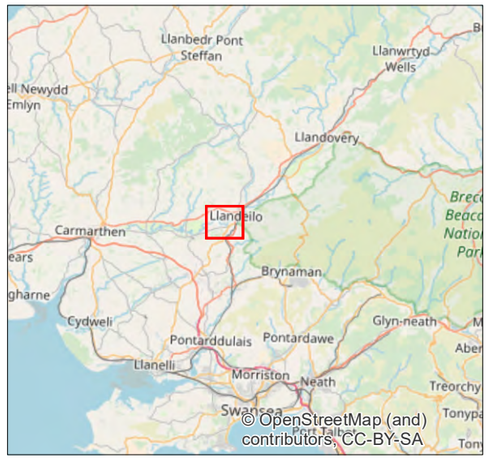


Legend

- Option route
- Roundabout
- Upgrade



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Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Western Bypass
Option BW5A

FINAL

Scale @ A3	1:17,500	DO NOT SCALE
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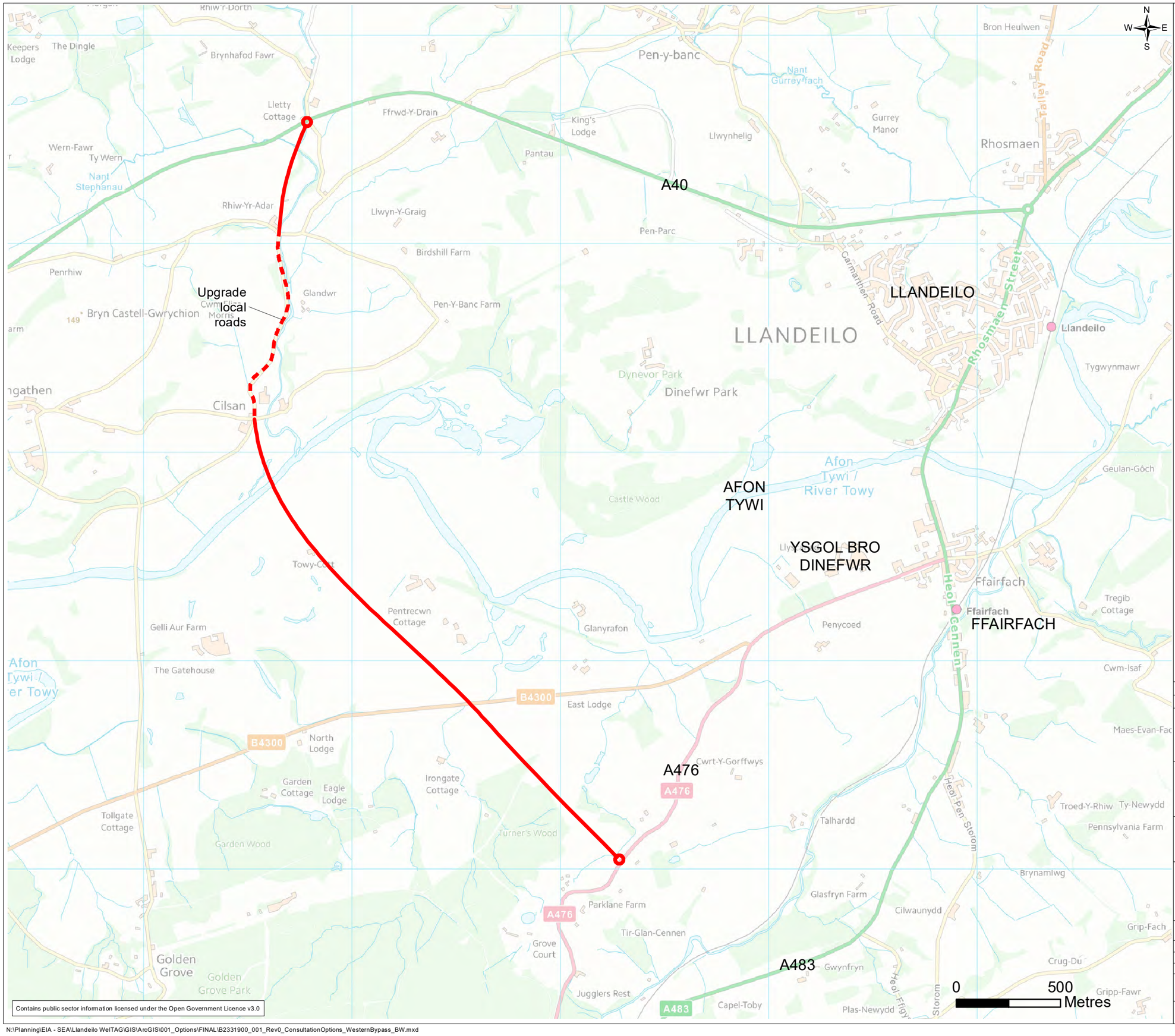

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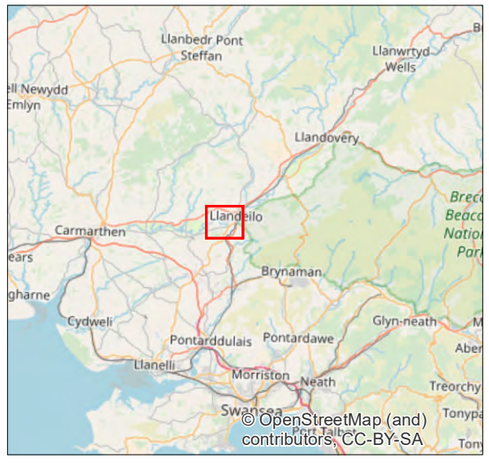
- Option route
- Roundabout
- Upgrade



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Project

A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Western Bypass
Option BW5B

FINAL

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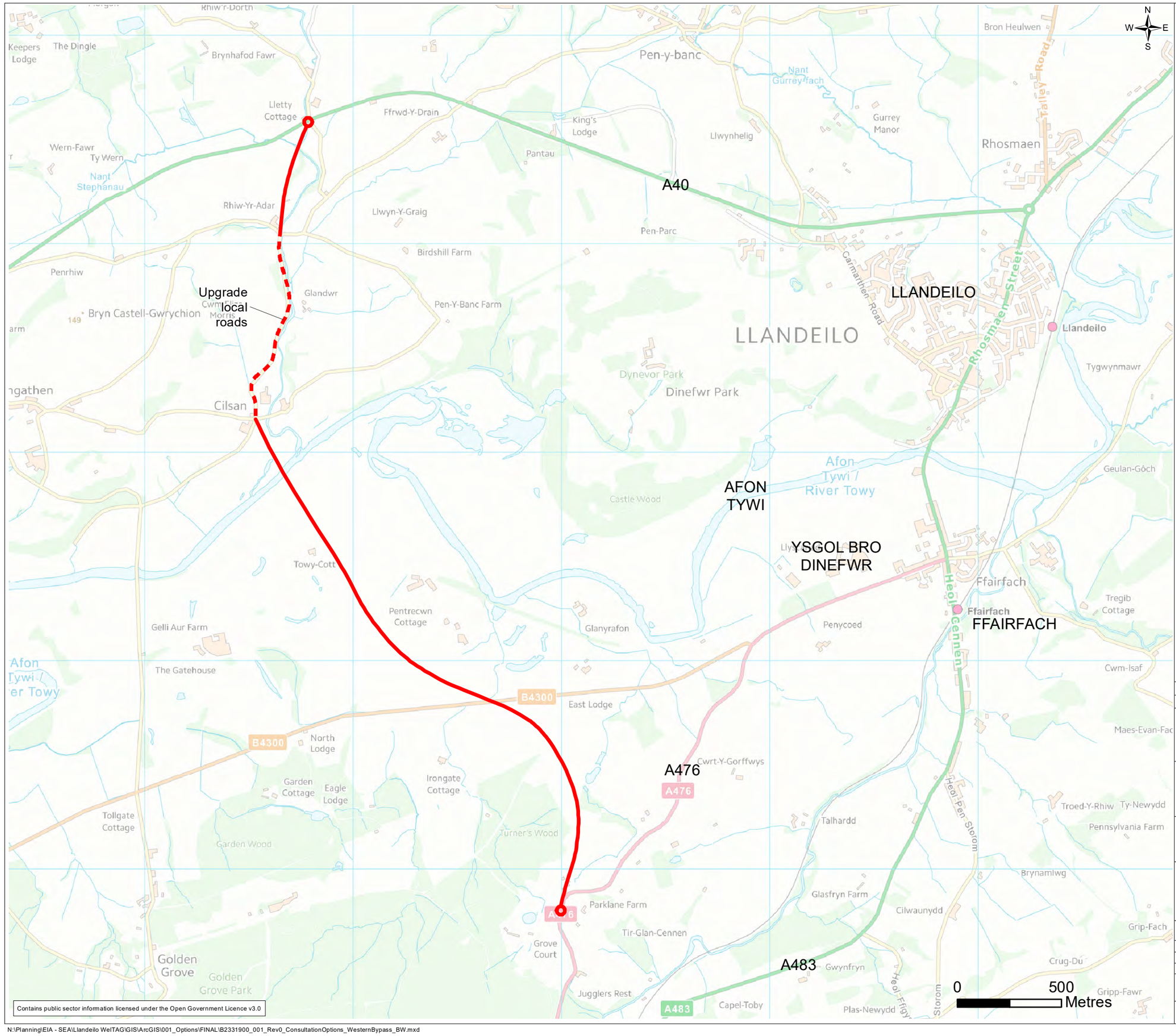

Legend

- Option route
- Roundabout
- Upgrade

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Drawing Title

Western Bypass
Option BW5C

FINAL

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A40

LLANDEILO

AFON
TYWI
YSGOL BRO DINEFWR

FFAIRFACH

A476

A483

B4297

DRYSLWYN

Section of new
carriageway to
avoid hairpin bend

PENRHIWGOCH

MAESYBONT

B4297

CASTELL-Y-RHINGYLL

0 500 Metres

Legend

- Option route
- Roundabout
- Upgrade

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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A483 LLANDEILO TRANSPORT STUDY

Drawing Title

Western Bypass
Option BW6

FINAL

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Appendix D. Cost Estimate Report

Estimate Report

CORDEROY

Project:	A483 Llandeilo Bypass
Title:	Option Estimates

Document Verification

Revision	Date		Prepared	Reviewed	Approved
00	18/05/18	Name	R. Jones	M. Griffiths	M. Griffiths
		Position	Principal Surveyor	Associate Director	Associate Director
		Signature			
01	05/06/18	Name	R. Jones	M. Griffiths	M. Griffiths
		Position	Principal Surveyor	Associate Director	Associate Director
		Signature			

Contents

1.0 Introduction

Corderoy has been commissioned by Mott MacDonald Ltd under their Framework Agreement with Welsh Government to provide budget cost estimates in respect of the following options being considered for the construction of the A483 Llandeilo Bypass.

The options being considered are:

1. Route Option BE1A(1) – based on 2015 structure lengths
2. Route Option BE1A(2) – based on 2018 structure lengths
3. Route Option BE1B(1) – based on 2015 structure lengths
4. Route Option BE1B(2) – based on 2018 structure lengths
5. Route Option BE1C(1) – based on 2015 structure lengths
6. Route Option BE1C(2) – based on 2018 structure lengths
7. Route Option BE3D
8. Route Option BE4D
9. Route Option BW3C
10. Route Option ARL1
11. Route Option ARL2

2.0 Information Used and General Assumptions

2.1 Information Used

The budget estimates have been based on the following information :

- Design Information provided by Mott MacDonald Ltd (May 2015) which supersedes previous information provided by CH2M in November 2015.
- Report on Public Workshop and Consultation prepared by Jacobs (March 2007) – Option ARL2 only.

2.2 Measurement

As far as possible, measurement has been undertaken using the Method of Measurement for Highway Works and standard highway design principles, however there is limited design information available and no construction programme, information on phases, availability of work areas or other constraints has been provided.

Measurement has been limited to the Options and extents noted in Section 1.0 above.

2.3 Pricing

The budget estimate relates to the direct cost of construction works only. It has been prepared using analytical estimating techniques employing market rates and prices. All pricing has been base dated to Q4 2017 using the ROADCON indices published by BCIS.

In the absence of any formal Risk Review process, the estimate includes an allowance for Optimism Bias in accordance with relevant guidelines.

2.4 Assumptions and Exclusions

2.4.1 Preliminaries

We consider that a figure of 25% of the contractor's direct costs total would be usual for works of this nature being undertaken as a standalone scheme. This has been applied to our estimated total of direct costs to give the figures shown in the estimate.

In addition, we have included an allowance for track monitoring which is likely to be required by Network Rail given the proximity of the proposed works to their assets. This has been allowed based on a duration of 12 months for Options BE1A, BE1B, and BE1C.

2.4.2 General Roadworks

For each option reasonable allowance has been made for the typical roadwork sections which are based upon information from recently completed highway schemes and the following general assumptions :

- 7.3m carriageway
- 1.0m Hardstrips
- 2.5m Verges (widening in places)
- 100kph Design Speed
- No structures to be demolished
- No concrete foundations are required to fencing
- No safety barriers have been included
- 50m high friction surfacing on approaches to roundabouts
- 2m wide footways have been assumed to 50% of the new alignment
- No road lighting is required along the new alignment

2.4.3 Earthworks

Earthworks have been measured to the all Options based on the marked up layout drawings provided by Mott MacDonald Ltd the following assumptions :

- 1V:4H Earthwork Fill slopes
- 1V:2H Earthwork Cut slopes
- 80% of all bulk excavation is assumed to be in rock / hard material
- All excavated rock / hard material is suitable for processing and reuse in embankments
- No capping layer is required, however 800mm thick drainage layer to be provided beneath all embankments across flood plain

- No unacceptable material to be excavated other than to accommodate drainage layer
- All surplus acceptable material can be deposited in landscape areas

2.4.4 Structures

Structures measurement and cost is based upon the following information provided by Mott MacDonald Ltd unless otherwise stated :

- River Bridge :
    - Option BE1A(1) – 175m bridge with curved alignment (as CH2M design 2015)
    - Option BE1A(2) – 234m bridge with curved alignment
    - Option BE1B(1) – 175m bridge with curved alignment (as CH2M design 2015)
    - Option BE1B(2) – 234m bridge with curved alignment
    - Option BE1C(1) – 175m bridge with curved alignment (as CH2M design 2015)
    - Option BE1C(2) – 234m bridge with curved alignment
    - Option BW3C – 282m bridge with curved alignment
- Rail Bridge :
    - Option BE1A(1) – 168m bridge with straight alignment
    - Option BE1A(2) – 168m bridge with straight alignment
    - Option ARL1 – 176m bridge with straight alignment
- Rail / River Bridge :
    - Option BE3D – 206m bridge with straight alignment
    - Option BE4D – 293m bridge with curved alignment
    - Option ARL2 – 650m bridge with straight alignment
- Footpath Crossing : 4.5m span underpass with minimum 3.0m clearance (Options BE1A, BE1B, and BE1C only)
- Retaining Wall :
    - Option BE1A(1) – 408m overall length, 8.2m average height (as CH2M design 2015)
    - Option BE1A(2) – 444m overall length, 8.2m average height
    - Option BE1B(1) – 408m overall length, 8.2m average height (as CH2M design 2015)
    - Option BE1B(2) – 444m overall length, 8.2m average height
    - Option BE1C(1) – 408m overall length, 8.2m average height (as CH2M design 2015)
    - Option BE1C(2) – 444m overall length, 8.2m average height
    - Option BE3D – 573m overall length, 5.0m average height

- Option BE4D – 573m overall length, 5.0m average height

  Note the average heights stated include 2m upstand.

- Railway Footbridge : two span steel footbridge including lifts to both platforms for DDA compliance for Options BE1A, BE1B and BE1C only.

2.4.5 Works for Statutory Undertakers

No information has been provided with regard to Statutory Undertakers' apparatus and, as such, no allowance has been made for these works in the estimate.

However, we note that a high pressure gas pipeline is located to the south of Ffairfach which may require diversion or protection, resulting in potentially significant additional cost. This pipeline affects Options BE1A, BE3D, BE4D and ARL1 only.

2.4.6 Accommodation Works

No details have been provided of Accommodation Works. However, we have included a lump sums for each Options in respect of works anticipated to be required to residents and businesses in the vicinity of the route.

2.4.7 Landscaping & Ecology

Only topsoiling and seeding has been allowed at this stage for each option. No allowances have been made for planting or for special ecological measures.

2.4.8 Lighting

It has been assumed that road lighting will not be required, other than at roundabouts.

2.4.9 Contractor's Fee

We have included an allowance of 9% for this which is deemed appropriate for a scheme of this nature to cover the Contractor's Head Office Overheads and Profit.

2.4.10 Risk and Optimism Bias

Under WelTAG guidelines the standard approach given the status of the scheme would be to add 44%. Given the lack of detailed design, the uncertainty with regard to route selection and the fact that no formal Risk Workshop has been held, we consider this to be appropriate and have included this figure.

We have also identified the following work elements that we believe carry a significant level of risk which might impact the cost differential between the Options :

- River Bridges – Options BE1A(2), BE1B(2), and BE1B(2) have a longer span (234m) which increases risk compared with the shorter span (175m) for Options BE1A(1), BE1B(1), and BE1B(1).

- Works Adjacent to Railway – Options BE1A(2), BE1B(2), and BE1B(2) are aligned adjacent to the railway line over a longer length which increases risk compared with Options BE1A(1), BE1B(1), and BE1B(1) in terms of the following matters :

    - Restricted working space on the rail side of the embankment over a longer length

    - Increased interface with Network Rail in respect of approvals / lead-in times

    - The need to comply with Network Rail procedures and methodologies in respect of safety over a longer length / duration

- Retaining Wall – Options BE1A(2), BE1B(2), and BE1B(2) requires a longer retaining wall which increases risk compared with the shorter wall proposed for Options BE1A(1), BE1B(1), and BE1B(1).

- Ground Conditions – in the absence of any Ground Investigation, it has been assumed that the majority (80%) of excavation (other than to accommodate the drainage layer across the floodplain) will be in rock / hard material which is suitable for processing and re-use within the works. This has been assumed on the basis of visual evidence in the vicinity of the railway station. Any significant change this proportion will impact not only the direct cost of the scheme but also the methodology in terms of the volume of imported material required and the treatment / handling of surplus excavated material.

- Statutory Undertakers' Apparatus – whilst a significant proportion of both routes is across floodplain, there is a significant risk of encountering known and uncharted services in the area of the railway station and the adjacent industrial area. However, the risk of these is broadly similar for both Options. In addition, there may be cabling along the existing railway embankment which needs to be re-routed or worked around. The risk associated with this is greater for Option 1 due to the increased length of embankment adjacent to the railway.

- Noise, Air Quality and Visual Impacts – it is considered that Option 2 carries the greater risk in these respects due to its location. It is situated closer to properties over a longer proportion of its length which increases the risk of noise and air quality impacts while its visual impact is also likely to be higher due to it benefitting less from the existing screening offered by the railway.

- Flooding – given that both Options cross a flood plain, this is clearly a significant risk which will need to be mitigated through the final design and dealt with during construction. However, there is no information to indicate any significant difference in terms of flood risk between the two Options.

- Land – we have identified that most of the land required behind the railway station to accommodate the bypass is owned by Network Rail although some areas including the footpath and steps down onto the platform are leased to Arriva Trains. The risk associated with these areas is similar for both Options. With regard to privately owned land such as gardens or farmland, no information is available as to how many different landowners / tenants / residents might be affected. As such, we are not able to comment on whether there is any differential between the two Options in terms of this risk, however the increased extent of work adjacent to the railway line for Option 1 may affect matters to some extent.

2.4.11 Active Travel

An allowance of £2m has been included for provision of measures for NMUs within all Options with the exception of Option ARL1.

For Options ARL1 and ARL2, an allowance of £0.5m has been included to reflect the shorter length of these Options and the fact that they will need to be combined with other Options where separate allowance has also been made.

2.4.12 Employer's Agent and Detailed Design Costs

Our estimates include allowances for the cost of Employer's Agent services and preparation of Detailed Design. On the basis of recent project cost information, we would assess these as follows :

- Employer's Agent : 3% of estimated Construction Costs
- Detailed Design : 7% of estimated Construction Costs

The above percentages reflect our knowledge from recent ECI projects, however we note WG's intention to procure this project on a Design & Build rather than ECI basis including the requirement for the Employer's Agent to deliver "Design Plus". Whilst we consider the overall allowance to be appropriate, we acknowledge that the individual percentages may not be reflective of WG's preferred procurement approach.

As such, we have made a single allowance equivalent to 10% of the estimated Construction Costs to cover the total cost of delivering both elements.

2.4.13 Non-Recoverable VAT

We understand that WG can recover the VAT associated with online improvement works. We have therefore made an assessment of the online extent of each of the various Options as set out in Section 4 of this Report and used this to determine the VAT payable in respect of each Option.

2.4.14 Land Costs and Compensation

No information has been provided in respect of anticipated land purchase requirements or compensation arrangements. As such, no allowance has been made within our Estimates for these costs.

3.0.1 Option BE1A(1) – Specific Assumptions and Estimate Summary

- River Crossing – 175m bridge with curved alignment
- Rail Crossing – 168m bridge with straight alignment
- Footpath Crossing – 4.5m span underpass with minimum 3.0m clearance
- Retaining Wall – 408m overall length, 8.2m average height
- Railway Station Footbridge – two span steel footbridge including lifts for DDA compliance
- 103,000m3 total excavation, 115,000m3 total fill
- Total pavement area = 34,000m2

ESTIMATE SUMMARY – OPTION BE1A(1)			
Series 100 - Preliminaries			6,983,375.00
Series 200 - Site Clearance			31,250.00
Series 300 - Fencing			192,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			632,250.00
Series 600 - Earthworks			2,409,000.00
Series 700 - Pavements			2,714,000.00
Series 1100 - Kerbs, Footways and Paved Areas			336,500.00
Series 1200 - Traffic Signs and Road Markings			31,500.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			57,000.00
Structures - River Crossing			9,010,750.00
Structures - Rail Crossing			8,417,500.00
Structures - Footpath Crossing			195,000.00
Structures - Retaining Wall			1,671,500.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			338,500.00
Series 3000 - Landscaping & Ecology			22,750.00
Sub-Total			**34,500,875.00**
Add Contractor's Fee	9%		3,105,078.75
Sub-Total			**37,605,953.75**
Add Optimism Bias	44%		16,546,619.65
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**56,152,573.40**
Add Employer's Agent and Detailed Design	10%		5,615,257.34
Sub-Total			**61,767,830.74**
Non-Recoverable VAT on Construction	7.25%	Online	10,416,302.37
VAT on Employer's Agent and Detailed Design			1,123,051.47
ESTIMATE SUMMARY – OPTION BE1A(1)			**73,307,184.58**

3.0.2 Option BE1A(2) – Specific Assumptions and Estimate Summary

- River Crossing – 234m bridge with curved alignment
- Rail Crossing – 168m bridge with straight alignment
- Footpath Crossing – 4.5m span underpass with minimum 3.0m clearance
- Retaining Wall – 444m overall length, 8.2m average height
- Railway Station Footbridge – two span steel footbridge including lifts for DDA compliance
- 103,000m3 total excavation, 110,000m3 total fill
- Total pavement area = 34,000m2

ESTIMATE SUMMARY – OPTION BE1A(2)			
Series 100 - Preliminaries			7,727,500.00
Series 200 - Site Clearance			30,750.00
Series 300 - Fencing			192,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			623,250.00
Series 600 - Earthworks			2,253,500.00
Series 700 - Pavements			2,666,500.00
Series 1100 - Kerbs, Footways and Paved Areas			358,250.00
Series 1200 - Traffic Signs and Road Markings			31,500.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			57,000.00
Structures - River Crossing			12,031,250.00
Structures - Rail Crossing			8,417,500.00
Structures - Footpath Crossing			195,000.00
Structures - Retaining Wall			1,819,000.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			338,500.00
Series 3000 - Landscaping & Ecology			22,000.00
Sub-Total			**38,221,500.00**
Add Contractor's Fee	9%		3,439,935.00
Sub-Total			**41,661,435.00**
Add Optimism Bias	44%		18,331,031.40
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**61,992,466.40**
Add Employer's Agent and Detailed Design	10%		6,199,246.64
Sub-Total			**68,191,713.04**
Non-Recoverable VAT on Construction	7.25%	Online	11,499,602.52
VAT on Employer's Agent and Detailed Design			1,239,849.33
ESTIMATE SUMMARY – OPTION BE1A(2)			**80,931,164.89**

3.1.1 Option BE1B(1) – Specific Assumptions and Estimate Summary

- River Crossing – 175m span bridge with straight alignment
- Footpath Crossing – 4.5m span underpass with minimum 3.0m clearance
- Retaining Wall – 408m overall length, 8.2m average height
- Railway Footbridge – two span steel footbridge including lifts for DDA compliance
- 68,000m3 total excavation, 111,000m3 total fill
- Total pavement area = 21,000m2

ESTIMATE SUMMARY – OPTION BE1B(1)			
Series 100 - Preliminaries			4,510,250.00
Series 200 - Site Clearance			20,750.00
Series 300 - Fencing			107,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			367,750.00
Series 600 - Earthworks			2,595,250.00
Series 700 - Pavements			1,607,000.00
Series 1100 - Kerbs, Footways and Paved Areas			233,750.00
Series 1200 - Traffic Signs and Road Markings			23,500.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			33,750.00
Structures - River Crossing			9,010,750.00
Structures - Rail Crossing			
Structures - Footpath Crossing			195,000.00
Structures - Retaining Wall			1,671,500.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			282,250.00
Series 3000 - Landscaping & Ecology			18,750.00
Sub-Total			**22,135,250.00**
Add Contractor's Fee	9%		1,992,172.50
Sub-Total			**24,127,422.50**
Add Optimism Bias	44%		10,616,065.90
Active Travel / NMU Measures			2,000,000.00
Sub Total			**36,743,488.40**
Add Employer's Agent and Detailed Design	10%		3,674,348.84
Sub-Total			**40,417,837.24**
Non-Recoverable VAT on Construction	2.50%	Online	7,164,980.24
VAT on Employer's Agent and Detailed Design			734,869.77
ESTIMATE SUMMARY – OPTION BE1B(1)			**48,317,687,25**

3.1.2 Option BE1B(2) – Specific Assumptions and Estimate Summary

- River Crossing – 234m span bridge with straight alignment
- Footpath Crossing – 4.5m span underpass with minimum 3.0m clearance
- Retaining Wall – 444m overall length, 8.2m average height
- Railway Footbridge – two span steel footbridge including lifts for DDA compliance
- 68,000m3 total excavation, 106,000m3 total fill
- Total pavement area = 21,000m2

ESTIMATE SUMMARY – OPTION BE1B(2)			
Series 100 - Preliminaries			5,254,500.00
Series 200 - Site Clearance			20,250.00
Series 300 - Fencing			107,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			359,000.00
Series 600 - Earthworks			2,439,750.00
Series 700 - Pavements			1,559,500.00
Series 1100 - Kerbs, Footways and Paved			255,750.00
Series 1200 - Traffic Signs and Road Markings			23,500.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			33,750.00
Structures - River Crossing			12,031,250.00
Structures - Rail Crossing			
Structures - Footpath Crossing			195,000.00
Structures - Retaining Wall			1,819,000.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			282,250.00
Series 3000 - Landscaping & Ecology			18,000.00
Sub-Total			**25,856,500.00**
Add Contractor's Fee	9%		2,327,085.00
Sub-Total			**28,183,585.00**
Add Optimism Bias	44%		12,400,777.40
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**42,584,362.40**
Add Employer's Agent and Detailed Design	10%		4,258,436.24
Sub-Total			**46,842,798.64**
Non-Recoverable VAT on Construction	2.50%	Online	8,303,950.67
VAT on Employer's Agent and Detailed Design			£851,687.25
ESTIMATE SUMMARY – OPTION BE1B(2)			**55,998,436.56**

3.2.1 Option BE1C(1) – Specific Assumptions and Estimate Summary

- River Crossing – 175m span bridge with straight alignment
- Footpath Crossing – 4.5m span underpass with minimum 3.0m clearance
- Retaining Wall – 408m overall length, 8.2m average height
- Railway Footbridge – two span steel footbridge including lifts for DDA compliance
- 67,000m3 total excavation, 198,000m3 total fill
- Total pavement area = 31,000m2

ESTIMATE SUMMARY – OPTION BE1C(1)			
Series 100 - Preliminaries			5,325,813.00
Series 200 - Site Clearance			31,000.00
Series 300 - Fencing			170,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			555,000.00
Series 600 - Earthworks			4,733,750.00
Series 700 - Pavements			2,424,500.00
Series 1100 - Kerbs, Footways and Paved Areas			309,750.00
Series 1200 - Traffic Signs and Road Markings			29,250.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			51,250.00
Structures - River Crossing			9,010,750.00
Structures - Rail Crossing			
Structures - Footpath Crossing			195,000.00
Structures - Retaining Wall			1,671,500.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			225,750.00
Series 3000 - Landscaping & Ecology			21,750.00
Sub-Total			**26,213,063.00**
Add Contractor's Fee	9%		2,359,175.67
Sub-Total			**28,572,238.67**
Add Optimism Bias	44%		12,571,785.01
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**43,144,023.68**
Add Employer's Agent and Detailed Design	10%		4,314,402.37
Sub-Total			**47,458,426.05**
Non-Recoverable VAT on Construction	1.50%	Online	8,499,372.66
VAT on Employer's Agent and Detailed Design			862,880.47
ESTIMATE SUMMARY – OPTION BE1C(1)			**56,820,679.18**

3.2.2 Option BE1C(2) – Specific Assumptions and Estimate Summary

- River Crossing – 234m span bridge with straight alignment
- Footpath Crossing – 4.5m span underpass with minimum 3.0m clearance
- Retaining Wall – 444m overall length, 8.2m average height
- Railway Footbridge – two span steel footbridge including lifts for DDA compliance
- 67,000m3 total excavation, 194,000m3 total fill
- Total pavement area = 31,000m2

ESTIMATE SUMMARY – OPTION BE1C(2)			
Series 100 - Preliminaries			6,070,125.00
Series 200 - Site Clearance			30,750.00
Series 300 - Fencing			170,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			546,000.00
Series 600 - Earthworks			4,578,250.00
Series 700 - Pavements			2,377,250.00
Series 1100 - Kerbs, Footways and Paved Areas			331,750.00
Series 1200 - Traffic Signs and Road Markings			29,250.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			51,250.00
Structures - River Crossing			12,031,250.00
Structures - Rail Crossing			
Structures - Footpath Crossing			195,000.00
Structures - Retaining Wall			1,819,000.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			225,750.00
Series 3000 - Landscaping & Ecology			21,000.00
Sub-Total			**29,934,625.00**
Add Contractor's Fee	9%		2,694,116.25
Sub-Total			**32,628,741.25**
Add Optimism Bias	44%		14,356,646.15
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**48,985,387.40**
Add Employer's Agent and Detailed Design	10%		4,898,538.74
Sub-Total			**53,883,926.14**
Non-Recoverable VAT on Construction	1.50%	Online	9,650,121.32
VAT on Employer's Agent and Detailed Design			979,707.75
ESTIMATE SUMMARY – OPTION BE1C(2)			**64,513,755.21**

3.3.0 Option BE3D – Specific Assumptions and Estimate Summary

- Combined Rail / River Bridge – 206m span bridge with straight alignment
- Retaining Wall – 573m overall length, 5m average height
- 28,000m3 total excavation, 30,000m3 total fill
- Total pavement area = 32,000m2

ESTIMATE SUMMARY – OPTION BE3D			
Series 100 - Preliminaries			4,613,063.00
Series 200 - Site Clearance			26,250.00
Series 300 - Fencing			194,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			622,250.00
Series 600 - Earthworks			849,000.00
Series 700 - Pavements			2,532,000.00
Series 1100 - Kerbs, Footways and Paved Areas			327,250.00
Series 1200 - Traffic Signs and Road Markings			31,500.00
Series 1300 - Road Lighting Columns			
Series 1400 - Electrical Work for Road Lighting and Signs			
Series 1500 - Motorway Communications			57,500.00
Structures - River Crossing			10,321,500.00
Structures - Rail Crossing			
Structures - Footpath Crossing			
Structures - Retaining Wall			1,432,500.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			225,750.00
Series 3000 - Landscaping & Ecology			16,000.00
Sub-Total			**22,649,313.00**
Add Contractor's Fee	9%		2,038,438.17
Sub-Total			**24,687,751.17**
Add Optimism Bias	44%		10,862,610.51
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**37,550,361.68**
Add Employer's Agent and Detailed Design	10%		3,755,036.17
Sub-Total			**41,305,397.85**
Non-Recoverable VAT on Construction	45.00%	Online	4,130,539.78
VAT on Employer's Agent and Detailed Design			751,007.23
ESTIMATE SUMMARY – OPTION BE3D			**46,186,944.86**

3.4.0 Option BE4D – Specific Assumptions and Estimate Summary

- Combined Rail / River Bridge – 293m span bridge with curved alignment
- Retaining Wall – 573m overall length, 5m average height
- 25,000m3 total excavation, 43,000m3 total fill
- Total pavement area = 32,000m2

ESTIMATE SUMMARY – OPTION BE4D			
Series 100 - Preliminaries			6,597,813.00
Series 200 - Site Clearance			27,000.00
Series 300 - Fencing			200,250.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			625,000.00
Series 600 - Earthworks			1,194,000.00
Series 700 - Pavements			2,721,000.00
Series 1100 - Kerbs, Footways and Paved Areas			389,500.00
Series 1200 - Traffic Signs and Road Markings			32,000.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			59,500.00
Structures - River Crossing			17,593,750.00
Structures - Rail Crossing			
Structures - Footpath Crossing			
Structures - Retaining Wall			1,432,500.00
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			225,750.00
Series 3000 - Landscaping & Ecology			17,750.00
Sub-Total			**32,573,063.00**
Add Contractor's Fee	9%		2,931,575.67
Sub-Total			**35,504,638.67**
Add Optimism Bias	44%		15,622,041.01
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**53,126,679.68**
Add Employer's Agent and Detailed Design	10%		5,312,667.97
Sub-Total			**58,439,347.65**
Non-Recoverable VAT on Construction	43.00%	Online	6,056,441.48
VAT on Employer's Agent and Detailed Design			1,062,533.59
ESTIMATE SUMMARY – OPTION BE4D			**65,558,322.72**

3.5.0 Option BW3C – Specific Assumptions and Estimate Summary

- River Crossing – 282m span bridge with straight alignment
- 271,000m3 total excavation, 868,000m3 total fill
- Total pavement area = 23,000m2

ESTIMATE SUMMARY – OPTION BW3C			
Series 100 - Preliminaries			9,249,500.00
Series 200 - Site Clearance			33,750.00
Series 300 - Fencing			122,500.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			402,250.00
Series 600 - Earthworks			17,785,750.00
Series 700 - Pavements			1,717,250.00
Series 1100 - Kerbs, Footways and Paved Areas			291,250.00
Series 1200 - Traffic Signs and Road Markings			25,000.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			37,750.00
Structures - River Crossing			14,518,750.00
Structures - Rail Crossing			
Structures - Footpath Crossing			
Structures - Retaining Wall			
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			169,250.00
Series 3000 - Landscaping & Ecology			21,250.00
Sub-Total			**45,831,500.00**
Add Contractor's Fee	9%		4,124,835.00
Sub-Total			**49,956,335.00**
Add Optimism Bias	44%		21,980,787.40
Active Travel / NMU Measures			2,000,000.00
Sub-Total			**73,937,122.40**
Add Employer's Agent and Detailed Design	10%		7,393,712.24
Sub-Total			**81,330,834.64**
Non-Recoverable VAT on Construction	2.00%	Online	14,491,675.99
VAT on Employer's Agent and Detailed Design			1,478,742.45
ESTIMATE SUMMARY – OPTION BW3C			**97,301,253.08**

3.6.0 Option ARL1 – Specific Assumptions and Estimate Summary

- Combined Rail / River Bridge – 176m bridge with straight alignment
- 58,000m3 total excavation, 8,000m3 total fill
- Total pavement area = 12,000m2

ESTIMATE SUMMARY – OPTION ARL1			
Series 100 - Preliminaries			3,265,438.00
Series 200 - Site Clearance			10,000.00
Series 300 - Fencing			53,750.00
Series 400 - Road Restraint Systems			
Series 500 - Drainage and service Ducts			239,250.00
Series 600 - Earthworks			751,750.00
Series 700 - Pavements			1,052,000.00
Series 1100 - Kerbs, Footways and Paved Areas			103,250.00
Series 1200 - Traffic Signs and Road Markings			18,500.00
Series 1300 - Road Lighting Columns			19,750.00
Series 1400 - Electrical Work for Road Lighting and Signs			37,500.00
Series 1500 - Motorway Communications			18,750.00
Structures - River Crossing			
Structures - Rail Crossing			8,809,500.00
Structures - Footpath Crossing			
Structures - Retaining Wall			
Structures - Railway Footbridge			1,400,000.00
Series 2700 - Accommodation Works, Works for SUs, etc.			112,750.00
Series 3000 - Landscaping & Ecology			19,000.00
Sub-Total			**15,911,188.00**
Add Contractor's Fee	9%		1,432,006.92
Sub-Total			**17,343,194.92**
Add Optimism Bias	44%		7,631,005.76
Active Travel / NMU Measures			500,000.00
Sub-Total			**25,474,200.68**
Add Employer's Agent and Detailed Design	10%		2,547,420.07
Sub-Total			**28,021,620.75**
Non-Recoverable VAT on Construction	7.25%	Online	4,725,464.23
VAT on Employer's Agent and Detailed Design			509,484.01
ESTIMATE SUMMARY – OPTION ARL1			**33,256,568.99**

3.7.0 Option ARL2 – Specific Assumptions and Estimate Summary

- Combined Rail / River Bridge – 650m bridge with straight alignment

For Option ARL2, we were provided with a copy of the Report on Public Workshop and Consultation dated March 2007. This included, at paragraph 4.3.7, an estimate of £12.2m for a 650m structure noted as Option C.

We were instructed to incorporate this Option into our Report including a suitable adjustment for inflation and other allowances which is shown below. We have assumed that this figure includes Contractor's Fee but excludes allowances for Optimism Bias, Employer's Agent and Detailed Design costs.

ESTIMATE SUMMARY – OPTION ARL2		
Previous Estimate – March 2007		12,200,000.00
Inflation Adjustment		
ROADCON Indices		
Q4 2006 (Base Date) = 152		
Q4 2017 (Current Date) = 202		
Uplift Factor = (202 – 152) / 152 =	32.89%	
Adjusted Estimate (rounded)		**16,200,000.00**
Add Optimism Bias	44%	7,128,000.00
Active Travel / NMU Measures		500,000.00
Sub-Total		**23,828,000.00**
Add Employer's Agent and Detailed Design	10%	2,382,800.00
Sub-Total		**26,210,800.00**
Non-Recoverable VAT on Construction	7.15% Online	4,424,859.60
VAT on Employer's Agent and Detailed Design		476,560.00
ESTIMATE SUMMARY – OPTION ARL2		**31,112,219.60**

As a comparison, applying the £3,500 per m2 rate used for the rail / river bridge in Option BE3D to the stated deck area of (650 x 12.5) = 8,125m2 for this structure gives a cost of £28.437m. This suggests that the original unit rate of £1,500 per m2 may have been insufficient, particularly given the long span of the structure and construction difficulties associated with working in a steep-sided valley as noted in paragraph 4.3.5 of the March 2007 Report.

4.0 VAT Considerations

We understand that WG will be able to recover the VAT element of cost for construction of online improvement works only and have assessed the following proportions of each Option as meeting that criterion. VAT is payable in full on Employer's Agent and Detailed Design costs.

Route Option	Total Length	Online Proportion	Elements Taken as Online Improvement
BE1A	3450m	7.25%	2No. Roundabouts, 200m Tie-In
BE1B	2150m	2.50%	2No. Roundabouts
BE1C	3100m	1.50%	2No. Roundabouts
BE3D*	3500m	45.00%	1450m Online, 1No. Roundabout, 100m Tie-In
BE4D*	3600m	43.00%	1400m Online, 2No. Roundabouts, 100m Tie-In
BW3C	2450m	2.00%	2No. Roundabouts
ARL1	1200m	4.00%	2No. Roundabouts
ARL2	700m	7.15%	2No. Roundabouts

Applying the above proportions to the estimated Construction Costs for each Option generates the following VAT amounts.

Route Option	Estimate Total	Online Proportion	VAT-able Proportion	Non-Recoverable VAT @ 20%
BE1A(1)	£56,152,573	7.25%	£52,081,511	£10,416,302
BE1A(2)	£61,992,466	7.25%	£57,498,012	£11,499,602
BE1B(1)	£36,743,488	2.50%	£35,824,900	£7,164,980
BE1B(2)	£42,584,362	2.50%	£41,519,753	£8,303,951
BE1C(1)	£43,144,023	1.50%	£42,496,863	£8,499,373
BE1C(2)	£48,985,387	1.50%	£48,250,606	£9,650,121
BE3D	£37,550,362	45.00%	£20,652,699	£4,130,540
BE4D	£53,126,680	43.00%	£30,282,208	£6,056,442
BW3C	£73,937,122	2.00%	£72,458,380	£14,491,676
ARL1	£25,474,201	7.25%	£23,627,321	£4,725,464
ARL2	£23,828,000	7.15%	£22,124,298	£4,424,860

5.0 Conclusion

From the information provided, it is currently estimated that Option BE1B(1) would be the cheapest to construct. This is primarily due to it being the shortest route option with less onerous earthwork requirements and a river bridge with a reduced span.

The table below summarises the total cost of each route option including Non-Recoverable VAT.

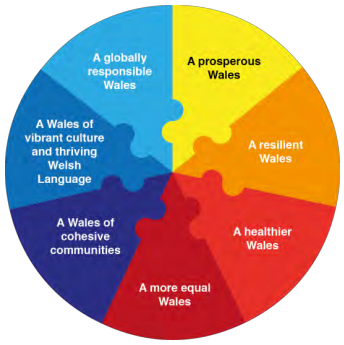
Route Option	Construction Cost	Employer's Agent & Detailed Design	Non-Recoverable VAT	Total Cost
BE1A(1)	£56,152,573	£5,615,257	£11,539,354	£73,307,184
BE1A(2)	£61,992,466	£6,199,247	£12,739,452	£80,931,165
BE1B(1)	£36,743,488	£3,674,349	£7,899,850	£48,317,687
BE1B(2)	£42,584,362	£4,258,436	£9,155,638	£55,998,436
BE1C(1)	£43,144,023	£4,314,402	£9,362,253	£56,820,679
BE1C(2)	£48,985,387	£4,898,539	£10,629,829	£64,513,755
BE3D*	£63,024,563	£6,302,456	£10,116,495	£79,443,514
BE3D**	£61,378,362	£6,137,836	£9,782,967	£77,299,165
BE4D*	£78,600,881	£7,860,088	£12,353,923	£98,814,892
BE4D**	£76,954,680	£7,695,468	£12,020,395	£96,670,543
BW3C	£73,937,122	£7,393,712	£15,970,418	£97,301,253

* Including the cost of Option ARL1 which is required in both cases.
** Including the cost of Option ARL2 which is required in both cases.

The discrete estimates for these individual Options are as follows :

Route Option	Construction Cost	Employer's Agent & Detailed Design	Non-Recoverable VAT	Total Cost
BE3D	£37,550,362	£3,755,036	£4,881,547	£46,186,945
BE4D	£53,126,679	£5,312,668	£7,118,975	£65,558,322
ARL1	£25,474,200	£2,547,420	£5,234,948	£33,256,568
ARL2	£23,828,000	£2,382,800	£4,901,420	£31,112,220

Appendix E. Short List Options Contribution to Well-being Goals



In this section the short-listed options have been considered in more detail.

E.1 A Prosperous Wales

Table sets out the extent to which each of the short-listed options could contribute to the 'A Prosperous Wales' Goal.

Table E-1: Assessment of Shortlist Options against Well-**Being Goal 'A Prosperous Wales'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	The improvements to the town centre, when considered with one of the short-listed bypass options would contribute to a Prosperous Wales. The removal of traffic associated with the bypass would have benefits to the town centre but the town centre improvements would make the shopping experience and general visitor experience within the town centre more appealing for local residents, people from the surrounding area who use Llandeilo as their service centre and for visitors and tourists. Signage on the bypass would be required to ensure that people passing through know how to access the town if they want to and are aware of its existence. With collaboration there is the potential for these benefits to be further realised, though this opportunity is not considered further at this stage.
NB1 – Traffic lights, no bypass	This option would have more limited benefits to the town centre but by widening the pavements it would still be possible to benefit the local economy. By not having a bypass through traffic HGVs would still detract from the town centre shopping experience but through traffic could result in ad hoc visits as people pass through the area.
NB2 – Removal of Parking on Rhosmaen Street	This option would have more limited benefits to the town centre. By not having a bypass through traffic HGVs would still detract from the town centre shopping experience but through traffic could result in ad hoc visits as people pass through the area.
NB5 – HGV Restriction (legal sanction) plus one-way system	This option would have benefits for the town in terms of the attractiveness as a service centre and as a shopping area for visitors and tourists, which would contribute to the local economy. However, the removal of the route for HGV traffic would have an adverse effect on freight transport, this would be felt most by local businesses and businesses in Ammanford who would otherwise travel north through Llandeilo. Overall this option is considered to be detrimental to the regional economy and does not contribute positively to this well-being goal.

Short-list Option	Assessment
NB6 – Combined no-bypass option (with HGV restriction)	This option would have benefits for the town in terms of the attractiveness as a service centre and as a shopping area for visitors and tourisms, which would contribute to the local economy. However, the removal of the route for HGV traffic would have an adverse effect on freight transport, this would be felt most by local businesses and businesses in Ammanford who would otherwise travel north through Llandeilo. Overall this option is considered to be detrimental to the regional economy and does not contribute positively to this well-being goal.
NB7 – Combined no-bypass option (no HGV restriction)	This option would have more limited benefits to the town centre but by widening the pavements it would still be possible to benefit the local economy. By not having a bypass through traffic HGVs would still detract from the town centre shopping experience but through traffic could result in ad hoc visits as people pass through the area.
BE1A – Eastern Bypass Option (including TC1A)	The bypass would result in the removal of HGVs from the town centre and would also remove through traffic, as these vehicles would then use the bypass. This would have benefits to freight traffic as there would be better journey reliability. Even without town centre improvements the bypass would benefit the town as a result of the reduction in traffic flows, especially HGV traffic, which currently detracts from the visitor experience.
BE1B – Eastern Bypass Option (including TC1A)	The bypass would result in the removal of HGVs from the town centre and would also remove through traffic, as these vehicles would then use the bypass. This would have benefits to freight traffic as there would be better journey reliability. Even without town centre improvements the bypass would benefit the town as a result of the reduction in traffic flows, especially HGV traffic, which currently detracts from the visitor experience.
BE1C – Eastern Bypass Option (including TC1A)	The bypass would result in the removal of HGVs from the town centre and would also remove through traffic, as these vehicles would then use the bypass. This would have benefits to freight traffic as there would be better journey reliability. Even without town centre improvements the bypass would benefit the town as a result of the reduction in traffic flows, especially HGV traffic, which currently detracts from the visitor experience.
BE4D – Eastern Bypass Option (including TC1A)	The bypass would result in the removal of HGVs from the town centre and would also remove through traffic, as these vehicles would then use the bypass. This would have benefits to freight traffic as there would be better journey reliability. Even without town centre improvements the bypass would benefit the town as a result of the reduction in traffic flows,

Short-list Option	Assessment
	especially HGV traffic, which currently detracts from the visitor experience.
BE6 – Eastern Bypass Option (including TC1A)	The bypass would result in the removal of HGVs from the town centre and would also remove through traffic, as these vehicles would then use the bypass. This would have benefits to freight traffic as there would be better journey reliability. Even without town centre improvements the bypass would benefit the town as a result of the reduction in traffic flows, especially HGV traffic, which currently detracts from the visitor experience.

E.2 A Resilient Wales

Table sets out the extent to which each of the shortlisted options could contribute to the 'A Resilient Wales' Goal.

Table E-2: Assessment of Shortlist Options against Well-**Being Goal 'A Resilient Wales'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	By removing through traffic there would be benefits to the town in terms of journey reliability and the trunk road network would be more resilient. However, by providing a one-way system that would not work for northbound HGV traffic there would be no benefit to HGV traffic should the bypass be closed as no alternative route through Llandeilo would be available. Overall there would be a benefit to cars, the improvements to HGV traffic would be neutral (the benefit of the bypass is discussed below).
NB1 – Traffic lights, no bypass	This option is neutral in respect of this goal.
NB2 – Removal of Parking on Rhosmaen Street	This option is neutral in respect of this goal.
NB5 – HGV Restriction (legal sanction) plus one-way system	This option is less resilient in terms of the trunk road network as there are currently several route options for HGV traffic should accidents or incidents result in the closure of other trunk roads. By limiting HGV traffic through Llandeilo that option would be lost.
NB6 – Combined no-bypass option (with HGV restriction)	This option is less resilient in terms of the trunk road network as there are currently several route options for HGV traffic should accidents or incidents result in the closure of other trunk roads. By limiting HGV traffic through Llandeilo that option would be lost
NB7 – Combined no-bypass option (no HGV restriction)	This option is neutral in respect of this goal.
BE1A – Eastern Bypass Option (including TC1A)	Overall there would be a benefit to cars, the improvements to HGV traffic would be neutral (the benefit of the bypass is discussed below).

Short-list Option	Assessment
BE1B – Eastern Bypass Option (including TC1A)	Overall there would be a benefit to cars, the improvements to HGV traffic would be neutral (the benefit of the bypass is discussed below).
BE1C – Eastern Bypass Option (including TC1A)	Overall there would be a benefit to cars, the improvements to HGV traffic would be neutral (the benefit of the bypass is discussed below).
BE4D – Eastern Bypass Option (including TC1A)	Overall there would be a benefit to cars, the improvements to HGV traffic would be neutral (the benefit of the bypass is discussed below).
BE6 – Eastern Bypass Option (including TC1A)	Overall there would be a benefit to cars, the improvements to HGV traffic would be neutral (the benefit of the bypass is discussed below).

E.3 A Healthier Wales

Table E-1 sets out the extent to which each of the shortlisted options could contribute to the 'A Healthier Wales' Goal.

Table E-1: Assessment of Shortlist Options against Well-**Being Goal 'A Healthier Wales'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	The benefits of the town centre improvements are associated with a reduction in accidents that would result from the widening of pavements to enable people to shop on Rhosmaen Street without having to walk in the road to pass each other. There would be an adverse effect on some properties in King Street and Carmarthen Road as a result of an increase in air emissions from cars which do not currently use that route. However, there would be a reduction in air emissions along Rhosmaen Street, which would be beneficial to people living or shopping in this area.
NB1 – Traffic lights, no bypass	The benefits of the town centre improvements are associated with a reduction in accidents that would result from the widening of pavements to enable people to shop on Rhosmaen Street without having to walk in the road to pass each other. In terms of air emissions, there would be no reduction in traffic flows through Llandeilo and so no overall benefit, there is the potential for there to be localised increases in air emissions where traffic is held at red lights, however, this should be considered against the current stop/start journey movements through the town.
NB2 – Removal of Parking on Rhosmaen Street	The benefits of the town centre improvements are associated with a reduction in accidents that would result from the removal of street parking.

Short-list Option	Assessment
	In terms of air emissions, there would be no reduction in traffic flows through Llandeilo and so no overall benefit.
NB5 – HGV Restriction (legal sanction) plus one-way system	The benefits of the town centre improvements are associated with a reduction in accidents that would result from the widening of pavements to enable people to shop on Rhosmaen Street without having to walk in the road to pass each other. There would be an adverse effect on some properties in King Street and Carmarthen Road as a result of an increase in air emissions from cars which do not currently use that route. However, there would be a reduction in air emissions along Rhosmaen Street, which would be beneficial to people living or shopping in this area. The removal of HGV traffic would improve the safety of the town for non-motorised users and would also reduce the air emissions from these vehicles.
NB6 – Combined no-bypass option (with HGV restriction)	The benefits of the town centre improvements are associated with a reduction in accidents that would result from the widening of pavements to enable people to shop on Rhosmaen Street without having to walk in the road to pass each other. The removal of HGV traffic would improve the safety of the town for non-motorised users and would also reduce the air emissions from these vehicles.
NB7 – Combined no-bypass option (no HGV restriction)	The benefits of the town centre improvements are associated with a reduction in accidents that would result from the widening of pavements to enable people to shop on Rhosmaen Street without having to walk in the road to pass each other.
BE1A – Eastern Bypass Option (including TC1A)	This option would result in the removal of HGVs and other through traffic from the town centre. This would be a benefit to people visiting the town as it would be safer. There would also be a reduction in the air emissions along Rhosmaen Street.
BE1B – Eastern Bypass Option (including TC1A)	This option would result in the removal of HGVs and other through traffic from the town centre. This would be a benefit to people visiting the town as it would be safer. There would also be a reduction in the air emissions along Rhosmaen Street.
BE1C – Eastern Bypass Option (including TC1A)	This option would result in the removal of HGVs and other through traffic from the town centre. This would be a benefit to people visiting the town as it would be safer. There would also be a reduction in the air emissions along Rhosmaen Street.
BE4D – Eastern Bypass Option (including TC1A)	This option would result in the removal of HGVs and other through traffic from the town centre. This would be a benefit to people visiting the town as it would be safer. There would also be a reduction in the air emissions along Rhosmaen Street.
BE6 – Eastern Bypass Option (including TC1A)	This option would result in the removal of HGVs and other through traffic from the town centre. This would be a benefit to people visiting the town as it would be safer. There would also be a reduction in the air emissions along Rhosmaen Street.

E.4 A More Equal Wales

Table E-2 sets out the extent to which each of the short-listed options could contribute to the 'A More Equal Wales' Goal.

Table E-2: Assessment of Shortlist Options against Well-**Being Goal 'A More Equal Wales'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
NB1 – Traffic lights, no bypass	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
NB2 – Removal of Parking on Rhosmaen Street	This option is neutral in respect of this goal.
NB5 – HGV Restriction (legal sanction) plus one-way system	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
NB6 – Combined no-bypass option (with HGV restriction)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
NB7 – Combined no-bypass option (no HGV restriction)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
BE1A – Eastern Bypass Option (including TC1A)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to

Short-list Option	Assessment
	people with young children due again to the improvements in the width of the pavements.
BE1B – Eastern Bypass Option (including TC1A)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
BE1C – Eastern Bypass Option (including TC1A)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
BE4D – Eastern Bypass Option (including TC1A)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.
BE6 – Eastern Bypass Option (including TC1A)	This option would result in a safer visitor experience for people of limited mobility, including wheelchair users who cannot currently travel along the length of Rhosmaen Street on the pavement due to its limited width in places. There would also be a benefit to people with young children due again to the improvements in the width of the pavements.

E.5 A Wales of Cohesive Communities

Table E-3 sets out the extent to which each of the shortlisted options could contribute to the 'A Wales of Cohesive Communities' Goal.

Table E-3: Assessment of Shortlist Options against Well-**Being Goal 'A Wales of Cohesive Communities'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	Improvements to the town centre will make it a more attractive centre for the town and reduce severance. Overall there should be a benefit to the cohesion of the town.
NB1 – Traffic lights, no bypass	Improvements to the town centre will make it a more attractive centre for the town and reduce severance. Overall there should be a benefit to the cohesion of the town.
NB2 – Removal of Parking on Rhosmaen Street	Minor improvements to the town centre will make it a marginally more attractive centre for the town and reduce severance. Overall there should be a marginal benefit to the cohesion of the town.

Short-list Option	Assessment
NB5 – HGV Restriction (legal sanction) plus one-way system	Improvements to the town centre will make it a more attractive centre for the town and reduce severance. Overall there should be a benefit to the cohesion of the town. The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive.
NB6 – Combined no-bypass option (with HGV restriction)	Improvements to the town centre will make it a more attractive centre for the town and reduce severance. Overall there should be a benefit to the cohesion of the town. The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive.
NB7 – Combined no-bypass option (no HGV restriction)	Improvements to the town centre will make it a more attractive centre for the town and reduce severance. Overall there should be a benefit to the cohesion of the town.
BE1A – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive. This should increase community cohesion.
BE1B – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive. This should increase community cohesion.
BE1C – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive. This should increase community cohesion.
BE4D – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive. This should increase community cohesion.
BE6 – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would reduce severance and make journeys on foot within the town more attractive. This should increase community cohesion.

E.6 A Wales of Vibrant Culture and Thriving Welsh Language

Table E-4 sets out the extent to which each of the shortlisted options could contribute to the 'A Wales of Vibrant Culture and Thriving Welsh language' Goal.

Table E-4: Assessment of Shortlist Options against Well-**Being Goal 'A Wales of Vibrant Culture and Thriving Welsh Language'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	Llandeilo is known for its numerous festivals with happen throughout the year. The removal of through traffic would benefit

Short-list Option	Assessment
	these festivals. However, at the moment some of these events involve the closure of some side roads, including some that would form part of the one way system. While this would not be insurmountable the way in which this is managed would need further consideration.
NB1 – Traffic lights, no bypass	This options would have limited benefits to Llandeilo, but the improvements to connectivity as a result of traffic only travelling in one direction (north or south bound based on the lights) would improve connectivity within the town during its many cultural events.
NB2 – Removal of Parking on Rhosmaen Street	This option is neutral or of limited benefit in respect of this goal.
NB5 – HGV Restriction (legal sanction) plus one-way system	Llandeilo is known for its numerous festivals with happen throughout the year. The removal of HGV traffic would benefit these festivals.
NB6 – Combined no-bypass option (with HGV restriction)	Llandeilo is known for its numerous festivals with happen throughout the year. The removal of HGV traffic would benefit these festivals.
NB7 – Combined no-bypass option (no HGV restriction)	There would be benefits associated with town centre improvements, though these would be limited.
BE1A – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would benefit the numerous cultural events that happen within the town centre. These events are widely advertised and people visit Llandeilo as a destination town, the bypass would not result in people not being aware of events as long as signage from the bypass is suitable.
BE1B – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would benefit the numerous cultural events that happen within the town centre. These events are widely advertised and people visit Llandeilo as a destination town, the bypass would not result in people not being aware of events as long as signage from the bypass is suitable.
BE1C – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would benefit the numerous cultural events that happen within the town centre. These events are widely advertised and people visit Llandeilo as a destination town, the bypass would not result in people not being aware of events as long as signage from the bypass is suitable.
BE4D – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would benefit the numerous cultural events that happen within the town centre. These events are widely advertised and people visit Llandeilo as a destination town, the bypass would not result in people not being aware of events as long as signage from the bypass is suitable.

Short-list Option	Assessment
BE6 – Eastern Bypass Option (including TC1A)	The removal of through traffic and HGV traffic from the town centre would benefit the numerous cultural events that happen within the town centre. These events are widely advertised and people visit Llandeilo as a destination town, the bypass would not result in people not being aware of events as long as signage from the bypass is suitable.

E.7 A Globally Responsible Wales

Table E-5 sets out the extent to which each of the shortlisted options could contribute to the 'A Globally Responsible Wales' Goal.

Table E-5: Assessment of Shortlist Options against Well-**Being Goal 'A Globally Responsible Wales'**

Short-list Option	Assessment
TCA1 – One-way system and bypass	The one-way system would improve the town centre for active travel journeys and should result in a reduction in the use of cars for short journeys.
NB1 – Traffic lights, no bypass	The improvements to the town centre should improve the town centre for active travel journeys and should result in reduction in the use of cars for short journeys. The construction of the bypass would result in the expenditure of embedded carbon. On this basis there would be a benefit of not undertaking these construction works.
NB2 – Removal of Parking on Rhosmaen Street	This option is neutral or of limited benefit in respect of this goal.
NB5 – HGV Restriction (legal sanction) plus one-way system	The one-way system would improve the town centre for active travel journeys and should result in a reduction in the use of cars for short journeys. However, the HGV restriction would lead to an increase in air emissions from HGVs as they have to travel longer distances to get to their destinations.
NB6 – Combined no-bypass option (with HGV restriction)	The improvements to the town centre should improve the town centre for active travel journeys and should result in reduction in the use of cars for short journeys. The construction of the bypass would result in the expenditure of embedded carbon. On this basis there would be a benefit of not undertaking these construction works. However, the HGV restriction would lead to an increase in air emissions from HGVs as they have to travel longer distances to get to their destinations
NB7 – Combined no-bypass option (no HGV restriction)	The improvements to the town centre should improve the town centre for active travel journeys and should result in reduction in the use of cars for short journeys. The construction of the bypass would result in the expenditure of embedded carbon. On this basis there would be a benefit of not undertaking these construction works.

Short-list Option	Assessment
BE1A – Eastern Bypass Option (including TC1A)	There would be embedded carbon expenditure from the construction of the bypass, though there would be wider benefits within the town as a result of the removal of through traffic and HGV traffic, which would improve the environment for active travel users. The design of the bypass would be critical in this regard to ensure that potential adverse impacts are minimised and where possible opportunities for enhancement are taken up.
BE1B – Eastern Bypass Option (including TC1A)	There would be embedded carbon expenditure from the construction of the bypass, though there would be wider benefits within the town as a result of the removal of through traffic and HGV traffic, which would improve the environment for active travel users. The design of the bypass would be critical in this regard to ensure that potential adverse impacts are minimised and where possible opportunities for enhancement are taken up.
BE1C – Eastern Bypass Option (including TC1A)	There would be embedded carbon expenditure from the construction of the bypass, though there would be wider benefits within the town as a result of the removal of through traffic and HGV traffic, which would improve the environment for active travel users. The design of the bypass would be critical in this regard to ensure that potential adverse impacts are minimised and where possible opportunities for enhancement are taken up.
BE4D – Eastern Bypass Option (including TC1A)	There would be embedded carbon expenditure from the construction of the bypass, though there would be wider benefits within the town as a result of the removal of through traffic and HGV traffic, which would improve the environment for active travel users. The design of the bypass would be critical in this regard to ensure that potential adverse impacts are minimised and where possible opportunities for enhancement are taken up.
BE6 – Eastern Bypass Option (including TC1A)	There would be embedded carbon expenditure from the construction of the bypass, though there would be wider benefits within the town as a result of the removal of through traffic and HGV traffic, which would improve the environment for active travel users. The design of the bypass would be critical in this regard to ensure that potential adverse impacts are minimised and where possible opportunities for enhancement are taken up.