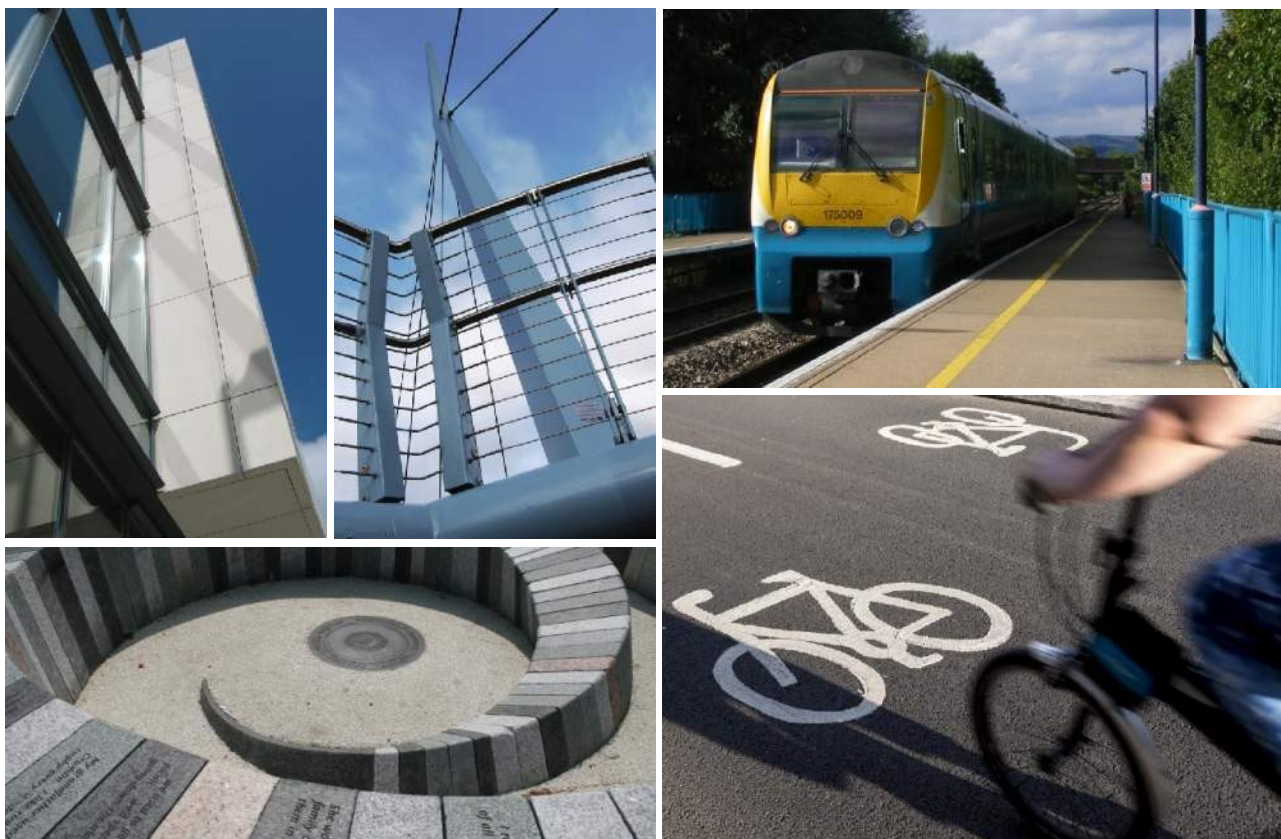


CAPITA



A483 Llandeilo to Ffairfach Transport Study:
WeITAG Stage 2
Outline Business Case

March 2021


CAPITA

Client: Transport for Wales


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A483 Llandeilo to Ffairfach Transport Study – WeITAG Stage 2 Outline Business Case


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1. Introduction

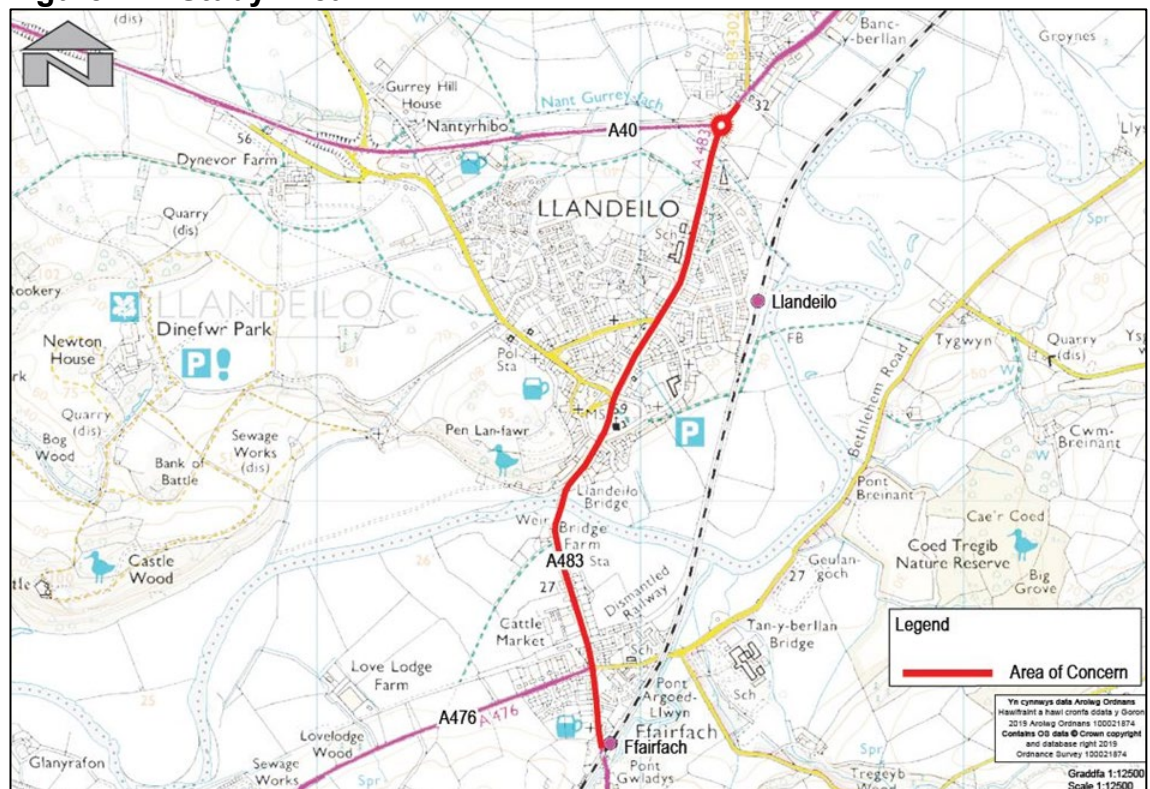
Background

Jacobs UK Limited (Jacobs) was commissioned by the Welsh Government to undertake a WeITAG Stage One Assessment in Llandeilo and Ffairfach in Carmarthenshire. Following the completion of this, Capita was commissioned by Transport for Wales to undertake a WeITAG Stage Two Assessment. As an early part of this process, Capita consulted with stakeholders on Tuesday 2nd April 2019 and with the public on Wednesday 3rd April and Saturday 6th April 2019. An additional round of consultation was then held towards the end of the WeITAG Stage Two with stakeholders consulted on the 28th and 29th September 2020 via a virtual workshop, and the public had opportunity to attend an online Public Consultation Clinic on the 16th, 19th, and 20th October 2020.

Study Area

Figure 1.1 below shows the study area in which this WeITAG study is focusing on. The area of concern is along the A483 within Llandeilo and Ffairfach, from its junction with the A40 to the north of Llandeilo all the way south to beyond the junction with the A476 to the south of Ffairfach.

Figure 1.1: Study Area



Purpose of a WeITAG Stage Two Study

The Stage Two WeITAG study included the further investigation of the 11 short-listed options identified at WeITAG Stage One, with a view to recommending a final preferred option.

This report summarises the output of the WeITAG Stage Two Appraisal. There is also substantial supporting evidence of the work undertaken in the accompanying WeITAG Stage Two Impact Assessment Report, which acts as a Technical Appendix to this summary report.

The appraisal of the short-listed options has been undertaken in line with the Welsh Transport Appraisal Guidelines (WeITAG 2017). The principles behind the Well-being of Future Generations (Wales) Act 2015 are embedded within the WeITAG process and have been an integral part of the development and appraisal of the options considered by this study.

WeITAG 2017

In 2017, the Welsh Government issued updated Welsh Transport Appraisal Guidance, which is used to appraise all transport schemes in Wales. The original guidance was issued in 2008.

The guidance has been used to appraise options developed as part of this report for the need for a transport improvement scheme in Llandeilo and Ffairfach.

Throughout the WeITAG process, appraisal is based on the Five Cases approach, which is used by the Welsh Government and HM Treasury in relation to business cases for projects requiring public sector funding.

The Five Cases are as follows:

- The Strategic Case.
- The Transport/Economic Case.
- The Financial Case.
- The Commercial Case; and
- The Management Case.

At the Outline Business Case (WeITAG Stage Two), which is the subject of this report, the purpose is to examine in greater detail the short-listed options for tackling the problems under consideration.

The Stage Two report should set out for the Review Group how each of the proposed options will meet the stated objectives, the anticipated impacts of each option and the ways in which the context of the scheme will affect the achievement of the objectives. It should also consider the robustness of the proposed options to meet the study objectives using sensitivity testing and scenario analysis including consideration of future scenarios. Key risks and dependencies should be presented.

The Stage Two report provides the evidence required for the Review Group to select a preferred option to take forward to Stage 3 (Full Business Case).

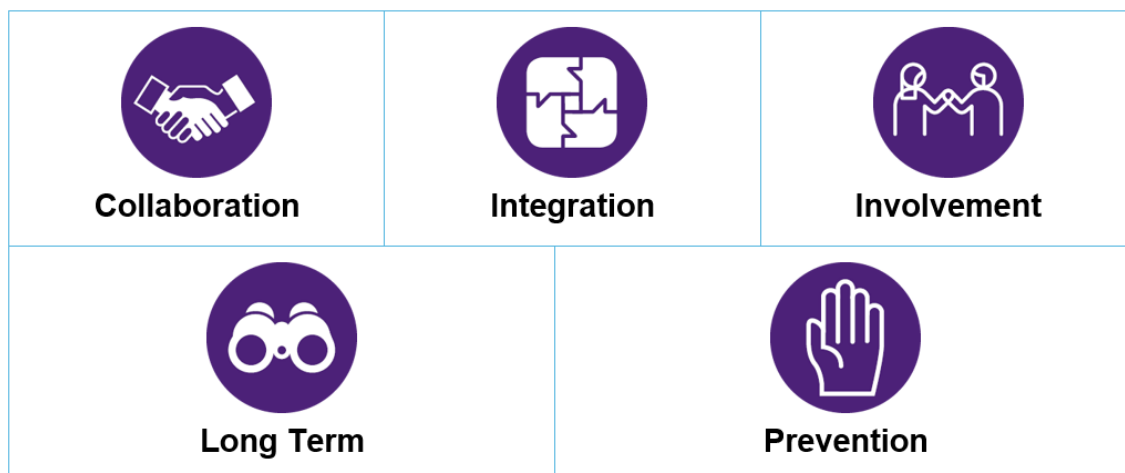
Well-being of Future Generations Considerations

The Well-being of Future Generations (Wales) Act 2015 places a duty on public bodies to carry out sustainable development. The Act has established seven well-being goals which should inform the way in which public bodies in Wales undertake work. As this scheme is developed on behalf of Welsh Government, this Act provides an important way in developing the project. Figure 1.2 shows these seven goals, which have informed the project objectives as set out in Chapter 2 of this report, in order to develop the project.

Figure 1.2: Well-Being Goals



The Act also provides “Five Ways of Working” which demonstrate that appropriate consideration has been given to the well-being goals and sustainable development principles. Figure 1.3 demonstrates the visual markers for each way of working that have been used in the development of this project.

Figure 1.3: Five Ways of Working

Report Structure

This WeITAG Stage Two report is structured as follows:

- Chapter 2 provides a summary of the Strategic Case of the short-listed options. It also includes an outline of further work to inform the case for change, including Consultation, as well as outlining option sifting and further option identification.
- Chapter 3 presents the Transport Case including further information on option sifting and option identification. This is also where the options in the revised short-list are appraised in detail.
- Chapter 4 presents the Commercial Case.
- Chapter 5 summarises the Financial Case.
- Chapter 6 highlights the Management Case; and
- Chapter 7 provides a summary and outlines recommendations.

2. Strategic Case

Introduction

The Strategic Case ‘tells us if we need change and why. It presents an evidence-based description of the current situation, describes the likely future situation if no action is taken, and presents the reasons why an intervention is required. It includes details of the wider context for the proposed intervention, including key trends’.

An analysis of the factors that are contributing to the problem is required along with a description of the key constraints which will affect the design and implementation of solutions to the challenge identified. The strategic case also establishes objectives that have been established for the particular issue under consideration in the WeITAG appraisal.

A Strategic Case already exists for this study. This was Chapter 2 of the A483 Llandeilo Transport Study WeITAG Stage One Strategic Outline Case Report that was prepared jointly by Jacobs and Mott McDonalds in November 2018. Given the comprehensive nature of the Strategic Case, which includes additional information contained in Section 1 of the Impacts Assessment Report, the Strategic Case in this Stage Two report has summarised this earlier work.

Following on from the Stage One Strategic Case summary, this chapter of the Stage Two WeITAG Outline Business Case considers further information to support the Strategic Case. This has become available since the Stage One WeITAG Strategic Outline Case report was published in November 2018.

Summary of the Strategic Case from the Stage One Report

The Strategic Case set out the need for a potential transport intervention in the Llandeilo and Ffairfach area. It sets out evidence based on the current baseline situation including details of issues of concern, as well as long term trends.

An intervention on the A483 through Llandeilo and Ffairfach was prompted by concerns raised in previous proposed scheme interventions (included the Refined Preferred Route announced in 2007), as well as through local observations, policy document updates, and the outcomes of public and stakeholder engagement. The Strategic Case considered all relevant information to present a case for a transport intervention within a defined Study Area, as shown in Figure 1.1.

Legislative and Policy Context

The assessment of options for a transport intervention was informed by a range of national (Wales) and local legislative and policy drivers including the following:

- The Well-being of Future Generations (Wales) Act 2015.
- The Wales Transport Strategy 2008.
- The National Transport Finance Plan (update 2017)
- Carmarthenshire Local Development Plan 2006-2021 (2014).

This report was originally drafted over the course of 2019/2020, however, prior to the final version being written, Llwybr Newydd: the Wales Transport Strategy 2021 was published in March 2021. The findings of this study are in accord with this document, highlighted by the extract from Section 7 Mini-plans: Roads, streets and Parking below:

Our Vision. We will ensure that our roads and streets are safe, well-maintained and managed for all road users, and also support sustainable transport options including active travel and more public transport ...

... Over the next five years we will

- Maintain and operate the Strategic Road Network in a way that meets our statutory obligations, minimizes adverse environmental impacts, promotes active travel, sustains and creates employment in Wales and reduces the backlog of maintenance
- Upgrade, improve and future-proof our road network, addressing congestion pinch points and investing in schemes that support road safety, journey reliability, resilience, modal shift and electric bike, motorbike and vehicle charging
- Work with Natural Resources Wales to manage the impact of climate change on road infrastructure by improving surface water drainage, managing flood risks and ensuring that new developments do not create harmful surface water discharges
- Develop policies on parking for all vehicle types to drive modal shift to public transport and active travel, taking equality into account for example, ensuring that parking provision for disabled people is maintained in the design of new schemes and road layouts

One key point in Llwybr Newydd is section 04 “How we will deliver”, where it states that Welsh Government “will ensure that the more specific capital transport expenditure on projects and programmes that support Llwybr Newydd is aligned with the Wales Infrastructure Investment Plan.” Listed in the Wales Infrastructure Investment Plan (March 2021) is the “A483 Llandeilo” project which this WelTAG Stage Two report is a key part.

As well as the above, a number of other important national, regional, and local documents have been taken into account in this Stage Two work. These are:

- Climate Change Act 2008.
- The Active Travel (Wales) Act 2013.
- One Wales: One Planet – the Sustainable Development Scheme for Wales (2009).
- Climate Change Strategy for Wales (2010).
- Air Quality Strategy for England, Scotland, Wales, and Northern Ireland (2011).
- Taking Wales Forward, The Welsh Government’s Well-being Objectives (2016).
- Prosperity for All: A Low Carbon Wales (2019).
- Prosperity for All, the National Strategy (2017).
- Prosperity for All, Economic Action Plan (2017).
- Environment Strategy for Wales (2006).
- The Wales Spatial Plan (2008).
- An Active Travel Action Plan for Wales (2016).
- Planning Policy Wales (2019) and associated Technical Advice Notes (various dates).
- Local Air Quality Management in Wales - Policy Guidance (2017).
- Joint Transport Plan for South West Wales 2015-2020.
- Brecon Beacons National Park Authority Local Development Plan (to 2022).
- Brecon Beacons National Park Authority Well-being Objectives.
- Carmarthenshire County Council Well-being Objectives.

For the Stage Two process, updated versions (to those listed above) of The National Transport Finance Plan and Carmarthenshire County Council Local Development Plan have been considered. The National Transport Finance Plan (2018 update) includes a transport intervention between Llandeilo and Ffairfach in its Delivery Schedule (in Table 1).

Table 1: Extract from National Transport Finance Plan (2018 update)

Reference	National Transport Finance Plan November 2018 Intervention Description	Progress since December 2017
R22	Carry out a WeITAG appraisal (2017) on Llandeilo/Ffairfach to confirm if a bypass is still required or if alternative solutions can be implemented. If the assessment concludes that a bypass is required, then all proposed routes need to be reviewed.	Depending on the outcome of the WeITAG work, a decision will be taken on the way forward. Considerations / alternatives are required with respect to the interface with Network Rail, the Afon Tywi/River Towy SAC, flooding measures and Carmarthenshire County Council. Consultants assigned (Oct 16/10/17) to complete Environmental and Transport tasks in line with WeITAG 2017.

The implementation of the Carmarthenshire Local Development Plan (LDP) 2018-2033 has commenced. One of the 33 summary issues outlined within the LDP is Air quality management areas in Carmarthen, Llanelli and Llandeilo. This issue will influence any transport intervention that is implemented within the study area. The updated LDP also mentions Llandeilo when outlining one of its Strategic Policies. Strategic Policy 2 relates to retail provision within Carmarthenshire, where Llandeilo is categorised as a 'middle tier' service centre on the retail hierarchy. More details of this is in the Carmarthenshire Local Development Plan (Deposit Plan), which is intended to be adopted by the end of 2021. Llandeilo is also categorised as a smaller/market town in the updated LDP, which has a more local catchment meeting local needs. This would have to be considered as part of any transport intervention that is taken forward from this study.

Strategic Policy 17 relates to 'Transport and Accessibility' and it outlines how the Local Development Plan will contribute to the delivery of a sustainable transport system within Carmarthenshire. It will achieve this through these eight points:

1. Reducing the need to travel, particularly by private motor car.
2. Addressing social inclusion through increased accessibility to employment, services and facilities.
3. Supporting and where applicable enhancing alternatives to the motor car, such as public transport (including park and ride facilities and encourage the adoption of travel plans) and active transport through cycling and walking.
4. Reinforcing the function and role of settlements in accordance with the settlement framework.
5. Promoting the efficient use of the transport network.
6. Enhancing accessibility to employment, homes, services and facilities at locations accessible to appropriate transport infrastructure – including significant trip generating proposals.
7. The incorporation of design and access solutions within developments to promote accessibility. Provide walking and cycling routes, linking in with active travel networks and green infrastructure networks; and
8. Adopt a sustainable approach to the design, function and layout of new development, including providing appropriate levels of parking.

Therefore, these eight points of sustainable transport should be taken into consideration when deciding the preferred option to take forward.

Further information on the Well-being objectives of relevant public bodies that have been considered are set out in the Impacts Assessment Report, which accompanies this WeITAG Stage Two report. These Well-being objectives have also been used to guide the development of the interventions that are proposed, and design and environmental objectives for the study.

The Existing Situation

Highway Network

The existing situation is described in terms of the highway network, both within Llandeilo and Ffairfach, and the wider area. Deficiencies are highlighted as well as features that are important to the area. The lack of suitable diversionary routes to the A483 through Llandeilo and Ffairfach is outlined and the use of the A40 and A48 Trunk Roads have been discussed at workshops and dismissed due to the increased journey times. Llandeilo and Ffairfach are located on the strategic highway network, with many HGVs travelling through the area.

Llandeilo is the principal area of economic activity for a wide rural area and has been for many centuries, with historical records on the existence of the town dating back to the 13th Century. Llandeilo provides an important function for the surrounding area with key basic aspects of life such as schools, supermarkets, banking and the Post Office all located here. It has been noted by some locals that internet services are particularly poor for the wider area. Thus, there is a considerable underlying need for those who live in the rural area to drive to the town, as there are limited alternatives.

Facilities for non-motorised users are poor and difficult to use by some user groups. Crossing points are of variable quality and quantity. Traffic using the A483 through Llandeilo can be imposing for pedestrians and cyclists. A lack of wayfinding is also a problem, particularly in relation to the two railway stations in the area (Llandeilo and Ffairfach).

Public Transport

In terms of public transport, the Heart of Wales railway line passes through Llandeilo and Ffairfach with a station serving each community. Despite their closeness to each other, both have seen very slight increases in use since 2014/15. Llandeilo Station is the busier and more modern of the two.

There are numerous bus stops in Llandeilo and Ffairfach which are of good quality, enabling a variety of destinations to be reached both locally and further afield. However, frequencies are limited with some operating only on certain days of the week. There has been a general trend to stop running services that are not cost effective.

At present, there is one bus service a week to the train station. This is the 280 service on a Saturday. However, there are six different bus services that stop at the bus stop on Rhosmaen Street at the top of Station Road, approximately 400m from the train station. During the weekday, there are usually nine buses a day using this stop. Therefore, connections between bus and rail are poor.

Traffic Flows

Traffic data has been taken from local counts on the A483 undertaken in May 2018. This shows nearly 9000 vehicles per day in both directions along the A483 through Llandeilo and Ffairfach, with directional flows broadly even northbound and southbound.

Accident Data

Over the five-year data collection period 2012-2016, the majority of accidents occurred along the A483 Rhosmaen Street in Llandeilo with small clusters in Ffairfach. Although the majority were slight there were two fatalities on Rhosmaen Street. These involved a pedestrian and a vehicle driver.

Air Quality

Llandeilo and Ffairfach were declared Air Quality Management Areas in 2011 due to concentrations of Nitrogen Dioxide (NO₂) within the A483 corridor.

Identification of Issues of Concern

These were identified using the Five Ways of Working set out in the Well-being of Future Generations (Wales) Act 2015, which are Thinking long-term, Prevention, Integration, Collaboration, and Involvement.

Issues of concern were identified through site visits followed by consultation. Site visits included observations of the operation of the local highway network, namely traffic flow and congestion, parking, visibility issues, vehicle type, and facilities for pedestrians and cyclists.

At WelTAG Stage One, consultation in the form of Workshop 1 was held in January 2018. Stakeholders included representatives from Carmarthenshire County Council, local town and community councils, the emergency services, train operators, health trusts, local business and access groups, and Sustrans. The scope of the transport study was outlined and key issues set out prior to the discussions that were held in respect of local transport. The key problems identified were as follows:

- Access to railway stations;

- Closure of local amenities;
- Crossing Rhosmaen Street / A483 (severance);
- Crossing / visibility at Ffairfach roundabout;
- Future development;
- Type of vehicle (HGV traffic);
- Journey reliability / resilience;
- Noise levels;
- Number of pedestrians;
- Parking;
- Pedestrian safety;
- Poor air quality;
- Poor cycling environment;
- Public transport;
- Road geometry and strategic purpose of A483;
- Road safety;
- School traffic;
- Traffic discouraging visitors (economic growth constraints);
- Traffic speed; and
- Vibration levels.

The preferred intervention from this Stage Two study will attempt to address all these key problems in order to provide significant transport improvements to the Llandeilo and Ffairfach transport corridor.

It is worthwhile noting that many of the problems identified in the study area relate to the pedestrian and cycling environment. Problems such as crossing the A483 Rhosmaen Street due to the type and volume of vehicles using it coupled with the narrow carriageway and footway widths, mean that pedestrians in particular are often disadvantaged due to their close proximity to passing vehicles. Therefore, even with advances in technology such as electric vehicles and/or autonomous vehicles that will likely happen in the long term, pedestrians in the future would still face many of the issues that are present today. In fact, the rise of electric vehicles may give rise to increased road traffic accidents in the study area, as these vehicles are considerably quieter than the internal combustion engines of conventional vehicles. Together with narrow footways and close passing vehicles, pedestrians will have less in the way of audible warnings of approaching traffic.

Scheme Objectives

At WeITAG Stage One the following eight objectives were identified:

1. Preserve strategic function of the 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.

The consideration of these objectives have continued through the Stage Two study.

Well-being Objectives

The well-being objectives of the relevant public bodies that were covered in the WeITAG Stage One Report have continued throughout the Stage Two study. Stage Two has presented opportunities to collaborate with these public bodies in order to deliver their objectives within the study area. The public bodies that have been considered relevant are:

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

Design and Environmental Objectives

As part of the WeITAG Stage Two process, a set of Design and Environmental Objectives were required. To enable this, the well-being objectives of key stakeholders listed in Section 2.6 were considered along with the scheme objectives in Section 2.5. Using the common themes of the well-being objectives, the final Design and Environmental Objectives that are listed below were defined in line with the scheme objectives and the design 'ethos' of the shortlisted options.

1. Provide good quality active travel facilities on any preferred option.
2. The preferred solution will provide an improvement to the baseline air quality in Llandeilo town centre.
3. Provide improved resilience to the highway network.
4. Design and materials palette to be sympathetic to the heritage of the area.
5. Lighting design will take into account the environmental sensitives of the area.

At this stage, these Design and Environmental objectives have not been scored against any set criteria, although they may be in the future. These objectives will be taken into account in all subsequent design work.

Long List of Options

A long list of options was developed at WeITAG Stage One through Workshop 2, on the 13th February 2018 together with the identification of constraints to their provision.

Workshop 2 was followed by two public forums where local people were given the opportunity to give their views on current issues within Llandeilo and Ffairfach and what potential options could address them. Comprehensive information was provided.

Each option, plus a Do Minimum scenario, was fully described in terms of how it would address issues or prevent them getting worse/happening in the first place, likely impacts (across many topics), meet the objectives, and key issues relating to delivery, including any 'deal breakers'. Options were included in one of six groups, which were Town Centre, Non-Bypass, Eastern, Additional Links, Western, or Tunnel.

Non-transport sector solutions were considered. These included the removal of large vehicles from the A483, noise/acoustic barriers adjacent to the Trunk Road, and improvements in air quality through the greater use of electric vehicles. The impact of traffic on the townscape and cultural heritage could only be addressed through its relocation within the existing or improved highway network. It was considered that public transport and non-transport solutions would not resolve the identified issues and the long list of options does not include these.

Assumptions used in the Appraisal

In order to make any recommendation for the study area, any preferred option should be in accord with the 7 wellbeing goals in the Well-being of Future Generations (Wales) Act 2015. Of particular relevance to this study are the wellbeing goals of "a prosperous Wales", "a healthier Wales" and "a Wales of cohesive communities", which are the main themes behind the project objectives.

Providing good active travel links are the key to realising these goals in the study area. Particularly along Rhosmaen Street in Llandeilo, there are serious pedestrian safety concerns, due to the narrow footpaths next to traffic travelling on narrow carriageway. Therefore, being able to provide wider footpaths will encourage greater pedestrian safety, promote tourism and enable higher numbers of pedestrians. In turn, greater pedestrian footfall will drive economic growth in the retail and leisure sectors for the area.

In order to deliver wider footpaths along the principal economic area of Rhosmaen Street, either reduced traffic capacity or alternative routes need to be provided. Thus, no bypass should be proposed without accompanying Town Centre improvement options. Any bypass would then become the A483 Trunk Road. However, if a new carriageway was constructed around Llandeilo and Ffairfach along with town centre or community infrastructure improvements, the new carriageway would not strictly be a “bypass”. The purpose of the carriageway would be a “relief road”. For consistency with the WeITAG Stage One, the “bypass” terminology is retained within this report.

Cutting carbon emissions from road traffic and improving air quality is a recurring theme with many of the current policies. Indeed, there is great focus from governments and the vehicle manufacturing industry on moving away from fossil fuel use. In the long term, it is foreseeable that there will be significantly cleaner vehicles, including HGVs and buses on the highway network. In the case of Llandeilo and Ffairfach, electric vehicles on the highway network, which are substantially quieter than current internal combustion engine vehicles, may actually lead to greater pedestrian safety concerns of individuals on narrow footpaths next to passing traffic.

The overriding factor behind any proposed option for this study is found in paragraph 5.3.13 of Planning Policy Wales (Edition 10) which states “The process of designing new road schemes and road improvements should take into account the transport hierarchy, whereby active and sustainable transport is considered before private motor vehicles. This will help to minimise community severance from a scheme and its impacts on the safety, convenience and amenity of routes for journeys on foot, bicycle and public transport.”

The options in the long list of options that emerged from the initial WeITAG Stage One work are shown below, together with their reference and title, where appropriate.

Long List of Options from WeITAG Stage One

Do Minimum Option

- DM - Do Minimum: no intervention

Town Centre Options with Bypass

- 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 with a bypass

Non-Bypass Options

- NB1 - Traffic lights on Rhosmaen Street
- NB2 - Removal of parking on Rhosmaen Street
- NB3 - HGV restriction on Rhosmaen Street (legal sanction)
- NB4 - HGV restriction with permits/emission charge
- NB5 - HGV restriction (legal sanction) with one-way system
- NB6 - Combined no-bypass option (with HGV restriction)
- NB7 - Combined no-bypass option (no HGV restriction)

Eastern Bypass Options

- BE1A - Eastern Option 1A
- BE1B - Eastern Option 1B
- BE1C - Eastern Option 1C
- BE1D - Eastern Option 1D
- BE2 - Eastern Option 2
- BE3A - Eastern Option 3A
- BE3B - Eastern Option 3B
- BE3C - Eastern Option 3C
- BE3D - Eastern Option 3D
- BE4A - Eastern Option 4A
- BE4B - Eastern Option 4B
- BE4C - Eastern Option 4C
- BE4D - Eastern Option 4D
- BE5A - Eastern Option 5A
- BE5B - Eastern Option 5B
- BE6 - Eastern Option 6

Road Links

- ARL 1 - Road Link 1
- ARL 2 - Road Link 2

Western Bypass Options

- BW1 - Western Bypass Option 1
- BW2 - Western Bypass Option 2
- BW3A - Western Bypass Option 3A
- BW3B - Western Bypass Option 3B
- BW3C - Western Bypass Option 3C
- BW4 - Western Bypass Option 4

- BW5A - Western Bypass Option 5A
- BW5B - Western Bypass Option 5B
- BW5C - Western Bypass Option 5C
- BW6 - Far West Route via Dryslwyn

Tunnel

- BT1 - Tunnel

Short-List of Options

As part of the appraisal process, which is covered in the Transport Case of the WeITAG Stage One Report (Jacobs, November 2018) and supplemented with information in the Stage One Impacts Assessment Report, the long list of options was reduced to a short-list of 11. The other 29 options were considered less favourable. Do Minimum was retained as a baseline reference option. The short-list of options is shown in Section 2.12. together with descriptions. The group that each option came from in the long list (see Section 2.8) is shown in the Option Grouping. The appraisal process included an assessment of the options in the short-list against the goals of the Well-being of Future Generations (Wales) Act 2015, which is included in Appendix A of the WeITAG Stage One Report.

It should be noted that in some cases, the option descriptions that are included below (Section 2.12) have been expanded upon as a result of additional information received during the Stage Two WeITAG process.

Recommended Short-list of Options from WeITAG Stage One

Town Centre Improvements

Traffic lights, no bypass (NB1) - Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Footways to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians in addition to enhancing the townscape and providing facilities for cyclists including cycle parking.

Removal of Parking (NB2) - 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.

HGV Restriction (legal sanction) plus one-way system (NB5) - 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, with 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. Improved facilities for pedestrians, cyclists would be possible as well as enhancements to the townscape.

Combined No-bypass Option (with HGV restriction) (NB6) - This option is a package of works representing a combination of Options NB1, NB2 and NB3.

Combined No-Bypass option (No HGV restriction) (NB7) - This option is a package of works representing a combination of Options NB1 and NB2.

Combined Bypass and Town Centre Improvements

One Way System and a Bypass Option – A (TC1A) - Town Centre routing restrictions will be installed. Two-way traffic will remain from the junction of the A40 and the 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 (HGVs and agricultural vehicles for access only). This will be linked to a weight restriction on the existing A483 between King Street and Ffairfach roundabout. 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. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi. The transfer of through traffic to a bypass will be beneficial to the air quality within the A483 corridor through Llandeilo and Ffairfach, which is an Air Quality Management Area.

The narrow footways (as low as 1.2 metres in places) will be widened to approximately 2.5 metres within the one-way section of Rhosmaen Street to provide safer conditions for pedestrians as well as providing opportunities for more widespread townscape improvements. The additional footway widths will mean that pedestrians will not have to step into the road whilst walking along Rhosmaen Street, and the improvements will help address the disproportionately high number of serious and fatal accidents that have occurred on Rhosmaen Street in the past. The footway improvements will also encourage greater pedestrian usage and promote more active travel as well as having the potential to increase visitor numbers to the town, which in turn will benefit the local economy. Northbound traffic displaced from Rhosmaen Street will have to use King Street, George Street, Carmarthen Street, and New Road, all of which will experience increased flow. This will be slightly disbeneficial in relation to road safety. Road safety in the town centre could be compromised in the future when electric vehicles are more common, as their near silent operation will mean that pedestrians may not be aware of their presence. Technology will be required to overcome this issue.

Although not classed as an Active Travel town by Carmarthenshire County Council, facilities for cyclists will be provided as part of town centre enhancements. This will be made possible through a reduction in traffic flow and reallocation of road space. This will include the provision of Sheffield Stands for cycle parking in appropriate locations although it will be important to ensure that this does not lead to conflict between cyclists and pedestrians.

Potential desire lines for cyclists, which should, where appropriate, be usable by pedestrians, are being identified. These include links between the town centre and the railway station and bypass. However, the topography of Llandeilo will always limit the number and extent of new or improved routes that can be provided. It is likely that no more than approximately five routes would be possible and some of these would be challenging to use. Overall, and in combination with a bypass option, there will be a net gain of at least 2 kilometres of new walking and cycling routes within Llandeilo and Ffairfach. Consideration will be given to tying the proposed Tywi Valley Path into these new facilities in the Ffairfach area.

The opportunity will be taken to provide a pilot cycle hire scheme based on e-bikes (electric bikes). This will include the necessary charging points. This facility could be marketed to local people as well as visitors and could be promoted as an environmentally beneficial way of accessing one of the main visitor attractions in the area, Dinefwr Park, the centre of which (the House) lies within 2 kilometres of the centre of Llandeilo. Although conventional bikes could also be available for hire, the challenging topography in Llandeilo would better suit the use of e-bikes particularly amongst people who normally cycle either occasionally or not at all. Although charging points for e-bikes could be considered in other parts of the town, there is less of a need for this as unlike electric cars, e-bikes can be easily charged domestically.

Eastern Bypass Group

Eastern Bypass Option 1A (BE1A) - Eastern Bypass Option 1A 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 west before curving south to join the A476 at a proposed roundabout immediately to the east of Ysgol Bro Dinefwr. From here, the route then heads south east and terminates on the A483 at a proposed roundabout to the south of Heol Pen Storom.

Facilities for pedestrians and cyclists will be provided over the southern part of this option all the way north to Llandeilo Railway Station. These will be particularly beneficial to school children accessing the Welsh medium school from the Llandeilo direction. Safe crossing facilities on the bypass close to its intermediate roundabout to the south of Llandeilo Bridge will be provided. Recent studies indicate that 25% of children at this school would like to walk or cycle more, which will be particularly beneficial to those that live locally despite the school having a car and bus bias due its significant catchment area. The facilities alongside the bypass could be extended over its entire length if necessary and if provided would be combined with a safe crossing point at the A40/A483 roundabout to the north of Llandeilo. Where feasible, walking and cycling links will be provided between the bypass and the centre parts of Llandeilo and Ffairfach although the local topography will limit what can reasonably be provided.

Eastern Bypass Option 1B (BE1B) - 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 roundabout is proposed to be constructed on the A483 to the south of Llandeilo Bridge. The route then heads west before curving south to terminate on the A476 at a proposed roundabout immediately to the east of Ysgol Bro Dinefwr.

Facilities for pedestrians and cyclists will be provided over the southern part of this option all the way north to Llandeilo Railway Station. These will be particularly beneficial to school children accessing the Welsh medium school from the Llandeilo direction. Safe crossing facilities on the bypass close to its intermediate roundabout to the south of Llandeilo Bridge will be provided. Recent studies indicate that 25% of children at this school would like to walk or cycle more, which will be particularly beneficial to those that live locally despite the school having a car and bus bias due its significant catchment area. The facilities alongside the bypass could be extended over its entire length if necessary and if provided would be combined with a safe crossing point at the A40/A483 roundabout to the north of Llandeilo. Where feasible, walking and cycling links will be provided between the bypass and the centre parts of Llandeilo and Ffairfach although the local topography will limit what can reasonably be provided.

Eastern Bypass Option 1C (BE1C) - 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 roundabout is proposed on the A483 to the south of Llandeilo Bridge. The route then heads further west before curving south to terminate at a proposed roundabout at the junction of the A476 and B4300 well to the west of Ysgol Bro Dinefwr.

Facilities for pedestrians and cyclists will be provided over the southern part of this option all the way north to Llandeilo Railway Station. These could be extended over its entire length if necessary and this will be combined with a safe crossing point at the A40/A483 roundabout to the north of Llandeilo.

Eastern Bypass Option 1D (BE1D) - 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 roundabout is proposed on the A483 to the south of Llandeilo Bridge. The route then heads further west before curving south to terminate at a proposed roundabout at the junction of the A476 and B4300 well to the west of Ysgol Bro Dinefwr. It then continues south east and terminates on the A483 at a proposed roundabout to the south of Heol Pen Storum.

Facilities for pedestrians and cyclists will be provided over the southern part of this option all the way north to Llandeilo Railway Station. Access to Ysgol Bro Dinefwr from the Llandeilo direction will continue to be through the northern half of Ffairfach. Fewer vehicles in this area together with townscape enhancements associated with Option TC1A will make this route safe although there will still be vehicles using the A476 on the western side of Ffairfach. Safe crossing facilities will be provided on the bypass close to its intermediate roundabout to the south of Llandeilo Bridge. Recent studies indicate that 25% of children at this school would like to walk or cycle more, which will be particularly beneficial to those that live locally despite the school having a car and bus bias due its significant catchment area. The facilities alongside the bypass could be extended over its entire length if necessary and if provided would be combined with a safe crossing point at the A40/A483 roundabout to the north of Llandeilo. Where feasible, walking and cycling links will be provided between the bypass and the centre parts of Llandeilo and Ffairfach although the local topography will limit what can reasonably be provided.

Option formerly known as the Refined Protected Route (BE6) - 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 to BE1D. It joins the A483 at a proposed roundabout 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 west before curving south to join the A476 at a proposed roundabout immediately to the east of Ysgol Bro Dinefwr. From here, the route then heads south east and terminates on the A483 at a proposed roundabout to the south of Heol Pen Storum.

Facilities for pedestrians and cyclists will be provided over the southern part of this option all the way north to Llandeilo Railway Station. These will be particularly beneficial to school children accessing the Welsh medium school from the Llandeilo direction. Safe crossing facilities on the bypass close to its intermediate roundabout to the south of Llandeilo Bridge will be provided.

Recent studies indicate that 25% of children at this school would like to walk or cycle more, which will be particularly beneficial to those that live locally despite the school having a car and bus bias due its significant catchment area. The facilities alongside the bypass could be extended over its entire length if necessary and if provided would be combined with a safe crossing point at the A40/A483 roundabout to the north of Llandeilo. Where feasible, walking and cycling links will be provided between the bypass and the centre parts of Llandeilo and Ffairfach although the local topography will limit what can reasonably be provided.

Consultation Events, Further Option Identification and Review Group Meetings

April 2019 Consultation Events

At the beginning of WeITAG Stage Two, a consultation was undertaken during April 2019 at the Llandeilo Fawr Civic Hall, to consult on the short-list of options from WeITAG Stage One. This consultation was held over the following four sessions:

- Stakeholder Workshop 2nd April, 10:00 - 12:00
- Public Forum 2nd April, 13:00 – 17:00
- Public Forum 3rd April, 13:30 – 19:30
- Public Forum 6th April, 09:30 – 12:30

These events are evidenced in the Consultation Report which is included in the Impacts Assessment Report as Appendix A1. It has been summarised below.

The Stakeholder Workshop was attended by representatives from Carmarthenshire County Council, the National Trust, and Transport for Wales. Information was given through a bi-lingual presentation that outlined the existing situation, background to the study, scheme options, and next steps. Time was allocated for questions.

A total of 404 people attended the four days of consultation. Comprehensive information was presented through 23 bi-lingual display panels, which covered the options in the short-list. Attendees were encouraged to complete a questionnaire, which asked for their views on the option groups/options as well as the ones that they preferred.

Summary of the April 2019 Questionnaire Results

A total of 250 questionnaires were completed. These were made up of paper copies from the Public Consultation Exercise, online questionnaires on the Welsh Government's Llandeilo Consultation website, and emailed questionnaires sent to a dedicated email address.

The questionnaire asked four questions:

Question 1 asked which option group respondents preferred. The option groups were Town Centre Improvements, Combined Bypass and Town Centre Improvements, and Bypass. The results of Question 1 were as follows:

1. 87 respondents preferred the Bypass option group.
2. 75 respondents preferred the Town Centre Improvements option group.
3. 62 respondents preferred the Combined Bypass and Town Centre Improvements option group.

Question 2 asked respondents to rank up to three options (from any option group) in order of preference. Their preferred option (1) scored three points, their second option (2) scored two points, and their third option (3) scored one point. The results were as follows:

1. Option NB6 Combined No-bypass Option (with HGV Restriction) - 212 points.
2. Option NB5 HGV Restriction (legal sanction) plus one-way system - 195 points.
3. Option BE1B Eastern Bypass Option 1(B) - 180 points.

Note, that the cumulative total of all Bypass Options (BE1A, BE1B, BE1C, BE4D and BE6) was 694, while the cumulative total of Non-Bypass Options (NB1, NB2, NB5, NB6 and NB7) was 579.

Question 3 asked respondents which option they considered best met the scheme objectives. The results were as follows:

1. Option NB6 Combined No-bypass Option (with HGV Restriction) – 58 votes.
2. Option BE1C Eastern Bypass Option 1C - 53 votes.

Question 4 asked respondents to identify which option best meets the Well-being of Future Generations (Wales) Act Goals. The results were as follows:

1. Option BE1A Eastern Bypass Option 1A - received 55 votes.
2. Option BE1C Eastern Bypass Option 1C - 52 votes.
3. Option NB6 Combined No-Bypass Option (With HGV Restriction) - 46 votes.

Further Option Identification

Following the April 2019 Stakeholder Workshop and Public Forum Consultation Exercise, further work was undertaken on the options in the short-list. This included a further sifting process during April to October 2019 to reduce the 11 options to a more manageable number. The results of this are included in the Assessment of Short-list Options report (included in the Impact Assessment Report Appendix B), and summarised in the Transport Case in Section 3 of this report.

Following the Assessment of the Short-list Options report, consideration was given to other options that had not been considered previously and might be worthy of investigation and added to the short-list. This was prompted for a number of reasons, including those below:

- Comments received from the Future Generations Commission in response to the WeITAG Stage One: Report on the Consideration of the Well-being of Future Generations (Wales) Act 2015 – the need to consider more radical solutions.
- To reduce costs.
- To provide a bypass option that could be extended to include Ffairfach; and
- To reduce environmental/visual impact.

Two smaller scale eastern bypass options have been considered. The most appropriate way of achieving these options would be through the provision of a bypass based on a similar alignment of Options BE1A, BE1B, and BE1C but terminating at a connection with the A483 either to the north or the south of Llandeilo Bridge. Termination to the north of the bridge would eliminate the requirement for a new crossing of the Afon Tywi and a new road to the south thus a notable cost saving would result.

A smaller scale bypass option terminating at a new junction to the north of Llandeilo Bridge would mean that this river crossing would continue to function as the A483 Trunk Road. It has been referenced Option BE7 Eastern Bypass Option 7 (No Bridge). In addition, the general impact on the environment between Llandeilo and Ffairfach would be reduced although visual intrusion on the view of Llandeilo from the south would remain. Option BE7 would only benefit Llandeilo and Trunk Road traffic would continue to pass through Ffairfach unless a separate bypass was provided for this community. If provided in the future, this Ffairfach bypass would be broadly based on the southernmost alignments of either Option BE1A, BE1B, or BE1C and would have to include a new bridge over the Afon Tywi. Even if one of these were ultimately provided, the saving in cost by not providing a new bridge over the Afon Tywi would be significant when compared to the original bypass options.

A smaller scale bypass option terminating at a new junction to the south of Llandeilo Bridge has been referenced as BE8 Eastern Bypass Option 8. Its termination point is where Options BE1A, BE1B, and BE1C would have junctions but these three options continue the bypass further, either to the south or west. Option BE8 would require a new bridge. As with Option BE7, there would be no benefit to Ffairfach unless a separate bypass was provided for this community, which would effectively result in the overall option becoming BE1A, BE1B, or BE1C.

Options BE7 and BE8 would be provided with pedestrian and cyclist facilities in much the same way as with bypass options BE1A, BE1B, BE1C, and BE1D.

Both of these additional options have been appraised in greater detail in the Transport Case along with the reduced number of options in the short-list. They are shown in outline form in Figure 2.1 and Figure 2.2 respectively.

The identification of Option BE7, in particular, is also directly related to the exercise covered in Chapter 3, the Transport Case where the number of options in the short-list has been reduced in number (the Short-list Options report). This is specifically in relation to Option BE6. Section 3.3 in the Transport Case refers to how Option BE7 was developed and its relationship to Option BE6.

Figure 2.1: Route of Option BE7



Figure 2.2: Route of Option BE8



Complementary Measures

In addition to these extra main options being identified, a series of complementary measures have been developed which could accompany a main option. Below is a list of complementary measures that were developed, with more detail on them available in the Impact Assessment Report (IAR) Appendix R, which includes an assessment of each option against project and well-being objectives.

- CF1 - New Ffairfach public car park
- CF2 - Electric cycle scheme
- CF3 - Ffairfach square traffic signal control
- CF4 - Improved pedestrian and cyclist links
- CF5 - South Ffairfach footway improvements
- CF6 - Improved vehicle access to Ysgol Bro Dinefwr from the A476
- CF7 - Tywi Valley route linking Ysgol Bro Dinefwr to Llandeilo Bridge
- CF8 - Additional car parking at Tregib School
- CL1 - Full time vehicle restrictions on Rhosmaen Street
- CL2 - Part time vehicle restrictions on Rhosmaen Street
- CL3 - Walking and cycling improvements
- CL4 - Public transport improvements
- CL5 - Lower carbon emissions from public transport
- CL6 - Additional parking on land adjacent to the A40
- CL7 - Additional parking on land at Maes Elfryn
- CL8 - Additional parking on Victoria Fields
- CL9 - Additional parking on Beechwood Industrial Estate
- ST1 - Llandeilo Station Alan Road Ramped Access
- ST2 - Llandeilo Station Alan Road Lift Access

Not all complementary measures would be sought as an overall package of works. For instance, there would be limited benefit of providing both ST1 (a ramp from Alan Road to Llandeilo Railway Station) and ST2 (a lift from Alan Road to Llandeilo Railway Station). Similarly, it would not be practical to provide all possible car parking options, as that would likely result in an overprovision of parking spaces, some of which may never be used.

Review Group Meetings 1 and 2

Following completion of an initial draft WeITAG Stage Two report and Impacts Assessment Report, a Review Group meeting 1 was held on the 21st October 2019. The meeting resulted in further detail being requested on items including flood modelling and active travel proposals.

A Review Group meeting 2 was held on 4th February 2020, to appraise the further detail requested, alongside an updated draft WeITAG Stage Two report and Impacts Assessment Report. The Review Group considered that additional consultation should be undertaken specifically on Options NB7 and TC1A with Options BE1A, BE1B and BE1C. Therefore, additional consultation was prepared, although this was delayed as a consequence of COVID-19.

Option NB6 was a preferred option from the consultation in April 2019, however the Review Group decided that due to deliverability challenges of practically implementing a HGV ban, option NB7 should be assessed in the Transport Case and consulted on as alternative to a road building option. NB7 is as per Option NB6 in terms of infrastructure proposals, with the only difference being that NB6 includes a ban on HGV movements in Llandeilo, whereas NB7 does not.

September and October 2020 Consultation Events

In September and October 2020, a Consultation Event was undertaken to consult on the sifted short-list of options and complementary measures, which had been developed since the April 2019 Consultation with Review Group input.

The event was focused around an online consultation platform that was hosted on the Welsh Government consultations website from 29th September 2020, for a period of eight weeks. The website provided a consultation information document which contained information regarding the WeITAG work undertaken thus far, as well as a response document and return address (including physical address as well as email). Due to the Coronavirus pandemic public face-to-face events were not possible during this period, and a series of virtual meetings/presentations were organised.

The following meetings and events were held:

- 28th September – Virtual Stakeholder Workshop
- 29th September – Virtual Stakeholder Workshop
- 16th October – On-line Public Consultation Clinic

- 19th October – On-line Public Consultation Clinic
- 20th October – On-line Public Consultation Clinic

These events are evidenced in the WelTAG Consultation Report, which is included in Appendix A2 of the Impacts Assessment Report (Capita, January 2021).

Two virtual stakeholder workshops were held on the 28th September 2020 and the 29th September 2020. The first workshop was targeted at statutory and elected government organisations and individuals and included Welsh Government, Transport for Wales and Carmarthenshire County Council. The second workshop was aimed at a wider stakeholder group and included local and national organisations that were interested in the study including Sustrans, haulage associations and local school representatives.

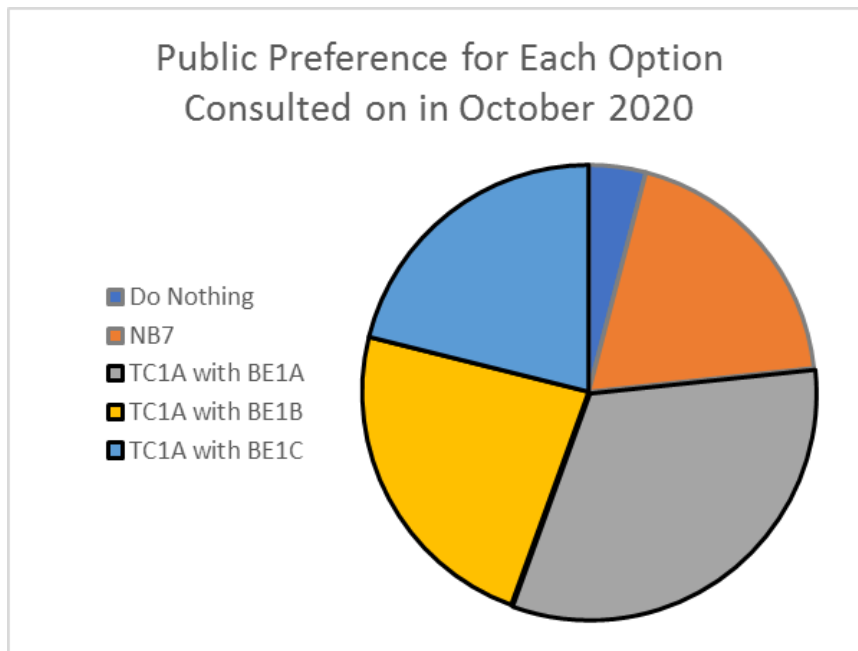
The virtual stakeholder workshops and the Public Consultation Clinics included an on-line presentation which provided an overview of the WelTAG process undertaken thus far, the results of the previous consultation undertaken, as well as a full description of the advantages and disadvantages associated with the proposed shortlisted options and complimentary enhancements. Stakeholders were invited to submit questions relating to the study and the shortlisted options, and responses were provided within 10 working days.

The public consultation electronic presentations were made available on the Welsh Government website where the consultation questionnaire and the WelTAG Stage Two Consultation Information Pack was available to download.

Summary of September and October 2020 Questionnaire Results

The results of the consultation showed that of the main options consulted on, the highest scoring option was 'TC1A with BE1A: Relief Road Option 1 (A)' with 87 votes (32%), followed by 'TC1A with BE1B: relief road option 1 (B)' with 63 votes (23%). It is also shown that 76% of the votes preferred an option which involves a relief road (in coordination with Option TC1A), only 19% were in favour of Option NB7, which does not involve any road building, while 5% were in favour of a Do Minimum (Do Nothing) option. This is illustrated in Figure 2.3 below, which highlights the relief road options (totalling 76% of votes) with a black border, and non-road building options (24% of votes) with a grey border.

Figure 2.3: October 2020 Public Consultation Option Preferences



Chronology of Consultation Events, Further Option Identification and Review Group Meetings

Table 2 below outlines the timescales and key events for consultation, further option identification and Review Group meetings which have occurred over the course of this WeITAG Stage Two study.

Table 2: WeITAG Stage Two Chronology Summary

Date	Event	Summary
Apr 2019	Consultation	11 short-list options consulted on, from the Stage One WeITAG report
Apr to Oct 2019	Short-list refined based on consultation feedback	Sifted short-list for options BE1A, BE1B, BE1C, TC1A, NB6
Apr to Oct 2019	Option BE7 introduced and assessed	Further detail on this is included in the Transport Case.
Oct 2019	Review Group Meeting 1	Option BE7 not recommended for further assessment by Review Group, but results included in Transport Case for completeness. Option BE8 raised for assessment by Review Group
Oct 2019 to Feb 2020	Option BE8 introduced and assessed	Further detail on this is included in the Transport Case

Date	Event	Summary
Feb 2020	Review Group Meeting 2	Option NB6 discounted by Review Group and recommended that NB7 should be consulted on during the next Consultation
Sep to Oct 2020	Consultation	Option NB7 and TC1A in combination with either BE1A, BE1B or BE1C and complementary measures is consulted on
Oct 2020 to May 2021	Short-list options and complementary measures is further developed based on consultation feedback	Further detail on this is included in the Transport Case

Summary of the Strategic Case

The Strategic Case was originally developed and presented at WeITAG Stage One. A review of the Strategic Case at WeITAG Stage Two has confirmed that the policy context, case for change, identified problems and study objectives remain current. The WeITAG Stage Two Strategic Case includes information from the April 2019 Consultation that has been carried out as well as details of additional proposals that have been added to some of the options. It also introduces an option sifting process to reduce the number in the short-list, as well as identifying two additional bypass options for further consideration alongside complementary measures. Much of this is further explored in the Transport Case.

Finally, following the September and October 2020 Consultation, there is evidence of strong support for a relief road to be delivered alongside local community improvements (TC1A) and selected complementary measures to support active travel and deliver modal shift in Llandeilo and Ffairfach.

3. Transport Case

Introduction

The Transport Case provides an assessment of the expected impacts of the options in the short-list against Economic, Environmental, Social and Cultural factors. WeITAG guidance states that at Stage Two the level of quantification of the impacts should increase from Stage One for those impacts which are relevant to the decisions that need to be made.

Summary of the Transport Case from the Stage One Report

The Transport Case included comprehensive information on each option in the long list, including some that informed the Appraisal Summary Table. This information included a description of each option, how it would tackle the problem, how it would meet the objectives, as well as other relevant issues (risks, adverse impacts, constraints, and interdependencies), high level appraisal against the three main Appraisal Summary Table criteria (aligning with the pillars of sustainability of the Well-being of Future Generations [Wales] Act 2015) of Economic, Environmental, and Social/Cultural, and who the option impacts upon. Most of the information to inform this appraisal was of a high-level nature and coupled with the limited information available for options in the long list, appraisal was generally preliminary.

The options in the long list were assessed and compared and the results presented in an Appraisal Summary Table. Of the main criteria assessed (Economic, Environmental, and Social/Cultural), only the impacts under Environment were able to be assessed in full. The Economic impacts that were assessed were journey time changes, journey time reliability, and local economy. The Social and Cultural impacts assessed were accidents, journey quality, severance, security, physical activity, access to employment and services, and active travel. Other criteria covered in the Appraisal Summary Table were option costs (within a band), how the options met the objectives, and whether or not the options were short-listed for further consideration.

The Appraisal Summary Table presented in the Stage One WeITAG contains only a selection of the above information with the version in its accompanying Impacts Assessment Report being more comprehensive.

The outcome of the Transport Case was the short-list of options that is shown in Section 2.11 in the Strategic Case. Although not included, Do Minimum was retained for appraisal as the baseline reference option.

Further Information to Support the Transport Case

Following the Stakeholder Workshop and Public Consultation Exercise held in April 2019, the further sifting process (outlined in the Strategic Case) was undertaken to reduce the short-list of 11 options to a more manageable number. This was achieved through an Assessment of WeITAG Stage 1 Short-list Options Report, which is included in the Impacts Assessment Report (IAR) as Appendix B. It is also summarised below.

The Short-list Options report was developed from the output from the Stakeholders' Workshop and Public Consultation Exercise in April 2019, including appraisal against the scheme objectives, Well-being Objectives of the Welsh Government and a high-level constructability and disruption assessment. The constructability and disruption assessment report is an appendix to the Short-list Options report. The Welsh Government Well-being Objectives relate to four overall topics, which are, in turn related to the Well-being of Future Generations (Wales) Act 2015 Goals.

The Welsh Government's Well-being Objectives

Prosperous and Secure

1. Support people and businesses to drive prosperity.
2. Tackle regional inequality and promote fair work.
3. Drive sustainable growth and combat climate change.

Healthy and Active

4. Deliver quality health and care services fit for the future.
5. Promote good health and well-being for everyone.
6. Build healthier communities and better environments.

Ambitious and Learning

7. Support young people to make the most of their potential.
8. Build ambition and encourage learning for life.
9. Equip everyone with the right skills for a changing world.

United and Connected

10. Build resilient communities, culture and language.
11. Deliver modern and connected infrastructure.

12. Promote and protect Wales’ place in the world.

From the short-list of 11 options at Stage One, five emerged from the further sifting process with six considered as being less favourable. Three of the five options were related directly to a bypass solution only (Options BE1A, BE1B, and BE1C), one was a combined no bypass option with no HGV restriction (Option NB7), and one was improvements to the town centre plus a one-way system, delivered in combination with a non-specific bypass option (Option TC1A). The options considered less favourable were NB1, NB2, NB5, NB6, BE4D, and BE6.

The WeITAG stage 1 appraisal of the options found that TC1A provides beneficial impact to the majority of the scheme objectives. TC1A is dependent on the construction of a Bypass and was assessed in the WeITAG stage 1 with Bypass Option (A). TC1A with bypass option (A) would –

- remove through traffic and improve resilience of the trunk road network,
- reduce severance for pedestrians along the A483/Rhosmaen street,
- improve pedestrian safety as well as the cycling environment,
- result in a reduction in air pollution within the AQMA.

A summary of the appraisal work undertaken is shown in Table 5 and Table 6. The former includes information taken from the Stage One WeITAG report, and the latter includes information specific to the Stage Two WeITAG work. The Acceptability ranking comes from the consultation held in April 2019 and this has been added to both tables.

Table 3: Legend for Scheme Objectives and Well-being Objectives

Score	Scheme Objectives (SO1, SO2 etc.) and Welsh Government’s Well-being Objectives (WBO1, WBO2 etc.)
Y (Yes)	Objective met
P (Partial)	Objective partially met
N (No)	Objective not met

Table 4: Legend for Constructability and Disruption

Score	Constructability	Disruption
1	Objective met	Minor
2	Objective partially met	Moderate
3	Objective not met	Major

Table 5: Short-list Analysis by Jacobs UK Limited (Jacobs) and Mott MacDonald (WeITAG Stage One)

Option	Accept-ability (rank)	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	WBO1	WBO2	WBO3	WBO4	WBO5	WBO6	WBO7	WBO8	WBO9	WBO10	WBO11	WBO12
TC1A	7	Y	Y	Y	P	P	Y	N	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
NB1	10	P	N	N	Y	Y	N	P	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
NB2	8	P	N	N	Y	Y	N	P	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
NB5	2	N	Y	Y	N	Y	N	Y	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
NB6	1	N	Y	Y	N	Y	N	Y	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
NB7	11	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
BE1A	4	Y	P	P	Y	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
BE1B	3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
BE1C	5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
BE1D	6	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y
BE6	9	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	P	Y	Y	P	P	P	Y	Y	Y

Table 6: Additional Short-list Analysis (WeITAG Stage Two)

Option	Constructability	Disruption	Acceptability (rank)	Final Short List
TC1A	1	1	7	Y
NB1	1	2	10	N
NB2	1	1	8	N
NB5	1	3	2	N
NB6	1	3	1	Y
NB7	1	2	11	N
BE1A	2	2	4	Y
BE1B	2	2	3	Y
BE1C	2	3	5	Y
BE1D	3	3	6	N
BE6	2	3	9	N

From the appraisal undertaken, the options in the reduced short-list that have been appraised in greater detail in this Stage Two report are as follows:

- Option BE1A - Eastern Bypass Option 1A.
- Option BE1B - Eastern Bypass Option 1B.
- Option BE1C - Eastern Bypass Option 1C.
- Option NB7 – Combined No-Bypass Option (No HGV restriction)
- Option TC1A - One-way system and a non-specific bypass option.

As outlined in the Strategic Case (Section 2.14), the deselection of Option BE6 from the short-list in the Stage Two WeITAG report is directly related to the addition of Option BE7.

Although not considered in any detail in the Stage One report, Option BE6 would locate a new bridge over the Afon Tywi considerably further west than with the other bypass options, potentially within 75 metres of the existing Llandeilo Bridge. This relative closeness plus a likely need for the structure to be elevated some distance above the flood plain, is likely to have a considerable impact upon the visual setting of the existing bridge. In relation to their proximity to each other, it could be questioned as to why a second bridge over the river so close to an existing structure can be justified when retention of the existing bridge to continue functioning as the A483 Trunk Road might be more appropriate. This is what has led to the identification of BE7 as an additional, minimalist, and potentially less expensive alternative option.

Option BE7 has been added to the reduced short-list of five options and appraised against the same criteria as the other options in the short-list. Option BE7 was identified following the Stakeholder Workshop and April 2019 Consultation Events (see the Strategic Case for further information). The Do Minimum (or maintaining the status quo) has been retained as a baseline reference option although it was not subject to the same level of appraisal as the 11 options in the short-list.

The Strategic Case also introduces another eastern bypass option, BE8, from Review Group Meeting 1. This is a minimalist bypass solution for Llandeilo based on the common sections of Options BE1A, BE1B, and BE1C. As with Option BE7, it has been added to the reduced short-list of five options and has been appraised against the same criteria as the other options in the short-list.

As noted in the Strategic Case, Option NB6 was a preferred option from the consultation in April 2019, however the Review Group decided that due to deliverability challenges of practically implementing a HGV ban, option NB7 should be assessed in the Transport Case and consulted on as alternative to a road building option. NB7 is as per Option NB6 in terms of infrastructure proposals, with the only difference being that NB6 includes a ban on HGV movements in Llandeilo, whereas NB7 does not.

To increase the viability of NB7 as a long-term solution, it is likely that some form of demand management will be required to ensure traffic levels in the study area are minimised. This could be through road user charging along the A483 in Llandeilo, or a change in the car parking strategy to alter the fees currently in place, or possibly through a combination of the two. Note that no change in demand management has been included in the economic assessment in this study. However, it is suggested that further investigation is undertaken if NB7 is progressed.

High level information about the options that constitute the reduced short-list is contained in the Stage One WeITAG report. To ensure that Options BE7 and BE8 are considered on equal terms to these options (at a WeITAG Stage One level), the equivalent relevant information about them is shown below.

Option BE7 – Eastern Bypass Option 7 (No Bridge)

Option BE7 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 immediately to the north west of Llandeilo Bridge.

Figure 3.1: Map showing the location of Option BE7



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How it Tackles the Problem

Option BE7 would improve journey reliability through Llandeilo only. This would be due to providing a direct, free-flow route which would avoid the pinch points in the town. It would do little or nothing for Ffairfach as it is not bypassed with this option. Pedestrian safety within Llandeilo would be improved and may promote an increase in visitors as the number of through-traffic journeys should decrease substantially with a bypass in place.

HGV and school traffic should also reduce within Llandeilo as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked through the town. 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 link around Llandeilo. There will be no equivalent benefits within Ffairfach.

This option would result in a reduction in air pollution within the AQMA that falls within Llandeilo although there would be no benefits within the AQMA in Ffairfach.

To what Extent Does it Meet the Objectives?

This option fulfils scheme objectives 1, 6, and 8 whilst partially fulfilling scheme objectives 2, 3, 4, 5, and 7 due to it only providing a bypass for Llandeilo.

Appraisal

Economy and Social and Cultural - The majority of the appraisal areas for this option of Economics 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 noise decreases within Llandeilo but increases in areas currently unaffected by road noise. There will be no benefits in Ffairfach. A beneficial effect is anticipated for air quality due to a reduction of vehicle movements, but only within Llandeilo. A slight adverse effect to the water environment and biodiversity is anticipated due to the loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape, and cultural heritage due to effects to a scheduled monument (the continued use of Llandeilo Bridge as the A483 Trunk Road), local views and views from the Brecon Beacons National Park.

Who the Option Impacts on - It is anticipated that there will be a slight to moderate beneficial impact on journey time and journey reliability for all road users. There will be a slight beneficial impact on the local economy and the local air quality (both in Llandeilo only). It is expected that there would be a large adverse impact upon landscape, townscape, and bio-diversity. Many of these impacts will be experienced by people that live and work in the area and those who use it for recreation. Furthermore, it is expected that there would be a slight beneficial impact on pedestrians and cyclists, access to services and employment, as well as on road accidents in the area.

Option BE8 – Eastern Bypass Option 8

Option BE8 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.

Figure 3.2: Map showing the location of Option BE8



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How it Tackles the Problem

Option BE8 would improve journey reliability through Llandeilo only. This would be due to providing a direct, free-flow route which would avoid the pinch points in the town. It would do little or nothing for Ffairfach as it is not bypassed with this option. Pedestrian safety within Llandeilo would be improved and may promote an increase in visitors as the number of through-traffic journeys should decrease with a bypass in place.

HGV and school traffic should also reduce within Llandeilo as it is anticipated that HGVs would use the bypass rather than Rhosmaen Street as the current A483 would be de-trunked through the town. 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 link around Llandeilo. There will be no equivalent benefits within Ffairfach.

This option would result in a reduction in air pollution within the AQMA that falls within Llandeilo although there would be no benefits within the AQMA in Ffairfach.

To what Extent it Meets the Objectives

This option fulfils scheme objectives 1, 6, and 8 whilst partially fulfilling scheme objectives 2, 3, 4, 5, and 7 due to it only providing a bypass for Llandeilo.

Appraisal

Economy and Social and Cultural - The majority of the appraisal areas for this option of Economics 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 noise decreases within Llandeilo but increases in areas currently unaffected by road noise. There will be no benefits in Ffairfach. A beneficial effect is anticipated for air quality due to a reduction of vehicle movements, but only within Llandeilo. An adverse effect on the water environment and biodiversity is anticipated due to the crossing of one designated water feature and through loss of hedgerow habitat. Adverse effects are anticipated to landscape, townscape, and cultural heritage due to effects on a scheduled monument, local views and views from the Brecon Beacons National Park.

Who the Option Impacts on - It is anticipated a slight to moderate beneficial impact on journey time and journey reliability for all road users. There will be a slight beneficial impact on the local economy and the local air quality (both in Llandeilo only). It is expected that there would be a large adverse impact upon landscape, townscape, biodiversity and the water environment. Many of these impacts will be experienced by people that live and work in the area and those who use it for recreation. Furthermore, it is expected that there would be a slight beneficial impact on pedestrians and cyclists, access to services and employment, as well as on road accidents in the area.

Options BE7 and BE8 do not perform particularly well against the scheme objectives. Although they meet three of them, they meet the other five only partially, which is largely due to them not being beneficial to the community of Ffairfach. In terms of appraisal against the other criteria, Options BE7 and BE8 are broadly similar.

Both options have been added to the short-list to be appraised in greater detail in this Transport Case.

Detailed appraisal of the reduced short-list of options is contained in the individual Appraisal Summary Tables that are included in Appendix B of this Stage Two report. This work is summarised in a single Appraisal Summary Table, Table 8.

Further Appraisal of the Reduced Short-list of Options

General

The following options, including a Do Minimum scenario, have been appraised against the key economic, environmental, social and cultural factors.

- Do Minimum.
- Option BE1A - Eastern Bypass Option 1A.
- Option BE1B - Eastern Bypass Option 1B.
- Option BE1C - Eastern Bypass Option 1C.
- Option BE7 – Eastern Bypass Option 7 (No Bridge).
- Option BE8 – Eastern Bypass Option 8.
- Option TC1A – One-way system and a non-specific bypass option; and
- Option NB7 – Combined No-Bypass Option (with no HGV Restrictions)

Preliminary highway design layouts have been produced for all the above options and these are included in Appendix A of this report.

This Stage Two WeITAG report has benefited from additional information that has informed the Transport Case. However, it should be noted that although Option BE7 is covered in these reports, Option BE8 is not included in the majority, due to its late consideration. Information has come from the following sources:

- Public and Stakeholder Consultation.

- Traffic modelling forecasting report.
- Economics Assessment report.
- Noise report.
- Air Quality and Carbon reports.
- Ecological reviews.
- Cultural Heritage report.
- Landscape and Visual Impact Assessment.
- Highways and Structural Feasibility reports.
- Geotechnical Preliminary Sources Study Report.
- Flood modelling.
- Active Travel Strategy; and
- Traffic Survey Report.

These studies are included in full in the Impacts Assessment Report that accompanies this Stage Two WeITAG report. The following summarises some of the key points, particularly in relation to the bypass options where impacts are likely to be at their greatest. As outlined above, Option BE8 was not included in the majority of the above studies and in these cases, references to this option are based on factors that it has in common with other bypass options.

Flooding

The primary cause of flooding is fluvial flooding arising from rainfall events, where significant rainfall within the main river catchment area results in increased river levels and subsequent riverbank overtopping and inundation of the flood plain.

The overall outcome is that any form of additional embankment within the flood plain will lead to a modest increase in flood water levels, in the range of 0 - 50mm overall and mostly <5mm increase. Given the existing wide flood plain the impact of the modest increase in flood water levels is minimal and predominantly impacts farmland within the flood plain, so there is minimal or no detrimental effect.

It is not anticipated nor demonstrated by the modelling that there is any significant increase to the risk of flooding properties as a result of introducing the bypass scheme. As noted above the risk of flooding generally will increase but only marginally and impact mainly farmland within the existing flood plain. However, it is noted that the existing flood defence bund at Ffairfach would need to be raised and tied into the new bypass embankment to give an increased factor of safety and consideration should be given to reconstruction as there is anecdotal evidence that seepage occurs beneath the existing flood defence bund.

The river course has changed significantly over recent times and is now much closer to the Bethlehem Road particularly adjacent to the Golian Goch properties than previously shown on NRW flood mapping. It is recommended that consideration is given to providing flood defence in this area in the form of earth bunds.

October 1987 will be remembered for several remarkable hydrometeorological events – the ‘hurricane’ during the night of the 15 / 16th and the widespread flooding associated with the passage of a series of vigorous low-pressure systems which affected various parts of the UK. Flooding was particularly severe in south-west Wales where media attention focused on the over topping of flood defences in Carmarthen and the fatalities resulting from the collapse of the railway bridge over the River Tywi at Llandeilo/Ffairfach.

An important consideration was the contribution, if any, of the outflow from the Llyn Brienne Reservoir on the degree of flooding. Llyn Brienne Reservoirs function is to act as a regulating reservoir, conserving water for release during dry periods and droughts in order to supplement the natural river flow. From October, the reservoir was at full capacity and overflowing continuously, which itself was a significant component in the flood flows in the upper Tywi. An addition technical note has been prepared to assess the Surge event impact on a relief road option and is included in the Impact Assessment report (IAR) appendix J3.

Station Access

Due to the constrained corridor available for all the Eastern Bypass options, the proposed road would have to pass through the Llandeilo Railway Station car park. In this area, the proposals will also have a direct impact on the Station hub and the Dinefwr Joinery Workshop.

Design options have been developed with the car park re-provisioned by cutting into the existing embankment adjacent to the current facility and providing a retaining wall. This additional space will enable the current number of spaces to be maintained, with access to this car park via Station Road rather than the bypass.

A signalised pedestrian crossing of the bypass link can then be provided to allow ease of movements between the station car park and the station platforms.

The preliminary layouts indicate that a bypass can be provided through this area without detrimentally impacting on access to the station.

Ecology

From the ecological assessment, the non-bypass option NB7 will have no effect on the ecology of the area. It is therefore the favoured option from an ecological perspective. The impact of the town centre improvement element of Option TC1A will be similar although as it is directly associated to a bypass option (non-specific), this cannot be considered in isolation.

Overall, based on current survey results, it is anticipated that bypass Option BE7 will have a lower ecological impact than the other bypass options. This is mainly due to the fact that a river crossing will not be required. However, this advantage is reduced by the requirement to construct large retaining walls with associated junction lighting in close proximity to the Afon Tywi SAC. In addition, there is likely to be less severance caused by Option BE7 due to the alignment of its western section being closer to the town than the other bypass options. It is acknowledged that some areas of relatively higher quality habitat such as broadleaved woodland and scrub will be lost at the western end of Option BE7 near the proposed A483 junction north of Llandeilo Bridge.

Although a river crossing is required, Option BE1B is the shorter of the remaining bypass options that give traffic relief to both Llandeilo and Ffairfach. The level of impact is considered marginally greater than Option BE7. Option BE8 only benefits Llandeilo and results in a level of ecological impact that is not dissimilar to the other bypass options.

Option BE1A also requires a crossing of the Afon Cennen, a tributary of the Afon Tywi and therefore presents further/cumulative impact opportunities. Option BE1C, provides further impact to the west and south of the proposed river crossing, but generally over land of limited ecological value, prior to joining the A476 to the west of Ffairfach School.

Landscape and Visual Impact

From the landscape and visual impact assessment, the non-bypass option NB7 will have little or no effect. It is therefore the favoured option from a landscape and visual perspective. The impact of the town centre improvement element of Option TC1A will be similar although as it is directly associated to a bypass option (non-specific), this cannot be considered in isolation.

It is anticipated that bypass Option BE7 will have very slightly lower landscape and visual impact compared to other bypass options. This is due to its location close to Llandeilo and as a result of not requiring a new bridge or including a bypass of Ffairfach. However, account has to be taken of the impact of its western section and its termination to the north of Llandeilo Bridge, which will result in considerable local visual impact. In particular, the high embankment necessary to the east of the A483 will greatly impact on the iconic view of Llandeilo from the south of the town.

Although a river crossing is required, Option BE1B is the shorter of the remaining bypass options that give traffic relief to both Llandeilo and Ffairfach. The level of landscape and visual impact is considered greater than with Option BE7. Option BE8 only benefits Llandeilo although it results in a level of impact that is less than the other bypass options.

Option BE1A requires a crossing of the Afon Cennen as well as the Afon Tywi and therefore gives landscape and visual impacts that extend further south than either Options BE1B or BE1C. However, both of these result in impacts to the west of Ffairfach, with the latter option being considerably more visual than the former due to its additional length.

Economics

The Financial Case (Chapter 5 of this report) provides information on the costs that have gone into the economic assessment of all the reduced short-listed options or combinations of options. Table 7 below summarises the outputs from the assessment.

Transport modelling has been undertaken in accord with current best practice to help provide input into the economic analysis. It should be noted that during the COVID-19 pandemic, substantial changes to traffic volumes have been seen which have not been modelled. There is no guidance at present as to how traffic volumes in the future will change. There is potential for altered travel pattern behaviours, even after the pandemic has ended, particularly with the uptake of home working. Nonetheless, in the context of Llandeilo and Ffairfach, the A483 running through the area is part of the strategic highway network and therefore does have a high number of HGV and LGV movements. It is unlikely that these vehicle classes will reduce as a result of the impact of COVID-19. Thus, the study area is less likely to see a substantial long-term reduction in traffic than a more urban area.

As Option TC1A has always been associated with a bypass (i.e. it's non-specific to which bypass option is delivered), it has been combined with four of the bypass options (BE1A, BE1B, BE1C and BE8) for the economic assessment. The other bypass option, BE7, is standalone in terms of its economic assessment, as this option was not developed as much the other options due to it not being favoured by the Review Group.

Table 7: Analysis of Monetised Costs and Benefits (£000s, 2010 prices)

TUBA (Transport User Benefits Appraisal) Outputs

Item	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Greenhouse Gases	-214	-237	-413	-388	-265	-761
Economic Efficiency: Consumer Users (Commuting)	4,861	2,934	2,658	1,527	2,132	-21,128
Economic Efficiency: Consumer Users (Other)	8,067	4,717	3,926	1,759	3,127	-33,455
Economic Efficiency: Business Users and Providers	5,186	4,023	3,134	1,290	2,484	-35,473

Item	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Wider Public Finances (Indirect Taxation Revenues)	449	501	882	835	562	1,647
Reliability Benefits	0	0	0	0	0	0
Present Value of Benefits (PVB)	18,349	11,938	10,187	5,023	8,040	-87,170
Broad Transport Budget / Present Value of Costs (PVC)	48,835	38,040	40,967	25,261	36,750	587

Overall Impacts

Item	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Net Present Value (NPV)	-30,486	-26,102	-30,780	-20,598	-28,710	-89,757
Benefit to Cost Ratio (BCR)	0.376	0.314	0.249	0.196	0.219	- 151.909

Non-TUBA Outputs

Item	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Accidents	-2,071	-2,235	346	1,639	-1,894	No data

Adjusted Impacts

Item	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Adjusted PVB	16,278	9,703	10,533	6,662	6,146	No data
Adjusted BCR	0.333	0.255	0.257	0.264	0.167	No data

Overall, Option BE1A provides the highest Benefit to Cost Ratio (0.333) of the options in the reduced short-list that have been considered. However, the Net Present Value is negative for all the above scheme option combinations. This signifies that the quantified benefits of each scheme option over the 60-year appraisal period will be less than the costs required to construct and maintain it. This results in a Benefit to Cost Ratio of less than 1 with each combination. Under the Department for Transport's value for money criteria, each scheme option represents poor value for money.

That notwithstanding, Option BE1A provides the most user benefits in terms of trip efficiency and time savings than the next highest option, BE1B. However, it also offers the least accident saving benefits. The Economic Assessment Report in Appendix O of the IAR (Capita, January 2021) shows that the Option TC1A traffic management measures have a negative impact on the accident benefits. This is a consequence of the closure of Rhosmaen Street to northbound traffic, forcing some traffic to use King Street/George Street as an alternative. This route is narrow, has a steep gradient and includes some on-street parking. The increase in traffic on this route is the cause of the negative impact on accidents. Nonetheless, this does not adequately consider the total volume of near misses with pedestrians currently experienced on Rhosmaen Street. The software used to assess the accident impacts is limited when it comes to the narrowness of the footways, thus the real-world benefit may be underrepresented. It is strongly recommended that during the next WelTAG Stage, this economic accident representation is further investigated.

Public Transport

The Stage One WelTAG identified that public transport solutions would not in isolation resolve the problems in the Study Area. This is because part of the problems currently faces are due to large vehicles having difficulties travelling through the narrow streets. Thus, an increase in buses may exacerbate this problem. During the Stage Two WelTAG process, improvements to public transport has been identified as an opportunity for providing complementary measures to any of the infrastructure options identified on the short-list.

As noted in the Stage One WeITAG, the current bus frequencies are sporadic. Due to rural areas covered by the bus services, the population catchment of the services are relatively low, making it difficult for services to operate without subsidy. However, there is potential to improve the public transport connectivity in the Study Area by having one or more bus services call at the train station to connect to rail services. Services such as the 280 or 281 through Llandeilo operate on a four services per day (each way) frequency. This compares favourably to the five services per day for the train station. If the existing services 280 and 281 are currently subsidised, then it would potentially be cost neutral to alter the route slightly to stop at the station. It is believed that a bus/rail connection service used to exist but has been discontinued.

Therefore, it is recommended that the potential rerouting of existing bus services to serve the train station is further examined in the Stage Three WeITAG.

Summary Tables

The majority of the options listed in Section 3.4 have been appraised by utilising a range of information that has been taken from the Stage One WeITAG reports plus the additional studies and technical appraisals that have been undertaken specifically for this Stage Two report. These are included in the Impacts Assessment Report. However, the exception to this is Option BE8, due to its identification late in the Stage Two process. For the majority of the qualitative criteria in the Appraisal Summary Tables, the impacts associated with Option BE8 have been based on other options that share similar characteristics.

Section 3.4 (Economics) describes how the options have been appraised in economic terms and outlines that the majority of bypass options (Options BE1A, BE1B, BE1C and BE8) have been appraised together with Option TC1A as this option can be included with any bypass. The combined economics output is shown under the Economy criteria in the Appraisal Summary Tables as Transport costs, Accidents, Land, Capital costs, and Affordability. Option BE7 has been appraised as standalone options only in economic terms.

A summary Appraisal Summary Table of the Transport Case appraisal of all the options listed in 3.4 is included in Table 8 with the full Appraisal Summary Tables included in Appendix B in this report.

Table 8: Summary of the Appraisal Summary Tables for the Revised Options

Economic Indicators	Do Minimum	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Journey time changes	Slight Adverse (-)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Slight Adverse (-)
Journey time reliability changes	Slight Adverse (-)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Slight Adverse (-)
Transport costs	Not applicable	£18m benefit	£12m benefit	£10m benefit	£5m benefit	£8m benefit	Not Yet Assessed
Accidents	Not applicable	£2.1m cost	£2.2m cost	£0.3m benefit	£1.6m benefit	£1.9m cost	Not Yet Assessed
Changes in productivity	Slight Adverse (-)	Slight Beneficial (+)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Slight Beneficial (+)	Slight Beneficial (+)	Not Yet Assessed
Local economy	Slight Adverse (-)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Neutral (0)
Land	Not applicable	£1.526m	£1.069m	£1.619m	£0.852m	Not applicable	Not applicable
Capital costs	Not applicable	£65.390m (includes 44% OB) £2.784m maintenance costs	£50.985m (includes 44% OB) £2.068m maintenance costs	£54.734m (includes 44% OB) £2.576m maintenance costs	£33.258m (includes 44% OB) £1.384m maintenance costs	£46.767m (includes 44% OB) £1.384m maintenance costs	£0.771m (includes 44% OB). No maintenance costs identified

Economic Indicators	Do Minimum	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Revenue costs	Not applicable	None identified	None identified	None identified	None identified	None identified	None identified
Affordability (BCR)	Not applicable	0.33	0.26	0.26	0.26	0.17	Not applicable

Table 9 Summary of the Appraisal Summary Tables for the Revised Options – Environmental Indicators

Environmental Indicators	Do Minimum	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Noise	Slight Adverse (-)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)
Local air quality	Slight Adverse (-)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Slight Beneficial (+)	Moderate Beneficial (+ +)	Moderate Beneficial (+ +)	Slight Beneficial (+)
Greenhouse Gas emissions	Neutral (0)	Slight Adverse (-)	Slight Adverse (-)	Slight Adverse (-)	Slight Adverse (-)	Slight Adverse (-)	Neutral (0)
Landscape (Historic) and Townscape	Slight Adverse (-)	Slight Beneficial (+) to Large Adverse (- - -)	Slight Beneficial (+) to Large Adverse (- - -)	Slight Beneficial (+) to Large Adverse (- - -)	Slight Beneficial (+) to Large Adverse (- - -)	Slight Beneficial (+) to Large Adverse (- - -)	Slight Beneficial (+)

Environmental Indicators	Do Minimum	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Biodiversity	Neutral (0)	Slight Adverse (-) to Large Adverse (---)	Slight Adverse (-) to Moderate Adverse (--)	Slight Adverse (-) to Moderate Adverse (--)	Slight Adverse (-) to Moderate Adverse (--)	Slight Adverse (-) to Moderate Adverse (--)	Neutral (0)
Cultural heritage (excluding historic landscape)	Slight Adverse (-)	Neutral (0) to Moderate Beneficial (+ +)	Neutral (0) to Moderate Beneficial (+ +)	Slight Adverse (-) to Moderate Beneficial (+ +)	Neutral (0) to Moderate Beneficial (+ +)	Neutral (0) to Moderate Beneficial (+ +)	Slight Beneficial (+)
Water environment	Neutral (0)	Neutral (0) To Large Adverse (---)	Neutral (0) To Large Adverse (---)	Neutral (0) To Large Adverse (---)	Neutral (0) To Slight Adverse (---)	Neutral (0) To Large Adverse (---)	Neutral (0)
Soils and Geology	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)

Social and Cultural Indicators	Do Minimum	TC1A and BE1A	TC1A and BE1B	TC1A and BE1C	BE7	TC1A and BE8	NB7
Physical activity	Slight Adverse (-)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)
Journey quality	Slight Adverse (-)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Neutral (0)
Accidents	Slight Adverse (-)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)
Security	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)	Neutral (0)
Access to employment	Slight Adverse (-)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Neutral (0)
Access to services	Slight Adverse (-)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)	Neutral (0)
Severance	Slight Adverse (-)	Slight Beneficial (+) to Slight Adverse (-)	Slight Beneficial (+) to Slight Adverse (-)	Slight Beneficial (+) to Slight Adverse (-)	Slight Beneficial (+) to Slight Adverse (-)	Slight Beneficial (+) to Slight Adverse (-)	Not applicable
Active travel	Slight Adverse (-)	Moderate Beneficial (++)	Moderate Beneficial (++)	Moderate Beneficial (++)	Slight Beneficial (+)	Slight Beneficial (+)	Slight Beneficial (+)
Option and non-use values	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Slight Beneficial (+)

Summary of the Transport Case

The Transport Case has appraised the reduced number of options in the short-list as well as the more recently identified bypass Options BE7 and BE8, and a Do Minimum scenario. These are as shown below:

- Do Minimum.
- Option BE1A - Eastern Bypass Option 1A.
- Option BE1B - Eastern Bypass Option 1B.
- Option BE1C - Eastern Bypass Option 1C.
- Option NB7 – Combined No-Bypass Option (with no HGV Restrictions).
- Option TC1A – One-way system along Rhosmaen Street (delivered with any of the bypass options).
- Option BE7 – Eastern Bypass Option 7 (No Bridge); and
- Option BE8 – Eastern Bypass Option 8.

Appraisal of the options has been against a number of national, regional and local policy objectives to assess their suitability and fit as potential solutions. Each option has also been assessed against the study objectives and their ability to address the identified problems. This appraisal provides an update to the previous appraisal undertaken at WelTAG Stage One and reflects the additional option development work that has been undertaken. This appraisal, along with the results from the April 2019 Consultation has enabled the recommended shortlist of 11 options from the WelTAG Stage One to be rationalised down to a final list of seven (two of which are bypass options not previously considered – BE7 and BE8). Do Minimum has been retained as a baseline option.

The ability to bring worthwhile improvements to Llandeilo town centre and to a slightly lesser extent, Ffairfach, is seen as extremely important. Enhancements to the townscape, in combination with wider footways and the provision of facilities for cyclists will make the centre of Llandeilo in particular, a more pleasant and safer place in which to live, shop, and do business. This will drastically reduce the potential safety risk for pedestrians and cyclists created by the current narrow footways and carriageways. Although Llandeilo is already a popular tourist destination, a more attractive town centre with fewer vehicles passing through it, will encourage more people to visit, which will, in turn, boost the local economy.

There are two town centre options in the revised short-list that will bring about improvements such as outlined above although they achieve them in different ways. Option NB7 is the only one that does not include a bypass and is therefore preferred in terms of its limited overall impact to the greater Llandeilo area. However, the lack of a bypass means that all through traffic will continue to pass through Llandeilo town centre, which will limit the scale of enhancements that can be provided and the benefits that they will bring. Traffic flow within the town centre would be managed through traffic signals and shuttle working. Option NB7 is therefore considered as the least favourable town centre option and did not prove popular during the September and October 2020 Consultation scoring 19% from the total feedback received, which was the second least favoured option, only ahead of a “Do Nothing” option.

Option TC1A is the only town centre option that includes a bypass. Provision of a bypass for Llandeilo and Ffairfach, which will result in a large reduction in traffic passing through these communities, is the only way that improvements to the town centre and the benefits that this will bring, can be fully realised.

A number of bypass options have been considered and all of these will allow the realisation of the identified benefits to Llandeilo town centre. Their differences lie mainly in the ways that they address the needs of Ffairfach and the impacts that they will have on the environment.

Bypass options BE1A, BE1B, BE1C, and BE8 all require additional flood mitigation added to the current designs in order to avoid adverse impacts on flood levels. Option BE7 does not require any additional flood mitigation as impacts will be slight.

All the bypass options have part of their alignments that are common extending from the A40 roundabout to south of the railway station, over which all impacts are similar. Only Option BE7 differs beyond this, meeting the A483 in a different location to the others to the north of Llandeilo Bridge. As a result of this, Option BE7 has the least overall ecological, environmental, and landscape impact of the bypass options due to it being a bypass for Llandeilo only. It is also the least expensive bypass option.

Option BE8 has the next lowest overall impact and is the next least expensive but this too is only a bypass for Llandeilo. In common with all the other bypass options, apart from Option BE7, Option BE8 requires a new bridge over the Afon Tywi. The lack of a bypass addressing the identified problems in both Llandeilo and Ffairfach is a major disbenefit associated with Options BE7 and BE8 and as a result, they are considered less favourable.

Of the bypass options that provide traffic relief to both Llandeilo and Ffairfach, Option BE1A is the one that fully achieves this as it completely bypasses both communities. This option is to be delivered in tandem with Option TC1A which had the highest public vote in the September and October 2020 Consultation. However, it is the longest, and most expensive bypass option and has the greatest impact on ecology, the environment, and the landscape.

Neither of the remaining bypass options fully bypass Ffairfach, which means that ecological, environmental, and landscape impact is slightly less. However, it is still quite considerable with both. Option BE1B is marginally better in this respect, followed by Option BE1C. Their difference lies in how this partial bypass of Ffairfach is achieved with one terminating on the A476 near Ysgol Bro Dinefwr (Option BE1B) and the other on the same road but much further west (Option BE1C). Both will require traffic to pass through the southern half of Ffairfach to continue on the A483. Option BE1C requires considerable additional journey distance.

Note, Option TC1A has not been considered on its own, although its non-economic impacts have been included in the appraisal of all the bypass options in their respective Appraisal Summary Tables.

All the options short-listed provide little economic return on the investment costs either on their own or when combined with others. Town centre Option TC1A, when combined with bypass options BE1B and BE1C results in a particularly poor Benefit to Cost Ratio. This is partly related to an increase in accidents due to the use of additional town centre roads for the one-way system that Option TC1A includes. However, it is recognised that there are wider benefits to these options, along with Option BE1A, that are not readily monetised. These benefits include the potential for an increase in visitor numbers in the area, the perceived safety of the pedestrian and cycling environment on Rhosmaen Street, and the ability to encourage active travel/walking and cycling as a mode of choice for short distance utility trips.

The ability of current bus services to be rerouted to call at Llandeilo Train Station should be examined further in the Stage Three WeITAG, as this is a measure that would be complementary to any of the infrastructure improvement options.

The list of complementary measures are not included in the full economic analysis, as at the time of writing, not all complementary measures were costed. However, not all complementary measures would be sought as an overall package of works. For instance, there would be limited benefit of providing both ST1 (a ramp from Alan Road to Llandeilo Railway Station) and ST2 (a lift from Alan Road to Llandeilo Railway Station). As part of the WeITAG Stage 3, the final list of complementary measures will be included in the assessment. The following complementary measures were well supported at the September and October Consultation and should be considered for future stages:

- Improved walking and cycling routes to Llandeilo and Ffairfach (ref. CL3, CF4 and CF7).
- Additional public parking associated with potential EV charging and cycle hire schemes (options subject to a full car parking demand study).
- Improved vehicle access to Ysgol Bro Dinefwr (ref. CF6); and
- Integration and de-carbonisation of public transport (ref. CL4 and CL5).

Overall, in terms of the Transport Case, the Do Minimum scenario will only maintain the status quo in terms of highway infrastructure and with the identified problems in Llandeilo and Ffairfach likely to worsen, continuing this scenario is not recommended.

In summary, this Transport Case recommends the following for each option:

- **Do Minimum:** Considered less favourable – but to continue as an option to benchmark against.
- **Option BE1A:** Considered less favourable on its own, but to be taken forward in combination with TC1A. Had the highest public vote at September and October Consultation
- **Option BE1B:** Considered less favourable on its own, but to be taken forward in combination with TC1A.
- **Option BE1C:** The September and October Consultation showed that this is not viewed as favourably as Options BE1A or BE1B. Not recommended to take further at this time.
- **Option BE7:** Considered less favourable and rejected by the Review Group in February 2020. Not recommended to take further at this time.
- **Option BE8:** Considered less favourable and rejected by the Review Group in February 2020. Not recommended to take further at this time.
- **Option TC1A:** Recommended for consideration with Options BE1A and /or BE1B.

- **Option NB7:** Not recommended as a long-term solution. Public consultation did not show support for this option.

4. Commercial Case

Introduction

The Commercial Case provides an outline of the procurement methods that could be used to implement the chosen option and evidence that a best value approach will be taken.

Procurement Method

At this current stage of the WeITAG process it cannot be stated as to what methods may be used to procure a preferred package of option(s) and complementary measures selected at the end of this WeITAG Stage Two report, nor the length of the contract given. However, it is likely to require the procurement of a Technical Advisor, Employer's Agent and potential contractor, depending on the option(s) and complementary measures being taken forward. This information will become clearer at WeITAG Stage Three, Full Business Case, once more details are finalised.

Summary of the Commercial Case

Each option under consideration (other than the Do Minimum scenario) will require the procurement of capital works to deliver new infrastructure. At this stage of option development, the procurement method and associated matters such as contract length, payment mechanism and pricing framework, have not been determined.

5. Financial Case

Introduction

WeITAG guidance states that the Financial Case *‘tells whether an option is affordable in the first place and the long-term financial viability of a scheme. It covers both capital and revenue requirements over the lift time of the project and the implications of these’*.

Capital Costs

The Capital Costs of the options have been calculated based on the option designs included in the Highway Options Report, which is included in Appendix D of the Impacts Assessment Report (Capita, January 2021). These have been calculated by Chandler KBS on behalf of Transport for Wales. Table 10 below shows the total capital cost of each option or combination of options. It should be noted that costs for flood mitigation works have not been included in Table 10.

As outlined in the Transport Case, as part of the economics assessment, town centre Option TC1A has been combined with bypass options BE1A, BE1B, BE1C, and BE8 and this is reflected in Table 10.

Table 10: Chandler KBS Cost Estimates for Each Option/Combination of Options (2019 prices)

Option	TC1A plus BE1A	TC1A plus BE1B	TC1A plus BE1C	BE7	TC1A plus BE8	TC1A only	NB7
Total	£65,389,552	£50,984,954	£54,734,016	£33,257,645	£46,766,575	£1,086,002	£771,012

Optimism Bias (the term for accounting that there are still some unknown or unquantified risk factors with the options at this stage of development) has been included in the cost estimates and kept at 44% in line with Department for Transport webTAG guidance. There is the potential for this to be reduced following further design work. This currently provides a measure of cover for the flood mitigation, costs of which are excluded from Table 10. However, once a recommended scheme progresses to detailed design and WeITAG Stage Three, this would present considerably more certainty over the costs and would be a more appropriate time to reconsider the Optimism Bias applied.

In accordance with webTAG, historic costs and recoverable VAT is excluded. Thus, for the economic analysis, 50% of each options preliminary costs were subtracted to approximate historic or “sunk costs”.

Furthermore, inflation to the time of construction has been accounted for in the assessment, along with discounting the costs to 2010 prices, all of which is in line with webTAG requirements. Full details of the economic assessment are included in the Economic Assessment Report in Appendix O of the Impacts Assessment Report.

Ongoing Costs

Maintenance costs have been calculated based on the additional major maintenance costs that will be required over the 60-year economic period of evaluation. As the options/combinations of options that include town centre improvements (NB7 and TC1A) only require an incremental change in the current maintenance works, the ongoing costs for these options have not been identified.

The bypass options will likely have routine maintenance where a number of items identified as new capital works will require replacement. Items such as planing and resurfacing carriageway and footway, replacing lighting columns, safety barriers, traffic signs, bridge deck joints, and re-waterproofing the bridge deck are the major items expected to be undertaken over a 60-year period. As with the capital costs, these maintenance costs have been adjusted for inflation according to when each item requires replacing, e.g. carriageway resurfacing is likely every 20 years, whereas replacing lighting columns may occur once every 40 years. Table 11 shows the total estimated maintenance costs of these major items for each of the bypass options in 2019 prices.

Table 11: Maintenance costs (2019 prices)

Option	TC1A plus BE1A	TC1A plus BE1B	TC1A plus BE1C	BE7	TC1A plus BE8*
Lifetime Maintenance Cost	£2,784,125	£2,068,084	£2,575,516	£1,383,571	£1,383,571

* Maintenance costs not available, BE7 values used.

If a bypass option, in combination with town centre improvements is taken forward, it is likely that the all-new road would become the Trunk Road. As such, the current maintenance costs for the existing A483 would likely be transferred from SWTRA to Carmarthenshire County Council. Nevertheless, this existing cost is of neutral impact for this assessment, as none of the options would likely increase the maintenance requirements of the existing carriageway.

Sources of Funding

Welsh Government have advised that they will be the source of funding of this project, with a budget of £50 million identified. On that basis, it is likely that Options BE1A, and BE1B and BE1C when combined with TC1A would exceed this budget based on the information currently available. These options would therefore require additional funding to be identified in order to be progressed or delivered in a phased approach to allow full development to be progressed in line with obtaining additional funding.

Summary of the Financial Case

The Financial Case has identified the capital costs and ongoing revenue costs anticipated for each option or combination of options assessed. There are no new revenue streams associated with any of the options.

Particularly with the bypass options, it is recognised that there is potential for further design refinement to increase the certainty of the costs which can be undertaken during WeITAG Stage Three.

6. Management Case

Introduction

WeITAG guidance states that the *'Management Case tells you if an option is achievable. This case covers the delivery arrangements for the project and then its management during its lifetime'*.

This chapter provides a review of the legal powers that will need to be completed for a transport improvement to the Llandeilo and Ffairfach transport corridor along with outline information on governance, communication and stakeholder management, project risks, constraints and deliverability.

Governance

Following Completion of an initial draft WeITAG Stage Two report, a Review Group Meeting 1 was held on the 21st October 2019, which resulted in further detail being requested on items such as flood modelling and active travel proposals. Thus, further work was undertaken, and the Review Group reconvened again to consider the revised draft WeITAG Stage Two report on the 4th February 2020.

The Review Group consisted of the following representatives:

- Andy Falley – Welsh Government
- John Byrne – Welsh Government
- Mark Dixon – Welsh Government
- Filipe Pamment – Welsh Government
- Gareth Potter – Transport for Wales
- Helen Bowkett – Independent Reviewer
- Ryland Jones – Sustrans
- Steve Pilliner – Carmarthenshire County Council
- Simon Charles – Carmarthenshire County Council

Communication and Stakeholder Management

A range of consultation activities have been undertaken as part of WeITAG Stage Two to date. Details of these are provided in Section 2.13 of the Strategic Case (Chapter 2).

Project Plan

A full project programme will be created when a preferred package of options(s) and complementary measures is developed as part of WeITAG Stage Three.

The key stages that remain to be completed as part of this WeITAG study include:

- **WeITAG Stage Three** – production of a full business case for a preferred package of options(s) and complementary measures. This will include detailed design, any associated works and the completion of all remaining activities to obtain planning permission.
- **WeITAG Stage Four** – implementation of the preferred package of options(s) and complementary measures.
- **WeITAG Stage Five** – production of monitoring information and lessons learnt reports post scheme completion.

Summary

It is evident from the Management Case that the options under consideration all require significant further development work prior to scheme delivery. The Management Case will need to develop an assessment of risks for the preferred package of options(s) and complementary measures progressed in WeITAG Stage Three. Other aspects considered by the management case are the governance structure, project management processes and the role of the WeITAG Review Group.

7. Conclusions

Summary and Conclusion

In 2018, Jacobs undertook a WeITAG Stage One study to look at the problems occurring on the A483 in Llandeilo and Ffairfach. Many of these problems that have been identified within the study area relate to the pedestrian and cycling environment. Issues such as crossing the road due to the type, size, and volume of vehicles on Rhosmaen Street, coupled with narrow carriageways and footpaths, mean that pedestrians in particular are often disadvantaged due to the proximity of their movements to passing vehicles. Therefore, even with advances in technology that will lead to an increase in electric, and/or autonomous vehicles, the pedestrians of the future will still face many of the issues that are present today. In reality, an increase in the use of electric vehicles may give rise to greater road safety issues, as these vehicles are considerably quieter than conventional petrol or diesel-powered vehicles. With the narrow footways and close passing vehicles on Rhosmaen Street, there will be less audible warning of approaching vehicles for pedestrians.

The WeITAG Stage One study set a series of project objectives for any intervention and appraised a long list of transport options against these objectives along with relevant national and local well-being objectives. The Stage One report concluded with a short-list of 11 options, which were recommended for further investigation.

This WeITAG Stage Two study commenced with public and stakeholder consultation on the 11 short-listed options in April 2019. Further appraisal on each option was undertaken to assess which, either singly or combined with others, could be progressed, and then further developed. The 11 options were reduced to five through a further sifting process. Two additional bypass options (BE7 and BE8) were identified at this stage, which were appraised along with the others on the short-list.

The revised short-list of options is as follows:

- Option TC1A (town centre plus a bypass)
- Option BE1A (full bypass of Llandeilo and Ffairfach)
- Option BE1B (full bypass of Llandeilo and partial bypass of Ffairfach)
- Option BE1C (full bypass of Llandeilo and partial bypass of Ffairfach)

- Option NB7 (town centre only)
- Option BE7 (full bypass of Llandeilo only)
- Option BE8 (full bypass of Llandeilo only)

In relation to the additional options, BE7 terminates a Llandeilo-only bypass at a point to the north of the existing A483 Llandeilo Bridge. This removes the need to build a new structure over the Afon Tywi as the existing bridge would continue to be used as the A483. Bypass Option BE8 is simply the Llandeilo Bypass part of Options BE1A, BE1B, and BE1C and would terminate to the south of Llandeilo Bridge. Due to these options being developed during the Stage Two WeITAG process, they have not been presented to stakeholders and the public. However, as both bypass options BE7 and BE8 only provide a bypass for Llandeilo and do not improve Ffairfach, they are considered as less favourable.

Transport modelling has been undertaken in accord with current best practice to help provide input into the economic analysis. It should be noted that during the COVID-19 pandemic, substantial changes to traffic volumes have been seen which have not been modelled. There is no guidance at present as to how traffic volumes in the future will change. There is potential for altered travel pattern behaviours, even after the pandemic has ended, particularly with the uptake of home working. Nonetheless, in the context of Llandeilo and Ffairfach, the A483 running through the area is part of the strategic highway network and therefore does have a high number of HGV and LGV movements. It is unlikely that these vehicle classes will reduce as a result of the impact of COVID-19. Thus, the study area is less likely to see a substantial long-term reduction in traffic than a more urban area.

This Stage Two WeITAG study has highlighted the potential severe economic implications associated with Option NB6 for the banning of HGVs through Llandeilo and Ffairfach without the provision of a bypass. This option was deemed undeliverable by the Review Group and was replaced by option NB7 for the September 2020 Consultation as an alternative to a road building solution.

The Stage Two WeITAG study has determined that town centre improvements, including improved facilities for pedestrians and cyclists as Option TC1A would be highly beneficial to Llandeilo and Ffairfach. However, this would only be realised when combined with a bypass option (non-specific) with which this option has always been associated. Further work is recommended in the Stage Three WeITAG to revisit the economic assessment of the accidents in relation to Option TC1A, due to the limitations of the software used.

The study has also highlighted that there is limited economic value in building any bypass even when combined with town centre Option TC1A. All Benefit to Cost Ratios (BCRs) are low. However, there would be tangible, non-monetised benefits for the residents and visitors to Llandeilo and Ffairfach that cannot easily be quantified. These include reduced severance, air quality and noise improvements, an improved walking and cycling environment, and opportunities to improve the local townscape, all of which are included in town centre Option TC1A. Such improvements would likely increase the number of visitors to the historic market town of Llandeilo in particular, which in turn would boost the local economy.

The opportunity has been taken to combine town centre Option TC1A with the remaining bypass options, for further investigation. The purpose of any recommended scheme is to make meaningful improvements to Llandeilo and Ffairfach, which TC1A and some of the complementary measures are able to provide. The improvements proposed with TC1A can only be realised with a bypass in place. The two bypass options recommended for consideration are BE1A and BE1B. Option BE1A was the most favoured option at the September 2020 Consultation event. It is recognised that both options would have a considerable impact on the ecology, environment, and landscape of the areas through which they would pass, which cannot be fully mitigated against. Bypass option BE1A would have the greatest impact due to its additional length, although it is the only option that offers a full bypass of both Llandeilo and Ffairfach. Nonetheless, the impact of the new road infrastructure must be viewed alongside the benefits to the community that can be realised in Option TC1A and any complementary measure. The principal benefit of TC1A is wider footways, coupled with lower traffic volumes, significantly reducing the risk of injury to pedestrians and cyclists. This option has the potential to create a higher volume of pedestrian movement, particularly in Llandeilo, which will encourage tourism and therefore wider economic benefits for the area.

Although it is not the case with all the bypass options, either standalone or in combination with town centre option TC1A, this study has shown that some would result in works costs in excess of the current project budget of £50 million. However, it is recognised that these costs are preliminary and include a large percentage of Optimism Bias. During further option development, it is likely that this percentage could be reduced as greater information about the construction processes and the likely scheme impacts would be known. Even then, there may still be a need to secure additional funding to allow the full provision of the recommended option or combination of options.

In addition to the main options, some complementary measures will be included in the final package of works to maximise the benefits to the wider community. As part of the WeITAG Stage Three, the final list of complementary measures will be included in the assessment.

Ministerial Letter

The Minister for Economy, Transport and North Wales, Ken Skates, wrote to Adam Price, the Senedd Member for Carmarthen East and Dinefwr with a project update on the 7th August 2020. The letter reaffirmed Welsh Governments commitment to continue work on options to deliver sustainable transport interventions to support active travel and deliver modal shift in Llandeilo and Ffairfach, as well as a new road to address the localised impact of traffic in Llandeilo town centre.

8. Recommendations

In order for any option to address the current issues and problems within the study area, there needs to be a substantial benefit to Llandeilo town centre and Ffairfach village, for the people that live, visit and work in these communities.

All options have been appraised against the following criteria:

- Their ability to prevent or solve the problem and in the future.
- Their ability to meet the scheme specific objectives and the Welsh Government Well-being objectives.
- Their short and longer-term impacts.
- Their deliverability, and
- Their robustness to uncertainty and potential to drive long-lasting change.

WeITAG Stage 2 Appraisal Recommendation

Through the WeITAG Stage Two appraisal process and public consultation Option TC1A with bypass Option BE1A has emerged as the preferred option.

The opportunity to maximise the improvements to Llandeilo and Ffairfach, will benefit a wide range of users and visitors, and help bring about improvements in the local economy, should be a priority. These opportunities can be realised by including some of the complementary measures identified. The following complementary measures were also well supported at the Stakeholder and Public Consultation Events held in September and October 2020, and should be considered for future stages:

- Improved walking and cycling routes to Llandeilo and Ffairfach (ref. CL3, CF4 and CF7).
- Additional public parking associated with potential EV charging and cycle hire schemes (options subject to a full car parking demand study).
- Improved vehicle access to Ysgol Bro Dinefwr (ref. CF6); and
- Integration and de-carbonisation of public transport (ref. CL4 and CL5).

Drawing A483-CAP-HML-ZZ-DR-CH-0026 in Appendix A provides an overall illustration of the recommended long-term option and complementary measures.

Appendix A – Option Drawings

Appendix A contains 12 drawings, showing preliminary highway design layouts which have been produced for all the below options:

- Do Minimum.
- Option BE1A - Eastern Bypass Option 1A.
- Option BE1B - Eastern Bypass Option 1B.
- Option BE1C - Eastern Bypass Option 1C.
- Option BE7 – Eastern Bypass Option 7 (No Bridge).
- Option BE8 – Eastern Bypass Option 8.
- Option TC1A – One-way system and a non-specific bypass option.
- Option NB7 – Combined No-Bypass Option (with no HGV Restrictions).

Figure A-1 - Eastern Bypass Option BE1A 70kph Design Speed General Arrangement



- Notes
- 1) Active Travel provision to be in the northern verge between Fford Brio Dinefor and Llandeilo Railway Station. Potential for route to be extended to A40/A483 Roundabout following the approval of the Beechwood development. Active Travel route to be in line with current design standards.
 - 2) Between Ch 0.00 to Ch. 760 on MC03 and Ch. 1300.00 to 1967.553 on MC03 the proposed highway is within the flood plain and therefore the embankments will be subject to Erosion Control Methods.
 - 3) To encourage lower speeds and a safer pedestrian environment, the proposed Highway Cross Section is to narrow from a single Rural All Purpose Road to a Single Urban All Purpose Road between Ch. 1020.00 and Ch. 1220.00 on MC03.
 - 4) Refer to drawing A483-CAP-HML-ZZ-DR-C-0002 for Long Section.
 - 5) Refer to drawing A483-CAP-HML-ZZ-DR-C-0005 for Llandeilo Railway Station Proposals.
 - 6) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0007 and A483-CAP-SGN-ZZ-DR-S-0008 for details of Proposed River Bridge.
 - 7) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0009 for details of Proposed Underpass.
 - 8) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0010 and A483-CAP-SGN-ZZ-DR-S-0011 for details of Proposed Retaining Wall.
 - 9) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0012, A483-CAP-SGN-ZZ-DR-S-0013 and A483-CAP-SGN-ZZ-DR-S-0015 for details of Proposed Culvert.
 - 10) Refer to drawing A483-CAP-SGN-ZZ-DR-S-0014 for details of Proposed Riverfall Bridge.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
INDICATION TO BE HIGHLY PROMINENT AND READILY ASSOCIATED WITH THE TYPE OF WORK TO BE UNDERTAKEN. SEE THE FOLLOWING:	
1.	Works are taking place in close proximity to a live railway.
2.	Part of the works are taking place at the base of a steep rock slope.
3.	Temporary works are taking place in close proximity to private households and safety of residents with regard to falling from height is paramount.
4.	Part of the works are taken taking place over the SSSI River Towy and its flood plain.
5.	The existing Llandeilo River Bridge is a Grade II* listed structure.
6.	Uncharted buried services may be present.
IT IS ADVISED THAT ALL WORKS ARE TO BE CONDUCTED OUT IN A CAREFUL MANNER TO AVOID DAMAGE TO THE EXISTING INFRASTRUCTURE.	

Rev	By	TS	Description	Date
100	SL	GRG	Issue in relation to Active Travel route update	05/02/2015
101	SL	GRG	Update in relation to Active Travel route update	05/02/2015
102	SL	GRG	Update in relation to Active Travel route update	02/02/2015
103	SL	GRG	Update in relation to Active Travel route update	02/02/2015

Purpose of Issue
S2 - Issued for Information

Classification
Commercial in Confidence

Client
**TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES**
Llywodraeth Cymru
Welsh Government

Project
**A483 Llandeilo To Ffairfach
Transport Study
WeITAG Stage 2**

Drawing
**Eastern Bypass Option BE1A
70kph Design Speed
General Arrangement**

Scale @ A1	Drawn	Checked	Approved
1:2500 & 1:200	SL	GRG	DJW

Project No. CS/09/523 Date 06/07/2019

Drawing Identifier
Topic: Original; Zone: Label; File Type: Title; Number: A483-CAP-HML-ZZ-DR-CH-0001 P03

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Figure A-2 - Eastern Bypass Option BE1A 70kph Design Speed Long Sections

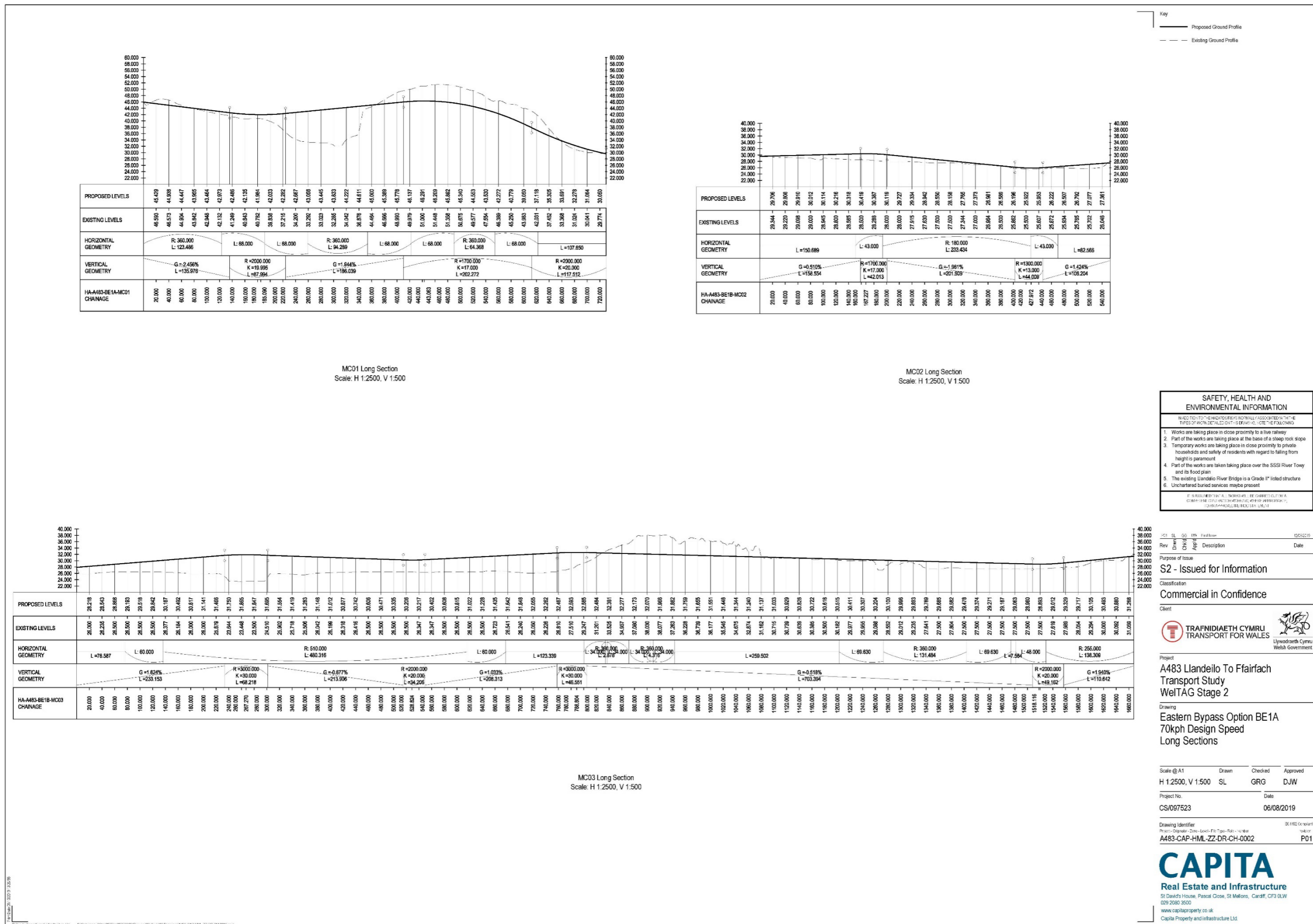
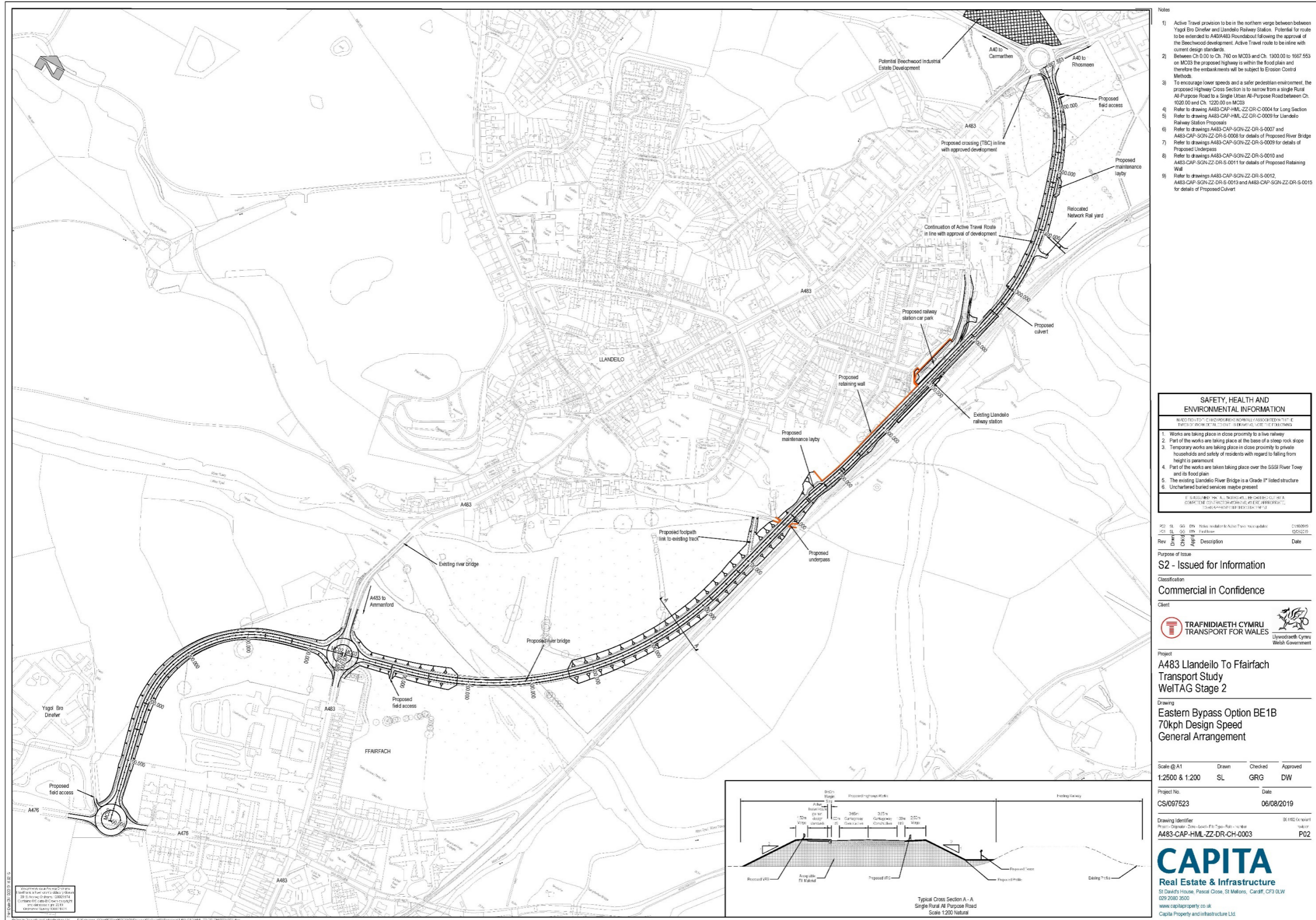


Figure A-3 - Eastern Bypass Option BE1B 70kph Design Speed General Arrangement



- Notes
- 1) Active Travel provision to be in the northern verge between Ysgol Bro Dinefwr and Llandeilo Railway Station. Potential for route to be extended to A40/A463 Roundabout following the approval of the Beechwood development. Active Travel route to be in line with current design standards.
 - 2) Between Ch 0+00 to Ch. 7+60 on MC03 and Ch. 13+00.00 to 16+67.553 on MC03 the proposed Highway is within the flood plain and therefore the embankments will be subject to Erosion Control Methods.
 - 3) To encourage lower speeds and a safer pedestrian environment, the proposed Highway Cross Section is to narrow from a single Rural All Purpose Road to a Single Urban All Purpose Road between Ch. 10+20.00 and Ch. 12+20.00 on MC03
 - 4) Refer to drawing A483-CAP-HML-ZZ-DR-C-0004 for Long Section
 - 5) Refer to drawing A483-CAP-HML-ZZ-DR-C-0009 for Llandeilo Railway Station Proposals
 - 6) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0007 and A483-CAP-SGN-ZZ-DR-S-0008 for details of Proposed River Bridge
 - 7) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0009 for details of Proposed Underpass
 - 8) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0010 and A483-CAP-SGN-ZZ-DR-S-0011 for details of Proposed Retaining Wall
 - 9) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0012, A483-CAP-SGN-ZZ-DR-S-0013 and A483-CAP-SGN-ZZ-DR-S-0015 for details of Proposed Culvert

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
NOTED TO THE CONTRACTOR TO BE RESPONSIBLE FOR THE PROVISION OF ALL NECESSARY SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION TO THE WORKERS.	
1.	Works are taking place in close proximity to a live railway
2.	Part of the works are taking place at the base of a steep rock slope
3.	Temporary works are taking place in close proximity to private households and safety of residents with regard to falling from height is paramount
4.	Part of the works are taken taking place over the SSSI River Tow and its flood plain
5.	The existing Llandeilo River Bridge is a Grade II* listed structure
6.	Unchartered buried services may be present
IT IS ASSUMED THAT ALL NECESSARY SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION HAS BEEN PROVIDED TO THE WORKERS.	

Rev	Date	By	Appr	Description	Date

Purpose of Issue
S2 - Issued for Information

Classification
Commercial in Confidence

Client
**TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES**
Llywodraeth Cymru
Welsh Government

Project
**A483 Llandeilo To Ffairfach
Transport Study
WeITAG Stage 2**

Drawing
**Eastern Bypass Option BE1B
70kph Design Speed
General Arrangement**

Scale @ A1	Drawn	Checked	Approved
1:2500 & 1:200	SL	GRG	DW
Project No.	Date		
CS/097523	06/08/2019		
Drawing Identifier	BE1B02-0001		
Project-Drawn-Date-Location-File Type-Revision	A483-CAP-HML-ZZ-DR-CH-0003 P02		

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Figure A-5 - Eastern Bypass Option BE1C 70kph Design Speed General Arrangement



- Notes
- 1) Active Travel provision to be in the northern verge between Ysgol Bro Dinefwr and Llandeilo Railway Station. Potential for route to be extended to A40/A483 Roundabout following the approval of the Beechwood development. Active Travel route to be in line with current design standards.
 - 2) Between Ch 0.00 to Ch. 780 on MC03 and Ch. 1300.00 to 1667.503 on MC03 the proposed highway is within the flood plain and therefore the embankments will be subject to Erosion Control Methods.
 - 3) To encourage lower speeds and a safer pedestrian environment, the proposed Highway Cross Section is to narrow from a single Rural All-Purpose Road to a Single Urban All-Purpose Road between Ch. 1020.00 and Ch. 1220.00 on MC03.
 - 4) Refer to drawing A483-CAP-HML-ZZ-DR-C-0006 for Long Section
 - 5) Refer to drawing A483-CAP-HML-ZZ-DR-C-0009 for Llandeilo Railway Station Proposals
 - 6) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0007 and A483-CAP-SGN-ZZ-DR-S-0008 for details of Proposed River Bridge
 - 7) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0009 for details of Proposed Underpass
 - 8) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0010 and A483-CAP-SGN-ZZ-DR-S-0011 for details of Proposed Retaining Wall
 - 9) Refer to drawings A483-CAP-SGN-ZZ-DR-S-0012, A483-CAP-SGN-ZZ-DR-S-0013 and A483-CAP-SGN-ZZ-DR-S-0015 for details of Proposed Culvert

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
1. Works are taking place in close proximity to a live railway	
2. Part of the works are taking place at the base of a steep rock slope	
3. Temporary works are taking place in close proximity to private households and safety of residents with regard to falling from height is paramount	
4. Part of the works are taking place over the SSSI River Towy and its flood plain	
5. The existing Llandeilo River Bridge is a Grade II* listed structure	
6. Unattended basins services may be present	

Rev	CHK	APP	Description	Date
1			Issue for Information	

Purpose of Issue
S2 - Issue for Information

Classification
Commercial in Confidence



Project
A483 Llandeilo To Ffairfach
Transport Study
WeITAG Stage 2

Drawing
Eastern Bypass Option BE1C
70kph Design Speed
General Arrangement

Scale	Drawn	Checked	Approved
1:2500 & 1:200	SL	GRG	DJW

Project No	Date
CS/097523	06/08/2019

Drawing Identifier	BSI/IGS Identifier
A483-CAP-HML-ZZ-DR-CH-0005	P02

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Figure A-7 - Llandeilo Railway Station General Arrangement

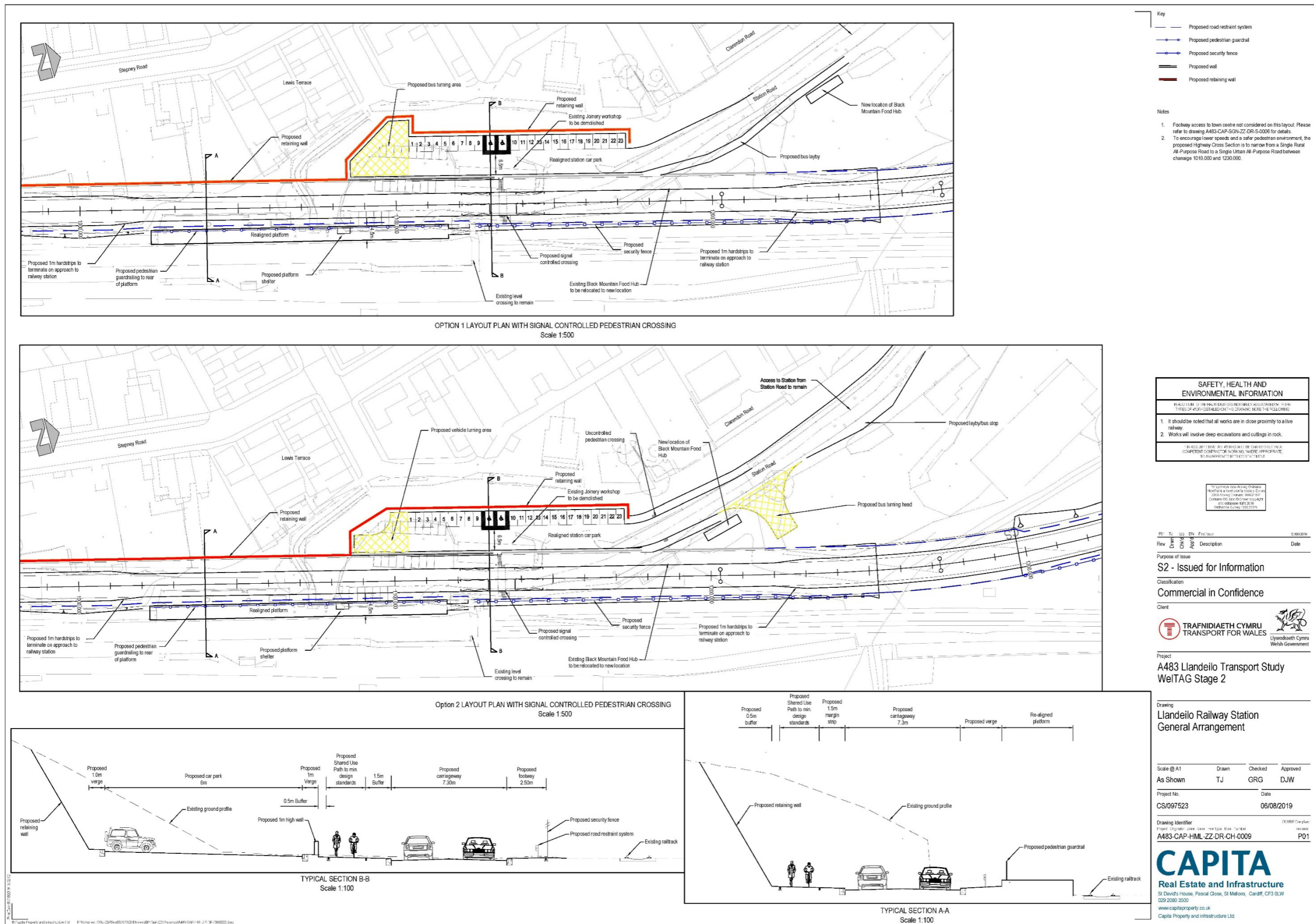


Figure A-8 - Town Centre Option TC1A



Key

- Proposed Footway Widening
- Access to be Maintained Vehicle Crossover and Dropped Kerb
- Tactile Paving and Dropped Kerb

- Notes**
- This Town Centre Enhancement Scheme is to Complement each of the proposed Bypass Options (BE1A, BE1B & BE1C).
 - Existing One Way systems to remain.
 - All crossing points are shown as per existing locations.
 - Existing one way systems to remain along King Street, George Street, George Hill, Carmarthen Street, Abbey Terrace and Church Street.
 - Rhydolfaen Street to remain subject to 20mph zone as per the current arrangement (between junction with New Road and junction with King Street). Subtle Traffic Calming Measures to be proposed to enforce the limit.
 - Existing carriageway will require resurfacing / regrading as part of the proposed works.
 - It is proposed that northbound cyclists are diverted down Abbey Terrace and onto Crescent Road where an unsegregated contraflow cycling system will operate along the one way section (1.5m cycle lane, 3.5m carriageway, 3.0m on-road parking). Where Crescent Road returns to two-way traffic flow it is proposed that cyclist will remain on road until the Junction with Rhydolfaen Street. It is proposed that southbound cyclists are to utilise the one way system along Rhydolfaen Street. Refer to Overview of Proposals.
 - A contraflow system along Rhydolfaen Street for northbound cyclists has also been considered but this would require a cycle lane of 1.5m, a carriageway width of 2.8m and widened footways of 2.1m. To accommodate at the narrowest section of the Rhydolfaen Street the loading bay outside the Cawdor Hotel would require removal.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

PLANNING TO PROCEED WITH THIS PROJECT MAY BE SUBJECT TO THE TERMS OF A LOCAL AUTHORITY'S CONSENT TO DEVELOPE THE FOLLOWING:

- Unchartered bus services may be present.

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Rev	Drawn	Checked	Appr	Description	Date
1	NP	GRG	DJW	Issue for Information	06/08/2019

Purpose of Issue
S2 - Issued for Information

Classification
Commercial in Confidence

Client
TRAFNDIAETH CYMRU TRANSPORT FOR WALES

Project
A483 Llandeilo To Ffairfach Transport Study WeITAG Stage 2

Drawing
Town Centre Option TC1A

Scale @ A1
As Shown

Drawn
NP

Checked
GRG

Approved
DJW

Project No.
CS097523

Date
06/08/2019

Drawing Identifier
A483-CAP-HML-ZZ-DR-CH-0010

DB 102 Consultant
F02

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Figure A-9 - No Relief Road Option NB7 Combined No Relief Road (Traffic Signals, Removal of Loading and Parking – No HGV Restrictions)

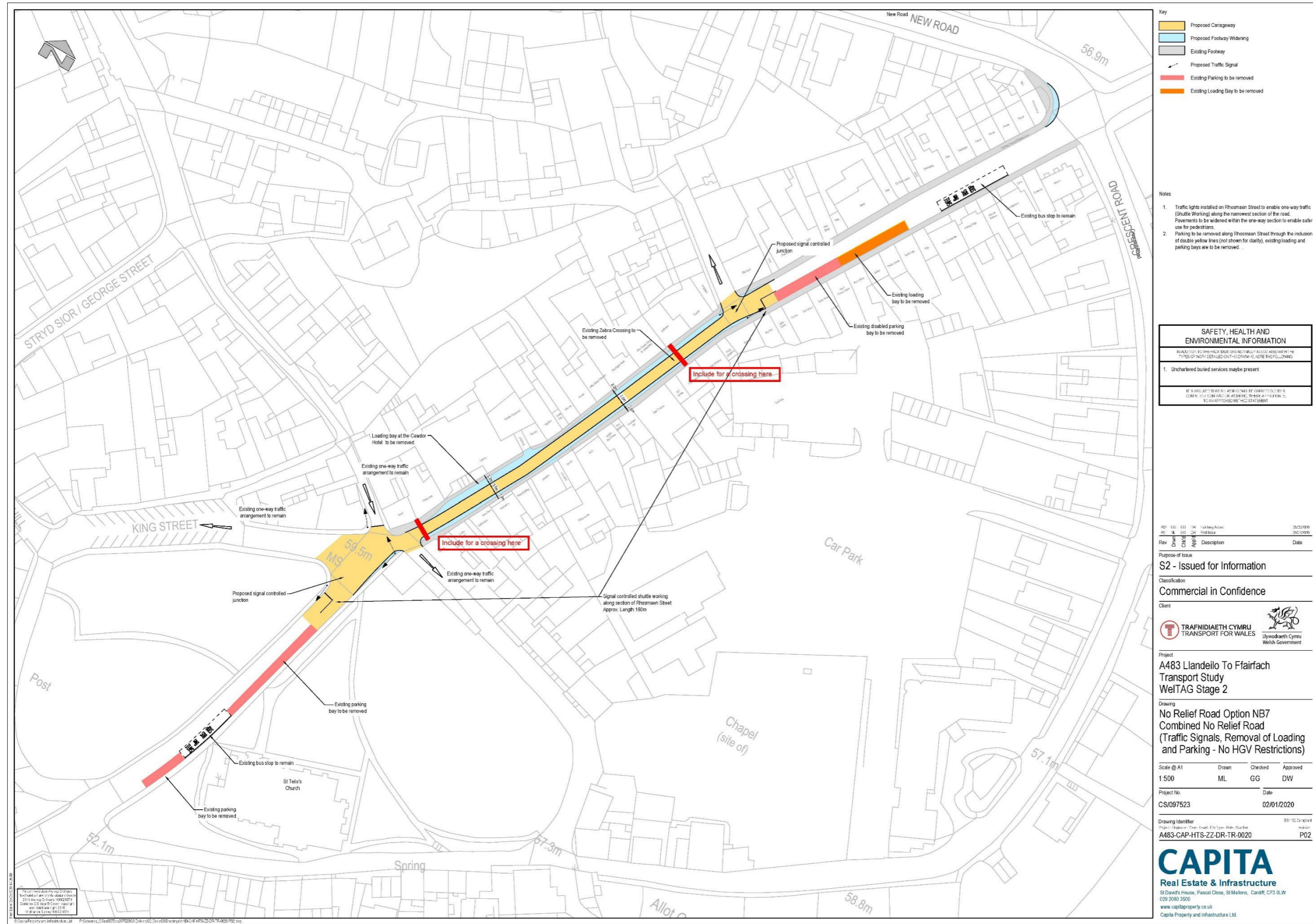


Figure A-10 - No Relief Road Option NB7 (Option 2) Combined No Relief Road (Traffic Signals, Removal of Loading and Parking – No HGV Restrictions)

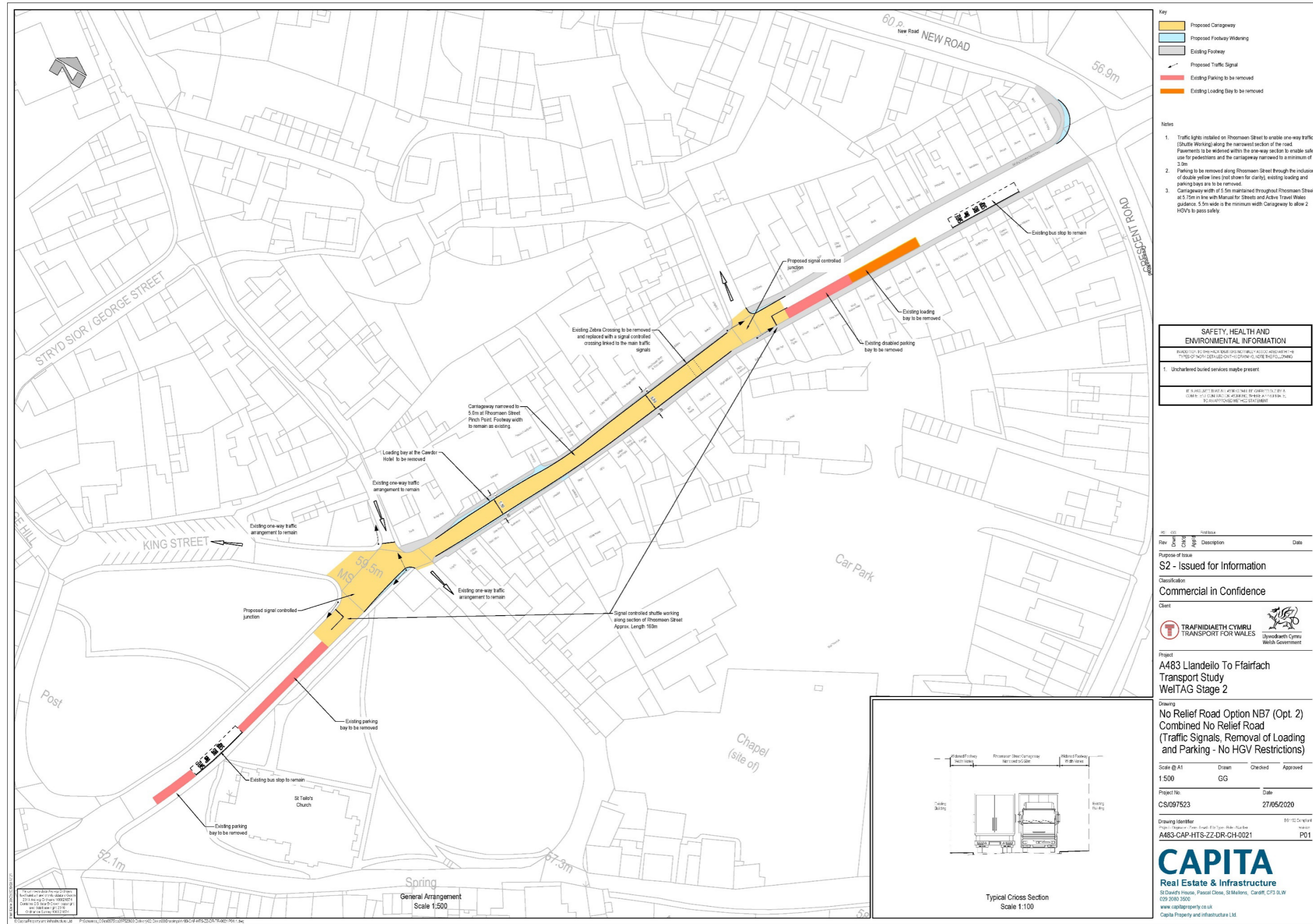


Figure A-11 - No Relief Road Option NB7 (Option 3) Combined No Relief Road (Traffic Signals, Removal of Loading and Parking – No HGV Restrictions)

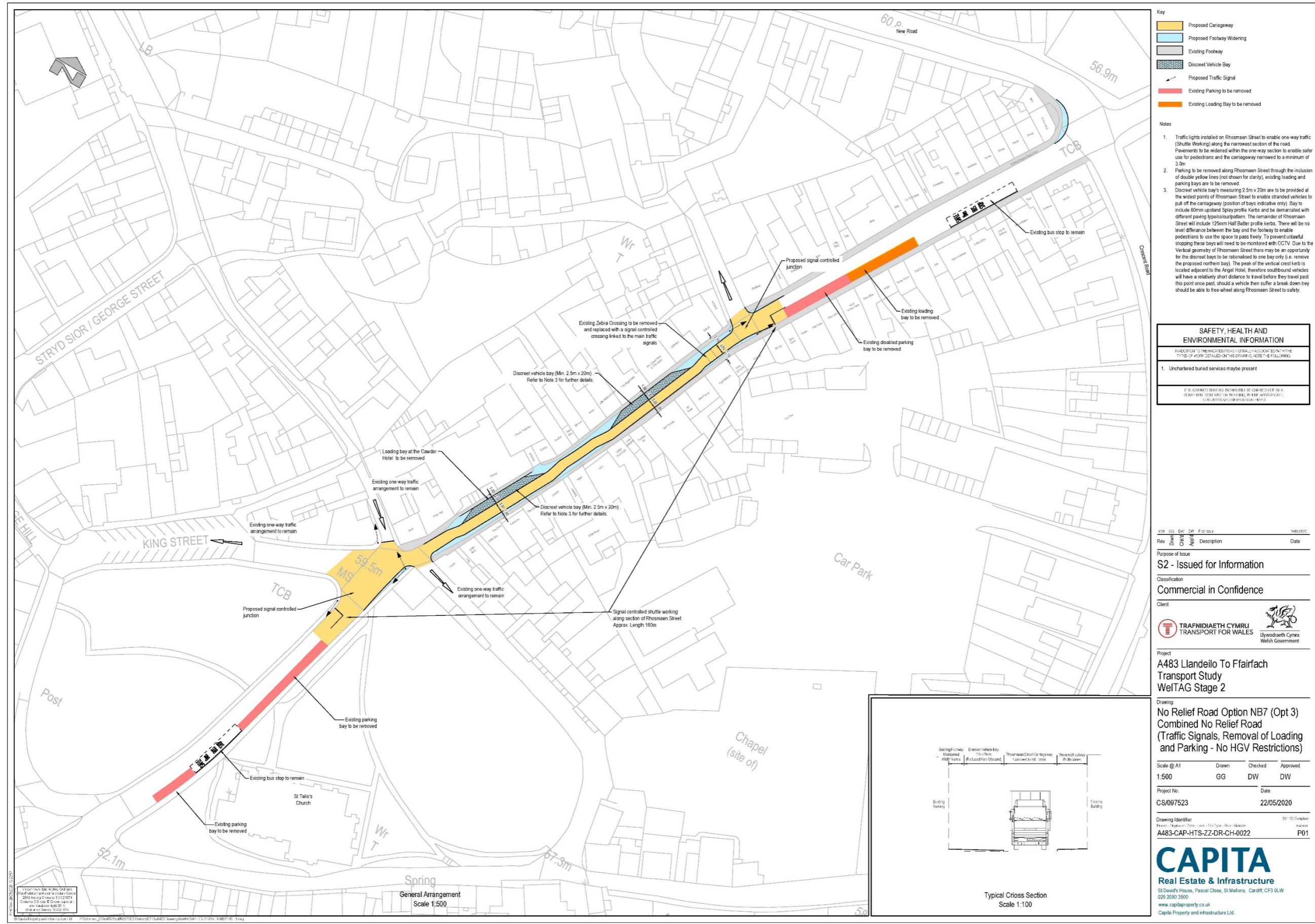
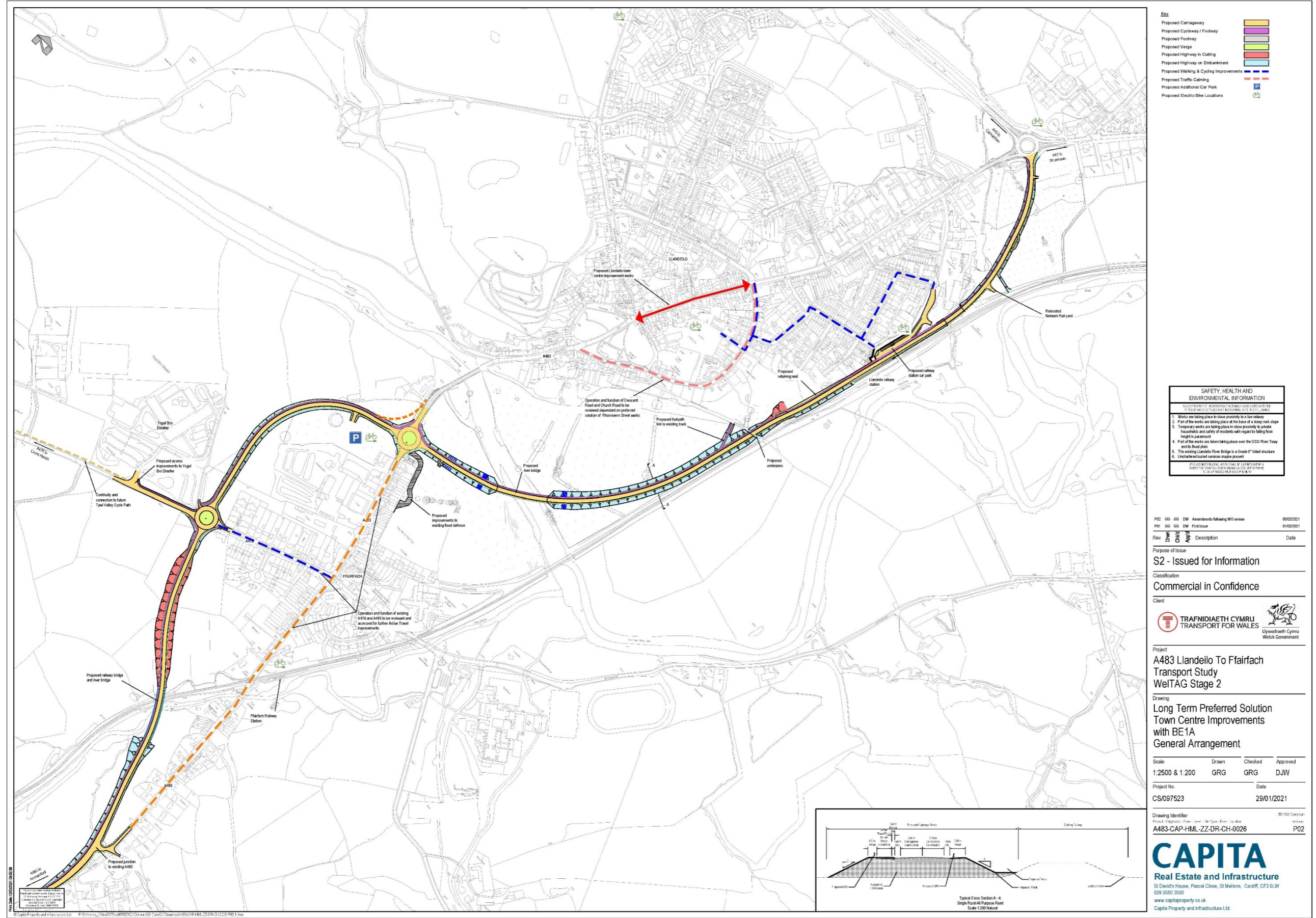


Figure A-12 - Long Term Preferred Solution Town Centre Improvements with BE1A General Arrangement



Appendix B – Appraisal Summary Tables

Do Minimum

The Do Minimum Option does not include any improvements to the current A483 highway layout within Llandeilo and Ffairfach. However, the road would still have to undergo regular and planned maintenance to continue functioning as a Trunk Road.

The tables below highlight the option's impact on economic, environmental, and social and cultural criteria.

Table B-1 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Increases in traffic flow will lead to increased journey times	All road users	Slight Adverse (-)
Journey time reliability changes	Journey time reliability will suffer	All road users	Slight Adverse (-)
Transport costs	Not applicable	Not applicable	Not applicable
Accidents	Not applicable	Not applicable	Not applicable
Changes in productivity	Increased traffic flows and congestion will impact upon freight journey times, affecting productivity	Local businesses	Slight Adverse (-)
Local economy	Adverse impact due to increasing levels of traffic	Local businesses	Slight Adverse (-)
Land	Not applicable	Not applicable	Not applicable
Capital costs	No construction costs although maintenance will be required	Not applicable	Not applicable
Revenue costs	Not applicable	Not applicable	Not applicable
Affordability (BCR)	Not applicable	Not applicable	Not applicable

Table B-2 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Increased traffic flows and congestion will contribute to increased noise.		Slight Adverse (-)
Local air quality	Air quality within the AQMA will continue to deteriorate.		Slight Adverse (-)
Greenhouse Gas emissions	No immediate change	Global	Neutral (0)
Landscape (Historic) and Townscape	Landscape – no impact Townscape – increasing levels of traffic will have an adverse impact on Llandeilo and Ffairfach	Central Llandeilo and Ffairfach	Slight Adverse (-)
Biodiversity	No impact	Not applicable	Neutral (0)
Cultural heritage (excluding historic landscape)	A worsening effect due to increasing traffic levels	Buildings of importance	Slight Adverse (-)
Water environment	No impact	Not applicable	Neutral (0)

Table B-3 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	A likely decrease in physical activity due to increased traffic	Pedestrians and cyclists	Slight Adverse (-)
Journey quality	Increased traffic levels will reduce journey quality	All road users	Slight Adverse (-)
Accidents	Possible increase due to increased traffic flows	All road users	Slight Adverse (-)
Security	No effect	Not applicable	Neutral (0)
Access to employment	Increased traffic levels will impact upon access to employment	Employees and businesses	Slight Adverse (-)

Social and Cultural Criteria	Assessment	Distribution	Significance
Access to services	Increased traffic levels will impact upon access to services	All users of services	Slight Adverse (-)
Severance	Increased traffic levels will increase severance on the A483 in Llandeilo and Ffairfach	Businesses, pedestrians, cyclists, students, railway users	Slight Adverse (-)
Active travel	High traffic levels are not conducive to active travel/walking and cycling.	Pedestrians and cyclists	Slight Adverse (-)
Option and non-use values	Not applicable	Not applicable	Not applicable

How Do Minimum relates to the problems outlined in the WeITAG Stage One Report

The Do Minimum option would not solve the identified problems with Llandeilo and Ffairfach as it is anticipated that traffic flows will continue to increase. HGVs would still use the A483 Trunk Road and thus congestion at the pinch points would worsen. As a result of this, air quality within the AQMA corridor is likely to deteriorate.

The Do Minimum option would not contribute to the Welsh Government achieving its Well-being Objectives or to deliver some of the long-term outcomes set out in the Wales Transport Strategy.

Key Risks

- Would not resolve the problems and issues of concern outlined during Consultation 1 (Stage One WeITAG report).

Adverse Impacts

- Potential adverse impact on local communities.
- Adverse impact on air quality within the AQMA.
- Potential adverse impacts on road safety within Llandeilo and Ffairfach due to increases in traffic flow on the A483.

Constraints

- No constraints have been identified.

Interdependencies

- No interdependencies have been identified.

TC1A plus BE1A, Llandeilo Town Centre Improvement plus Eastern Bypass Option 1A:

Option TC1A is the creation of a one-way system (in part) around the centre of the town. From the A40/Carmarthen Street junction to the George Street/Carmarthen Street junction, traffic would remain two-way as would New Road and much of Rhosmaen Street, apart from a section within the town centre. From the New Road/Crescent Road junction to the Carmarthen Street/Abbey Terrace junction, Rhosmaen Street would be one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout would be weight restricted. Permitted traffic going north would turn left into King Street, then into George Street (the current one-way system), then into Carmarthen Street/Carmarthen Road to join the A40 at the existing junction. Footways would be widened along Rhosmaen Street where it becomes one-way to enable safer use by pedestrians. There would be warning/diversion signs and weight limit signs within Ffairfach to stop HGVs from using Llandeilo Bridge to cross the Afon Tywi in a northbound direction.

This 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, to join the A483 to the south of Llandeilo Bridge, where a junction would be constructed. The route then heads further west and joins the A476 at a new junction to the east of Ysgol Bro Dinefwr. From this, the route heads south east and joins the A483 to the south of Heol Pen Storom at a junction.

The tables below highlight the option’s impact on economic, environmental, and social and cultural criteria.

Table B-4 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Journey times would improve through Llandeilo and Ffairfach due to a 59% and 93% reduction in traffic flow respectively. Through traffic will use the bypass, giving improved journey times.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)
Journey time reliability changes	With through traffic using the bypass and local traffic using roads through Llandeilo, journey time reliability will be improved.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)

Economic Criteria	Assessment	Distribution	Significance
Transport costs	The Transport costs for this option are £24.4m, which include journey time efficiencies.	All road users (light and heavy vehicles)	Not applicable
Accidents	This option presents £2.1m of accident costs, as a result of an increase in trips around the one-way streets.	All road users (light and heavy vehicles)	Not applicable
Changes in productivity	Local businesses could benefit through a reduction in journey times for supplies and deliveries.	Local businesses	Slight Beneficial (+)
Local economy	With such large reductions in traffic within Llandeilo town centre and Ffairfach, visitor numbers would increase and local businesses benefit. Improved links to other employment centres. Slight disbenefit from a reduction in 'passing trade'.	Mainly businesses in Llandeilo town centre	Slight Beneficial (+)
Land	£1.526 million	Not applicable	Not applicable
Capital costs	£65.390 million (includes 44% Optimism Bias) £2.784 million (maintenance costs over 60-year period, OB included)	Not applicable	Not applicable
Revenue costs	None identified	Not applicable	Not applicable
Affordability (BCR)	BCR is 0.33, but with costs in excess of the £50 million currently identified as the project budget, this option would require additional funding to be implemented.	Not applicable	Not applicable

Table B-5 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Noise increases up to 9.3dB on the eastern side of Llandeilo, noise reductions of between 8.2dB and 11.4dB through Llandeilo and up to 9.3dB in Ffairfach. Some noise increases in the NW/west of Ffairfach.	E side of Llandeilo and NW/W sides of Ffairfach - increases. Existing A483 - decreases	Neutral (0)
Local air quality	Reduced air quality on eastern side of Llandeilo and NW/west side of Ffairfach. Improved air quality through Llandeilo and Ffairfach. Option would have no significant impact.	E side of Llandeilo and NW/W sides of Ffairfach - reductions. Existing A483 - improvements	Moderate Beneficial (+ +)
Greenhouse Gas emissions	Construction stage - 15278 tonnes of CO2. Operational stage - 0.002 tonnes/year of CO2.	Globally	Slight Adverse (-)
Landscape (Historic) and Townscape	The Llandeilo area has a great historic landscape value. The bypass would impact upon this to a considerable extent as it would cross undeveloped flood plain and affect woodlands and the Afon Tywi. The tranquillity and character of the area will alter. The construction stage will also have considerable impact. Llandeilo town centre will benefit.	Llandeilo town centre, Ffairfach, and surrounding landscape	Landscape character - Moderate Adverse (- -) to Slight Beneficial (+), Historic landscape - Large Adverse (- - -), Llandeilo town centre - Slight Beneficial (+)
Biodiversity	Impact on marshy grassland and species-rich/important hedgerows and woodland. Impact on the Afon Tywi SAC and the Afon Cennen during construction stage.	Areas to E of Llandeilo, between Llandeilo and Ffairfach, and W/S of Ffairfach.	Slight Adverse (-) to Large Adverse (- - -)

Environmental Criteria	Assessment	Distribution	Significance
Cultural heritage (excluding historic landscape)	There are isolated Roman archaeological sites within the Afon Tywi flood plain and Llandeilo Battlefield to the north - little or no impact. Impact on the setting of Llandeilo Bridge and railway bridge (both listed). Reduced impact in Llandeilo town centre.	Areas surrounding Llandeilo and Ffairfach, and Llandeilo town centre	General - Neutral (0), Llandeilo town centre - Moderate Beneficial (+ +)
Water environment	Ffairfach is susceptible to changes in the flood level. Impact on flood levels have the potential to be mitigated at detail design stage but have not yet been costed for this option.	Ffairfach	Mitigated - Neutral (0) Unmitigated - Large Adverse (- - -)
Soils and Geology	There are a variety of ground conditions over the length of this option	Landscape areas through which option passes	Neutral (0)

Table B-6 – Options impact of social and criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Reduced traffic flows in Llandeilo and Ffairfach will encourage physical exercise due to improved environmental conditions. Shared use facilities on bypass.	Pedestrians/cyclists in Llandeilo and Ffairfach and area.	Slight Beneficial (+)
Journey quality	There will be improvements for all users, through and local	All road users	Slight Beneficial (+)
Accidents	Reduced traffic flows in Llandeilo and Ffairfach may reduce accidents. Bypass will be built to current/safe standards	All road users	Slight Beneficial (+)
Security	Little or no change	All road users	Neutral (0)
Access to employment	Lower traffic flows in Llandeilo & Ffairfach will benefit access to local employment, bypass benefit longer access.	Employees	Slight Beneficial (+)

Social and Cultural Criteria	Assessment	Distribution	Significance
Access to services	Reduced traffic flows in Llandeilo and Ffairfach will benefit access to local services, bypass will benefit longer distances to services.	All people accessing services	Slight Beneficial (+)
Severance	Reductions in severance in Llandeilo and Ffairfach due to reduced traffic flow. Perceived severance with railway station. Land severance where bypass is located	Users of Llandeilo and Ffairfach, and the countryside	Town centre - Slight Beneficial (+), Rural - Slight Adverse (-)
Active travel	Reduction in traffic flows in Llandeilo and Ffairfach and town centre improvements will encourage more active travel/walking and cycling. Facilities would be provided on the bypass.	Pedestrians and cyclists	Moderate Beneficial (++)
Option and non-use values	Not applicable	Not applicable	Not applicable

How a combination of Options TC1A and BE1A solves the problems outlined in the WeITAG Stage One Report

Option TC1A is fully dependant on the construction of a bypass (Option BE1B in this case). Option TC1A would reduce severance for pedestrians using the A483 Rhosmaen Street through Llandeilo due to lower traffic flows. A one-way system (in part) in the town centre would reduce this even more. However, there would be a slight increase on Carmarthen Road and others that would carry additional traffic. Pedestrian safety would improve in both Llandeilo town centre and Ffairfach although the additional traffic on other roads may result in accident increases. A reduction in traffic flow on Rhosmaen Street in Llandeilo and Towy Terrace in Ffairfach would improve conditions for cyclists and specific facilities could be provided including parking, e-bike (electric bike) hire and electric vehicle charging points. Emergency services response times (on call) should improve as traffic flows in Llandeilo town centre would be reduced (local access) or use can be made of the bypass offering free-flow conditions (wider access).

The proposed highway and any associated streetscape improvements, together with the presence of fewer vehicles would help encourage more visitors to Llandeilo, which would give a boost for tourism within the town and the local area, including Dinefwr Park, and improve the local economy. Option TC1A would result in general reductions in traffic noise as well as improvements in air quality within the whole of the AQMA through Llandeilo and Ffairfach. However, in both cases there would be a slight worsening of conditions on local roads that would carry additional traffic as part of the one-way system in Llandeilo.

Option BE1A would improve journey reliability due to it providing a direct, free-flow bypass route, which would avoid the pinch points within Llandeilo and Ffairfach. Pedestrian safety within these two communities would be improved with less traffic on local roads and this may promote an increase in visitor numbers and in turn boost the local economy. This traffic flow reduction would include HGVs and school traffic with the former (where through traffic) using the bypass rather than the A483 Rhosmaen Street. This will be associated with de-trunking of the A483. Furthermore, emergency services response times (on call) should improve as traffic flows in Llandeilo town centre will be reduced (local access) or use can be made of the bypass offering free-flow conditions (wider access).

This bypass option would result in an improvement in air quality within the whole of the AQMA, which extends throughout Llandeilo and Ffairfach along the A483.

This bypass option would contribute to the Welsh Government's Well-being Objectives, including promoting good health and well-being for everyone, building healthier communities and better environments, building resilient communities, culture and language, and delivering modern and connected infrastructure.

This bypass option would also help to deliver some of the long term outcomes set out in the Wales Transport Strategy such as improving access to healthcare, improving access to education, improving access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution (within Llandeilo), improve the impact of transport on the local environment, and improve the image of transport on Wales' heritage. These extensive benefits would be further enhanced with improvements to Llandeilo town centre, which is the only way to deliver some of the non-motorised benefits to the town.

This bypass option would also assist with the delivery of the long-term outcomes of the Wales Transport Strategy including improving connectivity within Wales and internationally, and improve the efficient and sustainable movement of freight.

However, all the above benefits have to be balanced against the impacts that this bypass option would have on the local environment, biodiversity, and heritage, which are not inconsiderable.

Key Risks

- Time to acquire land and the cost of land acquisition.

- Potential Public Inquiry.
- Topography and ground conditions – extensive investigation has been highlighted as being required to determine potential engineering solutions and their impacts, and more robust construction costs.
- Potential impact on flooding associated with work within the Afon Tywi flood plain.

Adverse Impacts

- Potential severance between Llandeilo and Ffairfach, and Ysgol Bro Dinefwr.
- Impacts during the construction period on people living and working close to the scheme. These include the eastern side of Llandeilo, and the west of Ffairfach including Ysgol Bro Dinefwr. Impacts will include construction noise and visual impact of construction processes. However, these will be minimised through good working practices.
- Noise impacts during the operational stage for properties that are currently not subject to noise from traffic.
- Potential delays to local and through traffic movements at tie-ins at existing roads (A40 roundabout, two locations on the A483, and one on the A476).
- Potential impact on the local environment. This includes the important landscape designations in the area, the ecology within them (including protected species), and the potential impacts from flooding on the Afon Tywi and Afon Cennen flood plains and parts of the local communities that are located close to them.

Constraints

- Land ownerships and acquisition.
- Potentially the topography in general but in particular in the vicinity of Llandeilo railway station where a large retaining wall will be required.
- The local environment, in particular the important local landscape designations, the townscape, protected species, cultural heritage importance, and the potential impact on flooding associated with the provision of new road structures over the Afon Tywi and Afon Cennen.

Interdependencies

- The acquisition of land necessary to allow this bypass option to be constructed
- Any agreements that may be required from Network Rail to construct a new road close to the railway.

TC1A plus BE1B, Llandeilo town centre improvements plus Eastern Bypass Option 1B:

Option TC1A is the creation of a one-way system (in part) around the centre of the town. From the A40/Carmarthen Street junction to the George Street/Carmarthen Street junction, traffic would remain two-way as would New Road and much of Rhosmaen Street, apart from a section within the town centre. From the New Road/Crescent Road junction to the Carmarthen Street/Abbey Terrace junction, Rhosmaen Street would be one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout would be weight restricted. Permitted traffic going north would turn left into King Street, then into George Street (the current one-way system), then into Carmarthen Street/Carmarthen Road to join the A40 at the existing junction. Footways would be widened along Rhosmaen Street where it becomes one-way to enable safer use by pedestrians. There would be warning/diversion signs and weight limit signs within Ffairfach to stop HGVs from using Llandeilo Bridge to cross the Afon Tywi in a northbound direction.

Option BE1B 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, to join the A483 to the south of Llandeilo Bridge, where a junction would be constructed. The route then heads further west and joins the A476 at a junction to the east of Ysgol Bro Dinefwr on the western side of Ffairfach.

The tables below highlight the option's impact on economic, environmental, and social and cultural criteria.

Table B-7 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Journey times would improve through Llandeilo due to an 59% reduction in traffic flow. Through traffic will use the bypass, giving improved journey times. Some through traffic will continue to pass through Ffairfach. Termination on A476 to west of Ffairfach benefits A476 journeys.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)
Journey time reliability changes	With through traffic using the bypass and local traffic using roads through Llandeilo, journey time reliability will be improved. The situation in Ffairfach will likely remain unchanged for A483 traffic but will benefit A476 traffic.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)

Economic Criteria	Assessment	Distribution	Significance
Transport costs	The Transport costs for this option are £12m, which include journey time efficiencies.	All road users	Not applicable
Accidents	This option presents £2.2m of accident costs as a result of an increase of trips around the one-way streets.	All road users	Not applicable
Changes in productivity	Local businesses could benefit through a reduction in journey times for supplies and deliveries.	Local businesses	Moderate Beneficial (++)
Local economy	With such a large reduction in traffic within Llandeilo town centre, visitor numbers would increase and local businesses benefit. Improved links to other employment centres. Slight disbenefit from a reduction in 'passing trade'.	Mainly businesses in Llandeilo town centre	Slight Beneficial (+)
Land	£1.069 million	Not applicable	Not applicable
Capital costs	£50.985 million (includes 44% Optimism Bias) £2.068 million (maintenance costs over 60-year period, OB included)	Not applicable	Not applicable
Revenue costs	None identified	Not applicable	Not applicable
Affordability (BCR)	BCR is 0.26. The cost of this option is just on the limit of the project budget of £50 million, so there is potential for this to be an affordable option.	Not applicable	Not applicable

Table B-8 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Noise increases up to 9.3dB on the eastern side of Llandeilo and 3.2dB to W/NW of Ffairfach, noise reductions of up to 9.3dB through Llandeilo.	E side of Llandeilo and NW/W sides of Ffairfach - increases. Existing A483 in Llandeilo - decreases	Neutral (0)
Local air quality	Reduced air quality on eastern side of Llandeilo and NW/west side of Ffairfach. Improved air quality through Llandeilo and Ffairfach. Option would have no significant impact.	E side of Llandeilo and NW/W sides of Ffairfach - reductions. Existing A483 - improvements	Moderate Beneficial (+ +)
Greenhouse Gas emissions	Construction stage - 10315 tonnes of CO2. Operational stage - 0.1 tonnes/year of CO2.	Globally	Slight Adverse (-)
Landscape (Historic) and Townscape	The Llandeilo area has a great historic landscape value. The bypass would impact upon this to a considerable extent as it would cross undeveloped flood plain and affect woodlands and the Afon Tywi. The tranquillity and character of the area will alter. The construction stage will also have considerable impact. Llandeilo town centre will benefit.	Llandeilo town centre, Ffairfach, and surrounding landscape	Landscape character - Moderate Adverse (- -) to Slight Beneficial (+), Historic landscape - Large Adverse (- - -), Llandeilo town centre - Slight Beneficial (+)
Biodiversity	Impact on marshy grassland and species-rich/important hedgerows and woodland. Impact on the Afon Tywi SAC during construction stage.	Areas to E of Llandeilo, between Llandeilo and Ffairfach, and W of Ffairfach.	Slight Adverse (-) to Moderate Adverse (- -)

Environmental Criteria	Assessment	Distribution	Significance
Cultural heritage (excluding historic landscape)	There are isolated Roman archaeological sites within the Afon Tywi flood plain and Llandeilo Battlefield to the north - little or no impact. Impact on the setting of Llandeilo Bridge and railway bridge (both listed). Reduced impact in Llandeilo town centre.	Areas surrounding Llandeilo and to NW of Ffairfach, Llandeilo town centre	Neutral (0) to Moderate Beneficial (+ +)
Water environment	Ffairfach is susceptible to changes in the flood level. Impact on flood levels have the potential to be mitigated at detail design stage but have not yet been costed for this option.	Ffairfach	Mitigated - Neutral (0) Unmitigated - Large Adverse (- - -)
Soils and Geology	There are a variety of ground conditions over the length of this option	Landscape areas through which option passes	Neutral (0)

Table B-9 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Reduced traffic flows in Llandeilo will encourage physical exercise due to improved environmental conditions. Shared use facilities on bypass.	Pedestrians/cyclists in Llandeilo and Ffairfach and area.	Slight Beneficial (+)
Journey quality	There will be improvements for all users, through and local	All road users	Slight Beneficial (+)
Accidents	Reduced traffic flows in Llandeilo may reduce accidents. Bypass will be built to current/safe standards	All road users	Slight Beneficial (+)
Security	Little or no change	All road users	Neutral (0)
Access to employment	Lower traffic flows in Llandeilo will benefit access to local employment, bypass benefit longer access.	Employees	Slight Beneficial (+)

Social and Cultural Criteria	Assessment	Distribution	Significance
Access to services	Reduced traffic flows in Llandeilo will benefit access to local services, bypass will benefit longer distances to services.	All people accessing services	Slight Beneficial (+)
Severance	Reductions in severance in Llandeilo due to reduced traffic flow. Perceived severance with railway station. Land severance where bypass is located	Users of Llandeilo and Ffairfach, and the countryside	Town centre - Slight Beneficial (+), Rural - Slight Adverse (-)
Active travel	Reduction in traffic flows in Llandeilo and town centre improvements will encourage more active travel/walking and cycling. Facilities would be provided on the bypass.	Pedestrians and cyclists	Moderate Beneficial (++)
Option and non-use values	Not applicable	Not applicable	Not applicable

How a combination of Options TC1A and BE1B solves the problems outlined in the WeITAG Stage One Report

Option TC1A is fully dependant on the construction of a bypass (Option BE1B in this case). Option TC1A would reduce severance for pedestrians using the A483 Rhosmaen Street through Llandeilo due to lower traffic flows. A one-way system (in part) in the town centre would reduce this even more. However, there would be a slight increase on Carmarthen Road and others that would carry additional traffic. Pedestrian safety would improve in both Llandeilo town centre and Ffairfach although the additional traffic on other roads may result in accident increases. A reduction in traffic flow on Rhosmaen Street in Llandeilo and Towy Terrace in Ffairfach would improve conditions for cyclists and specific facilities could be provided including parking, e-bike (electric bike) hire and electric vehicle charging points. Emergency services response times (on call) should improve as traffic flows in Llandeilo town centre would be reduced (local access) or use can be made of the bypass offering free-flow conditions (wider access).

The proposed highway and any associated streetscape improvements, together with the presence of fewer vehicles would help encourage more visitors to Llandeilo, which would give a boost for tourism within the town and the local area, including Dinefwr Park, and improve the local economy. Option TC1A would result in general reductions in traffic noise as well as improvements in air quality within the whole of the AQMA through Llandeilo and Ffairfach. However, in both cases there would be a slight worsening of conditions on local roads that would carry additional traffic as part of the one-way system in Llandeilo.

The bypass Option BE1B would carry through traffic, representing over 50% of the traffic that currently passes through Llandeilo and Ffairfach. This would include HGVs and school traffic. Journey reliability would be improved due to the bypass providing a direct, free-flow route, which would avoid the pinch points within Llandeilo. However, A483 traffic will continue to pass through the southern half of Ffairfach via a 280-metre length of the A476 east from Ysgol Bro Dinefwr although this would represent a large decrease compared to the Do Minimum scenario. Vehicular and pedestrian access to the school will be improved from the north. The bypass would be associated with de-trunking of the A483.

This combination of Options TC1A and BE1B would contribute to the Welsh Government's Well-being Objectives, including promoting good health and well-being for everyone, building healthier communities and better environments, building resilient communities, culture and language, and delivering modern and connected infrastructure.

The options would also help to deliver some of the long term outcomes set out in the Wales Transport Strategy such as improving access to healthcare, improving access to education, improving access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution (within Llandeilo), improve the impact of transport on the local environment, and improve the image of transport on Wales' heritage. The improvements to Llandeilo town centre will further enhance these extensive benefits and are the only way to deliver some of the non-motorised benefits to the town.

The combination of options, in particular BE1B, would also assist with the delivery of the long-term outcomes of the Wales Transport Strategy including improving connectivity within Wales and internationally, and improve the efficient and sustainable movement of freight.

However, all the above benefits would have to be balanced against the impact that the BE1B element of this combination of options would have on the local environment, biodiversity, and heritage, which is not inconsiderable.

Key Risks

- Time to acquire land and the cost of land acquisition.
- Potential Public Inquiry.

- Topography and ground conditions – extensive investigation has been highlighted as being required to determine potential engineering solutions and their impacts, and more robust construction costs.
- Potential impact on flooding associated with work within the Afon Tywi flood plain.

Adverse Impacts

- Potential severance between Llandeilo and Ffairfach, and Ysgol Bro Dinefwr.
- Impacts during the construction period on people living and working close to the scheme. These include Llandeilo town centre, the eastern side of Llandeilo, and the north west of Ffairfach including Ysgol Bro Dinefwr. Impacts would include construction noise and visual impact of construction processes. However, these would be minimised through good working practices.
- Noise impacts during the operational stage for properties that are currently not subject to noise from traffic.
- Potential delays to local and through traffic movements at tie-ins at existing roads (A40 roundabout and one location each on the A483 and the A476).
- Potential impact on the local environment. This includes the important landscape designations in the area, the ecology within them (including protected species), and the potential impacts from flooding on the Afon Tywi flood plain and parts of the local communities that are located close to it.

Constraints

- Land ownerships and acquisition.
- Potentially the topography in general but in particular in the vicinity of Llandeilo railway station where a large retaining wall would be required.
- The local environment, in particular the important local landscape designations, the townscape, protected species, cultural heritage importance, and the potential impact on flooding associated with the provision of a new road structure over the Afon Tywi.

Interdependencies

- The acquisition of land necessary to allow this bypass option to be constructed.
- Any agreements that may be required from Network Rail to construct a new road close to the railway.

TC1A plus BE1C, Llandeilo town centre improvements plus Eastern Bypass Option 1C:

Option TC1A is the creation of a one-way system (in part) around the centre of the town. From the A40/Carmarthen Street junction to the George Street/Carmarthen Street junction, traffic would remain two-way as would New Road and much of Rhosmaen Street, apart from a section within the town centre. From the New Road/Crescent Road junction to the Carmarthen Street/Abbey Terrace junction, Rhosmaen Street would be one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout would be weight restricted. Permitted traffic going north would turn left into King Street, then into George Street (the current one-way system), then into Carmarthen Street/Carmarthen Road to join the A40 at the existing junction. Footways would be widened along Rhosmaen Street where it becomes one-way to enable safer use by pedestrians. There would be warning/diversion signs and weight limit signs within Ffairfach to stop HGVs from using Llandeilo Bridge to cross the Afon Tywi in a northbound direction.

Option BE1C 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, to join the A483 to the south of Llandeilo Bridge, where a junction would be constructed. The route then heads further west and joins the A476 at a new junction at its junction with the B4300 to the west of Ysgol Bro Dinefwr.

The tables below highlight the option's impact on economic, environmental, and social and cultural criteria.

Table B-10 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Journey times would improve through Llandeilo due to a 59% reduction in traffic flow. Through traffic will use the bypass, giving improved journey times. Some through traffic will continue to pass through Ffairfach. Termination on A476 to west of Ffairfach benefits A476 journeys.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)
Journey time reliability changes	With through traffic using the bypass and local traffic using roads through Llandeilo, journey time reliability will be improved. The situation in Ffairfach will likely remain unchanged for A483 traffic but will benefit A476 traffic.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)

Economic Criteria	Assessment	Distribution	Significance
Transport costs	The Transport costs for this option are £10.2m, which include journey time efficiencies.	All road users	Not applicable
Accidents	This option presents £0.3m of accident savings due to increased distance between major junctions.	All road users	Not applicable
Changes in productivity	Local businesses could benefit through a reduction in journey times for supplies and deliveries.	Local businesses	Moderate Beneficial (++)
Local economy	With such a large reduction in traffic within Llandeilo town centre, visitor numbers would increase and local businesses benefit. Improved links to other employment centres. Slight disbenefit from a reduction in 'passing trade'.	Mainly businesses in Llandeilo town centre	Slight Beneficial (+)
Land	£1.619 million	Not applicable	Not applicable
Capital costs	£54.734 million (includes 44% Optimism Bias) £2.576 million (maintenance costs over 60-year period, Optimism Bias included)	Not applicable	Not applicable
Revenue costs	None identified	Not applicable	Not applicable
Affordability (BCR)	BCR is 0.26. This option is £4.7 million over the current allocated £50 million budget for this project and would require further financial backing to proceed.	Not applicable	Not applicable

Table B-11 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Noise increases up to 9.3dB on the eastern side of Llandeilo and 3.2dB to W/NW of Ffairfach, noise reductions of up to 9.3dB through Llandeilo.	E side of Llandeilo and NW/W sides of Ffairfach - increases. Existing A483 in Llandeilo - decreases	Neutral (0)
Local air quality	Reduced air quality on eastern side of Llandeilo and NW/west side of Ffairfach. Improved air quality through Llandeilo and Ffairfach. Option would have no significant impact.	E side of Llandeilo and NW/W sides of Ffairfach - reductions. Existing A483 - improvements	Moderate Beneficial (++)
Greenhouse Gas emissions	Construction stage - 12438 tonnes of CO2. Operational stage - 0.1 tonnes/year reduction of CO2.	Globally	Slight Adverse (-)
Landscape (Historic) and Townscape	The Llandeilo area has a great historic landscape value. The bypass would impact upon this to a considerable extent as it would cross undeveloped flood plan and affect woodlands and the Afon Tywi. The tranquillity and character of the area will alter. The construction stage will also have considerable impact. Llandeilo town centre will benefit.	Llandeilo town centre, Ffairfach, and surrounding landscape	Landscape character - Large Adverse (- - -) to Slight Beneficial (+), Historic landscape - Large Adverse (- - -), Llandeilo town centre - Slight Beneficial (+)
Biodiversity	Impact on marshy grassland and species-rich/important hedgerows and woodland. Impact on the Afon Tywi SAC during construction stage.	Areas to E of Llandeilo, between Llandeilo and Ffairfach, and N/NW of Ffairfach.	Slight Adverse (-) to Moderate Adverse (- -)

Environmental Criteria	Assessment	Distribution	Significance
Cultural heritage (excluding historic landscape)	There are isolated Roman archaeological sites within the Afon Tywi flood plain and Llandeilo Battlefield to the north - little or no impact. Impact on the setting of Llandeilo Bridge and railway bridge (both listed). Reduced impact in Llandeilo town centre.	Areas surrounding Llandeilo and to N/NW of Ffairfach, Llandeilo town centre	Slight Adverse (-) to Moderate Beneficial (+ +)
Water environment	Ffairfach is susceptible to changes in the flood level. Impact on flood levels have the potential to be mitigated at detail design stage but have not yet been costed for this option.	Ffairfach	Mitigated - Neutral (0) Unmitigated - Large Adverse (- - -)
Soils and Geology	There are a variety of ground conditions over the length of this option	Landscape areas through which option passes	Neutral (0)

Table B-12 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Reduced traffic flows in Llandeilo will encourage physical exercise due to improved environmental conditions. Shared use facilities on bypass.	Pedestrians/cyclists in Llandeilo and area.	Slight Beneficial (+)
Journey quality	There will be improvements for all users, through and local	All road users	Slight Beneficial (+)
Accidents	Reduced traffic flows in Llandeilo may reduce accidents. Bypass will be built to current/safe standards	All road users	Slight Beneficial (+)
Security	Little or no change	All road users	Neutral (0)
Access to employment	Lower traffic flows in Llandeilo will benefit access to local employment, bypass benefit longer access.	Employees	Slight Beneficial (+)

Social and Cultural Criteria	Assessment	Distribution	Significance
Access to services	Reduced traffic flows in Llandeilo will benefit access to local services, bypass will benefit longer distances to services.	All people accessing services	Slight Beneficial (+)
Severance	Reductions in severance in Llandeilo due to reduced traffic flow. Perceived severance with railway station. Land severance where bypass is located	Users of Llandeilo town centre, and the countryside	Town centre - Slight Beneficial (+), Rural - Slight Adverse (-)
Active travel	Reduction in traffic flows in Llandeilo and town centre improvements will encourage more active travel/walking and cycling. Facilities would be provided on the bypass.	Pedestrians and cyclists	Moderate Beneficial (++)
Option and non-use values	Not applicable	Not applicable	Not applicable

How a combination of Options TC1A and BE1C solves the problems outlined in the WeITAG Stage One Report

Option TC1A is fully dependant on the construction of a bypass (Option BE1B in this case). Option TC1A would reduce severance for pedestrians using the A483 Rhosmaen Street through Llandeilo due to lower traffic flows. A one-way system (in part) in the town centre would reduce this even more. However, there would be a slight increase on Carmarthen Road and others that would carry additional traffic. Pedestrian safety would improve in both Llandeilo town centre and Ffairfach although the additional traffic on other roads may result in accident increases. A reduction in traffic flow on Rhosmaen Street in Llandeilo and Towy Terrace in Ffairfach would improve conditions for cyclists and specific facilities could be provided including parking, e-bike (electric bike) hire and charging points. Emergency services response times (on call) should improve as traffic flows in Llandeilo town centre would be reduced (local access) or use can be made of the bypass offering free-flow conditions (wider access).

The proposed highway and any associated streetscape improvements, together with the presence of fewer vehicles would help encourage more visitors to Llandeilo, which would give a boost for tourism within the town and the local area, including Dinewr Park, and improve the local economy. Option TC1A would result in general reductions in traffic noise as well as improvements in air quality within the whole of the AQMA through Llandeilo and Ffairfach. However, in both cases there would be a slight worsening of conditions on local roads that would carry additional traffic as part of the one-way system in Llandeilo.

The bypass Option BE1C would carry through traffic, representing over 50% of the traffic that currently passes through Llandeilo and Ffairfach. This would include HGVs and school traffic. Journey reliability would be improved due to the bypass providing a direct, free-flow route, which would avoid the pinch points within Llandeilo. However, A483 traffic will continue to pass through the southern half of Ffairfach via a near 1-kilometre length of the A476 east from its junction with the B4300. Vehicular and pedestrian access to Ysgol Bro Dinefwr would be unaffected although traffic flows past it will greatly reduce compared to the Do Minimum scenario. The bypass would be associated with de-trunking of the A483.

This combination of Options TC1A and BE1C would contribute to the Welsh Government's Well-being Objectives, including promoting good health and well-being for everyone, building healthier communities and better environments, building resilient communities, culture and language, and delivering modern and connected infrastructure.

The options would also help to deliver some of the long term outcomes set out in the Wales Transport Strategy such as improving access to healthcare, improving access to education, improving access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution (within Llandeilo), improve the impact of transport on the local environment, and improve the image of transport on Wales' heritage. The improvements to Llandeilo town centre will further enhance these extensive benefits and are the only way to deliver some of the non-motorised benefits to the town.

The combination of options, in particular BE1C, would also assist with the delivery of the long-term outcomes of the Wales Transport Strategy including improving connectivity within Wales and internationally, and improve the efficient and sustainable movement of freight.

However, all the above benefits would have to be balanced against the impact that the BE1B element of this combination of options would have on the local environment, biodiversity, and heritage, which is not inconsiderable.

Key Risks

- Time to acquire land and the cost of land acquisition.
- Potential Public Inquiry.
- The possibility of archaeological finds in the area between the A476 and the Afon Tywi to the west of Ffairfach.
- Topography and ground conditions – extensive investigation has been highlighted as being required to determine potential engineering solutions and their impacts, and more robust construction costs.
- Potential impact on flooding associated with work within the Afon Tywi flood plain.

Adverse Impacts

- Potential severance between Llandeilo and Ffairfach, and Ysgol Bro Dinefwr.
- Impacts during the construction period on people living and working close to the scheme. These include Llandeilo town centre, the eastern side of Llandeilo, and the northern side of Ffairfach. Impacts would include construction noise and visual impact of construction processes. However, these would be minimised through good working practices.
- Noise impacts during the operational stage for properties that are currently not subject to noise from traffic.
- Potential delays to local and through traffic movements at tie-ins at existing roads (A40 roundabout and one location each on the A483 and the A476).
- Potential impact on the local environment. This includes the important landscape designations in the area, the ecology within them (including protected species), archaeology, and the potential impacts from flooding on the Afon Tywi flood plain and parts of the local communities that are located close to it.

Constraints

- Land ownerships and acquisition.
- Potentially the topography in general but in particular in the vicinity of Llandeilo railway station where a large retaining wall would be required.
- The local environment, in particular the important local landscape designations, the townscape, protected species, cultural heritage importance, and the potential impact on flooding associated with the provision of a new road structure over the Afon Tywi.

Interdependencies

- The acquisition of land necessary to allow this bypass option to be constructed.
- Any agreements that may be required from Network Rail to construct a new road close to the railway.

BE7, Eastern Bypass Option 7:

This 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, and without crossing the Afon Tywi, joins the A483 immediately to the north of Llandeilo Bridge, where a junction would be constructed.

The tables below highlight the option's impact on economic, environmental, and social and cultural criteria.

Table B-13 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Journey times would improve through Llandeilo due to an approximate 70% reduction in traffic flow. Through traffic will use the bypass, giving improved journey times. All through traffic will continue to pass through Ffairfach.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)
Journey time reliability changes	With through traffic using the bypass and local traffic using roads through Llandeilo, journey time reliability will be improved. The situation in Ffairfach will likely remain unchanged for all through traffic.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)
Transport costs	The Transport costs for this option are £5.0m, which include journey time efficiencies.	All road users	Not applicable
Accidents	This option presents £1.6m of accident savings due to a less congested network.	All road users	Not applicable
Changes in productivity	Local businesses could benefit through a reduction in journey times for supplies and deliveries.	Local businesses	Slight Beneficial (+)

Economic Criteria	Assessment	Distribution	Significance
Local economy	With such a large reduction in traffic within Llandeilo town centre, visitor numbers would increase and local businesses benefit. Improved links to other employment centres. Slight disbenefit from a reduction in 'passing trade'.	Mainly businesses in Llandeilo town centre	Slight Beneficial (+)
Land	£0.852 million	Not applicable	Not applicable
Capital costs	£33.258 million (includes 44% Optimism Bias) £1.384 million (maintenance costs over 60-year period, OB included)	Not applicable	Not applicable
Revenue costs	None identified	Not applicable	Not applicable
Affordability (BCR)	BCR is 0.26. However, this option could be further enhanced to include a Ffairfach bypass with active travel/walking and cycling measures currently not part of this option and would still likely be within the current budget allocation of £50 million.	Not applicable	Not applicable

Table B-14 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Noise increases up to 5.9dB on the eastern side of Llandeilo, noise reductions of up to 5.9dB through Llandeilo.	E side of Llandeilo - increases. Existing A483 in Llandeilo - decreases	Neutral (0)
Local air quality	Reduced air quality on eastern side of Llandeilo and NW/west side of Ffairfach. Improved air quality through Llandeilo and Ffairfach. Option would have no significant impact.	E side of Llandeilo - reductions. Existing A483 - improvements	Moderate Beneficial (+ +)

Environmental Criteria	Assessment	Distribution	Significance
Greenhouse Gas emissions	Construction stage - 7455 tonnes of CO2, Operational stage - 0.3 tonnes/year of CO2.	Globally	Slight Adverse (-)
Landscape (Historic) and Townscape	The Llandeilo area has a great historic landscape value. The bypass would impact upon this to a considerable extent as it would cross undeveloped flood plain and affect woodlands. The tranquillity and character of the area will alter. The construction stage will also have considerable impact. Llandeilo town centre will benefit.	Llandeilo town centre, and surrounding landscape	Landscape character - Moderate Adverse (- -) , Historic landscape - Large Adverse (- - -) , Llandeilo town centre - Slight Beneficial (+)
Biodiversity	Impact on marshy grassland and species-rich/important hedgerows and woodland.	Areas to E and S of Llandeilo	Slight Adverse (-) to Moderate Adverse (- -)
Cultural heritage (excluding historic landscape)	Llandeilo Battlefield to the north - little or no impact. Impact on the setting of Llandeilo Bridge and railway bridge (both listed) during construction and operation, in particular the former due to proximity of option. Reduced impact in Llandeilo town centre.	Areas to E and S of Llandeilo and Llandeilo town centre	Neutral (0) to Moderate Beneficial (+ +)
Water environment	Ffairfach is susceptible to changes in the flood level. The impact on flood levels are minimal for this option although any identified impact could be mitigated at detail design stage. However, mitigation has not yet been costed for this option.	Ffairfach	Mitigated - Neutral (0) Unmitigated - Slight Adverse (-)
Soils and Geology	There are a variety of ground conditions over the length of this option	Landscape areas through which option passes	Neutral (0)

Table B-15 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Reduced traffic flows in Llandeilo will encourage physical exercise due to improved environmental conditions. Shared use facilities on bypass.	Pedestrians/cyclists in Llandeilo and area.	Slight Beneficial (+)
Journey quality	There will be improvements for all users, through and local	All road users	Slight Beneficial (+)
Accidents	Reduced traffic flows in Llandeilo may reduce accidents. Bypass will be built to current/safe standards	All road users	Slight Beneficial (+)
Security	Little or no change	All road users	Neutral (0)
Access to employment	Lower traffic flows in Llandeilo will benefit access to local employment, bypass benefit longer access.	Employees	Slight Beneficial (+)
Access to services	Reduced traffic flows in Llandeilo will benefit access to local services, bypass will benefit longer distances to services.	All people accessing services	Slight Beneficial (+)
Severance	Reductions in severance in Llandeilo due to reduced traffic flow. Perceived severance with railway station. No change in Ffairfach. Land severance where bypass is located	Users of Llandeilo town centre, and the countryside	Town centre - Slight Beneficial (+), Rural - Slight Adverse (-)
Active travel	Reduction in traffic flows in Llandeilo will encourage more active travel/walking and cycling. Facilities would be provided on the bypass.	Pedestrians and cyclists	Slight Beneficial (+)
Option and non-use values	Not applicable	Not applicable	Not applicable

How Option BE7 solves the problems outlined in the WeITAG Stage One Report

Option BE7 would improve journey reliability due to it providing a direct, free-flow bypass route, which would avoid the pinch points within Llandeilo. Pedestrian safety within these two communities would be improved with less traffic on local roads and this may promote an increase in visitor numbers and in turn boost the local economy. This traffic flow reduction would include HGVs and school traffic with the former (where through traffic) using the bypass rather than the A483 Rhosmaen Street. This would be associated with de-trunking of the A483. Furthermore, emergency services response times (on call) should improve as traffic flows in Llandeilo town centre would be reduced (local access) or use can be made of the bypass offering free-flow conditions (wider access).

This bypass option would result in an improvement in air quality within the northern half of the AQMA only, the whole of which extends throughout Llandeilo and Ffairfach along the A483.

This bypass option would contribute to the Welsh Government's Well-being Objectives, including promoting good health and well-being for everyone, building healthier communities and better environments, building resilient communities, culture and language, and delivering modern and connected infrastructure.

This bypass option would also help to deliver some of the long term outcomes set out in the Wales Transport Strategy such as improving access to healthcare, improving access to education, improving access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution (within Llandeilo), improve the impact of transport on the local environment, and improve the image of transport on Wales' heritage. These extensive benefits would be further enhanced with improvements to Llandeilo town centre, which is the only way to deliver some of the non-motorised benefits to the town.

This bypass option would also assist with the delivery of the long-term outcomes of the Wales Transport Strategy including improving connectivity within Wales and internationally and improve the efficient and sustainable movement of freight.

However, all the above benefits have to be balanced against the impact that this bypass option would have on the local environment, biodiversity, and heritage, which is not inconsiderable.

Key Risks

- Time to acquire land and the cost of land acquisition.
- Potential Public Inquiry.
- Topography and ground conditions – extensive investigation has been highlighted as being required to determine potential engineering solutions and their impacts, and more robust construction costs.

- Potential impact on flooding associated with work within the Afon Tywi flood plain.

Adverse Impacts

- Impacts during the construction period on people living and working close to the scheme. These include the eastern and southern sides of Llandeilo. This would include construction noise and visual impact of construction processes. However, these would be minimised through good working practices.
- Noise impacts during the operational stage for properties that are currently not subject to noise from traffic.
- Potential delays to local and through traffic movements at tie-ins at existing roads (A40 roundabout and one location on the A483).
- Potential impact on the local environment. This includes the important landscape designations in the area, the ecology within them (including protected species), and the potential impacts from flooding on the Afon Tywi flood plain and parts of the local communities closely located to it.

Constraints

- Land ownerships and acquisition.
- Potentially the topography in general but in particular in the vicinity of Llandeilo railway station where a large retaining wall would be required.
- The local environment, in particular the important local landscape designations, the townscape, protected species, cultural heritage importance, and the potential impact on flooding associated with the provision of a new road within the Afon Tywi flood plain.

Interdependencies

- The acquisition of land necessary to allow this bypass option to be constructed.
- Any agreements that may be required from Network Rail to construct a new road close to the railway.

TC1A plus BE8, Llandeilo town centre improvements plus Eastern Bypass Option 8:

Option TC1A is the creation of a one-way system (in part) around the centre of the town. From the A40/Carmarthen Street junction to the George Street/Carmarthen Street junction, traffic would remain two-way as would New Road and much of Rhosmaen Street, apart from a section within the town centre. From the New Road/Crescent Road junction to the Carmarthen Street/Abbey Terrace junction, Rhosmaen Street would be one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout would be weight restricted. Permitted traffic going north would turn left into King Street, then into George Street (the current one-way system), then into Carmarthen Street/Carmarthen Road to join the A40 at the existing junction. Footways would be widened along Rhosmaen Street where it becomes one-way to enable safer use by pedestrians. There would be warning/diversion signs and weight limit signs within Ffairfach to stop HGVs from using Llandeilo Bridge to cross the Afon Tywi in a northbound direction.

Option BE8 is a new highway link that 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, to join the A483 immediately to the south of Llandeilo Bridge, where a junction would be constructed.

The tables below highlight the option’s impact on economic, environmental, and social and cultural criteria.

Table B-16 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Journey times would improve through Llandeilo due to an approximate 70% reduction in traffic flow. Through traffic will use the bypass, giving improved journey times. All through traffic will continue to pass through Ffairfach.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)
Journey time reliability changes	With through traffic using the bypass and local traffic using roads through Llandeilo, journey time reliability will be improved. The situation in Ffairfach will likely remain unchanged for all through traffic.	All road users (light and heavy vehicles)	Moderate Beneficial (+ +)

Economic Criteria	Assessment	Distribution	Significance
Transport costs	The Transport costs for this option are £8.0m, which include journey time efficiencies.	All road users	Not applicable
Accidents	This option presents -£1.9m of accident costs as a result of an increase of trips around the one-way streets.	All road users	Not applicable
Changes in productivity	Local businesses could benefit through a reduction in journey times for supplies and deliveries.	Local businesses	Slight Beneficial (+)
Local economy	With such a large reduction in traffic within Llandeilo town centre, visitor numbers would increase and local businesses benefit. Improved links to other employment centres. Slight disbenefit from a reduction in 'passing trade'.	Mainly businesses in Llandeilo town centre	Slight Beneficial (+)
Land	£0.852 million	Not applicable	Not applicable
Capital costs	£46.767 million (includes 44% Optimism Bias) £1.384 million (maintenance costs over 60-year period, OB included)	Not applicable	Not applicable
Revenue costs	None identified	Not applicable	Not applicable
Affordability (BCR)	BCR is 0.17. However, this option could be further enhanced to include a Ffairfach bypass with active travel/walking and cycling measures currently not part of this option and would still likely be within the current budget allocation of £50 million.	Not applicable	Not applicable

Table B-17 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Noise increases up to 5.9dB on the eastern side of Llandeilo, noise reductions of up to 5.9dB through Llandeilo.	E side of Llandeilo - increases. Existing A483 in Llandeilo - decreases	Neutral (0)
Local air quality	Reduced air quality on eastern side of Llandeilo and NW/west side of Ffairfach. Improved air quality through Llandeilo and Ffairfach. Option would have no significant impact.	E side of Llandeilo - reductions. Existing A483 - improvements	Moderate Beneficial (+ +)
Greenhouse Gas emissions	Construction stage - 7455 tonnes of CO ₂ , Operational stage - 0.3 tonnes/year of CO ₂ .	Globally	Slight Adverse (-)
Landscape (Historic) and Townscape	The Llandeilo area has a great historic landscape value. The bypass would impact upon this to a considerable extent as it would cross undeveloped flood plain and affect woodlands and the Afon Tywi. The tranquillity and character of the area will alter. The construction stage will also have considerable impact. Llandeilo town centre will benefit.	Llandeilo town centre, and surrounding landscape	Landscape character - Moderate Adverse (- -) Historic landscape - Large Adverse (- - -), Llandeilo town centre - Slight Beneficial (+)
Biodiversity	Impact on marshy grassland and species-rich/important hedgerows and woodland.	Areas to E and S of Llandeilo	Slight Adverse (-) to Moderate Adverse (- -)
Cultural heritage (excluding historic landscape)	Llandeilo Battlefield to the north - little or no impact. Impact on the setting of Llandeilo Bridge and railway bridge (both listed) during construction and operation, in particular the former due to proximity of option. Reduced impact in Llandeilo town centre.	Areas to E and S of Llandeilo and Llandeilo town centre	Neutral (0) to Moderate Beneficial (+ +)

Environmental Criteria	Assessment	Distribution	Significance
Water environment	Ffairfach is susceptible to changes in the flood level. The impact on flood levels have the potential to be mitigated at the detailed design stage. However, mitigation has not yet been costed for this option.	Ffairfach	Mitigated - Neutral (0) Unmitigated - Large Adverse (---)
Soils and Geology	There are a variety of ground conditions over the length of this option	Landscape areas through which option passes	Neutral (0)

Table B-18 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Reduced traffic flows in Llandeilo will encourage physical exercise due to improved environmental conditions. Shared use facilities on bypass.	Pedestrians/cyclists in Llandeilo and area.	Slight Beneficial (+)
Journey quality	There will be improvements for all users, through and local	All road users	Slight Beneficial (+)
Accidents	Reduced traffic flows in Llandeilo may reduce accidents. Bypass will be built to current/safe standards	All road users	Slight Beneficial (+)
Security	Little or no change	All road users	Neutral (0)
Access to employment	Lower traffic flows in Llandeilo will benefit access to local employment, bypass benefit longer access.	Employees	Slight Beneficial (+)
Access to services	Reduced traffic flows in Llandeilo will benefit access to local services, bypass will benefit longer distances to services.	All people accessing services	Slight Beneficial (+)

Social and Cultural Criteria	Assessment	Distribution	Significance
Severance	Reductions in severance in Llandeilo due to reduced traffic flow. Perceived severance with railway station. No change in Ffairfach. Land severance where bypass is located	Users of Llandeilo town centre, and the countryside	Town centre - Slight Beneficial (+), Rural - Slight Adverse (-)
Active travel	Reduction in traffic flows in Llandeilo will encourage more active travel/walking and cycling. Facilities would be provided on the bypass.	Pedestrians and cyclists	Slight Beneficial (+)
Option and non-use values	Not applicable	Not applicable	Not applicable

How Option BE8 solves the problems outlined in the WeITAG Stage One Report

Option BE8 would improve journey reliability due to it providing a direct, free-flow bypass route, which would avoid the pinch points within Llandeilo. Pedestrian safety within these two communities would be improved with less traffic on local roads and this may promote an increase in visitor numbers and in turn boost the local economy. This traffic flow reduction would include HGVs and school traffic with the former (where through traffic) using the bypass rather than the A483 Rhosmaen Street. This would be associated with de-trunking of the A483. Furthermore, emergency services response times (on call) should improve as traffic flows in Llandeilo town centre would be reduced (local access) or use can be made of the bypass offering free-flow conditions (wider access).

This bypass option would result in an improvement in air quality within the northern half of the AQMA, the whole of which extends throughout Llandeilo and Ffairfach along the A483.

This bypass option would contribute to the Welsh Government's Well-being Objectives, including promoting good health and well-being for everyone, building healthier communities and better environments, building resilient communities, culture and language, and delivering modern and connected infrastructure.

This bypass option would also help to deliver some of the long term outcomes set out in the Wales Transport Strategy such as improving access to healthcare, improving access to education, improving access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution (within Llandeilo), improve the impact of transport on the local environment, and improve the image of transport on Wales' heritage. These extensive benefits would be further enhanced with improvements to Llandeilo town centre, which is the only way to deliver some of the non-motorised benefits to the town.

This bypass option would also assist with the delivery of the long-term outcomes of the Wales Transport Strategy including improving connectivity within Wales and internationally and improve the efficient and sustainable movement of freight.

However, all the above benefits have to be balanced against the impact that this bypass option would have on the local environment, biodiversity, and heritage, which is not inconsiderable.

Key Risks

- Time to acquire land and the cost of land acquisition.
- Potential Public Inquiry.
- Topography and ground conditions – extensive investigation has been highlighted as being required to determine potential engineering solutions and their impacts, and more robust construction costs.
- Potential impact on flooding associated with work within the Afon Tywi flood plain.

Adverse Impacts

- Impacts during the construction period on people living and working close to the scheme. These include the eastern and southern sides of Llandeilo. This would include construction noise and visual impact of construction processes. However, these would be minimised through good working practices.
- Noise impacts during the operational stage for properties that are currently not subject to noise from traffic.
- Potential delays to local and through traffic movements at tie-ins at existing roads (A40 roundabout and one location on the A483).
- Potential impact on the local environment. This includes the important landscape designations in the area, the ecology within them (including protected species), and the potential impacts from flooding on the Afon Tywi flood plain and parts of the local communities that are located close to it.

Constraints

- Land ownerships and acquisition.
- Potentially the topography in general but in particular in the vicinity of Llandeilo railway station where a large retaining wall would be required.

- The local environment, in particular the important local landscape designations, the townscape, protected species, cultural heritage importance, and the potential impact on flooding associated with the provision of a new road within the Afon Tywi flood plain.

Interdependencies

- The acquisition of land necessary to allow this bypass option to be constructed.
- Any agreements that may be required from Network Rail to construct a new road close to the railway.

NB6, Town Centre improvements:

This option does not include a bypass. It represents a combination of three other options focused on town centre improvements (NB1, NB2, and NB3). These three would provide a traffic signal system along Rhosmaen Street to regulate traffic at the bottleneck within Llandeilo town centre. Further to this, the scheme also included the removal of parking along Rhosmaen Street and restricting HGV access throughout the main part of the day.

The tables below highlight the option’s impact on economic, environmental, and social and cultural criteria.

Table B-19 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	Regulating traffic flow with traffic signals and one-way operation may result in increased queuing and journey times. Diversionary routes for HGVs will be longer.	All road users (light and heavy vehicles)	Slight Adverse (-)
Journey time reliability changes	Traffic flows will be managed through traffic signals. Removal of on-street parking will benefit traffic flow although reliability of journey times for local journeys may not change due to no overall reduction in flow. Benefits to diverted HGV movements.	All road users (light and heavy vehicles)	Neutral (0)
Transport costs	The Transport costs for this option are -£72.5m, which include substantial journey time losses for the HGVs needing to reroute via Carmarthen rather than travel through Llandeilo.	Particularly HGVs	Not applicable

Economic Criteria	Assessment	Distribution	Significance
Accidents	This option presents no accident savings as there is no tangible change to the highway junction and link network.	All road users	Not applicable
Changes in productivity	Restrictions on HGV access may impact upon the timings of supplies and deliveries.	Local businesses	Slight Adverse (-)
Local economy	The urban environment will be improved, although traffic flows will only be reduced through HGV restrictions and may be an impediment to increasing visitor numbers. Businesses may incur additional costs through different serving arrangements. The local economy may not benefit.	Mainly businesses in Llandeilo town centre	Slight Adverse (-)
Land	None	Not applicable	Not applicable
Capital costs	£0.771 million (includes 44% Optimism Bias). No maintenance costs identified.	Not applicable	Not applicable
Revenue costs	None identified	Not applicable	Not applicable
Affordability (BCR)	BCR is -125.5 meaning that there is a substantial detriment to the economy as a result of rerouting the HGVs via Carmarthen. The option cost is less than £1m is well within the available project budget.	Not applicable	Not applicable

Table B-20 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	Reduced traffic flows in Llandeilo would reduce noise allowing characteristics associated with traffic signals may partly cancel this out. Increased noise due to alternative HGV delivery timings.	Llandeilo town centre (increases and decreases)	Neutral (0)
Local air quality	Traffic flow will be managed and HGV access will be restricted. Much traffic will continue to pass through the town. Queuing will occur at traffic signals. Footway improvements will benefit pedestrians. There will be air quality benefits and disbenefits.	Llandeilo town centre (increases and decreases)	Neutral (0)
Greenhouse Gas emissions	No overall change in traffic flow.	Globally	Neutral (0)
Landscape (Historic) and Townscape	Although HGV access will be restricted, all other traffic will continue passing through Llandeilo. New signage will be required. Little or no change to the townscape.	Llandeilo town and Conservation Area.	Neutral (0)
Biodiversity	No impact	Not applicable	Neutral (0)
Cultural heritage (excluding historic landscape)	Although HGV access will be restricted, all other traffic will continue passing through Llandeilo. New signage will be required. Little or no change to the local cultural heritage (listed buildings).	Buildings of importance in town centre	Neutral (0)
Water environment	No impact	Not applicable	Neutral (0)
Soils and Geology	No impact	Not applicable	Neutral (0)

Table B-21 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Widened footways, managed traffic flows and restrictions on HGV access may encourage increased levels of physical activity.	Pedestrians and cyclists	Slight Beneficial (+)
Journey quality	The management of traffic flow in the centre of Llandeilo and HGV access restrictions will improve journey quality for many people	All road users, and pedestrians	Slight Beneficial (+)
Accidents	Managed traffic flows and restrictions on HGV access together with pedestrian improvements may lead to a reduction in accidents.	All road users, and pedestrians	Slight Beneficial (+)
Security	Improved pedestrian facilities could be of benefit.	Pedestrians in Llandeilo	Slight Beneficial (+)
Access to employment	Although HGV access restrictions may be of some benefit to local and wider employment access, changes are likely to be minimal.	Employees	Neutral (0)
Access to services	Although HGV access restrictions may be of some benefit to local and wider access to services, changes are likely to be minimal.	All people accessing services	Neutral (0)
Severance	Restrictions on HGV access and the management of traffic flow in Llandeilo town centre through one-way movements will benefit severance. Pedestrians will find it easier to cross Rhosmaen Street and footway enhancements will help.	All users of Llandeilo town centre	Slight Beneficial (+)

Social and Cultural Criteria	Assessment	Distribution	Significance
Active travel	Footway enhancements, restrictions on HGV access and the management of traffic flow in Llandeilo town centre through one-way movements will help to encourage active travel/walking and cycling in the town centre. The removal of the ability to park on sections of Rhosmaen Street will also encourage more active travel/walking and cycling.	Pedestrians and cyclists in Llandeilo	Slight Beneficial (+)
Option and non-use values	Not applicable	Not applicable	Not applicable

How Option NB6 solves the problems outlined in the WeITAG Stage One Report

Option NB6 would improve journey time reliability due to it providing a direct, free-flow route, which would reduce the pinch points within Llandeilo. This would be achieved through managing traffic flow over part of Rhosmaen Street in the town centre. There would be improvements in pedestrian facilities, which would benefit safety. Fewer vehicles on part of Rhosmaen Street at any particular time, although same overall vehicle demand, during the main part of the day (including all HGVs) would improve conditions for, and the safety of, cyclists. The removal of on-street parking would also benefit traffic flow. This option would slightly benefit severance and slightly improve local air quality within the AQMA.

This option would also contribute to the Welsh Government’s Well-being Objectives, including promoting good health and well-being for everyone, building healthier communities and better environments, and building resilient communities, culture and language.

This option would further support some of the long term outcomes set out in the Wales Transport Strategy such as improving access to healthcare, improving access to education, improving access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution (within Llandeilo), improve the impact of transport on the local environment, and improve the image of transport on Wales’ heritage. However, this will be only in part as this option does not include any additional infrastructure to give more wide-ranging benefits, such as a bypass.

This option would have a significant adverse impact on freight traffic and on this basis it would have a negative effect on the delivery of the following long term outcomes of the Wales Transport Strategy those being improving connectivity within Wales and internationally, and improving the efficient, reliable and sustainable movement of freight.

Key Risks

- Additional delivery costs may be unacceptable to businesses that are affected by the impact of diversionary routes.

Adverse Impacts

- Adverse impact on the local economy as a result of an increase in time and fuel costs incurred by delivery companies.

Constraints

- Environmental considerations in relation to the townscape.

Interdependencies

- None identified.

NB7, Town Centre improvements:

This option does not include a bypass. It represents a combination of two other options focused on town centre improvements (NB1 and NB2). These three would provide a traffic signal system along Rhosmaen Street to regulate traffic at the bottleneck within Llandeilo town centre. Further to this, the scheme also included the removal of parking along Rhosmaen Street and Bridge Street.

The tables below highlight the option’s impact on economic, environmental, and social and cultural criteria.

Table B-22 – Options impact of economic criteria

Economic Criteria	Assessment	Distribution	Significance
Journey time changes	By removing on-street parking during peak hours there would be an improvement in journey times as there would be less need to be held at pinch points However, it is anticipated that traffic light signalling would result in increased queueing and increased journey times. Overall, this criterion scores slight adverse.	Road users (light and heavy vehicles) may overall benefit from the reduction in journey times with this option.	Slight Adverse (-)

Economic Criteria	Assessment	Distribution	Significance
Journey time reliability changes	It is anticipated that the proposed traffic light system may slightly increase journey times due to potential queuing however the reliability of journey times would increase as the signals would be managed. Further to this, NB7 may reduce journey times by removing on-street parking which would allow a free-flow of traffic along Rhosmaen Street. This should therefore reduce congestion which should improve journey time reliability within Llandeilo. Overall, this criterion scores slight adverse.	Some road users may dis-benefit from the potential queueing at the traffic lights in regard to journey time reliability changes with this option.	Slight Adverse (-)
Transport costs	Not Yet Assessed	Not Yet Assessed	Not Yet Assessed
Accidents	Not Yet Assessed	Not Yet Assessed	Not Yet Assessed
Changes in productivity	Not Yet Assessed	Not Yet Assessed	Not Yet Assessed

Economic Criteria	Assessment	Distribution	Significance
Local economy	<p>There may be an impact on local businesses by the removal of parking opportunities for people accessing local businesses and services. However, parking in the Crescent Road car park and on King Street would be unaffected. The largest impact on businesses is likely to be the restriction on deliveries to off peak periods. This would have to be a managed and would result in changes to the hours people would need to be in the business premises for some businesses.</p> <p>However, improvements to traffic flows would improve the visitor experience within the town due to the removal of obstructions on the pavements and improved visibility for people crossing the road.</p> <p>Installing traffic management controls along Rhosmaen Street should not have a negative effect on town centre businesses, though some will have to adapt the way in which they manage deliveries.</p>	No significant distributional effects.	Neutral (0)
Land	It is anticipated that all works could be undertaken within the existing highway boundary.	Not Yet Assessed	Not Yet Assessed
Capital costs	£0.771 million (includes 44% Optimism Bias). No maintenance costs identified.	Not applicable	Not applicable
Revenue costs	Not Yet Assessed	Not Yet Assessed	Not Yet Assessed
Affordability (BCR)	Not Yet Assessed	Not Yet Assessed	Not Yet Assessed

Table B-23 – Options impact of environmental criteria

Environmental Criteria	Assessment	Distribution	Significance
Noise	<p>Potential benefits to properties within Llandeilo during loading restriction periods, although potential disturbance from night-time deliveries. Overall, the significance is considered to be neutral when considered over 18-hour period.</p> <p>There are likely to be periodical reductions in noise associated with the general slowing of traffic on the approaches to traffic lights. There may also be localised increases at these locations resulting from accelerating traffic. Notwithstanding the above, WeITAG methodology requires appraisal of noise changes on the basis of 18-hour traffic flows (06:00 – 24:00), therefore, when considered over this duration it is likely that effects would be neutral. Overall, the significance is considered to be neutral when considered over 18-hour period.</p>	<p>Distributional impact assessment for Noise has been scoped out at Stage One as the level of detail required to assess the impacts for each option is not available.</p>	Neutral (0)
Local air quality	<p>Air quality has the potential to improve as traffic management would reduce congestion via the traffic lights although queuing at the lights would create localised hot spots. Only a small number of receptors are likely to be affected by this localised effect. The widening of the pavements would move vehicles further from sensitive receptors which is beneficial for air quality.</p>	<p>Distributional impact assessment for Air Quality has been scoped out at Stage One as the level of detail required to assess the impacts for each option is not available.</p>	Slight Beneficial (+)

Environmental Criteria	Assessment	Distribution	Significance
<p>Greenhouse Gas emissions</p>	<p>Unlike some other environmental impacts, the nature of GHG emissions means that the ultimate receptor is the global climate system. Climate change resulting from GHG emissions would lead to impacts felt globally, regardless of where the GHGs are emitted and therefore it is not possible to link the emissions from an individual project to a specific receptor. Therefore, any differentiation between options would be made on the basis of any change in volume of GHG emissions as a result of the scheme, rather than the presence of any local receptors.</p> <p>The majority of GHG emissions resulting from the scheme would be in the operational phase, resulting from traffic movements. The volume of GHG emissions would depend upon a number of factors including the number and type of vehicles using the routes, the average speed and impacts on congestion. To assess volumes of GHG emissions properly would require detailed traffic modelling which is not currently available. At this stage there are no significant factors apparent that can be used to meaningfully differentiate between options.</p>	<p>Globally</p>	<p>Neutral (0)</p>

Environmental Criteria	Assessment	Distribution	Significance
Landscape (Historic) and Townscape	Highway works in a Conservation Area could have an adverse effect on the townscape if done insensitively. If done sympathetically, with careful attention to detail, a one-way system removing bulky, noisy and air quality-reducing HGVs could benefit the overall townscape quality and experience by increasing available pedestrian and sitting space, improving air quality, reducing noise and providing a more open, less oppressive streetscape. This would be aided by removing on-street parking, easing traffic flow and reducing vehicles. Materials choices, street furniture, lighting and public realm opportunities and links would all need to be carefully addressed, respecting and working with the existing townscape character. If townscape improvements maintained this approach, their introduction would be beneficial.		Slight Beneficial (+)
Biodiversity	There are no effects on biodiversity from the installation of traffic lights, the removal of parking or HGV restrictions.		Neutral (0)

Environmental Criteria	Assessment	Distribution	Significance
Cultural heritage (excluding historic landscape)	Pavement widening and additional street furniture in the conservation area adjacent to numerous listed buildings could affect the setting of these heritage assets, although this could be mitigated through good design. Lessening of congestion in town centre would be beneficial to the setting of the conservation area and listed buildings.		Slight Beneficial (+)
Water environment	This option is not anticipated to affect the water environment.		Neutral (0)
Soils and Geology	There are no effects on soils and geology		Neutral (0)

Table B-24 – Options impact of social and cultural criteria

Social and Cultural Criteria	Assessment	Distribution	Significance
Physical activity	Physical activity levels may improve as there would be widened pavements along Rhosmaen Street which may encourage walkers/cyclists to travel through Llandeilo/Ffairfach and reduce conflict between NMUs and vehicles. As a result, this criterion scores slight beneficial.	Walkers/cyclists would benefit most for this option.	Slight Beneficial (+)

Social and Cultural Criteria	Assessment	Distribution	Significance
Journey quality	Journey quality may reduce as this option may result in queuing at the traffic lights within Llandeilo's town centre, however the improved NMU environment could improve journeys for pedestrians and cyclists. Further to this, by removing on-street parking, journey quality should improve as there would be less congestion and improved visibility for NMUs. As a result, this criterion scores neutral.	No significant distributional effects.	Neutral (0)
Accidents	NB7 proposes to widen pavements which should decrease conflict of NMUs with vehicles, therefore improving pedestrian safety and reducing the likeliness of accidents to occur. Further to this, NB7 also proposes to remove on-street parking along Rhosmaen Street which is likely to improve visibility of NMUs when crossing the road which may reduce the number of accidents. As a result, this criterion scores slight beneficial.	Road users including pedestrians and cyclists may benefit due to the restriction of HGVs using the A483.	Slight Beneficial (+)
Security	Security is not anticipated to be materially affected and therefore the impact upon this criterion has been determined as being neutral.	No significant distributional effects.	Neutral (0)
Access to employment	Access to employment would not experience a significant impact, resulting in the significance of neutral.	No significant distributional effects.	Neutral (0)
Access to services	Access to services would not experience a significant impact, resulting in the significance of neutral.	No significant distributional effects.	Neutral (0)

Social and Cultural Criteria	Assessment	Distribution	Significance
Severance	Not Yet Assessed	Not Yet Assessed	Not Yet Assessed
Active travel	The removal of parking along Rhosmaen Street and restricting loading times is likely to reduce severance on A483 as the NMU environment is likely to improve due to the reducing of idling vehicles and queuing. The inclusion of traffic lights may reduce severance as there would only be one-way traffic, which should result in increased crossing opportunities, however, where there is a green light there may be a greater stream of traffic that has been held at a red light. Overall, it has been determined that this criterion scores slight beneficial.	Some road users should benefit from improvements to severance due to the removal of parking along the A483.	Slight Beneficial (+)
Option and non-use values	Widened pavements and the reduction of parked vehicles along Rhosmaen Street may encourage walkers/cyclists to travel through Llandeilo/Ffairfach and reduce the conflict between NMUs and vehicles.	Walkers/cyclists are likely to benefit most from this proposed bypass option.	Slight Beneficial (+)

How Option NB7 solves the problems outlined in the WeITAG Stage One Report

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 appraisal has not 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 WeITAG Stage 2.

This option would contribute to the Welsh Government achieving its Well-being Objectives, including 'building healthier communities and better environments'.

This option would help deliver some of the long term outcomes set out in the Wales Transport Strategy: improve access to healthcare, improve access to education, improve access to shopping and leisure facilities, encouraging healthy lifestyles, improving actual and perceived safety of travel, improving access to employment, improving access to visitor attractions, reduce the contribution of transport to air pollution within Llandeilo, improve the impact of transport on the local environment and improve the impact of transport on Wales' heritage. However, it would be to a lesser extent than a bypass option with town centre improvements.

Key Risks

- Traffic light system may incur delays within Llandeilo town centre.
- May impact negatively on the local economy within Llandeilo town centre.
- May impact negatively on services within Llandeilo town Centre.

Adverse Impacts

- Potential adverse impacts on journey quality due to queueing at the traffic lights.

Constraints

- Environmental considerations including landscape and townscape.

Interdependencies

- None identified.

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