A483 Transport Study WelTAG Stage One

Welsh Government

Summary WelTAG One Report

B2231900-D4-5-002 | 0

2 October 2018

Transport Consultancy Framework Task 1/14

A483 Transport Study WelTAG Stage One

Project No:	B2331900
Document Title:	Summary WelTAG One Report
Document No.:	B2231900-D4-5-002
Revision:	0
Date:	2 October 2018
Client Name:	Welsh Government
Client No:	Transport Consultancy Framework Task 1/14
Project Manager:	Julie Hunt
Author:	Voirrey Costain
File Name:	P:\Transport\Projects\B2331900 Llandeilo Bypass\5. Project Work\A. Reporting\B2231900-D4-5-002 WelTAG Summary Report.docx

Jacobs U.K. Limited

Churchill House
Churchill Way
Cardiff, CF10 2HH
United Kingdom
T +44 (0)29 2035 3200
F +44 (0)29 2035 3222
www.jacobs.com

© Copyright 2018 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document history and status

Revision	Date	Description	By	Review	Approved
0	3/10/18	Summary Report for Client Issue	VC	TJ	JA

Contents

1. Introduction 1
1.1 Background 1
2. Methodology 2
3. Issues of Concern and Scheme Objectives 4
3.1 Key Issues 4
3.2 Scheme Objectives 6
4. Long-list Options 8
4.1 Environmental Appraisal 17
5. Recommendations 24
5.1 Short-list Options 24
5.2 Impacts to be considered at WelTAG Stage Two 31
5.3 Legislative requirements relevant to WelTAG Stage Two 31

1. Introduction

1.1 Background

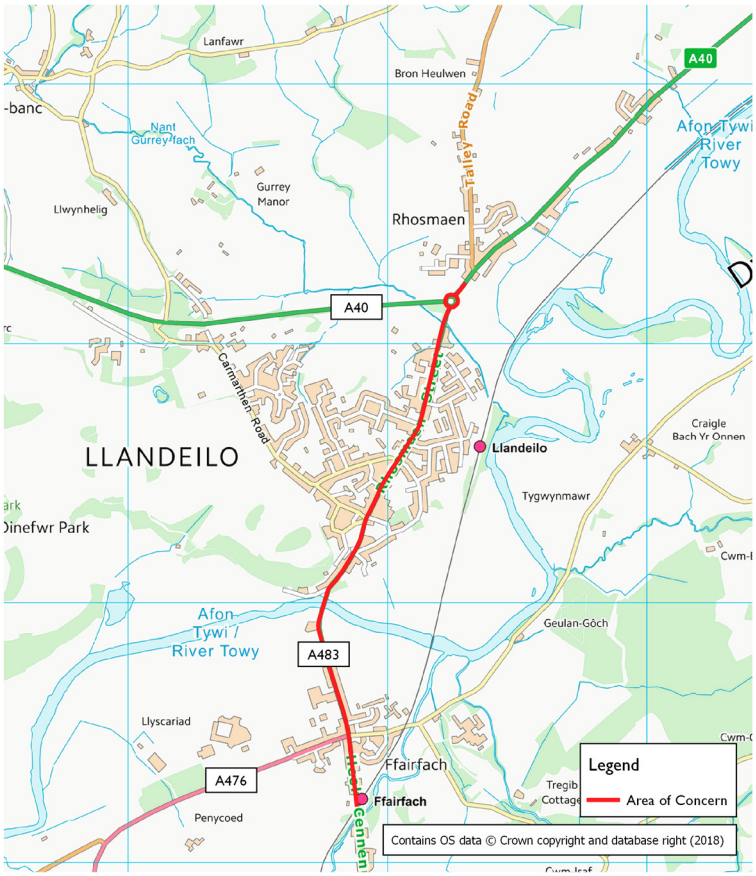
Jacobs UK Limited (Jacobs) and Mott Macdonald have been commissioned by the Welsh Government to undertake a WelTAG Stage One Assessment to identify the need for a transport improvement scheme to address several issues of concern on the current highway network within the settlements of Llandeilo and Ffairfach in Carmarthenshire.

1.2 Study Area

Figure 1-1 below illustrates the area of concern along the A483 within Llandeilo and Ffairfach, which is the focus for this Study. It comprises the A483 from its junction with the A40 to the north of Llandeilo through to the south of Ffairfach, beyond the junction with the A476. This is the same area of concern that has been studied previously.

This section of the A483 is situated at the heart of Llandeilo's town centre forming the high street (Rhosmaen Street). The A483 is a two-way street with parking and loading-only bays located in various locations along its length. Double-yellow lines are present where the road width narrows. There are numerous side streets running off the A483, many of which have poor visibility for traffic attempting to exit onto the A483. Footways are present throughout the majority of the A483 through Llandeilo and Ffairfach but are narrow in many places, forcing pedestrians to walk single file. To the north of Llandeilo, the A483 meets the A40 and to the south meets the A476 north of Ffairfach Railway Station.

Figure 1-1 – Study Area within Llandeilo and Ffairfach



2. Methodology

The identification of existing issues and scheme objectives, along with the identification of the long-list and short-list options has taken into account the five ways of working set out in the *Well-being of Future Generations (Wales) Act 2015*. Consideration of the Well-being of Future Generations Act has been considered throughout the study and reporting on this is clear in both the WelTAG Stage One: Strategic Options Report and the WelTAG Stage One: Impact Assessment Report. However, in order to draw out the detail of the assessment a separate Report of the Consideration of the Well-being of Future Generations (Wales) Act 2015 was also prepared and appended to the Strategic Options Report.

WelTAG is a five-stage process which takes a project from the identification of problems and project objectives through to post implementation reviews.

The first stage of the work undertaken as part of this assessment was the identification of the main transport issues affecting Llandeilo and Ffairfach. This was achieved through a series of workshops, public forum events and professional judgement based on desk-based information reviews and site visits.

Having identified the need for some form of intervention scheme, objectives were agreed for the project. These scheme objectives, along with relevant Well-being Objectives of public bodies, were considered in the assessment of options.

During the second workshop and both public forum events, stakeholders were asked to identify solutions that could address the areas of concern. These solutions, along with further solutions identified by the project team, were collated to form a long-list of options. These options were developed further based on the feedback at workshops, the public forums.

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

This SOC will therefore:

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

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

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

At this stage this information is considered to be at a high level based on site visits and desk-based research. Where an impact has not yet been assessed this is made clear in this report using the acronym NYA (Not Yet Assessed). A summary table of the impacts identified is provided showing a colour matrix comparison between

options. In accordance with WelTAG, the significance and scale of the impacts of each option will be presented using a seven-point scale, which is outlined in Table 2 1 below:

Table 2 1: WelTAG Seven-point Assessment Scale

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

3. Issues of Concern and Scheme Objectives

3.1 Key Issues

Table 3 1 sets out the issues of concern that were identified at the early stages of this transport study.

Table 3 1: Issues of Concern

Key Problem	Further Detail
Access to railway stations	There is a lack of pedestrian wayfinding information from Llandeilo Railway Station providing directions for visitors into Llandeilo Town Centre. In addition, the path down to the railway station is of poor quality and not suitable for less-mobile people and inaccessible to wheelchair users.
Closure of local amenities	There are concerns that the congestion in Llandeilo can depress visitor numbers within the town, which result in economic challenges for businesses.
Crossing Rhosmaen Street / A483 (severance)	The traffic flows through Llandeilo, especially HGVs at peak times, can make crossing the A483 along Rhosmaen Street hazardous to pedestrians. There is a zebra crossing within the town, as well as pedestrian lights, but there is a concern that people crossing the road at other locations are at risk from collisions with through traffic.
Crossing / visibility at Ffairfach roundabout	The pavements at the Ffairfach roundabout are narrow particularly where children walk to get between Llandeilo and Ysgol Bro Dinefwr. Visibility is considered to be poor at this location.
Emergency service response time (on-call fire service)	There were specific concerns regarding the length of time it can take on-call fire fighters to arrive at the fire station when there is congestion in Llandeilo and Ffairfach. The fire station is an on-call station, which means that fire fighters have to access the station using their own vehicles before they access the fire tenders, which have blue light priorities through congestion.
Future development	Concerns regarding how attractive Llandeilo is to future development and the ability of the local transport network to cope with any new development as set out in the Carmarthenshire Local Development Plan (there are land allocations within Llandeilo for future development).
Type of vehicle (HGV traffic)	HGVs, cattle trailer's and coaches appear to use the A483 for access to businesses, schools and other towns, such as Llandybïe and Ammanford, which can cause congestion due to the slow vehicle speeds caused by gradients and width constraints and the amount of space they take up whilst manoeuvring within Llandeilo and Ffairfach.
Journey reliability / resilience	It has been identified that traffic flow is seasonal reflecting the status of Llandeilo as a tourist town with the further attraction of the National Trust Park. Llandeilo therefore experiences an increase in vehicles during summer months to that of winter months.
Noise levels	Contributors to noise in the areas of Llandeilo and Ffairfach include the speed of which vehicles are driving at, the types of vehicle, flow of traffic and the proximity of the buildings to carriageways and lack of dispersion because of this.
Number of pedestrians	It is considered likely that the number of pedestrians accessing Llandeilo or Ffairfach on foot is reduced as a result of the traffic flows on the A483 and that improvements to the transport network would encourage active travel by pedestrians.
Parking	Vehicles parked on the street conflict with moving traffic resulting in localised congestion. Long-stay parking on the A483 occurs due to a lack of off-street residential parking for many properties in Llandeilo. A combination of unused pay and display car parking at Crescent Road and free car parking at King Street suggest that drivers may be unwilling to pay charges. There also appears to be a lack of enforcement. This results in additional on-street parking, especially in 'Loading Only' bays.

Key Problem	Further Detail
Pedestrian safety	Non-Motorised Users (NMUs) have to use narrow pavements throughout both Llandeilo and Ffairfach due to the width of space available. The proximity of HGVs to these narrow footways results in an intimidating experience for those walking or cycling. It is also difficult for pushchair/wheelchair users and people walking with children as the majority of footways would result in pedestrians having to walk in single-file. The quality and number of crossing points within the areas are frequently poor as many are not equipped with tactile paving/dropped kerbs.
Poor air quality	As a result of idling vehicles, stop/starting, manoeuvring around parked vehicles, hill starts (due to the gradient to the north of Llandeilo town centre) and the proximity of the buildings to the carriageway which reduces dispersion, pollution within Llandeilo town centre is problematic. An industrial estate is also located within Llandeilo where manufacturing businesses may contribute to pollution as well. The length of Rhosmaen Street in Llandeilo is currently identified as an Air Quality Management Area.
Poor cycling environment	When a site visit was conducted there were no cyclists observed in Llandeilo or Ffairfach arising from barriers to cycling such as the type of vehicles which use the A483 and the lack of cycling infrastructure in place, such as on-road or off-road cycleway. There were also few cycle racks within Llandeilo and Ffairfach, with only Llandeilo Railway Station providing three racks for cyclists to secure their bikes to.
Public transport	The quality of bus stops available in Llandeilo and Ffairfach are of a good standard, however the frequency of buses is sporadic. Llandeilo and Ffairfach Railway Stations offer Real Time Information displays and information, however the shelters which are provided are in need of maintenance and modernisation. This, as well as the lack of facilities and the infrequency of train services to surrounding villages and towns, may discourage residents and visitors to use public transport.
Road geometry and strategic purpose of A483	A number of junctions and sections of the A483 do not comply with current standards which may reduce the overall capacity and safety of the network. In particular, there are pinch points due to the proximity of buildings which result in localised congestion and narrow footways. Lack of visibility for drivers exiting junctions onto the A483 has been highlighted as an issue which could result in accidents with other vehicles or pedestrians. Further to this, there is limited rear access for retail properties which are located along the A483 and, therefore, servicing vehicles have to park and load on-street on the A483. The majority of residential properties within Llandeilo and Ffairfach do not have driveways and therefore have to park on the highway which adds to the congestion issues along the A483. The A483 has topographical constraints, particularly in regard to the incline on the A483 in both directions into Llandeilo Town Centre, which appears to reach a pinnacle at the zebra crossing. The River Towy, as well as the single-arch Grade II* listed road bridge (Llandeilo Bridge), add to the topographical constraints. The Heart of Wales railway line, which runs through Ffairfach village, skirts Llandeilo to the east of the town. Due to the historical nature of both Llandeilo and Ffairfach, each area is characterised by listed buildings and conservation areas which impact on the townscape. These impacts include reduced visibility, narrow streets, tight radii of corners and junctions, one-way streets, a listed bridge, a National Trust Park and parts of Llandeilo Town Centre are within a Conservation Area and the Brecon Beacons National Park boundary lies a short distance to the east. Servicing for businesses which line the A483 generally has to be carried out from the highway at the front of the properties as there is a lack of rear servicing provision, thus further contributing to the congestion issues in Llandeilo Town Centre. There is a lack of potential diversion routes which are suitable for HGVs around Llandeilo and Ffairfach.
Road safety	Safety concerns relate to the visibility of pedestrians attempting to cross the A483 and side streets which lead onto it. Furthering this, due to the historic street layout of Llandeilo and

Key Problem	Further Detail
	Ffairfach, visibility splays out of a number of key junctions onto the A483 are insufficient and are mainly blocked by historic buildings. There are also conflicting road signs in relation to speed limits which could cause confusion. Convex mirrors are not present in either settlement area which, if implemented, could prove to be beneficial in the future for drivers exiting junctions onto the A483.
School traffic	Ysgol Bro Dinewfr has a large catchment of children resulting in a significant number of coaches travelling to and from the school at the beginning and end of the school day. Many of these coaches are routed through Llandeilo and cause congestion due to the potential for them to cause a convoy. This traffic is also a hazard to children walking or cycling to the school from Llandeilo or Ffairfach. To a lesser extent there are problems with school traffic associated with the three primary schools in Llandeilo and Ffairfach. However, due to the small catchment to each of these schools the number of children coming to school by car is reduced and there are no coach movements required.
Traffic discouraging visitors (economic growth constraints)	The volume of traffic, especially the number of HGVs travelling on the A483 through Llandeilo, detract from the attractiveness of the town and its streetscape. There are concerns that this is discouraging visitors from staying in the town to shop or access services.
Traffic speed	There are general observations that drivers do not always abide to speed limits when looking to manoeuvre around obstructions or to avoid congestion. This is also perceived to occur at approach arms to the A483/A40 roundabout. Additionally, problems with vehicles driving at inappropriate speeds while passing parked vehicles have been highlighted, which could result in accidents. Conflicting/confusing speed limit signs could also result in drivers exceeding speed limits.
Vibration levels	The traffic flows, particularly the HGV movements, cause vibration through Llandeilo. While vibration levels dissipate quickly there are concerns regarding the effect this is having on the listed buildings that are alongside the A483 along Rhosmaen Street.

3.2 Scheme Objectives

Scheme objectives were identified as a result of the workshops and public forum. These scheme objectives will be considered alongside the Well-being Objectives of relevant public bodies and the wider transport objectives set out in the Wales Transport Strategy.

The scheme objectives are:

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 and Ffairfach;
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.

Further detail regarding the Well-being Objectives of relevant public bodies is set out in the report on the Consideration of the Well-being of Future Generations (Wales) Act 2015.

4. Long-list Options

Detailed descriptions of the long-list options are provided in the WelTAG Stage One: Strategic Outline Case Report. A summary of these options is set out below.

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	Do-Minimum The Do-Minimum option does not include any improvements to the current scenario of the A483 within Llandeilo and Ffairfach	✓	×	×	×	×	×	×	×
TC1A	**One Way System and a Bypass Option (A)** Town Centre routing restrictions will be installed. Two-way traffic will remain from the junction of the A40 and junction of New Road/Carmarthen Street. New Road to remain open to two-way traffic. Rhosmaen Street from New Road/Crescent Road junction to Carmarthen Street and Abbey Terrace changed to one-way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout is weight restricted. Permitted traffic going north would turn left into King Street then George Street, then onto Carmarthen Street/Carmarthen Road to join the A40 at the existing junction with a potential roundabout. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi.	✓	✓	✓	Partial	Partial	✓	×	×
TC1B	**One Way System and a Bypass Option (B)** Two-way traffic from the junction of A40 and junction of New Road/Carmarthen Street. New Road to remain open to two-way traffic. Rhosmaen Street from New Road/Crescent Road junction to Carmarthen Street and Abbey Terrace is one way southbound but open to all vehicles. Rhosmaen Street between King Street and Ffairfach roundabout is weight restricted. Permitted traffic going north would turn left into Carmarthen Street then Carmarthen Road to join the A40 at the existing junction with a possible roundabout. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians. There will be warning/diversion signs and weight limited signs within Ffairfach to stop HGVs from using Llandeilo Bridge crossing the Afon Tywi.	✓	✓	✓	Partial	Partial	✓	×	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
TC1C	**One Way System and a Bypass Option (C)** One-way system using Crescent Road for southbound traffic and Rhosmaen Street for northbound traffic. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.	✓	✓	✓	Partial	Partial	✓	×	×
TC2	**Traffic Light System and a Bypass Option** Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.	✓	×	×	×	×	✓	×	×
NB1	**Traffic Lights** Traffic lights would be installed on Rhosmaen Street to enable one-way traffic along the narrowest section of the road. Pavements to be widened within the one-way section of Rhosmaen Street to enable safer use by pedestrians.	Partial	×	×	✓	✓	×	Partial	×
NB2	**Removal of Parking** Removal of parking along Rhosmaen Street enforced through double yellow lines. Restrictions of 'Loading Only' from 18:00 to 07:00, and then from 10:00 – 15:00 with no parking between 08:00 – 18:00 will be enforced.	Partial	×	×	✓	✓	×	Partial	×
NB3	**HGV Restriction (legal sanction)** Restriction on HGVs through Llandeilo between 08:00 – 20:00, all HGVs to be routed along the A40 to Carmarthen which will be enforced through traffic cameras. This restriction will apply from the A40 roundabout within Rhosmaen to the roundabout within Ffairfach.	×	✓	✓	✓	✓	×	✓	×
NB4	**HGV Restriction with permit/emissions charge** Restriction on HGVs with the exception of businesses within a certain distance which would be entitled to a free permit. The permit for other businesses will be priced at a cost that makes it more economically viable to go via Carmarthen rather than through Llandeilo and/or Ffairfach. This option would be a similar scheme to congestion charge/emission zone areas.	×	✓	✓	×	✓	×	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
NB5	**HGV Restriction (legal sanction) plus one-way system** One-way system where there would be limited access for HGVs travelling southbound from the A40 onto the A483, with access permitted for deliveries only. Rhosmaen Street would be one-way southbound and directed to King Street onto Carmarthen Road and back onto the A40. HGVs would be restricted from crossing Llandeilo Bridge crossing the Afon Tywi in a northbound direction and the A483 will be de-trunked**.**	×	✓	✓	×	✓	×	✓	×
NB6	**Combined No-bypass Option (with HGV restriction)** This option is a package of works representing a combination of NB1, NB2 and NB3.	×	✓	✓	×	✓	×	✓	×
NB7	**Combined No-bypass Option (No HGV restriction)** This option is a package of works representing a combination of NB1 and NB2.	✓	✓	✓	×	✓	×	✓	×
BE1A	**Eastern Bypass Option 1 (A)** Eastern Bypass Option 1 (A) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west, crossing the Afon Tywi then joins the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge. The route then heads further west and joins the A476 to the east of Ysgol Bro Dinefwr. A roundabout is proposed to be constructed on the A476 where the route then heads south east and joins the A483 to the south of Heol Pen Storom.	✓	Partial	Partial	✓	✓	✓	✓	✓
BE1B	**Eastern Bypass Option 1 (B)** Eastern Bypass Option 1 (B) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line, heading west to join the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge.	✓	✓	✓	✓	✓	✓	✓	✓
BE1C	**Eastern Bypass Option 1 (C)** Eastern Bypass Option 1 (C) leaves the A40 at the A40/A483 roundabout, heading south east around the boundary of Llandeilo, to the west of the railway line and follows the railway line. The route then heads west to join the A483 to the south of Llandeilo Bridge. A	✓	✓	✓	✓	✓	✓	✓	✓

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

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	the former secondary school, linking to the A483 to the north of Heol Pen Storum. This option would require a link to the A476.								
BE3C	**Eastern Bypass Option 3 (C)** Eastern Bypass Option 3 (C) leaves the A40 at the existing A40/A483 roundabout, heading south east towards Bethlehem Road, crossing the Afon Tywi and railway using a single structure. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE3D	**Eastern Bypass Option 3 (D)** Eastern Bypass Option 3 (D) leaves the A40 at the existing A40/A483 roundabout, heading south east towards Bethlehem Road, crossing the Afon Tywi and railway using a single structure. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road towards Ffairfach, leaves Bethlehem Road to the west of the former secondary school to join the A483 to the north of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE4A	**Mid Rhosmaen Eastern Bypass Option 4 (A)** Mid Rhosmaen Eastern Bypass Option 4 (A) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-east towards Bethlehem Road, crossing the railway and Afon Tywi. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE4B	**Mid Rhosmaen Eastern Bypass Option 4 (B)** Mid Rhosmaen Eastern Bypass Option 4 (B) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-east towards Bethlehem Road, crossing the railway and Afon Tywi. The route then links to Bethlehem Road near Craigle Bach Yr Onnen, follows Bethlehem Road west to the	✓	✓	✓	✓	✓	✓	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
	edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.								
BE4C	**Mid Rhosmaen Eastern Bypass Option 4 (C)** Mid Rhosmaen Eastern Bypass Option 4 (C) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-west towards Llandeilo Railway Station before crossing the railway and Afon Tywi using a single structure. The route then links to Bethlehem Road to the south of Craigle Bach Yr Onnen, follows Bethlehem Road west to the edge of the Woodland Trust woodland then heads south avoiding the former secondary school playing fields so far as possible, before linking to the A483 to the south of Heol Pen Storum. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE4D	**Mid Rhosmaen Eastern Bypass Option 4 (D)** Mid Rhosmaen Eastern Bypass Option 4 (D) leaves the A40 to the north-east of the A40/A483 roundabout using a new junction by the Plough Inn Hotel. The route then heads south-west towards Llandeilo Railway Station before crossing the railway and Afon Tywi using a single structure. The route then links to Bethlehem Road to the south of Craigle Bach Yr Onnen, follows Bethlehem Road towards Ffairfach, leaves Bethlehem Road to the west of the former secondary school, to join the A483 to the north of Heol Pen Storom. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×
BE5A	**Far Eastern Route 5 (A)** Far Eastern Route 5 (A) leaves the A40 to the east of Rhosmaen, crosses the railway line and Afon Tywi at a single crossing point, and crosses the estuary to meet Bethlehem Road near to Pentre Parr Lodge. Bethlehem Road will be upgraded towards Ffairfach and the route will leave Bethlehem Road near Geulan Goch and link to A483 to the south of residential properties to avoid Heol Pen Storom. The route would avoid playing fields associated with the former secondary school. This option would require a link to the A476.	✓	✓	✓	✓	✓	✓	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
BE5B	**Far Eastern Route 5 (B)** Far Eastern Route 5 (B) leaves the A40 to the east of Rhosmaen, crosses the railway line and Afon Tywi at a single crossing point and crosses the river to meet Bethlehem Road near to Pentre Parr Lodge. Bethlehem Road will be upgraded towards Ffairfach and the route will leave Bethlehem Road to the west of the former secondary school (to the east of the railway line) and wraps to the east of residential properties along Heol Cennen linking to A483 before Heol Pen Storom.	✓	✓	✓	✓	✓	✓	✓	×
BE6	**Option formerly known as the Refined Protected Route** This option leaves the A40 at the A40/A483 roundabout, heading south-east around the boundary of Llandeilo, to the west of the railway line and follows the railway line, before passing closer to the escarpment than options BE1A – BE1D. It joins the A483 to the south of Llandeilo Bridge. A proposed roundabout would be constructed on the A483 to the south of Llandeilo Bridge.	✓	✓	✓	✓	✓	✓	✓	×
ARL1	**A Road Link (1)** ARL1 connects the A476 and A483 without the need to pass through Ffairfach. The route starts at the junction between the B4300 and A476 and follows the slight valley, crossing the railway line at approximate NGR SN625 205 then joins the A483 south of Caemen Cottage.	✓	×	×	✓	✓	✓	×	×
ARL2	**A Road Link (2)** ARL2 connects the A476 to the A487 without the need to pass through Ffairfach. The route would leave the A476 south of Cwm at approximate NGR BN610 189 crossing the gorge over the railway line and links to A487 at approximately NRG SN 614 191.	✓	×	✓	✓	✓	✓	×	×
BW1	**Western Bypass Option 1** Western Bypass Option 1 leaves the A40 at the existing junction with Carmarthen Road at a new junction. The route then follows Carmarthen Road south to the entrance to the National Trust Dinefwr property and follows the slight dip between mounds south-west of the junction of the B4300 and A476.	✓	✓	✓	✓	✓	×	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
BW2	**Western Bypass Option 2** Western Bypass Option 2 leaves the A40 at the existing junction with Carmarthen Road at a new junction. The route then follows an alignment to the west of Carmarthen Road south of the entrance to National Trust Dinefwr property, then runs to the west of residential properties on Carmarthen Road, Carmarthen Street, George Street, Bank Terrace and Bridge Street before crossing the Afon Tywi to the west of Llandeilo Bridge. The route then wraps west along the route of the Afon Tywi, north of Ysgol Bro Dinefwr and links to the A476 at the existing junction with the B4300.	✓	✓	×	✓	✓	×	✓	×
BW3A	**Western Bypass Option 3 (A)** Western Bypass Option 3 (A) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west in a southern direction to the entrance to the National Trust Dinefwr property and follows the 'protected route' to the east of Ysgol Bro Dinefwr and links to the A483 within Ffairfach to the south of Heol Pen Storom.	✓	✓	Partial	✓	✓	×	✓	×
BW3B	**Western Bypass Option 3 (B)** Western Bypass Option 3 (B) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west in a southern direction to the entrance to the National Trust Dinefwr property and follows the 'protected route' to the east of Ysgol Bro Dinefwr.	✓	×	×	✓	Partial	×	✓	×
BW3C	**Western Bypass Option 3 (C)** Western Bypass Option 3 (C) leaves the A40 at the existing junction with Carmarthen Road at a new roundabout. The route then follows Carmarthen Road to the west, in a southern direction to the entrance to the National Trust Dinefwr property then passes to the north of Ysgol Bro Dinefwr and links to the junction of the B4300 and A476.	✓	✓	✓	✓	✓	×	✓	×
BW4	**West of Dinefwr (East)** West of Dinefwr Bypass Option (East) leaves the A40 prior to King's Lodge, wraps around the western boundary of National Trust Dinefwr Park property, links to A476 at the junction of the A476 and B4300.	✓	Partial	Partial	✓	Partial	×	✓	×

Option Ref	Option Name and Description	Compliance with Scheme Objectives							
		1	2	3	4	5	6	7	8
BW5A	**West of Dinefwr (A)** West of Dinefwr Bypass Option (A) leaves the A40 near Lletty Cottage and heads south along local roads which will be upgraded between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi and links to the B4300. The route also involves an upgrade of the B4300 and the existing junction with the A476, proposed to be a roundabout.	✓	×	×	✓	×	×	✓	×
BW5B	**West of Dinefwr (B)** West of Dinefwr Bypass Option (B) leaves the A40 near Lletty Cottage and heads south along local roads which will be upgraded between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi estuary and links to the B4300. The route continues south to link to the A476 at approximate NGR SN 613200.	✓	×	×	✓	×	×	✓	×
BW5C	**West of Dinefwr (C)** West of Dinefwr Bypass Option (C) leaves the A40 near Lletty Cottage, heads south, including an upgrade of local roads between Rhiw-Yr-Adar and Cilsan. The route then crosses the Afon Tywi estuary, links to the B4300 and continues south to link to the A476 at approximate NGR SN 610198 (wrapping around the boundary of Turner's wood).	✓	×	×	✓	×	×	✓	×
BW6	**Far West Route via Dryslwyn** Far West Route via Dryslwyn is located approximately 6km west of Llandeilo. The route leaves the A40 at the junction with the B4297, near Cross Inn Cottage. The B4297 will be upgraded to an A road standard single carriageway (7.3m) which passes through Felindre, Dryslwyn, Penrhiwgoch and Maesybont. The route will then connect into A476 at Castyll-y-rhingyll/The Gate to the north of Cross Hands. It should be noted that Active Travel provision for this option not specified at this point.	✓	×	×	×	×	×	×	×
BT1	**Tunnel** The tunnel is proposed from the A40 to A476 under Dinefwr Park to the east of King's Lodge.	✓	✓	✓	✓	✓	✓	✓	✓

4.1 Environmental Appraisal

Each of the long-list options were considered against the key economic, environmental, social and cultural factors, with details of the assessment included in the Impact Assessment Report and a summary of the findings set out in Table 4 1. The assessment of each of the long-list options have also been considered against the extent to which they could contribute to the Well-being Goals along with relevant Well-being Objectives.

Table 4 1: Summary of the WelTAG Assessment.

Option Name	Economy			Environment								Social and Cultural							
	Journey time	Journey time reliability	Local Economy	Noise	Local Air Quality	Greenhouse Gas Emissions	Landscape and Townscape	Biodiversity	Cultural Heritage	Water Environment	Soils and Geology	Physical Activity	Journey Quality	Accidents	Security	Access to Employment	Access to Services	Severance	Active Travel
Do Minimum	-	-	-	-	-	0	-	0	-	0	0	-	-	-	0	-	-	-	-
TC1A One Way System and a Bypass Option (A)	+	++	+	0	++	0	+	0	+	0	0	++	++	++	0	0	0	+	+
TC1B One Way System and a Bypass Option (B)	+	++	+	0	++	0	+	0	+	0	0	++	++	++	0	0	0	0	+
One Way System and a Bypass Option (C)	+	++	+	0	++	0	+	0	+	0	0	++	++	++	0	0	0	0	+
Traffic Light System and a Bypass Option	-	+	+	0	++	0	+	0	+	0	0	++	-	++	0	0	0	0	+

Option Name	Economy			Environment								Social and Cultural							
	Journey time	Journey time reliability	Local Economy	Noise	Local Air Quality	Greenhouse Gas Emissions	Landscape and Townscape	Biodiversity	Cultural Heritage	Water Environment	Soils and Geology	Physical Activity	Journey Quality	Accidents	Security	Access to Employment	Access to Services	Severance	Active Travel
Traffic Lights	-	+	+	0	+	0	+	0	+	0	0	+	-	+	0	0	0	+	+
Removal of Parking	+	+	-	0	+	0	+	0	+	0	0	+	+	+	0	0	0	+	+
HGV Restriction (legal sanction)	-	-	0	0	++	0	+	0	+	0	0	+	0	+	0	0	0	+	+
HGV Restriction with permit/emissio ns charge	-	-	0	0	++	0	+	0	+	0	0	+	0	+	0	0	0	+	+
HGV Restriction (legal sanction) plus one-way system	-	-	0	0	++	0	+	0	+	0	0	+	0	+	0	0	0	+	+
Combined No-bypass Option (with HGV restriction)	-	-	0	0	+	0	+	0	+	0	0	+	0	+	0	0	0	+	+
Combined No-bypass Option	-	-	0	0	+	0	+	0	+	0	0	+	0	+	0	0	0	+	+

Option Name	Economy			Environment								Social and Cultural							
	Journey time	Journey time reliability	Local Economy	Noise	Local Air Quality	Greenhouse Gas Emissions	Landscape and Townscape	Biodiversity	Cultural Heritage	Water Environment	Soils and Geology	Physical Activity	Journey Quality	Accidents	Security	Access to Employment	Access to Services	Severance	Active Travel
(No HGV restriction)																			
Eastern Bypass Option 1 (A)	++	++	+	0	++	0	---	---	--	---	0	+	+	+	0	+	+	--	+
Eastern Bypass Option 1 (B)	++	++	+	0	+	0	---	---	--	---	0	+	+	+	0	+	+	-	+
Eastern Bypass Option 1 (C)	+	+	+	0	+	0	---	---	--	---	0	+	+	+	0	+	+	-	+
Eastern Bypass Option 1 (D)	+	+	+	0	++	0	---	---	--	---	0	+	+	+	0	+	+	-	+
Eastern Bypass Option 2	+++	+	+	0	+++	0	---	---	--	---	0	+	++	+	0	+	+	++	+
Eastern Bypass Option 3 (A)	++	++	+	0	+++	0	---	---	--	---	0	+	++	+	0	+	+	++	+

Option Name	Economy			Environment								Social and Cultural							
	Journey time	Journey time reliability	Local Economy	Noise	Local Air Quality	Greenhouse Gas Emissions	Landscape and Townscape	Biodiversity	Cultural Heritage	Water Environment	Soils and Geology	Physical Activity	Journey Quality	Accidents	Security	Access to Employment	Access to Services	Severance	Active Travel
Eastern Bypass Option 3 (B)	+++	++	+	0	+++	0	---	---	--	---	0	+	++	+	0	+	+	+	+++
Eastern Bypass Option 3 (C)	+	++	+	+	+++	0	---	---	--	--	0	+	++	+	0	+	+	+++	+
Eastern Bypass Option 3 (D)	++	++	+	0	+++	0	---	---	--	--	0	+	++	+	0	+	+	++	+
Mid Rhosmaen Eastern Bypass Option 4 (A)	+	++	+	+	+++	0	---	---	--	--	0	+	++	+	0	+	+	+++	+
Mid Rhosmaen Eastern Bypass Option 4 (B)	++	++	+	+	+++	0	---	---	--	--	0	+	++	+	0	+	+	++	+
Mid Rhosmaen Eastern Bypass Option 4 (C)	+	++	+	+	+++	0	---	---	--	--	0	+	++	+	0	+	+	+++	+
Mid Rhosmaen Eastern	++	++	+	0	+++	0	---	---	--	--	0	+	++	+	0	+	+	++	+

Option Name	Economy			Environment								Social and Cultural							
	Journey time	Journey time reliability	Local Economy	Noise	Local Air Quality	Greenhouse Gas Emissions	Landscape and Townscape	Biodiversity	Cultural Heritage	Water Environment	Soils and Geology	Physical Activity	Journey Quality	Accidents	Security	Access to Employment	Access to Services	Severance	Active Travel
Bypass Option 4 (D)																			
Far Eastern Route 5 (A)	+	++	+	0	+++	0	---	---	----	--	0	+	++	+	0	+	+	+++	+
Far Eastern Route 5 (B)	+	++	+	0	+++	0	---	---	--	--	0	+	++	+	0	+	+	++	+
Option formerly known as the Refined Protected Route	+	++	+	0	++	0	---	---	--	---	0	+	++	+	0	+	+	++	+
A Road Link (1)	NYA	NYA	NYA	0	++	0	--	--	-	-	0	+	+	+	0	0	0	+	+
A Road Link (2)	NYA	NYA	NYA	0	++	0	--	--	-	-	0	0	NYA	+	0	0	0	+	0
Western Bypass Option 1	+	+	0	0	++	0	---	---	---	--	0	+	++	+	0	0	0	+	+
Western Bypass Option 2	+	+	-	0	++	0	---	---	---	--	0	+	+++	+	0	0	0	+	+

Option Name	Economy			Environment								Social and Cultural							
	Journey time	Journey time reliability	Local Economy	Noise	Local Air Quality	Greenhouse Gas Emissions	Landscape and Townscape	Biodiversity	Cultural Heritage	Water Environment	Soils and Geology	Physical Activity	Journey Quality	Accidents	Security	Access to Employment	Access to Services	Severance	Active Travel
Western Bypass Option 3 (A)	0	+	-	-	+++	0	---	---	---	--	0	+	++	+	0	0	0	--	+
Western Bypass Option 3 (B)	+	+	-	-	++	0	---	---	---	--	0	+	+	+	0	0	0	--	+
Western Bypass Option 3 (C)	+	+	-	0	++	0	---	---	---	--	0	+	++	+	0	0	0	+	+
West of Dinefwr (East)	+	+	+	+	++	0	---	---	---	--	0	+	+	+	0	+	+	+	+
West of Dinefwr (A)	-	+	0	+	++	0	---	---	--	--	0	0	0	+	0	+	+	0	0
West of Dinefwr (B)	-	+	0	0	++	0	---	---	--	--	0	0	+	+	0	+	+	+	+
West of Dinefwr (C)	-	+	0	0	++	0	---	---	--	--	0	+	+	+	0	+	+	+	+
Far West Route via Dryslwyn	---	0	0	-	++	0	-	---	-	--	0	0	0	0	0	0	0	0	0
Tunnel	+	++	+	+	++	0	-	-	0	--	0	+	++	+	0	+	+	++	+

5. Recommendations

5.1 Shortlist Options

The 40 long-listed options were appraised through the WelTAG Stage One process against the following criteria:

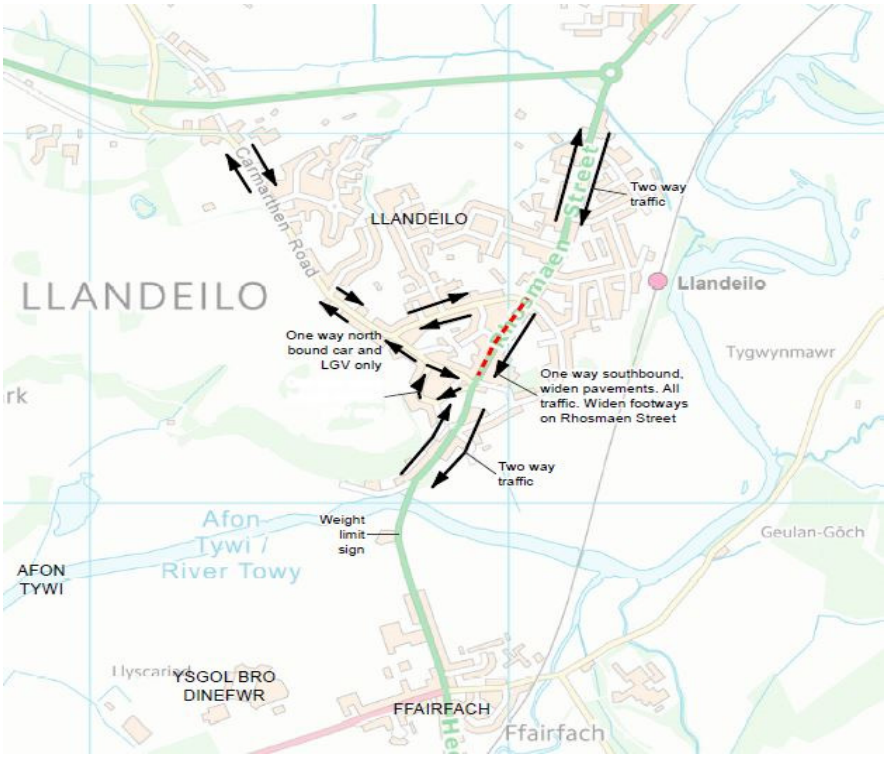
- Their ability to prevent, or solve the problem now and in the future;
- Their ability to meet the scheme specific objectives and the Welsh Government Well-being Objectives;
- Their short and longer-term impacts;
- Their deliverability; and
- Their robustness to uncertainty and potential to drive long-lasting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

On the basis of the appraisal, the highest scoring options are recommended for further consideration at WelTAG Stage Two.

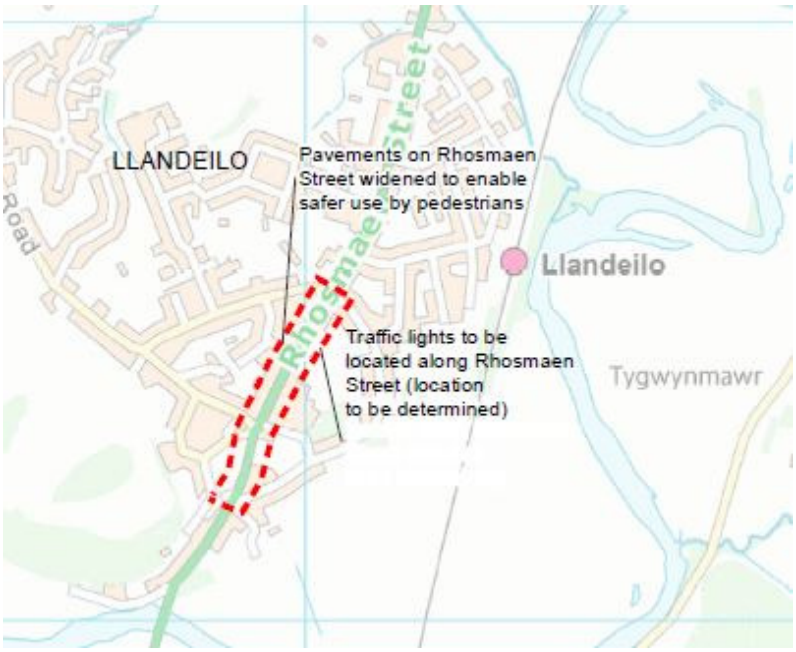
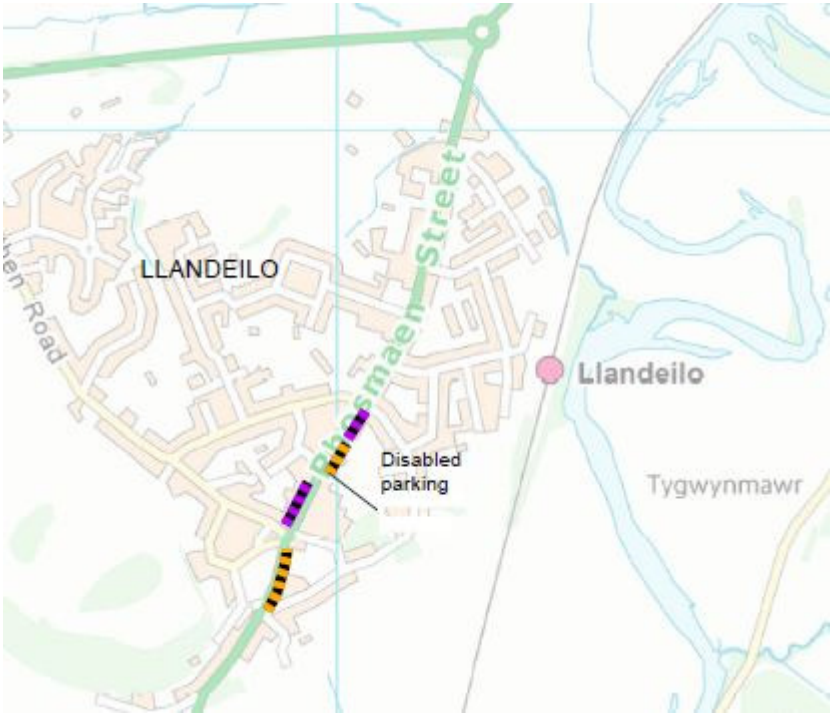
The shortlist options are set out in Table 5 1:

Table 5 1: Shortlisted Options

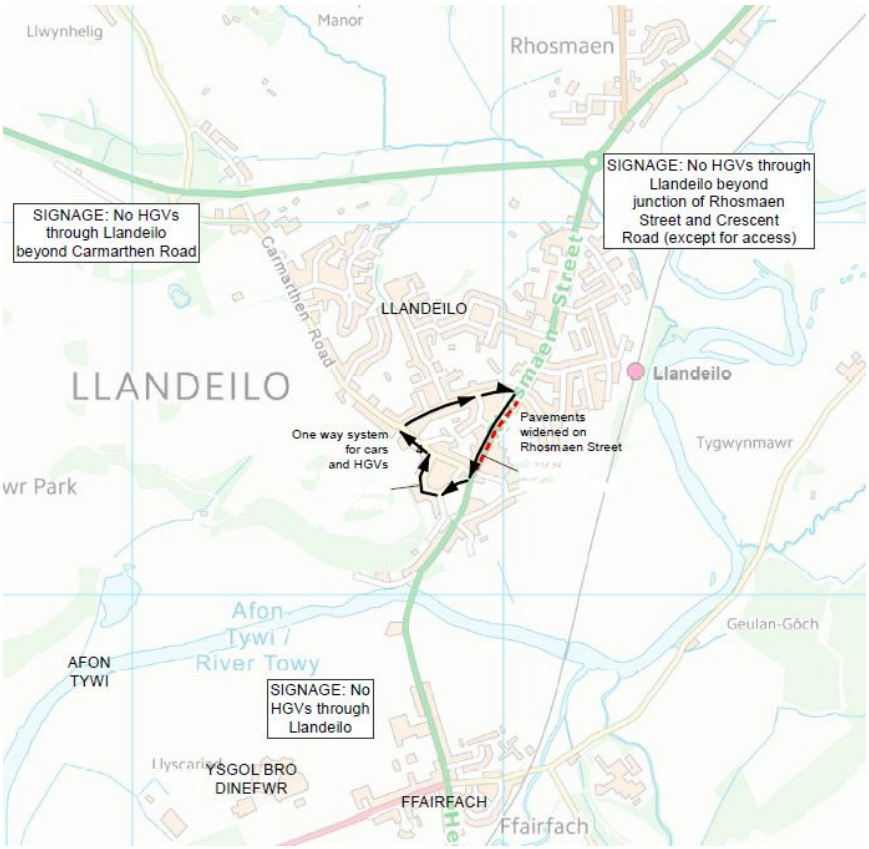
Option Reference	Option Name & Location
TC1A	One-way System and a Bypass Option (A)



Contains public sector information licensed under the Open Government Licence v3.0

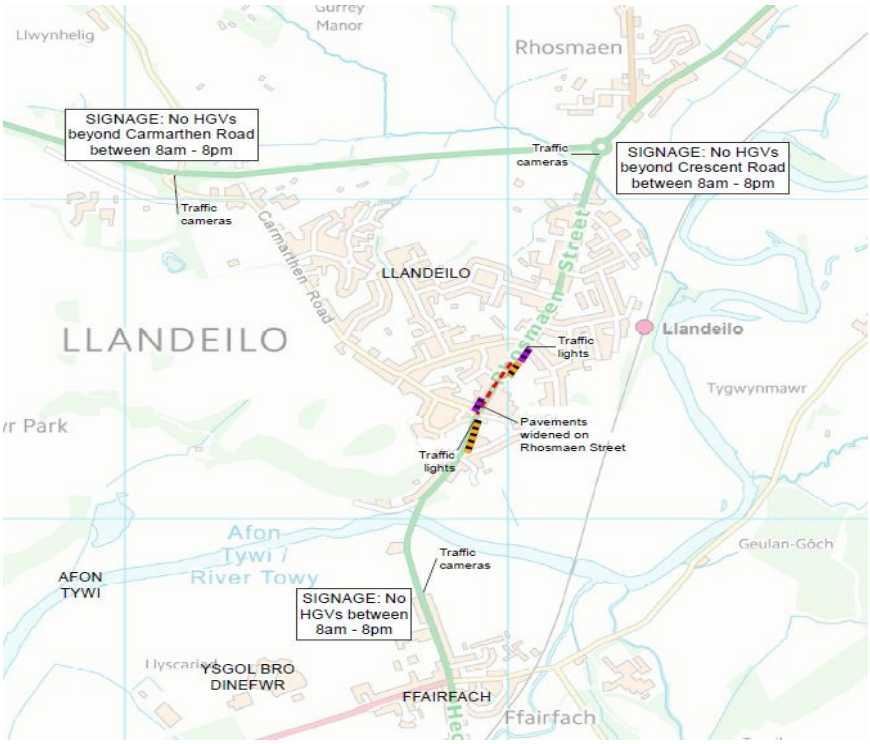
Option Reference	Option Name & Location
NB1	Traffic Lights  Contains public sector information licensed under the Open Government Licence v3.0
NB2	Removal of Parking  Contains public sector information licensed under the Open Government Licence v3.0

Option Reference	Option Name & Location
NB5	HGV Restriction (legal sanction) plus one-way system



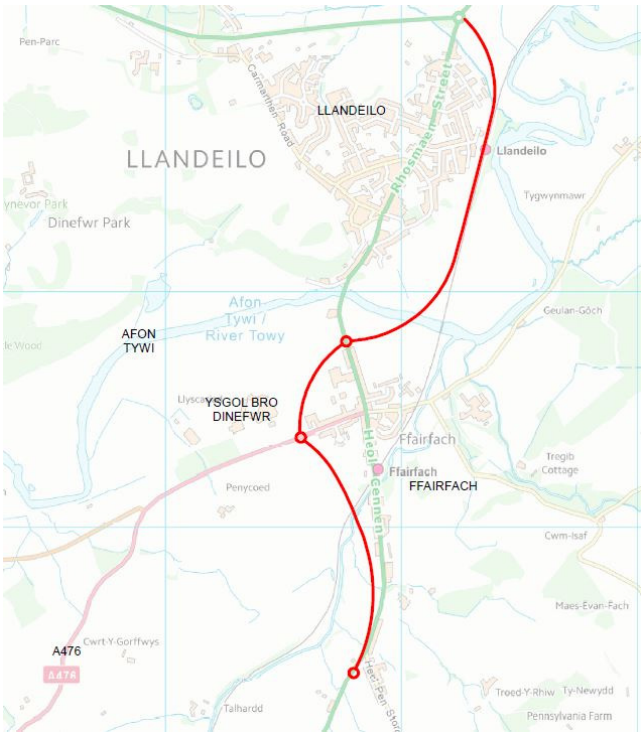
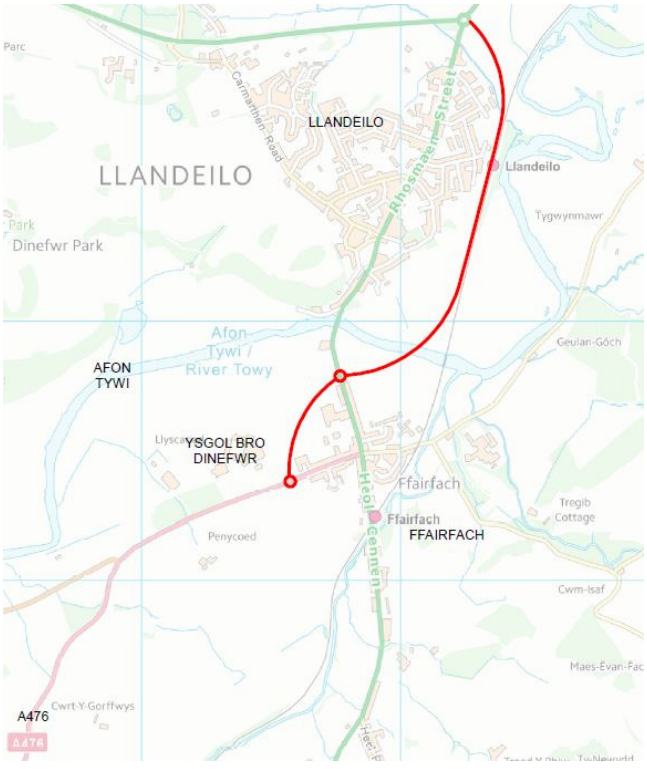
Contains public sector information licensed under the Open Government Licence v3.0

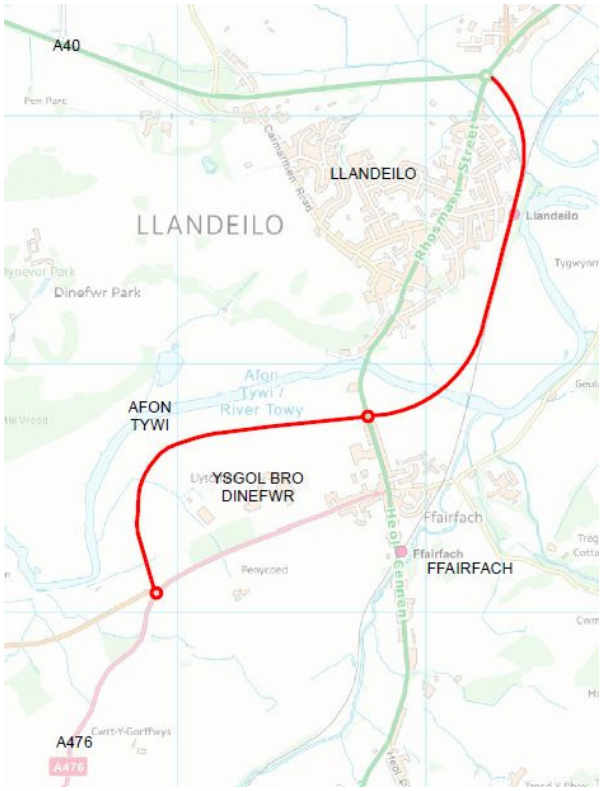
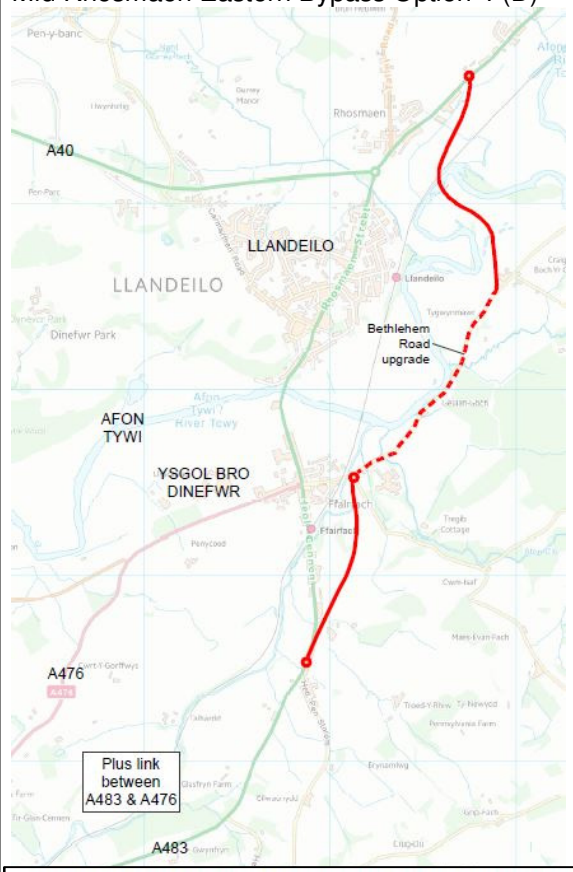
Option Reference	Option Name & Location
NB6	Combined no-bypass option (with HGV restriction)



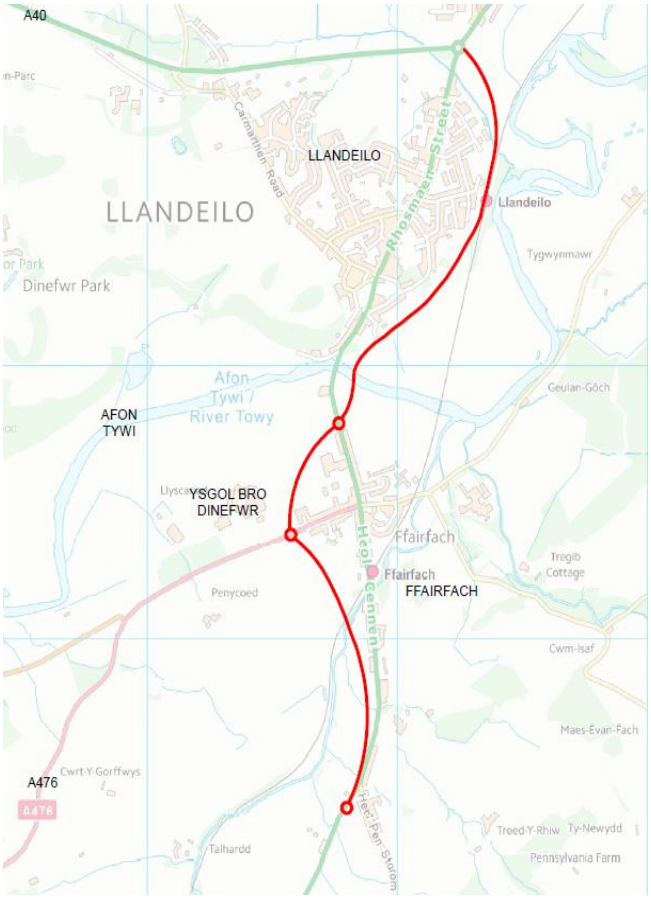
Contains public sector information licensed under the Open Government Licence v3.0

Option Reference	Option Name & Location
NB7	Combined No-Bypass Option (No HGV restriction) Contains public sector information licensed under the Open Government Licence v3.0

Option Reference	Option Name & Location
BE1A	Eastern Bypass Option 1 (A)  Contains public sector information licensed under the Open Government Licence v3.0
BE1B	Eastern Bypass Option 1 (B)  Contains public sector information licensed under the Open Government Licence v3.0

BE1C	Eastern Bypass Option 1 (C)  Contains public sector information licensed under the Open Government Licence v3.0
BE4D	Mid Rhosmaen Eastern Bypass Option 4 (D)  Contains public sector information licensed under the Open Government Licence v3.0

BE6	Eastern Bypass Option 6 – Option formerly known as the Refined Protected Route



Contains public sector information licensed under the Open Government Licence v3.0

5.2 Impacts to be considered at WelTAG Stage Two

The impacts that should be considered at WelTAG Stage Two will build on those that were considered at Stage One, with more detailed information identified for each of the topic areas set out in the assessment tables.

Key data that has been identified as being required are:

- Traffic data;
- Traffic model;
- Geotechnical, Hydrological and Topographical data;
- Accident data;
- Social and cultural data;
- Environmental data (surveys); and
- Cost information.

5.3 Legislative requirements relevant to WelTAG Stage Two

As the transport study progresses through WelTAG Stage Two there is a range of legislation that will need to be considered. This includes a suite of environmental legislation which forms the basis of the environmental constraints, including legislation with regard to air quality, biodiversity, water quality, cultural heritage and landscape.

In addition, the provisions of the Active Travel (Wales) Act 2013 will be a key consideration.

The provisions of the Well-being of Future Generations (Wales) Act 2015 will be considered throughout WelTAG Stage Two and the way in which the study is undertaken will take into account the five ways of working. In assessing each of the shortlist options the extent to which any future scheme would contribute to the Well-being Goals and the Well-being Objectives of relevant public bodies will be considered.