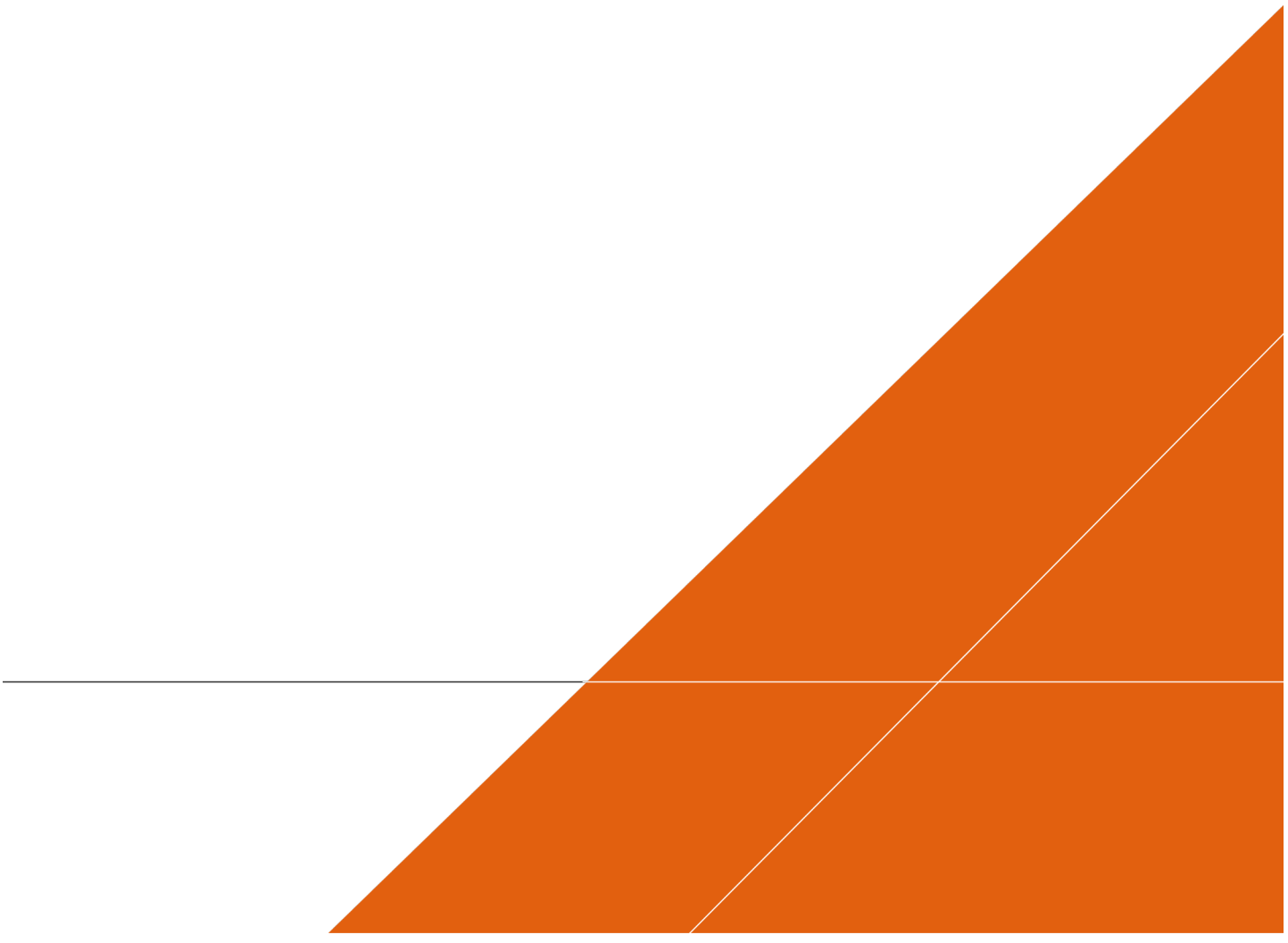
ARCADIS Design & Consultancy for natural and built assets

M4 J35 PENCOED TO J49 PONT ABRAHAM

WelTAG Stage One: Strategic Outline Case Report

JULY 2019



M4 J35 Pencoed to J49 Pont Abraham

WelTAG Stage One: Strategic Outline Case Report

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Report No	10022136-ARC-XX-XX-RP-TP-0002
Date	JULY 2019

VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
D01	17.05.19	CC/LN	LN	JH	Draft for Issue
D02	03.07.19	CC/LN/JH	LN	JH	Final for Issue
D03	31.07.19	CC/LN/JH	LN	JH	Final for Issue addressing client comments

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1 Introduction

1.1 Purpose of the Study

1.1.1 Arcadis Consulting (UK) Limited ('Arcadis') has been commissioned by the Welsh Government to develop and appraise potential options for improving road-based congestion affecting the M4 transport corridor between Junction 35 Pencoed to Junction 49 Pont Abraham.

1.1.2 The study forms part of a wider based objective being taken forward by the Minister for Economy, Science & Natural Resources to develop a series of projects to tackle road-based congestion at the most severely congested locations on the Welsh Government Trunk Road and Motorway network. These projects will form the basis of the Congestion Pinch Points Programme and subject to Ministerial approval, the availability of resources and satisfying the necessary statutory processes, will be taken forward through to implementation.

1.1.3 The M4 corridor between Junctions 35 to 49 is identified by the Welsh Government in the National Transport Finance Plan 2017 update (and the subsequent 2018 update), as a corridor experiencing congestion. It is a Welsh Government priority to develop options to address both current and future problems along the corridor, including congestion and air quality.

1.1.4 The study recognises that transport, the economy and housing growth is inextricably linked, and the necessity to function effectively together to deliver enhanced prosperity. This study for the M4 transport corridor has therefore identified the regional growth potential which will impact on the study area and has been appraised in accordance with the Welsh Government's published version of WelTAG (December 2017).

1.1.5 The scope for the study has been broadened by Welsh Government in September 2018 to ensure that the role of strategic public transport and active travel options in addressing the problems of the M4 congestion is fully considered. Specifically, the following has been considered:

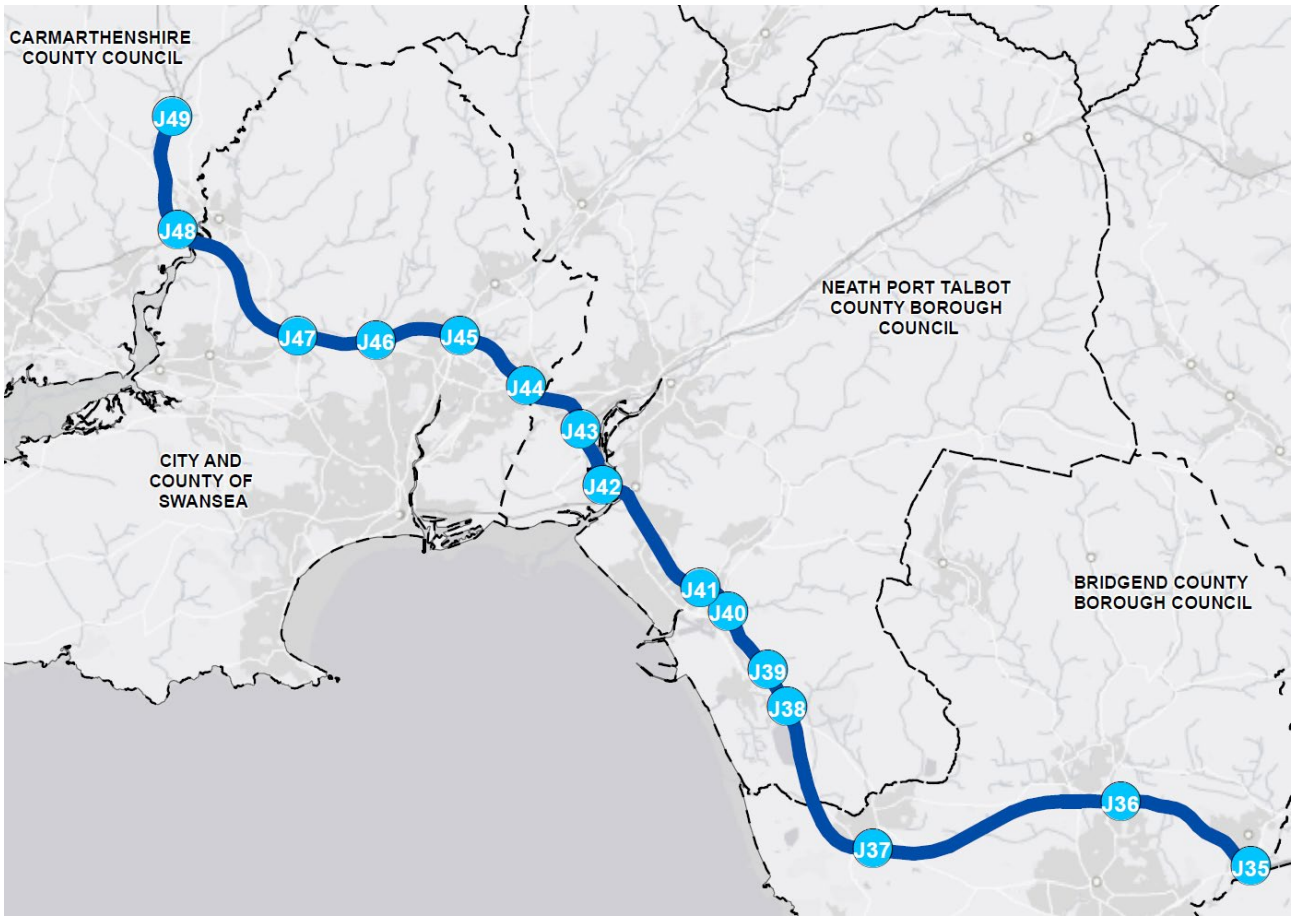
- Heavy rail options for the corridor for both local and strategic routes;
- Metro proposals and advice on benefits and possible prioritisation of Transport for Wales Rail Services elements and the Swansea Metro studies;
- Road based public transport initiatives and opportunities; and
- Active travel initiatives and opportunities.

1.1.6 The appraisal of options has been undertaken in accordance with the Welsh Government's Welsh Transport Appraisal Guidance (WelTAG, December 2017) including advice on the appraisal in relation to the Future Generations of Wales (2015) Act Well-being Goals. This WelTAG report presents the development, appraisal and evaluation of transport related options and has been undertaken with the involvement of key stakeholders. This report presents Stage One of the WelTAG process known as the Strategic Outline Case.

1.2 The Study Area

1.2.1 The study area for appraisal extends from Bridgend (Junction 35) in the east to Pont Abraham (Junction 49) in the west and covers 56 km (35 miles) of the M4 corridor. The study area crosses four local authorities, namely Bridgend County Borough Council, Carmarthenshire County Council, Neath Port Talbot County Borough Council and the City and County of Swansea, as illustrated within Figure 1.1. Moreover, the study area encompasses parts of both the Cardiff Capital Region and the Swansea Bay City Region.

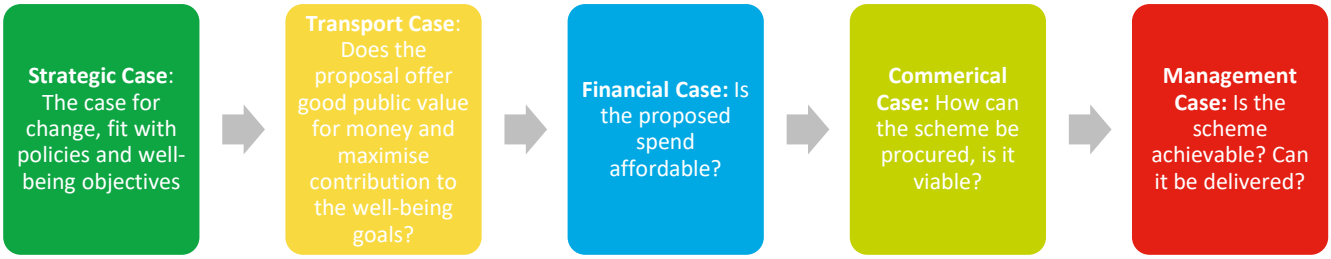
Figure 1.1 Study Area



1.3 WelTAG Stage One: Strategic Outline Case

1.3.1 The purpose of the WelTAG Strategic Outline Case is to establish *'a clear evidence-based description of the issue that needs addressing and the problems that are manifesting now or will do so in the future if no action is taken'*. During Stage One, the appraisal team needs to analyse the factors that are establishing the problem and clearly identify the objectives from which the solutions will be appraised.

1.3.2 This WelTAG Stage One report follows the structure of the Five Case Model used by the Welsh Government:



1.3.3 During Stage One the strategic case will be almost fully developed as this sets out the need for change. The transport case will provide an initial assessment of the expected impacts of each of a long list of options for tackling the issue under consideration based largely on currently available evidence. The delivery, commercial, and financial cases will be of a

preliminary nature but must consider all the key issues which would affect the selection of options taken forward for further investigation.

1.3.4 The outcomes of Stage One: Strategic Outline Case report are:

- Decide whether there are any transport options, or other solutions that can address the issues identified;
- Select a short list of options to be taken forward to Stage Two, based on their ability to solve the problem, their fit with local, regional and/ or national objectives, their positive impacts across all aspects of well-being, their deliverability and robustness under uncertainty and potential to drive long lasting change;
- Agree the impacts, across all aspects of well-being (including social, environmental, cultural and economic well-being), to be considered during Stage Two including the methods to be used to provide additional evidence where required;
- Identify any legislative requirements that are relevant to and need to be met during Stage Two; and
- Document the decisions of the Stage One Review Group, and the basis for these decisions.

1.3.5 This Stage One report follows the principle of proportionate appraisal. It presents a qualitative appraisal, providing stakeholders and decision makers with high level information and understanding of the problems and potential options as outlined within the accompanying Impacts Assessment Report (see Appendix A) for this Stage One appraisal. In accordance with the WelTAG guidance the significance and scale of the impacts throughout the assessment has been appraised using a seven-point scale, as presented in Table 1.

Table 1 WelTAG Seven-Point Assessment Scale

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

1.4 Future Generations of Wales Act Approach

1.4.1 This section provides an overview of how the approach and proposals set out in this report evidence the Five Ways of Working and support the Well-being goals set out in the Future Generations of Wales Act 2015. As set out in detail in the Impact Assessment Report, the latest WelTAG guidance has been developed in such a way to ensure that public funds are invested to maximise contribution to the well-being of Wales. The onus is specifically focused upon the delivery of sustainable development, of which will in turn contribute to the achievement of the well-being goals.

Five Ways of Working

1.4.2 This section identifies how the Five Ways of Working have been applied to the consideration of potential solutions. The WelTAG guidance states it is required 'to ensure the needs of future generations are considered and understand how well they help public bodies to meet the well-being objectives and maximise their contribution to each of the seven goals'. Consideration should be given to long-term challenges, trends, opportunities, as well as integration, collaboration, involvement and preventing problems from occurring or getting worse.

Long Term

1.4.3 The Impact Assessment Report (IAR) which accompanies the Strategic Outline Case Report provides the evidence of both current and future problems, trends and opportunities to inform consideration of the long-term perspective and the development of options.

1.4.4 Improvements are needed to address the congestion and road safety issues associated with the M4 corridor and key connections and the subsequent impacts on the economy, access to education, jobs and services, health and the environment (notably air quality and noise impacts).

1.4.5 Current traffic congestion and connectivity issues will be exacerbated in the future with traffic growth. The options considered in the WelTAG Stage One report offer long term solutions to address the existing issues.

Prevention

1.4.6 The options under consideration offer the opportunity to prevent as far as possible the future problems and trends from occurring, through a combination of reducing demand for travel through a network management approach, enhancing alternative travel modes (public transport and active travel) and undertaking junction and link improvements.

1.4.7 Moreover, the Commercial, Financial and Management Cases in this Strategic Outline Case report seek to identify costs and deliverability risks to aid decision making and prevent long term liabilities for public money by considering all of the issues at the outset.

Integration

1.4.8 The options under consideration involve the integration of active travel, rail and bus modes together with the highway network. The WelTAG study has been undertaken in an integrated manner to consider and take account of other schemes and proposals through discussion with stakeholders as well as integration with adjacent studies such as the M4 J32 to 35 WelTAG Stage Two Study.

Collaboration

1.4.9 In undertaking the WelTAG Stage One study, there has been collaboration between departments within Welsh Government, between stakeholders and between Arcadis and other consultants working on projects influencing the study area issues and solutions.

Involvement

1.4.10 Stakeholder workshops have been undertaken, meetings with key stakeholders were held and other stakeholders were invited to provide written representation to inform the study. A good level of response was received through the engagement process. The Review Group brings together key stakeholders to oversee the studies. Further stages of WelTAG would involve full public consultation in due course.

Well-being Goals

1.4.11 The objectives have been developed through consideration of the Well-being goals and this is presented in the Strategic Case Section. The Strategic Case also considers how each of the options meets the Well-being goals. Together this seeks to ensure that achieving the Well-being goals are at the centre of the setting of objectives for the study and the emerging interventions.

1.5 Report Structure

1.5.1 In accordance with the WelTAG guidance the structure of this report is as follows:

- Chapter 2: Strategic Case;
- Chapter 3: Transport Case;
- Chapter 4: Financial Case;
- Chapter 5: Commercial Case;
- Chapter 6: Management Case; and
- Chapter 7: Conclusions and Next Steps.

2 Strategic Case

2.1 Overview

2.1.1 The Strategic Case addresses the need for change, providing an evidence-based description of the current situation, describes the likely funding situation if no action is taken and presents the reasons why an intervention is required. The Strategic Case includes analysis of the factors leading to the problem and the development of possible solutions, establishes objectives and provides a narrative as to how each of the solutions is intended to change the situation.

2.2 Evidence Base

2.2.1 The development of the Strategic Case has been evidence based, drawing on currently available data and is presented within the accompanying Impact Assessment Report in Appendix A. The key sources of information have come from the following:

- Studies and strategy documents – e.g. WelTAG studies for J36, J48, and J41-42; draft report on the Case for Rail Investment in Wales
- Transport Data – South East Wales Transport Model; Swansea Traffic Model, mobile phone data; traffic counts; accident data; speed data; existing transport provision; appraisal of existing highways
- Development proposals – Local Development Plan proposals for sites of significant scale and strategic impact
- Environmental Constraints – air quality, noise, heritage, landscape, water
- Social, Economic and Cultural – e.g. data on demographics, facilities and the economy and tourism

2.3 Legislative and Policy Context

2.3.1 The Impacts Assessment Report provides an appraisal of the legislative and national and local policy framework within which this study sits. The key documents are:

- Active Travel (Wales) Act (2013)
- Well-being of Future Generations (Wales) Act 2015
- Environment (Wales) Act 2016
- Wales Transport Strategy (One Wales: Connecting the Nation)
- Partnership for Growth: Welsh Government Strategy for Tourism 2013-2020 (2013)
- Natural Resources Policy (2015)
- Taking Wales Forward 2016 -2021 (2017)
- Prosperity for All – The National Strategy (2017)
- Prosperity for All: Economic Action Plan (2017)
- Planning Policy Wales: Edition 10 (2018)
- Emerging National Development Framework
- Local Development Plans (Bridgend, Neath Port Talbot, Swansea and Carmarthenshire)
- Local Transport Plans (Bridgend, South West Wales)

2.4 Consultation

2.4.1 Stakeholder consultation has been undertaken to inform the State of the Nation appraisal, to establish the objectives and to discuss the initial long list of options. A report detailing the consultation process is included within Appendix B. The process has included:

- Face to face meetings with each of the local authorities in the study area (Bridgend, Neath Port Talbot, Swansea and Carmarthenshire)
- A first Stakeholder Workshop held 6th September 2018 at the Tower Hotel, Jersey Marine. This was attended by 17 individuals from a wide range of organisations) and covered problems, opportunities, constraints, objectives and initial options
- Face to face meetings with other stakeholders including SWTRA, Network Rail, Welsh Government departments and Transport for Wales
- An invitation issued to key businesses and organisations in the study area to provide written representation to the consultation process (33 invited)
- An invitation issued to a list of wider stakeholders to provide written representation to the consultation process (40 organisations).
- A second Stakeholder Workshop on 21st March 2019 at the Tower Hotel, Jersey Marine. This was attended by 16 individuals and discussed the emerging long list of options.

2.4.2 Appendix B also includes the one-page summary notes on the project which were shared with stakeholders as part of the engagement process.

2.4.3 In addition to consideration of the problems, opportunities and constraints, objectives and potential interventions, the following key general issues were highlighted:

- The importance of land use and spatial planning to be considered on a regional level, as the transport implications of developments are not isolated to local authority boundaries.
- An opportunity to encourage more tourism journeys to be undertaken by sustainable travel modes and reduce the adverse impact peak tourism traffic has on the transport network, particularly the road network.

2.5 The Case for Change

Overview of Problems and Opportunities

2.5.1 The problems and opportunities of the study area are the drivers of the proposals for a transport intervention. The identification of problems and opportunities has been done through analysing local data, reference to policy, and the feedback from the stakeholder consultation. The Impacts Assessment Report sets out the context and evidence behind the problems and opportunities presented below. The problems drawn from this appraisal are summarised in Table 2.

Table 2 Identified Problems

Reference	Problem
P01	Road network is subject to significant congestion and delays, particularly at peak periods, summer or in an event of an accident (particularly J38-49).
P02	Many junctions experience queuing and delays (e.g. J36, 41, 43-49)
P03	Poor journey times and reliability impacts on the economy, particularly on access to tourist destinations, as well as bus services and haulage vehicles.
P04	The study area includes some of the most deprived areas of Wales (particularly Neath Port Talbot and Swansea) and Neath Port Talbot and Carmarthenshire residents have lower incomes than Wales as a whole.
P05	Residents in parts of the study area are less likely to be active with associated health risks than the Wales average (Bridgend and Neath Port Talbot).
P06	Relatively low average trips lengths - local trips using the corridor.
P07	Parts of the highway network built to previous standards.
P08	Road safety issues.
P09	Air quality and noise impacts of traffic.
P10	Planned future development will increase the demand along the M4 corridor.
P11	Long journey times or poor availability of public transport services and lack of connections to public transport interchanges.
P12	Limited opportunities for park and ride and joining bus and rail services from the M4.
P13	Limited provision for Active Travel to provide for purposeful journeys

2.5.2 The opportunities of the study area have been identified. These assist in ensuring that the objectives and options are realistic as well as maximise potential benefits and take into account the context of the study area. They are summarised in Table 3.

Table 3 Identified Opportunities

Reference	Opportunity
O1	Improve efficiency and capacity of links and junctions and connecting routes.
O2	Improve road safety.
O3	Improve air quality and reduce noise impacts from transport.
O4	Enhance transport interchanges.
O5	Enhance public transport.
O6	Encourage uptake of low emissions vehicles.
O7	Support and facilitate developments.
O8	Enhance the active travel network

Study Objectives

2.5.3 The objectives for interventions in the M4 Junctions 35 to 49 study corridor have been derived from general and transport-specific objectives as set by the Welsh Government. The development of the objectives for the intervention has also taken into account particular issues and opportunities identified and have evolved through the process of engagement in the stakeholder workshops.

2.5.4 Subsequent to the second stakeholder workshop, the following changes have been made: Objective 4 has been made more specific to access to employment, business and tourism for sustainable growth, rather than a generic economic growth objective; and in Objective 6, improving health has been made an explicit objective alongside the environment given its particular relationship to air quality and noise.

2.5.5 The Stage One objectives are shown in Table 4.

Table 4 WelTAG Stage One Identified Objectives

Objective	Description	What will success look like?	How will success be measured?
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	• Improved average speed during peak periods on congested sections (J38 to 47) • Reduced delay at junctions • Reduced impact of major incidents on traffic delay	• Speed data • Junction operational assessments • Average time taken to reopen M4 following incidents
2	Improve road safety and journey time reliability.	• Reduced rate of accidents • Improved average speed during peak periods on congested sections (J38 to 47)	• Accident rate for vehicle kilometres by section • Speed data
3	Improve multi-modal travel options that reduce dependence on the motorway.	• A greater number of journeys undertaken by sustainable modes • Lower traffic volume than forecast on M4	• Number of journeys to work undertaken by sustainable modes • Travel surveys of key employers • Rail patronage • Bus passenger surveys • Cycle/ pedestrian counters on strategic routes
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	• Enhanced access to main employment and tourist facilities	• Number of employment or tourism developments with improved strategic infrastructure
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	• Enhanced access to education, health and cultural facilities	• Number of education, health and cultural facilities with improved strategic infrastructure
6	Improve health and the local and global environment, including reducing air and noise pollution.	• Reduced impact of motorway and diversionary route traffic on air quality • Reduced noise impacts of traffic • Improved levels of physical activity and	• Length of motorway within noise action priority areas • Exceedance of air quality guidance • Percentage of local authority residents who are physically active and obese

Objective	Description	What will success look like?	How will success be measured?
		associated health benefits	
7	Improve communication and information to users and management of the motorway	• Fully bilingual signage • Installation of variable signing or equivalent for diversionary routes • Increased user satisfaction with strategic network	• User satisfaction • Delays caused by incidents

Verification of Objectives

2.5.6 The objectives have been verified to determine how they contribute to:

- Resolving problems of the study area;
- The Well-being of Future Generations (Wales) Act well-being goals;
- Wales Transport Strategy (WTS) outcomes;
- The Welsh Government's Strategic Priorities; and
- The Economic Action Plan Priorities.

2.5.7 Table 5 illustrates the extent to which the objectives address the identified transport problems using the seven point scoring criteria. The application of the seven point scoring criteria has been undertaken by experienced WelTAG practitioners applying their professional judgement. The application of the seven point scoring criteria illustrates where the relationship between the problems and objectives is considered to be beneficial, neutral or adverse. All the identified problems are directly addressed by all the objectives and Table 5 demonstrates where the relationship is considered a large, moderate or slight beneficial relationship.

Table 5 Relationship of Objectives to Problems

Obj.			Identified Problems										
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12	P13
1	+++	+++	+++	0	0	0	++	+	+	++	++	+	0
2	+++	+++	+++	0	0	0	+	+++	0	+	++	0	+
3	+++	+++	+++	0	+++	+++	+	++	+++	+++	+++	+++	+++
4	++	++	+++	+++	+	+	0	0	0	+++	++	+	++
5	++	++	+	+++	+++	+	0	0	0	+++	++	+	++
6	+	+	0	+	++	0	0	+++	+++	0	0	0	+++
7	+++	+++	+++	0	0	+	+	++	++	+	+	0	0

2.5.8 Table 6 shows the positive relationship between the objectives and the Well-being of Future Generations (Wales) Act goals.

Table 6 Objectives Relating to the Well-being of Future Generations (Wales) Act Goals

Well-being of Future Generations (Wales) Act Well-Being Goals	Objectives						
	1	2	3	4	5	6	7
A prosperous Wales	++	+	+++	+++	+++	+	+
A resilient Wales	+	+	+++	+++	+++	+++	+
A healthier Wales	+	+++	++	++	++	+++	+
A more equal Wales	+	+	++	+++	+++	+	+
A Wales of cohesive communities	++	++	++	++	+++	+	+
A Wales of vibrant culture and Welsh language	+	0	+	++	++	+	0
A globally responsible Wales	+	+	+++	+	+	+++	+

2.5.9 Table 7 shows a positive relationship between the objectives and the WTS outcomes.

Table 7 Objectives Relating to the WTS Outcomes

	Wales Transport Strategy Outcomes	Objectives						
		1	2	3	4	5	6	7
Social	Improve access to healthcare	++	+	++	0	+++	0	+
	Improves access to education, training and lifelong learning	++	+	++	+++	+++	0	+
	Improving access to shopping and leisure facilities	++	+	++	++	++	0	+
	Encourage healthy lifestyles	0	0	++	0	0	+++	0
	Improve the actual and perceived safety of travel	+	+++	++	0	0	+	+
Economic	Improve access to employment opportunities	++	++	++	+++	++	0	0
	Improve connectivity within Wales and internationally	+++	+++	+++	+++	+++	0	+
	Improve the efficient, reliable and sustainable movement of people	+++	+++	+++	+	+	0	+++
	Improve access to visitor attractions	++	++	++	++	0	0	0
Environmental	Increase the use of more sustainable materials	0	0	+	0	0	+	0
	Reduce the contribution of transport to greenhouse gas emissions	+	+	+++	0	0	++	+
	Adapt to the impacts of climate change	+	0	++	0	0	++	+
	Reduce the contribution of transport to air pollution and other harmful emissions	+	0	++	0	0	+++	+
	Improve the impact of transport on the local environment	+	+	+	0	0	+++	+

Wales Transport Strategy Outcomes	Objectives						
	1	2	3	4	5	6	7
Improve the impact of transport on our heritage	0	0	0	0	0	0	0
Improve the impact of transport on biodiversity	0	0	0	0	0	0	0

2.5.10 Table 8 shows a positive relationship between the objectives and the Strategic Priorities as set out in the Wales Transport Strategy.

Table 8 Objectives Relating to the Strategic Priorities

Strategic Priorities	Objectives						
	1	2	3	4	5	6	7
Reducing greenhouse gas emissions and other environmental impacts from transport	+	+	+++	0	0	++	+
Integrating local transport	++	+	+++	0	0	+	+
Improving access between key settlements and sites	++	+	++	+++	+++	0	+
Enhancing international connectivity	+++	++	+++	+	+	0	+
Increasing safety and security	+	+++	++	0	0	+	+

2.5.11 Table 9 shows the relationship between the objectives and the priorities of the Economic Action Plan for Wales.

Table 9 Objectives Relating to the Economic Action Plan Priorities

Strategic Priorities	Objectives						
	1	2	3	4	5	6	7
Support people and businesses to drive prosperity	0	0	0	+++	+	0	0
Tackle regional inequality and promote fair work	+	+	+	++	++	0	0
Drive sustainable growth and combat climate change	0	+	+++	+++	++	+++	0
Build ambition and encourage learning for life	0	0	0	0	+++	0	0
Equip everyone with the right skills for a changing world	0	0	0	0	+++	0	0
Deliver modern and connected infrastructure	+++	+++	+++	++	++	0	0
Promote and protect Wales' place in the world	0	0	0	+	+	+	0

2.5.12 In summary, the above appraisal demonstrates that the proposed objectives positively contribute the Well-being goals, the Welsh Government's Strategic Priorities, the WTS

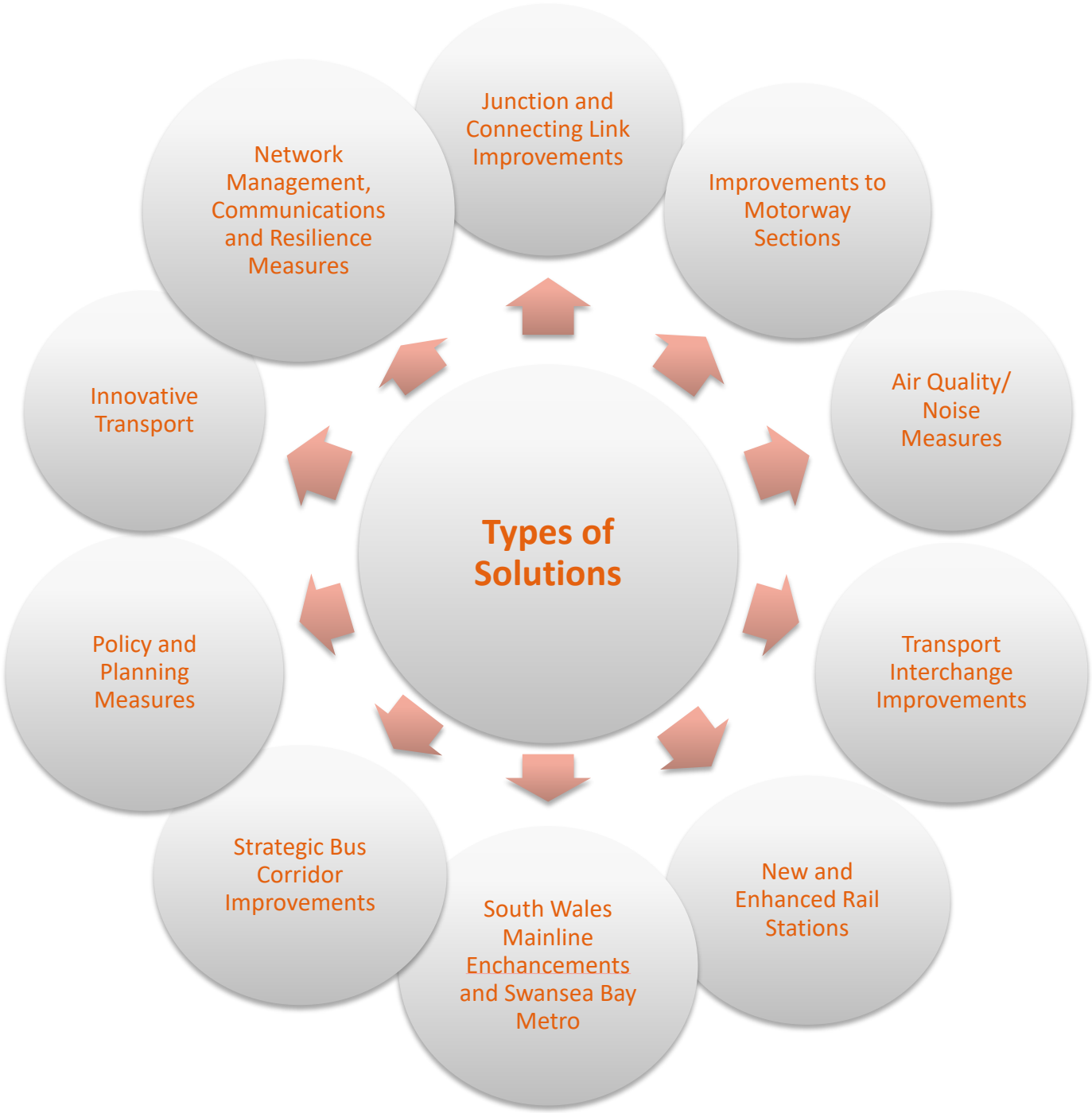
outcomes and Economic Action Plan priorities, together with overcoming the identified problems.

2.6 Long List of Interventions

Option Development Process

2.6.1 The next stage of the WelTAG process has been to develop options that alleviate the identified problems and achieve the objectives based on a range of possible solutions to the transport problems. The types of solutions considered are illustrated in Figure 2.1.

Figure 2.1 Types of Transport Solutions



2.6.2 In response to the current and future problems of the M4 study corridor, the strategy principles of developing interventions are to firstly to manage demand for travel on the motorway network, then to make most efficient use of the network and then to address future demand for the network through improvements. This is illustrated in Figure 2.2.

Figure 2.2 Strategy Principles

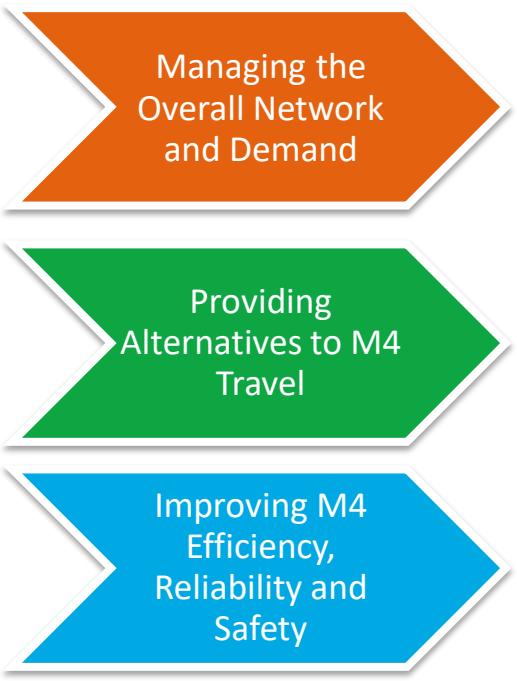
2.6.3 In order to inform the identification of options to meet the strategy principles, a range of sources have been used:

- Policies and Plans (e.g. LDPs, LTPs)
- Programmes (e.g. NTFP, South Wales Metro)
- Strategies and Studies (e.g. Welsh Route Study, Case for Rail Investment in Wales, J36 WelTAG Stage One)
- Stakeholder workshop (September 2018)
- Stakeholder consultation meetings (e.g. Local Authorities, Trunk Road Agency, Network Rail, Transport for Wales)
- Arcadis study team workshop

2.6.4 The initial long-list of options have been developed into intervention packages to respond to the strategy principles and enable appraisal. The three packages are illustrated in Figure 2.3. These packages were discussed and refined in meetings with the Welsh Government and the Trunk Road Agency, and then presented to stakeholders are the workshop on 21st March 2019, leading to further discussion and refinement.

2.6.5 The Do minimum (against which all interventions will be appraised) and the interventions are set out below. For each intervention, apart from the Do Minimum, the likely level of costs involved has been included. This is discussed further in Chapter 4.

Figure 2.3 Intervention Packages



2.6.6 In addition to the intervention packages considered, the stakeholders emphasised the importance of land use planning and policy measures that may contribute to addressing the problems and objectives. These would be best considered as part of the Wales Transport Strategy and planning policy as they would require national interventions.

2.6.7 A plan illustrating all of the interventions identified as part of this study are presented in Appendix C, together with a plan showing the proposed interventions in relation to the Local Development Plan allocated sites.

Do Minimum

2.6.8 The Do Minimum Scenario assumes that there is no step change in investment beyond the current programmes and commitments. For the M4, the Trunk Road Agency have the remit to "Enable the day to day safe, efficient and effective operation of the trunk and motorway network through regular inspection and maintenance, supported by appropriate enforcement. Measures to reduce energy consumption such as low energy lighting and innovative techniques to manage the network will be rolled out where specific business cases allow." This is defined as the Do-Minimum in terms of activity. Similarly, the Do-Minimum for public transport and active travel infrastructure assumes maintenance and committed investment.

2.6.9 Forecast traffic flows on the M4 and connecting routes has been obtained for a 2026 future year from the SEWTM. This provides a do minimum scenario for traffic without interventions included in the options in this study.

2.6.10 Table 10 has been provided by Transport for Wales' consultants Arup/ Mott Macdonald and lists the schemes explicitly included in the SEWTM in the 2026 reference case that are relevant to the study corridor, as used for the modelling associated with the A470/ M4 Junctions 32-35 WelTAG Stage Two study. The Do Minimum also includes a range of public transport schemes such as the South Wales Metro but for parts of the network that do not impact on the study area.

Table 10 SEWTM Reference Case – Included Schemes

Type	Name	Description/Comments
Highway schemes	M4 Junction 32 Improvements	New through-junction link and traffic signals for M4 westbound to A470 northbound movements
	M4 Junction 33 Improvements	New left-turn filter lane from M4 westbound off-slip to A4232
	A4336 Five Mile Lane Improvements	Road quality improvements
	Severn Bridge tolls	Tolls (and delay at toll booths) removed for all vehicle types
	A465 Dualling	Dualling completed (grade separation of junctions excluded)

Source: Mott MacDonald/Arup

2.6.11 In addition to the committed schemes, there are sections of the trunk road that are likely to require renewal in the medium or long term (notably the A48 Briton Ferry Bridge, elevated M4 section through Port Talbot and the M4 River Tawe Bridge). These can be viewed as Do-Minimum requirements but as they would require a step change in investment levels to maintain existing infrastructure, they are discussed under interventions.

Managing the Overall Network and Demand

2.6.12 This intervention package includes the development of strategies for managing the trunk road network, specifically for resilience, noise impacts, low emissions vehicles and travel planning of developments and land uses in the study area. Moreover, it includes for freight measures to manage lorry parking requirements and to facilitate use of rail freight. These measures are short term but may lead to longer term measures to be implemented, once the strategies are in place.

MND.1: Study Area Wide Network Management	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short term interventions to commission and complete for the corridor a: • Resilience Study; • Network Management Plans, with ITS & traffic officer deployment strategies to improve everyday operation, average speed management and network resilience; • Noise Priority Areas Action Plan; • Low Emission Vehicle Fuelling Strategy; • Travel Planning Strategy; and • ITS solutions – including VMS gantry signage on M4.	

MND.1: Study Area Wide Network Management	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
The outcome of these studies would inform short, medium and longer term measures for implementation to improve network management and resilience, arising from the corridor studies.	
Cost Range: High (>£20M) | Medium (£5-20M) | **Low (<£5M)**	

MND.2: Freight Measures	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short term interventions to commission and complete for the corridor a: • Rail Freight Strategy; and • Lorry Parking Strategy. The outcome of these studies would inform additional short, medium and longer term measures.	Implementation of measures to improve rail freight and lorry parking, arising from the strategies.
Cost Range: High (>£20M) | Medium (£5-20M) | **Low (<£5M)**	Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)

Providing Alternatives to M4 Travel

2.6.13 This intervention package includes active travel, bus, rail, multi-modal interchange and park and ride options that have the potential to provide alternative travel modes to vehicle use on the M4.

2.6.14 Interventions have been identified as short and medium term or long term measures, with some involving the same measures over a long programme and others separately defined in the two time periods depending on what is involved to bring them forward. For many of the interventions, there are specific proposals already being developed by stakeholders. The purpose of the package is to collate these and enable a strategic overview on the

range of interventions and how they would meet the objectives of this study for the M4 corridor.

<table>
<tr><th colspan="2">ALT.1: Active Travel Routes and Infrastructure</th></tr>
<tr><th>Short Term and Medium Term Measures (within 5 years)</th><th>Long Term Measures (5 years and beyond)</th></tr>
<tr><td colspan="2">Potential short, medium and long term interventions:

• Connections between key settlements;
• Address gaps in the National Cycle Network and Local Authority Active Travel Network;
• Connections to public transport interchanges and key education, health facilities and employment locations; and
• Cycling infrastructure measures to support and encourage cycle use e.g. cycle storage, cycle hire scheme, electric bikes.</td></tr>
<tr><td colspan="2">Cost Range:

<table><tr><td>High (>£20M)</td><td>Medium (£5-20M)</td><td>Low (<£5M)</td></tr></table></td></tr>
</table>

ALT.2: Strategic Bus Corridors	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short and medium term interventions: • Connections between key settlements; • Priority measures on key routes; and • Consideration of regional bus services.	Potential long term intervention: • Consideration of rapid transit from Porthcawl to Bridgend.
Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Cost Range: **High (>£20M)** | Medium (£5-20M) | Low (<£5M)

ALT.3: South Wales Metro	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short and medium term interventions: • First-class service from Swansea to Manchester from 2024; • Introduction of a new two and three-car DMUs on the Milford Haven to Manchester service by 2023; • 2tph between Cardiff and Bridgend via Vale of Glamorgan from December 2023; • 4tph between Cardiff and Bridgend (direct, Monday to Saturday) from December 2019; and • Maesteg Line – four Metro style services per hour from Maesteg through to Bridgend and beyond	See above for Strategic Bus Corridors
Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	

<table>
<tr><th colspan="2">ALT.4: South Wales Mainline</th></tr>
<tr><th>Short Term and Medium Term Measures (within 5 years)</th><th>Long Term Measures (5 years and beyond)</th></tr>
<tr><td>Potential short and medium term interventions:
Infrastructure upgrades to enable direct services from Pembroke Dock to London via Carmarthen on new trains; and
Improved service frequency to local stations between Cardiff Central and Swansea.</td><td>Potential long term interventions:
Journey time reductions through line speed upgrades throughout the South Wales Mainline (SWML) (including west of Swansea);
Cardiff to Severn Tunnel Junction relief line upgrades to provide additional service capacity;
Additional connectivity between Swansea, Cardiff, Bristol and London; and
Electrification of line from Cardiff to Swansea.</td></tr>
<tr><td>Cost Range:<table><tr><td>High (>£20M)</td><td>Medium (£5-20M)</td><td>Low (<£5M)</td></tr></table></td><td>Cost Range:<table><tr><td>High (>£20M)</td><td>Medium (£5-20M)</td><td>Low (<£5M)</td></tr></table></td></tr>
</table>

ALT.5: Swansea Bay Metro	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short and medium term: • Swansea Bay and Western Valleys Metro Proposal – Business Case Development. Funding has been allocated to undertake initial feasibility study; • Park and Ride provision at key stations; and • Integration measures for active travel and bus routes to maximise the rail network's reach.	Potential long term interventions: • A new dedicated Swansea Bay commuter rail network serving a range of new and existing stations (for example, Landore, Felindre, Winch Wen); • Two initial routes (including some new infrastructure) could be operated using the rolling stock based on the tram-train that will be procured for the South Wales Metro: A Llanelli – Pontarddulais – Swansea 'Metro' service; A Port Talbot – Neath - Swansea 'Metro' service (subject to operational feasibility); and • LRT/ ultra-light rail opportunities.
Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Cost Range: **High (>£20M)** | Medium (£5-20M) | Low (<£5M)

ALT.6: West and Mid Wales Rail Connections	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Further feasibility and business case work to develop and assess impacts and benefits of the intervention.	Potential long term interventions: • Improved connectivity to the Heart of Wales Line and major economic centres at either end of the route and • Options to reduce journey times to Llanelli, Carmarthen and West Wales through new alignment options and reduced stops.
Cost Range: High (>£20M) | Medium (£5-20M) | **Low (<£5M)**	Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)

ALT.7: West Wales Parkway	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Further feasibility and business case work to identify the appropriate location and impacts and benefits of the intervention.	Potential long term interventions: Development of a parkway station on the Swansea District Line (SDL) perhaps at Llandarcy (inc. additional services) and/or route/station alternatives such as Felindre. This may require a link between SDL and the main line near Llansamlet.
Cost Range: High (>£20M) | Medium (£5-20M) | Low (<£5M)	Cost Range: High (>£20M) | Medium (£5-20M) | Low (<£5M)

ALT.8: Public Transport Interchanges	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short, medium term and longer interventions: • Rail and bus station enhancements (e.g. Pyle, Swansea, Llanelli); • Integration of bus/ rail/ cycling/ park and ride; • Accessibility measures; • Active Travel connections; and • New stations (e.g. Landore, Cockett, Brackla)	
Cost Range: High (>£20M) | Medium (£5-20M) | Low (<£5M)	

ALT.9: Park & Ride and Park & Share M4 Corridor Strategy	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short, medium term and long interventions: • Enhancements to existing bus park and ride sites; • New bus based park and ride sites; and • Additional park and share sites.	
Cost Range: High (>£20M) | Medium (£5-20M) | Low (<£5M)	

Improving M4 Efficiency, Reliability and Safety

2.6.15 This intervention package includes measures that aim to improve the efficiency, reliability and safety of the M4 motorway corridor, junctions and where appropriate, connecting routes.

ERS.1: J36-38 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short term interventions: • Undertaking a detailed corridor study (focusing on accidents and traffic speeds) to identify measures to address high vehicle speeds. The outcome of this study would inform other short and medium term measures.	N/A
Cost Range: High (>£20M) | Medium (£5-20M) | Low (<£5M)	N/A

ERS.2: J38-43 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short to medium term interventions: • Permanent 50mph speed limit; • Variable speed limit; • Signing and diversion to Harbour Way; • Upgrades to Harbour Way including possibility of new westbound on-slip at Baglan; • Junctions 40 and 41 consideration of junction arrangements; • Improvements to Junction 43 to facilitate development and improve connectivity between A465 and A483; and • Consideration of congestion and renewal issues on A48 and Briton Ferry Bridge.	Potential long term interventions: • Renewal of Briton Ferry Bridge; • Widening of M4 to 3 lanes from J38-42; • Widening of M4 to 4 lanes in each direction from J42-43 (potential off mainline running?); • 'Smart Motorway' to provide 3 lanes in each direction from J38-42 ('Smart Motorway' is assumed to involve use of technology to manage the flow of traffic through variable message signing and can include the temporary use of the hard shoulder at peak times or conversion to a permanent extra lane); • New M4 section between J38 and J42/ Swansea? – to north-east or south-west?; and • Further Improvements to J43 to improve connectivity between A465 and A483.
Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Cost Range: **High (>£20M)** | Medium (£5-20M) | Low (<£5M)

ERS.3: J43-47 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short to medium term interventions: • Junction efficiency improvements to Junctions 44-47; • New road link to connect Junction 46 spur roundabout to Pantlasau Road within the vicinity of Morriston Hospital; • Consideration of crawling lane design between J45 and J46.	Potential long-term interventions: • Increased lane provision to 3 lanes in both directions on section (such as Smart Motorway and widening); and • Renewal of River Tawe Bridge (Ynysforgen).

ERS.3: J43-47 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Cost Range: High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Cost Range: **High (>£20M)** | Medium (£5-20M) | Low (<£5M)

ERS.4: Junction Improvements	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Potential short to medium term interventions: • Junction 36 enhancements to improve efficiency. This may involve various options such as dedicated slip/ relief lanes (short-term measure); larger roundabout; signalised two-bridge hamburger as well as improvements to Heol Spencer and active travel measures; • Junction 48 and Llanelli corridor connection improvements. This is anticipated to involve consideration of reducing journey times from the M4 motorway to Llanelli along the A4138, Park & Ride or Park & Share facilities in the wider Llanelli area, improved signage and active travel routes, alongside junction improvements. There may be further options to be developed for the longer term; and • Junction 49 enhancements to improve efficiency. This may involve significant works as well as signage improvements. Some improvements may be longer term depending on scale.	
Cost Range: **High (>£20M)** | Medium (£5-20M) | Low (<£5M)	

2.7 Appraisal of Options

2.7.1 At this early stage in the WelTAG process high level options have been appraised. This section describes each of the options in turn, how it tackles the identified problems, how it meets the objectives and how it meets well-being goals (in relation to the Framework for Projects provided by the Future Generations Commissioner) as well as key risks and adverse impacts. The appraisal of the extent the option meets the objectives and well-being goals is described using the WelTAG seven-point assessment scale as set out in Table 1.

Do-Minimum

2.7.2 An appraisal of the do-minimum option has identified the following as set out below. The impacts have been done separately for short term and long term, with the assumption that impacts will increase over time with increasing traffic and development as well as continued spending on existing committed programmes:

- **Overcome identified problems** – In the do-minimum scenario, the existing problems (P01, P02, P03) would be exacerbated with forecast traffic growth in 2026 from 2015 base year of up to 20% on M4 sections. Air quality measures are being put in place to address some of the existing problems (P09), but the larger scale interventions are not part of the do minimum. There would be some improvements for rail and bus as well as active travel improvements through the South Wales Metro, Local Transport and Active Travel Funding, for example which could support addressing the limitations of public transport and active travel (P11 and P13). Some development led issues will be addressed through developer agreements such as the planned upgrades to Junction 43 as part of the Coed Darcy development (P10). Problems associated with the low average trip lengths and standards of the highway network (P06 and P07) and the long journey times/ availability of public transport (P11) are not anticipated to be addressed.

- **Contributes to objectives** – The forecast levels of traffic growth would be expected to have an adverse impact on improving highway efficiency and resilience, road safety and journey time reliability as well as leading to a negative impact on health and the local and global environment. There would be some beneficial impacts on improving multi-modal options through scheme commitments and funding programmes. Investment in local transport should improve access to employment and services, but this benefit would be expected to be negated by increasing congestion, giving a neutral impact.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	-	–
2	Improve road safety and journey time reliability.	-	–
3	Improve multi-modal travel options that reduce dependence on the motorway.	0	+
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	0	0

Objective	Description	Short Term Impact	Long Term Impact
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	0	0
6	Improve health and the local and global environment, including reducing air and noise pollution.	0	-
7	Improve communication and information to users and management of the motorway	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A neutral impact is predicted, with the exception of a healthier Wales goal when a negative impact is predicted in the longer term.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	0	0
A resilient Wales	0	0
A healthier Wales	0	-
A more equal Wales	0	0
A Wales of cohesive communities	0	0
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	0	0

- **Adverse Impacts –**
  - An exacerbation of existing issues would be expected from increased traffic including worsening journey quality, increased accidents, poor access to employment and services through congestion, discouragement to tourists from journey delays during peak weekend and holiday periods, and noise and air quality impacts from traffic on adjacent communities. Moreover, adverse economic impacts would be expected with increased journey times, reduced journey time reliability, increased transport costs for road users and impacts on the wider economy through labour market and agglomeration disbenefits.
- **Key Risks**:
  - Failure to comply with environmental legislation such as for air quality.
  - Substantial investment is required to maintain the existing infrastructure.
  - Sustainable economic growth of the region cannot be fully realised.

MND.1: Study Area Wide Network Management

2.7.3 An appraisal of the study area wide network management measures in comparison to the do-minimum option has identified the following as set out below. It is assumed that measures arising may have a similar impact in the short, medium and long term:

- **Overcome identified problems** – The network management measures in this intervention would be anticipated to have a minor beneficial impact on P01-04, and P08-10 through better and more efficient management of the existing highway capacity, bringing minor improvements to road safety through the resilience proposals, reducing noise impacts and climate impacts through a low emission vehicle fuelling strategy and management of future development through travel planning. There is likely to be a neutral impact on other problems.

- **Contributes to objectives** – The measures would be expected to have a beneficial impact on the highway efficiency and resilience, road safety, access to employment and services and the environment. A neutral impact on multi modal travel options is anticipated.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	+	+
2	Improve road safety and journey time reliability.	+	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	0	0
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	+	+
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	+	+
6	Improve health and the local and global environment, including reducing air and noise pollution.	+	+
7	Improve communication and information to users and management of the motorway	+	+

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to a prosperous Wales, a resilient, a healthier Wales and a globally responsible Wales through developing strategies to support low emission vehicles and in improving community connections through better travel planning.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	++	++
A resilient Wales	+	+
A healthier Wales	+	+
A more equal Wales	0	0
A Wales of cohesive communities	0	0
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - No adverse impacts from the intervention have not been identified at this stage.

- **Key Risks:**
  - The successful implementation of strategies requires an integrated and multi-agency approach which may be difficult to achieve where there are differing priorities.

MND.2: Freight Management

2.7.4 An appraisal of freight measures in comparison to the do-minimum option has identified the following as set out below. The impact of measures would be experienced in the medium to long term, as a result of the strategy being established in the short term.

- **Overcome identified problems** – The freight strategy measures in this intervention would be anticipated to have a minor beneficial impact on P03, P09 and P011 by improving journey time reliability for freight, addressing air quality and noise impacts of road freight by encouraging rail freight and increasing use of rail for freight journeys thus enhancing public transport options.

- **Contributes to objectives** – The measures would be expected to have a beneficial impact on the highway efficiency and resilience, multi modal options and supporting sustainable economic growth through encouraging rail freight. A strategy for lorry park could have a beneficial effect on management of the motorway by providing appropriate locations for HGV's to park.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	+	+
2	Improve road safety and journey time reliability.	0	0
3	Improve multi-modal travel options that reduce dependence on the motorway.	+	+

Objective	Description	Short Term Impact	Long Term Impact
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	+	+
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	0	0
6	Improve health and the local and global environment, including reducing air and noise pollution.	0	0
7	Improve communication and information to users and management of the motorway	+	+

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to a prosperous Wales, a resilient Wales and a globally responsible Wales by supporting a lower carbon means of transporting goods.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	+
A resilient Wales	+	+
A healthier Wales	0	0
A more equal Wales	0	0
A Wales of cohesive communities	0	0
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - No adverse impacts have been identified at this stage apart from potentially on land and property for lorry parking.

- **Key Risks:**
  - No specific risks have been identified at this stage.

ALT.1: Active Travel Routes and Infrastructure

2.7.5 An appraisal of the active travel routes and infrastructure intervention as compared to the do-minimum option has identified the following as set out below. It is assumed that measures arising may have a similar impact in the short, medium and long term:

- **Overcome identified problems** – The improvements to active travel routes and infrastructure could contribute a major beneficial impact to the limited active travel provision (P13). A moderate beneficial impact on low average trip lengths (P06) is anticipated through tackling short car journeys of up to 5km realistic cycling distance. Active travel measures can also help in addressing future development impacts, with a moderate beneficial impact identified (P10). as well as have minor beneficial impact on P03, P09 and P11 by improving journey time reliability for walking and cycling, helping to address air quality and noise impacts and addressing poor public transport provision by improving connections to interchanges.
- **Contributes to objectives** – A neutral impact is anticipated on improving highway efficiency, road safety and journey time reliability. Whilst active travel interventions should assist in reducing car modal share, there can also be increased delays to vehicle traffic through priorities at junctions and cycle lane infrastructure. A moderate beneficial impact on access to employment, services and on health and the environment is anticipated through encouraging physical activity and providing modal options for access to facilities and services.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	0	0
2	Improve road safety and journey time reliability.	0	0
3	Improve multi-modal travel options that reduce dependence on the motorway.	+	+
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	++	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	++	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	++	++
7	Improve communication and information to users and management of the motorway	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to all the well-being goals through supporting low

carbon travel and sustainable employment and cultural opportunities through a growth in walking and cycling, and community cohesion and access.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	++	++
A resilient Wales	+	+
A healthier Wales	++	++
A more equal Wales	+	+
A Wales of cohesive communities	++	++
A Wales of vibrant culture and Welsh language	+	+
A globally responsible Wales	++	++

- **Adverse Impacts:**
  - There is potential for adverse impacts on journey times for vehicles from priority measures for active travel.

- **Key Risks:**
  - Active travel measures may have other benefits but limited impact on the congestion of the M4.

ALT.2: Strategic Bus Corridors

2.7.6 An appraisal of the strategic bus corridors intervention as compared to the do-minimum option has identified the following:

- **Overcome identified problems** – The improvements to strategic bus corridors could contribute a minor beneficial impact on P03, P09 and P11 by improving journey times and reliability for public transport and helping to address air quality and noise impacts. A moderate beneficial impact on low average trip lengths (P06) is anticipated through tackling shorter car journeys through encouraging bus use. Strategic bus corridor measures can also help in addressing future development impacts, with a moderate beneficial impact identified (P10). It may also address the problem (P10) of limited park and ride by linking to park and ride facilities. A moderate beneficial effect on poor public transport provision (P11) has been identified which could arise if there is a substantial programme of strategic bus corridor upgrades in the study area. This could be higher in the longer term if rapid transit is achieved in the Bridgend to Porthcawl corridor although this may not have a significant direct benefit on the M4.
- **Contributes to objectives** – A neutral impact is anticipated on improving highway efficiency and resilience and to improve communication and information. A moderate beneficial impact on access to employment, services and on health and the environment is anticipated through encouraging physical activity and providing modal options for access to facilities and services. The impacts are considered to be similar in principle in the short and longer term. Although there is potential for rapid transit between Bridgend to Porthcawl to bring stronger benefits, this corridor may not have a

very direct benefit on the M4. A minor beneficial impact on journey time reliability, as an increase in reliability of journey times for bus users could be achieved, but there could be a decrease in reliability for car users if road space reallocated to buses and buses get priority at junctions, whilst a neutral impact on road safety is predicted.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	0	0
2	Improve road safety and journey time reliability.	+	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	++	++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	++	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	++	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	+	+
7	Improve communication and information to users and management of the motorway	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a beneficial impact on all the well-being goals except a Wales of vibrant culture and Welsh language through supporting access to employment and connectivity for communities with lower carbon based travel than the car. Strategic routes should have some benefits for rural communities in terms of ongoing connections to larger urban areas.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	+
A resilient Wales	+	+
A healthier Wales	+	+
A more equal Wales	+	+
A Wales of cohesive communities	+	+
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - There is potential for adverse impacts on transport costs through additional bus use giving rise to concessionary fare cost increases. There may be adverse land and property impacts of longer term measures such as rapid transit.

- **Key Risks:**
  - Strategic bus operations are reliant on the highway network being efficient and congestion may limit journey time benefits.
  - Enhancement of bus services requires the investment by commercial operators or additional public subsidy.

ALT.3: South Wales Metro

2.7.7 An appraisal of the South Wales Metro intervention as compared to the do-minimum option has identified the following as set out below. It should be noted that substantial South Wales Metro improvements are already identified in the Do Minimum thus this appraisal only involves additional interventions. The benefits are the same in the short to long term as the majority of the interventions identified are in the likely short and medium term programme.

- **Overcome identified problems** – The improvements to South Wales Metro could contribute a minor beneficial impact on P01, P03, P09, P10, P11 and P12 by helping to achieve modal shift and reducing congestion, improving journey times and reliability for public transport, helping to address air quality and noise impacts, helping to address future development needs and improving availability of park and ride. A moderate beneficial impact on low average trip lengths (P06) is anticipated through tackling shorter as well as longer car journeys through encouraging rail use (such as between Cardiff and Bridgend or long term between Porthcawl and Bridgend) has been identified, as well as on poor public transport provision (P11). The benefits are assessed as not as high as some public transport measures given that only a relatively small part of the study area would benefit.
- **Contributes to objectives** – A minor beneficial impact is anticipated on improving highway efficiency, journey time reliability as well as health and the environment. A moderate beneficial impact on multi modal options, access to employment and services is anticipated.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	+	+
2	Improve road safety and journey time reliability.	+	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	++	++

Objective	Description	Short Term Impact	Long Term Impact
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	++	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	++	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	+	+
7	Improve communication and information to users and management of the motorway.	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a beneficial impact on all the well-being goals except a Wales of vibrant culture and Welsh language through providing low carbon travel and better connectivity.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	++	++
A resilient Wales	+	+
A healthier Wales	+	+
A more equal Wales	+	+
A Wales of cohesive communities	+	+
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - No adverse impacts have been identified at this stage although there may be adverse land and property impacts of longer term measures such as rapid transit (addressed in ALT.2).

- **Key Risks:**
  - South Wales Metro proposals are likely to have benefits for journeys in the Maesteg/ Bridgend area but limited impact on the most congested parts of the study corridor.
  - Delivery risks will have been identified by other stakeholders in developing the Metro proposals.

ALT.4: South Wales Mainline Enhancements

2.7.8 An appraisal of the South Wales Mainline enhancements intervention as compared to the do-minimum option has identified the following as set out below. The intervention includes short to medium and longer term measures and where appropriate, the differences in the effects of each have been identified.

- **Overcome identified problems** – In the short and medium term the improvements to South Wales Mainline are anticipated to have a moderate beneficial impact on poor public transport provision (P11) and a minor beneficial impact on poor journey times and public transport reliability, low average trip lengths and development impacts (P03, P06 and P10). The interventions would tackle shorter as well as longer car journeys through encouraging rail use (in particular the local service enhancement between Cardiff and Swansea and in the longer term services west of Swansea) such as between Cardiff and Bridgend or long term between Porthcawl and Bridgend).

  In the longer term, more substantial improvements to line speeds reducing journey times could bring a major benefit in terms of journey times and improved public transport (P03). The major beneficial impact on poor public transport provision (P11) is anticipated given the long term potential upgrades to strategic connections along the motorway corridor. Moderate benefits to addressing low average trip lengths and planned developments are anticipated (P06 and P10), given the proximity of stations on the mainline to many key developments (P11).
- **Contributes to objectives** – In the longer term, a minor beneficial impact is anticipated on improving highway efficiency, road safety and journey time reliability. Moderate beneficial impacts are anticipated on access to employment and services as well as health and the environment. A major beneficial impact is identified for improving multi modal travel options that reduce dependence on the motorway as the rail corridor offers the opportunity to provide for a larger proportion of strategic trips, given that it runs parallel to the M4. Impacts in the short term are assumed to be lower than following the more substantial long term interventions.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	0	+
2	Improve road safety and journey time reliability.	0	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	++	+++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	+	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	+	++

Objective	Description	Short Term Impact	Long Term Impact
6	Improve health and the local and global environment, including reducing air and noise pollution.	+	++
7	Improve communication and information to users and management of the motorway	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a beneficial impact on all the well-being goals except a Wales of vibrant culture and Welsh language providing sustainable travel connections to strategic destinations supports the local economy, tourism and communities by enabling communities to thrive whilst being linked to markets and facilities both within the study area and further afield.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	++	++
A resilient Wales	++	++
A healthier Wales	+	++
A more equal Wales	+	+
A Wales of cohesive communities	+	+
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - No adverse impacts have been identified at this stage.

- **Key Risks:**
  - Delivery risks will be identified by other stakeholders in developing Mainline enhancement proposals.

ALT.5: Swansea Bay Metro

2.7.9 An appraisal of the Swansea Bay Metro intervention as compared to the do-minimum option has identified the following as set out below. The intervention includes short to medium and longer term measures and where appropriate, the differences in the effects of each has been identified.

- **Overcome identified problems** – The Swansea Bay Metro in the short term could contribute a minor beneficial impact low average trip lengths, planned future development impacts, public transport provision, park and ride and active travel (P06,

P10, P11, P12 and P13) through improvements in park and ride provision at key stations and integration of bus routes and active travel.

Longer term, there is potential for a minor beneficial impact on road network congestion and delay, junctions, journey times and reliability by public transport and air quality and noise (P01, P02, P03 and P09). There is potential for a moderate benefit on the problems of low average trip lengths, planned future development, park and ride and active travel (P06, P10, P12 and P13) and a major public transport provision benefit from a new dedicated commuter rail network and potential for tram/ LRT/ ultra-light rail (P11).

- **Contributes to objectives** – For the short term measures, a minor beneficial impact is anticipated on improving multi modal options, access to employment and services as well as health and the environment. For the longer term measures, a major beneficial impact is identified for improving multi modal travel options that reduce dependence on the motorway as this would provide the opportunity for commuter journeys in the Swansea area to be undertaken by trail. There are also moderate beneficial impacts anticipated on access to employment, services, health and the environment and minor on highway and junction efficiency, delay and journey time reliability.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	0	+
2	Improve road safety and journey time reliability.	0	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	+	+++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	+	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	+	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	+	++
7	Improve communication and information to users and management of the motorway	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a moderate beneficial impact in the longer term on all the well-being goals with the exception of a more equal Wales and globally responsible Wales (minor beneficial impact) and a Wales of vibrant culture and Welsh language (minor beneficial impact) providing sustainable travel connections within the

study area supports the growth of the local economy, tourism and communities by enabling communities to thrive whilst being linked to markets and facilities both within the study area and further afield.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	++
A resilient Wales	+	++
A healthier Wales	+	++
A more equal Wales	+	+
A Wales of cohesive communities	+	++
A Wales of vibrant culture and Welsh language	+	+
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - No adverse impacts have been identified at this stage although there may be land and property impacts associated with options.

- **Key Risks:**
  - Delivery risks will be identified by other stakeholders in developing Metro proposals.

ALT. 6: West and Mid Wales Rail Connections

2.7.10 The West and Mid Wales Rail connections intervention is anticipated in the longer term. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – Improvements to the connections to West Wales and Mid Wales could contribute a minor beneficial impact on poor journey times and public transport reliability, low trip lengths and planned future development impacts (P03, P06, and P10) as well as moderate beneficial on poor public transport provision through improvements in connections to the Heart of Wales Line and reductions in journey times through to Llanelli, Carmarthen and West Wales (P11).
- **Contributes to objectives** – A moderate beneficial impact is anticipated on improving multi modal options, and access to employment and services and a minor impact on improving health and the environment.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network	N/A	0
2	Improve road safety and journey time reliability	N/A	0

Objective	Description	Short Term Impact	Long Term Impact
3	Improve multi-modal travel options that reduce dependence on the motorway	N/A	++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity	N/A	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being	N/A	++
6	Improve health and the local and global environment, including reducing air and noise pollution	N/A	+
7	Improve communication and information to users and management of the motorway	N/A	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a moderate beneficial impact in the longer term on the well-being goals with the exception of a healthier Wales, a more equal Wales and globally responsible Wales (minor beneficial impact) and a Wales of vibrant culture and Welsh language (neutral impact) providing sustainable travel connections between the rural parts of west and mid Wales to strategic destinations supports the local economy, agriculture, tourism and communities by enabling communities to thrive whilst being linked to markets and facilities.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	N/A	++
A resilient Wales	N/A	++
A healthier Wales	N/A	+
A more equal Wales	N/A	+
A Wales of cohesive communities	N/A	++
A Wales of vibrant culture and Welsh language	N/A	0
A globally responsible Wales	N/A	+

- **Adverse Impacts**:
  - No adverse impacts have been identified at this stage although there may be land and property impacts associated with long term options.

- **Key Risks:**
  - Delivery risks will be identified by other stakeholders in developing proposals.

ALT.7: West Wales Parkway

2.7.11 The West Wales Parkway intervention is anticipated in the longer term, with feasibility and business case work in the short term including identification of location. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – Provision of a West Wales Parkway could improve connectivity to west Wales, reducing journey times by providing a direct connection that does not go into Swansea Railway Station. There is potential to reduce congestion on the motorway through encouraging modal transfer to rail, although there may be increased delays at the motorway junction providing access, depending on location (P01 and P02) as well as reduce traffic movements into Swansea city centre to access the station.

  There could be a minor beneficial impact on poor journey times and public transport reliability and planned future development impacts (P03, P10 and P11) as well as on poor public transport provision through improved connections between the main line and the Swansea District Line. This intervention could have a major beneficial impact on addressing the lack of park and ride provision, enabling those travelling from the west of Wales to join rail services for making longer distance journeys.
- **Contributes to objectives** – A moderate beneficial impact is anticipated on improving multi modal options, and access to employment and for business and tourism, particularly for areas to the west of Swansea. A minor impact on improving journey time reliability and access to local services is anticipated, with the impacts being more on longer distance journeys. The impact on the objectives for highway efficiency and resilience is anticipated to be neutral as there would be some benefits but increased congestion in the local vicinity. The benefits for health and the environment are likely to be neutral.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	N/A	0
2	Improve road safety and journey time reliability.	N/A	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	N/A	++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	N/A	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	N/A	+

6	Improve health and the local and global environment, including reducing air and noise pollution.	N/A	0
7	Improve communication and information to users and management of the motorway	N/A	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to a prosperous, resilient Wales and cohesive communities, through providing an improved means of joining the rail services from west Wales to strategic destinations supports the local economy, agriculture, tourism and communities.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	N/A	+
A resilient Wales	N/A	+
A healthier Wales	N/A	0
A more equal Wales	N/A	0
A Wales of cohesive communities	N/A	+
A Wales of vibrant culture and Welsh language	N/A	0
A globally responsible Wales	N/A	0

- **Adverse Impacts:**
  - No adverse impacts have been identified at this stage although there may be land and property impacts associated with long term options.

- **Key Risks:**
  - The development of a West Wales Parkway Station may conflict with proposals for a Swansea Bay Metro by re-routing through trains away from existing stations, such as Swansea Central Station.

ALT.8: Public Transport Interchanges

2.7.12 The Public Transport Interchanges intervention aims to bring upgrades to rail and bus interchanges to make them more accessible and high quality and better integrated with the active travel network and between bus and rail and public transport and cars. The contribution to problems and objectives is anticipated to increase over time as the strategy is put in place and improvements are brought forward. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – Provision of interchange improvements has the potential to reduce congestion on the motorway through increased use of other modes, depending on location (P01). There may be increased junction delays at the motorway junctions providing access to the interchange, depending on location (P02).

This intervention could have a major beneficial impact on addressing poor public transport provision, the lack of park and ride/ park and share provision and active travel (P11, P12, P13). There could be moderate benefits in terms of addressing future development needs and low average trip lengths (P06 and P10). Minor benefits on journey times and reliability and air quality and noise could be experienced (P03 and P09).

- **Contributes to objectives** – In the longer term as the strategy is fully implemented, a major beneficial impact is anticipated on improving multi modal travel options and a moderate impact on improving access to employment and for business and tourism and to local services and facilities as well as health and the environment, through encouraging low carbon modes and active travel. A minor impact on improving highway efficiency and journey time reliability is anticipated.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	0	+
2	Improve road safety and journey time reliability.	0	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	++	+++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	+	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	+	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	+	++
7	Improve communication and information to users and management of the motorway	0	0

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a moderate beneficial impact on the well-being goals, with the exception of a globally responsible Wales (minor beneficial impact) and a Wales of vibrant culture and Welsh language (neutral impact) providing sustainable travel connections between communities and strategic destinations enabling access to jobs and services.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	++	++
A resilient Wales	++	++
A healthier Wales	+	++
A more equal Wales	++	++
A Wales of cohesive communities	++	++
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - No adverse impacts have been identified at this stage although there may be land and property impacts associated with the options.

- **Key Risks:**
  - No specific risks have been identified for the enhancement of public transport interchanges. These would be identified on a project basis.

ALT.9: Park & Ride and Park & Share M4 Corridor Strategy

2.7.13 The Park and Ride and Park and Share strategy aims to improve facilities along the motorway corridor in a coordinated manner to maximise the benefits for M4 congestion. The contribution to problems and objectives is anticipated to increase over time as the strategy is put in place and sites are brought forward. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – Provision of park and ride/ park and share sites have the potential to reduce congestion on the motorway for trips to the east or west of the facility, depending on the main direction of travel being addressed (i.e. whether it meets needs for trips to and from Swansea for example). Sites may reduce traffic movements into Swansea city centre or potentially Bridgend, Cardiff etc to and from the motorway (P01). However, there may be increased junction delays at the motorway junctions providing access, depending on location (P02).

  This intervention could have a major beneficial impact on addressing the lack of park and ride/ park and share provision, enabling those travelling using the motorway to employment, hospitals, tourist attractions etc to travel shorter distances by car as well as car share. There could be a minor beneficial impact on low average journey lengths, planned future development impacts, and poor public transport provision (P06, P10 and P11).
- **Contributes to objectives** – In the longer term as the strategy is fully implemented, a moderate beneficial impact is anticipated on improving multi modal options, and access to employment and for business and tourism and to local services and facilities (for example park and ride may provide improved access to hospital and education sites). A minor impact on improving journey time reliability and access to local services is anticipated, with the impacts being more on longer distance journeys. Beneficial impacts

on management of the motorway are also anticipated through use of park and ride to address peak periods and event management for example. The impact on the objectives for highway efficiency and resilience is anticipated to be neutral as there would be some benefits but increased congestion in the local vicinity. The benefits for health and the environment are likely to be neutral.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	0	0
2	Improve road safety and journey time reliability.	0	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	+	++
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	+	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	+	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	0	0
7	Improve communication and information to users and management of the motorway	+	+

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a minor beneficial impact on the following goals, namely a prosperous Wales, a resilient Wales, a more equal Wales and a Wales of cohesive communities providing opportunities to transfer from cars to sustainable travel and improving connectivity to jobs and services.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	+
A resilient Wales	+	+
A healthier Wales	0	0
A more equal Wales	+	+
A Wales of cohesive communities	+	+
A Wales of vibrant culture and Welsh language	0	0

Well-Being Goals	Short Term Impact	Long Term Impact
A globally responsible Wales	0	0

- **Adverse Impacts:**
  - There is potential for an adverse impact on journey times as people using park and ride likely to have longer journey times due to interchange time and waiting for the bus service. There are also likely to be land and property impacts associated with the options.

- **Key Risks:**
  - Park and Ride and Park and Share sites are being brought forward by a number of stakeholders. In order to ensure a strategic approach is delivered and potential benefits for the M4 are not realised, it is essential that stakeholders work collaboratively.

ERS.1: J36-38 Improvements Package

2.7.14 The improvements to the M4 between Junctions 36 and 38 seek to develop and implement measures to address high vehicle speeds and road safety on this section. The measures are anticipated to be short and medium term. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – Speed reduction and road safety measures would be anticipated to a moderate beneficial impact on road safety and air quality and noise problems (P08 and P09). Minor beneficial impacts on highway network standard and planned development impacts could also be anticipated (P07 and P10). Neutral contributions may be made to road network congestion and delay and journey times, as there may be a reduction in average speed outside of peak times as a result, but traffic flow may be more predictable (P01 and P02).
- **Contributes to objectives** – A major beneficial impact is anticipated on improving road safety and journey time reliability and moderate benefits on objectives for air quality and noise and improving communication and management of the motorway. Similarly, moderate benefits to highway efficiency and resilience are anticipated due to the tackling of accidents.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	++	++
2	Improve road safety and journey time reliability.	+++	+++
3	Improve multi-modal travel options that reduce dependence on the motorway.	0	0
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	0	0
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	0	0
6	Improve health and the local and global environment, including reducing air and noise pollution.	++	++
7	Improve communication and information to users and management of the motorway	++	++

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a moderate beneficial impact against the goal to deliver a healthier Wales and a minor beneficial impact on the goal to achieve a globally responsible Wales.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	0	0
A resilient Wales	0	0
A healthier Wales	++	++
A more equal Wales	0	0
A Wales of cohesive communities	0	0
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	+	+

- **Adverse Impacts:**
  - There is potential for an adverse impact on average journey times outside of the peak periods by addressing high average speeds.

- **Key Risks:**
  - The gradient of the section of motorway is a constraint that may impact on the achievability of speed reduction.

ERS.2: J38-43 Improvements Package

2.7.15 The improvements to the M4 between Junctions 38 and 43 seek to address the issues of congestion and delay, accidents, air quality and noise impacts. The measures are anticipated to make a different level of contribution to problems and objectives in the short and medium term compared to the long term. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – The short and medium term interventions could have a moderate beneficial impact on road network congestion and delay, junction queuing and delay, poor journey times and reliability, the standard of the highway network (through junction reconfiguration for example), road safety and dealing with development impacts (P01, P02, P03, P07, P08 and P10). The longer term interventions could generally bring increased contributions to each of these problems with major beneficial contributions for road network congestion, poor journey times and reliability, highway network standard and planned future development impacts. However local short trips by motorway may be encouraged through provision of enhanced highway infrastructure (P06). The impact on air quality and noise problems is seen as neutral as it depends on the details of the interventions and there may be knock on impacts elsewhere (P09).
- **Contributes to objectives** – The short and medium term interventions could bring a moderate benefit to meeting objectives for highway efficiency and resilience, road safety and journey time reliability and access to employment, business and tourism (for strategic connections through South Wales) and on communication and management of the M4. A neutral impact on the health and air quality and noise is anticipated as there may be some benefits along the motorway corridor but could be negative impacts on alternative routes.

In the longer term, with more substantial possible interventions of motorway widening or an alternative route, major beneficial impacts could be found on objectives for highway efficiency and resilience, road safety and journey reliability and on access to employment and for business and tourism. For example, the increased capacity may particularly address peak period congestion westbound to west Wales affecting tourism. There may be some benefit for sustainable modes of travel through better journey times for regional bus services, and access to park and ride sites and stations. The extent of contribution to access to services as well as more local employment in the corridor would be dependent on the detail of interventions but is likely to be positive. As in the short term the impact on air quality and noise is considered to be neutral as this early stage.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	++	+++
2	Improve road safety and journey time reliability.	++	+++
3	Improve multi-modal travel options that reduce dependence on the motorway.	0	+
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	++	+++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	+	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	0	0
7	Improve communication and information to users and management of the motorway	++	++

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a minor beneficial impact against four of the well-being goals and the remaining impacts considered to be neutral in particular the interventions would support a prosperous Wales through reducing regional barriers experienced for connectivity for the rural, agricultural and tourism based economy and communities in West and Mid Wales including for strategic/ regional bus services.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	+

Well-Being Goals	Short Term Impact	Long Term Impact
A resilient Wales	+	+
A healthier Wales	0	0
A more equal Wales	+	+
A Wales of cohesive communities	+	+
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	0	0

- **Adverse Impacts:**
  - There could be adverse impacts on the landscape and the historic environment depending on options taken forward as well as severance to communities through increased traffic levels on other routes such as Harbour Way/ PDR. There are also likely to be land and property impacts from options, particularly those for the long term.

- **Key Risks:**
  - Displacement of traffic onto alternative routes may lead to transference of air quality and noise impacts to other areas.
  - Public and political acceptability of any changes to junction arrangements and long term substantial options.
  - Improving highway efficiency has the potential to improve journey times and reliability, thus has the potential to encourage more journeys to be undertaken by motorist vehicles.

ERS.3: J43-47 Improvements Package

2.7.16 The improvements to the M4 between Junctions 43 and 47 seek to address the issues of congestion and delay, accidents, and highway network resilience issues. The measures are anticipated to make a different level of contribution to problems and objectives in the short and medium term compared to the long term. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – The short and medium term interventions could have a beneficial impact on road network congestion and delay, junction queuing and delay, poor journey times and reliability, the standard of the highway network (through junction reconfiguration for example), road safety and dealing with development impacts (P01, P02, P03, P07, P08 and P010). The longer term interventions could generally bring increased contributions to each of these problems. However local short trips by motorway may be encouraged through provision of enhanced highway infrastructure (P07). The impact on air quality and noise problems is seen as neutral as it depends on the details of the interventions (P09).
- **Contributes to objectives** – The short and medium term interventions could bring a moderate benefit to meeting objectives for highway efficiency and resilience, road safety and journey time reliability and access to employment, business and tourism (for strategic connections through South Wales) and access to services and facilities and

management of the motorway (through junction efficiency improvements and crawling lane for example). A neutral impact on the health and air quality and noise is anticipated as the benefits along the motorway corridor would depend on the details of the interventions.

In the longer term, with more substantial possible interventions of motorway widening or additional lane provision, major beneficial impacts could be found on objectives for highway efficiency and resilience, road safety and journey reliability and on access to employment and for business and tourism as well as services and facilities (with major facilities such as Morriston Hospital being in this corridor) and management of the motorway and junctions. There may be some benefit for sustainable modes of travel through better journey times for regional bus services and access to park and ride sites and stations. As in the short term the impact on air quality and noise is considered to be neutral as this early stage.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	++	+++
2	Improve road safety and journey time reliability.	++	+++
3	Improve multi-modal travel options that reduce dependence on the motorway.	0	+
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	++	+++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	++	+++
6	Improve health and the local and global environment, including reducing air and noise pollution.	0	0
7	Improve communication and information to users and management of the motorway	++	+++

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a minor beneficial impact against four of the well-being goals and the remaining impacts considered to be neutral in particular the interventions would support a prosperous Wales through reducing regional barriers experienced for connectivity for the rural, agricultural and tourism based economy and communities in West and Mid Wales including for strategic/ regional bus services.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	+
A resilient Wales	+	+
A healthier Wales	0	0
A more equal Wales	+	+
A Wales of cohesive communities	+	+
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	0	0

- **Adverse Impacts:**
  - There could be adverse impacts on the landscape/ townscape and the historic environment depending on options taken forward. There are also likely to be land and property impacts from options, particularly those for the long term.

- **Key Risks:**
  - Provision of additional lanes and links may lead to increased air quality and noise impacts on areas in the vicinity.
  - Public and political acceptability of motorway widening or Smart Motorway arrangements.
  - Improving highway efficiency has the potential to improve journey times and reliability, thus has the potential to encourage more journeys to be undertaken by motorist vehicles.

ERS.4: Junction Improvements

2.7.17 The improvements to the M4 junctions outside of the specifically identified sections (Junctions 36, 48 and 49) seek to address the issues of congestion and delay and connectivity resilience issues. This includes connections from Junction 48 on the A4138. The measures are anticipated to make the same contribution to problems and objectives in the short and medium term compared to the long term. An appraisal of the impacts as compared to the do-minimum option is set out below.

- **Overcome identified problems** – The interventions could have a moderate beneficial impact on problems of road network congestion and delay, poor journey times and reliability, the standard of the highway network (through junction reconfiguration), and dealing with development impacts (P01, P03, P07, P08 and P10). A more substantial contribution could be made to junction queuing and delay problems (P02). However local short trips by motorway may be encouraged through provision of enhanced highway infrastructure (P06). The impact on air quality and noise problems is seen as neutral as it depends on the details of the interventions (P09).
- **Contributes to objectives** – The interventions could bring a moderate benefit to meeting objectives for highway efficiency and resilience, access to employment, business and tourism (for destinations served by the motorway junctions) and access to services and facilities. A minor contribution is anticipated for road safety and journey time reliability and improvement to multi modal options given the localised nature of

improvements. A neutral impact on the health and air quality and noise is anticipated as the benefits at junctions would depend on the details of the interventions.

Objective	Description	Short Term Impact	Long Term Impact
1	Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	++	++
2	Improve road safety and journey time reliability.	+	+
3	Improve multi-modal travel options that reduce dependence on the motorway.	+	+
4	Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	++	++
5	Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	++	++
6	Improve health and the local and global environment, including reducing air and noise pollution.	0	0
7	Improve communication and information to users and management of the motorway	+	+

- **Meets Well-being Goals** – The table below summarises potential contribution of the intervention to the seven well-being goals of the Future Generations of Wales Act. A positive contribution is anticipated to have a minor beneficial impact against three of the well-being goals and the remaining impacts considered to be neutral in particular the interventions would support a prosperous Wales through reducing regional barriers experienced for connectivity for the rural, agricultural and tourism based economy and communities in West and Mid Wales including for strategic/ regional bus services, particularly this intervention can support connectivity to the Llanelli area (including park and ride and bus priority) as well as west Wales through improvements to the M4/A40 junction at Pont Abraham.

Well-Being Goals	Short Term Impact	Long Term Impact
A prosperous Wales	+	+
A resilient Wales	+	+
A healthier Wales	0	0
A more equal Wales	0	0
A Wales of cohesive communities	+	+

Well-Being Goals	Short Term Impact	Long Term Impact
A Wales of vibrant culture and Welsh language	0	0
A globally responsible Wales	0	0

- **Adverse Impacts:**
  - There are no known adverse impacts at present although there may be land and property impacts from options, particularly those for the long term.

- **Key Risks:**
  - Junction improvements require a joint approach between the Trunk Road Agency and local authorities who may have differing priorities.
  - Future developments in close proximity to junctions may impact on success of interventions (although it may also provide the opportunity for upgrades).
  - Improving highway efficiency has the potential to improve journey times and reliability, thus has the potential to encourage more journeys to be undertaken by motorist vehicles.

2.8 Summary of Contribution to Problems, Objectives and Well-being Goals

2.8.1 The Stage One appraisal as set out above demonstrates that all the interventions identified are considered to make a positive contribution to problems, objectives and well-being goals and address the Strategic Case requirements. The interventions provide an integrated programme approach to tackling the congestion problems of the M4 corridor from Junction 35 to 49 rather than alternative options. The appraisal identifies that the Do-Minimum scenario is expected to lead to worsening problems with a negative impact on objectives and well-being goals. Table 11, Table 12 and Table 13 summarise the contribution of each of the interventions to the problems, objectives and well-being goals.

2.8.2 The strongest overall potential contribution to problems and objectives is anticipated from the following interventions:

- Swansea Bay Metro (long term);
- Public Transport Interchanges (long term);
- South Wales Main Line Enhancements (long term);
- J38-43 Improvements Package (short, medium and long term); and
- J43-47 Improvements Package (long term).

2.8.3 All of the interventions are considered to make a positive contribution to well-being goals with the strongest overall potential contributions anticipated from the following interventions:

- Public Transport Interchanges (short, medium and long term); and
- Active Travel Routes.

Table 11 Contribution to Problems

Intervention		Short Term/ Long Term	P1 Road network congest-ion and delay	P2 Junction queuing and delay	P3 Poor journey times and reliability	P4 Low average trip lengths	P5 Highway network standard	P6 Road safety issues	P7 Air quality and noise	P8 Planned future develop ment impacts	P9 Poor public transport provision	P10 Limited park and ride	P11 Limited active travel provision
DM	Do Minimum		-	-	-	0	0	-	-	+	+	0	+
MND.1	Study Area Wide Network Management		+	+	+	+	0	+	+	+	0	0	0
MND.2	Freight Measures		0	0	+	0	0	0	+	0	+	0	0
ALT.1	Active Travel Routes		0	0	+	++	0	0	+	++	+	0	+++
ALT.2	Strategic Bus Corridors		0	-	+	++	0	0	+	++	++	++	0
ALT.3	South Wales Metro		+	0	+	++	0	0	+	+	++	+	0
ALT.4	South Wales Mainline Enhancements	Short Term	0	0	+	+	0	0	0	+	++	0	0
		Long Term	+	+	+++	++	0	0	+	++	+++	+	0
ALT.5	Swansea Bay Metro	Short Term	0	0	0	+	0	0	0	+	+	+	+
		Long Term	+	+	+	++	0	0	+	++	+++	++	++

Intervention		Short Term/ Long Term	P1 Road network congest-ion and delay	P2 Junction queuing and delay	P3 Poor journey times and reliability	P4 Low average trip lengths	P5 Highway network standard	P6 Road safety issues	P7 Air quality and noise	P8 Planned future develop ment impacts	P9 Poor public transport provision	P10 Limited park and ride	P11 Limited active travel provision
ALT.6	West and Mid Wales Rail Connections		0	0	+	+	0	0	0	+	++	0	0
ALT.7	West Wales Parkway		+	-	+	0	0	0	0	+	+	+++	0
ALT.8	Public Transport Interchanges		0	0	+	++	0	0	+	++	+++	+++	+++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy		0	-	0	+	0	0	0	+	+	+++	0
ERS.1	J36-38 Improvements Package		0	0	0	0	+	++	++	+	0	0	0
ERS.2	J38-43 Improvements Package	Short Term	++	++	++	0	++	++	0	++	0	0	0
		Long Term	+++	++	+++	-	+++	++	0	+++	0	0	0
ERS.3	J43-47 Improvements Package	Short Term	+	++	+	0	+	+	0	++	0	0	0
		Long Term	++	+++	++	-	++	++	0	++	0	0	0
ERS.4	Junction Improvements		++	+++	++	-	++	+	0	++	0	0	0

Table 12 Contribution to Objectives

Intervention		Short Term/ Long Term	O1 Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	O2 Improve road safety and journey time reliability.	O3 Improve multi-modal travel options that reduce dependence on the motorway.	O4 Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	O5 Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	O6 Improve health and the local and global environment, including reducing air and noise pollution.	O7 Improve communication and information to users and management of the motorway
DM	Do Minimum	Short Term	-	-	0	0	0	0	0
		Long Term	--	--	+	0	0	-	0
MND.1	Study Area Wide Network Management		+	+	0	+	+	+	+
MND.2	Freight Measures		+	+	+	+	0	0	+
ALT.1	Active Travel Routes		0	0	+	++	++	++	0
ALT.2	Strategic Bus Corridors		0	+	++	++	++	+	0
ALT.3	South Wales Metro		+	+	++	++	++	+	0
ALT.4	South Wales Mainline Enhancements	Short Term	0	0	++	+	+	+	0

Intervention		Short Term/ Long Term	O1 Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	O2 Improve road safety and journey time reliability.	O3 Improve multi-modal travel options that reduce dependence on the motorway.	O4 Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	O5 Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	O6 Improve health and the local and global environment, including reducing air and noise pollution.	O7 Improve communication and information to users and management of the motorway
		Long Term	+	+	+++	++	++	++	0
ALT.5	Swansea Bay Metro	Short Term	0	0	+	+	+	+	0
		Long Term	+	+	+++	++	++	++	0
ALT.6	West and Mid Wales Rail Connections		0	+	++	++	++	+	0
ALT.7	West Wales Parkway		0	+	++	++	+	0	0
ALT.8	Public Transport Interchanges	Short Term	0	0	++	+	+	+	0
		Long Term	+	+	+++	++	++	++	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Short Term	0	0	+	+	+	0	+
		Long Term	0	+	++	++	++	0	+
ERS.1	J36-38 Improvements Package		++	+++	0	0	0	++	++

Intervention		Short Term/ Long Term	O1 Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	O2 Improve road safety and journey time reliability.	O3 Improve multi-modal travel options that reduce dependence on the motorway.	O4 Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.	O5 Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.	O6 Improve health and the local and global environment, including reducing air and noise pollution.	O7 Improve communication and information to users and management of the motorway
ERS.2	J38-43 Improvements Package	Short Term	++	++	0	++	+	0	++
		Long Term	+++	+++	+	+++	++	0	++
ERS.3	J43-47 Improvements Package	Short Term	++	++	0	++	++	0	++
		Long Term	+++	+++	+	+++	+++	0	+++
ERS.4	Junction Improvements		++	+	+	++	++	0	+

Table 13 Contribution to Well-Being Goals

Intervention		Short Term/ Long Term	A prosperous Wales	A resilient Wales	A healthier Wales	A more equal Wales	A Wales of cohesive communities	A Wales of vibrant culture and Welsh language	A globally responsible Wales
DM	Do Minimum	Short Term	0	0	0	0	0	0	0
		Long Term	0	0	-	0	0	0	0
MND.1	Study Area Wide Network Management		++	+	+	0	0	0	+
MND.2	Freight Measures		+	+	0	0	0	0	+
ALT.1	Active Travel Routes		++	+	++	+	++	+	++
ALT.2	Strategic Bus Corridors		+	+	+	+	+	0	+
ALT.3	South Wales Metro		++	+	+	+	+	0	+
ALT.4	South Wales Mainline Enhancements	Short Term	++	++	+	+	+	0	+
		Long Term	++	++	++	+	+	0	+
ALT.5	Swansea Bay Metro	Short Term	+	+	+	+	+	0	+
		Long Term	++	++	++	+	++	+	+

Intervention		Short Term/ Long Term	A prosperous Wales	A resilient Wales	A healthier Wales	A more equal Wales	A Wales of cohesive communities	A Wales of vibrant culture and Welsh language	A globally responsible Wales
ALT.6	West and Mid Wales Rail Connections		++	++	+	+	++	0	+
ALT.7	West Wales Parkway		+	+	0	0	+	0	0
ALT.8	Public Transport Interchanges	Short Term	++	++	+	++	++	0	+
		Long Term	++	++	++	++	++	0	+
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy		+	+	0	+	+	0	0
ERS.1	J36-38 Improvements Package		0	0	++	0	0	0	+
ERS.2	J38-43 Improvements Package	Short Term	+	+	0	+	+	0	0
		Long Term	+	+	0	+	+	0	0
ERS.3	J43-47 Improvements Package	Short Term	+	+	0	+	+	0	0
		Long Term	+	+	0	+	+	0	0
ERS.4	Junction Improvements		+	+	0	0	+	0	0

2.9 Summary of Adverse Impacts and Key Risks

2.9.1 At this early stage, the appraisal has identified potential adverse impacts and the key risks to taking forward interventions. These are summarised in Table 14.

Table 14 Summary of Adverse Impacts and Key Risks

Intervention		Adverse Impacts	Key Risks
DM	Do Minimum	• Worsening journey quality • Increased numbers of accidents • Poor access to employment and services through congestion • Discouragement to tourists from journey delays during peak weekend and holiday periods • Noise and air quality impacts from traffic on adjacent communities. • Increased journey times • Reduced journey time reliability • Increased transport costs for road users • Impacts on the wider economy through labour market and agglomeration disbenefits.	• Failure to comply with environmental legislation such as for air quality • Substantial investment is required to maintain the existing infrastructure • Sustainable economic growth of the region cannot be fully realised
MND.1	Study Area Wide Network Management	• No adverse impacts from the intervention have not been identified at this stage.	• The successful implementation of strategies requires an integrated and multi-agency approach which may be difficult to achieve where there are differing priorities.
MND.2	Freight Measures	• No adverse impacts have not been identified at this stage apart from potentially on land and property for lorry parking.	• No specific risks have been identified at this stage.
ALT.1	Active Travel Routes	• Increased journey times for vehicles from priority measures for active travel.	• Active travel measures may have other benefits but limited impact on the congestion of the M4.
ALT.2	Strategic Bus Corridors	• Transport costs through additional bus use giving	• Strategic bus operations are reliant on the highway

Intervention		Adverse Impacts	Key Risks
		rise to concessionary fare cost increases. • Land and property impacts of longer term measures such as rapid transit.	network being efficient and congestion may limit journey time benefits. • Enhancement of bus services requires the investment by commercial operators or additional public subsidy.
ALT.3	South Wales Metro	• No adverse impacts have been identified at this stage although there may be adverse land and property impacts of longer term measures such as rapid transit (addressed in ALT.2).	• South Wales Metro proposals are likely to have benefits for journeys in the Maesteg/ Bridgend area but limited impact on the most congested parts of the study corridor. • Delivery risks will have been identified by other stakeholders in developing the Metro proposals.
ALT.4	South Wales Mainline Enhancements	• No adverse impacts have been identified at this stage.	• Delivery risks will be identified by other stakeholders in developing Mainline enhancement proposals.
ALT.5	Swansea Bay Metro	• No adverse impacts have been identified at this stage although there may be land and property impacts associated with options.	• Delivery risks will be identified by other stakeholders in developing Metro proposals.
ALT.6	West and Mid Wales Rail Connections	• No adverse impacts have been identified at this stage although there may be land and property impacts associated with long term options.	• Delivery risks will be identified by other stakeholders in developing proposals.
ALT.7	West Wales Parkway	• No adverse impacts have been identified at this stage although there may be land and property impacts associated with the options.	• The development of a West Wales Parkway Station may conflict with proposals for a Swansea Bay Metro by re-routing through trains away from existing stations, such as Swansea Central Station.
ALT.8	Public Transport Interchanges	• No adverse impacts have been identified at this stage although there may be land and property impacts associated with the options.	• No specific risks have been identified for the enhancement of public transport interchanges. These would be identified on a project basis.

Intervention		Adverse Impacts	Key Risks
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	• There is potential for an adverse impact on journey times as people using park and ride likely to have longer journey times due to interchange time and waiting for the bus service. • There are also likely to be land and property impacts associated with the options.	• Park and Ride and Park and Share sites are being brought forward by a number of stakeholders. In order to ensure a strategic approach is delivered and potential benefits for the M4 are not realised, it is essential that stakeholders work collaboratively.
ERS.1	J36-38 Improvements Package	• There is potential for an adverse impact on average journey times outside of the peak periods by addressing high average speeds.	• The gradient of the section of motorway is a constraint that may impact on the achievability of speed reduction.
ERS.2	J38-43 Improvements Package	• Impacts on landscape and the historic environment depending on options taken forward • Severance to communities through increased traffic levels on other routes such as Harbour Way/ PDR. • Land and property impacts from options, particularly those for the long term.	• Displacement of traffic onto alternative routes may lead to transference of air quality and noise impacts to other areas • Public and political acceptability of any changes to junction arrangements and long term substantial options. • Improving highway efficiency has the potential to improve journey times and reliability, thus has the potential to encourage more journeys to be undertaken by motorist vehicles.
ERS.3	J43-47 Improvements Package	• There could be adverse impacts on landscape/ townscape and the historic environment depending on options taken forward. • Land and property impacts from options, particularly those for the long term.	• Provision of additional lanes and links may lead to increased air quality and noise impacts on areas in the vicinity • Public and political acceptability of motorway widening or Smart Motorway arrangements

Intervention		Adverse Impacts	Key Risks
			• Improving highway efficiency has the potential to improve journey times and reliability, thus has the potential to encourage more journeys to be undertaken by motorist vehicles.
ERS.4	Junction Improvements	• No known adverse impacts at present although there may be land and property impacts from options, particularly those for the long term.	• Junction improvements require a joint approach between the Trunk Road Agency and local authorities who may have differing priorities • Future developments in close proximity to junctions may impact on success of interventions (although it may also provide the opportunity for upgrades) • Improving highway efficiency has the potential to improve journey times and reliability, thus has the potential to encourage more journeys to be undertaken by motorist vehicles.

3 Transport Case

3.1 Overview

3.1.1 The aim of the Transport Case is to explain the expected impacts of the project, how the project will contribute to the well-being goals and whether a project will provide value for public money. The social, cultural, environmental and economic costs and benefits of each intervention are considered. The transport case presents the approach and assessment of impacts of each intervention under the headings of social, cultural, environmental and economic impacts and an evidence-based assessment of the following:

- What the impacts will be;
- The scale of those impacts;
- Where will they occur; and
- Who/ what will experience them.

3.2 Approach to Impact Assessment

3.2.1 An assessment of effects for each of the interventions has been undertaken. A qualitative assessment of the impacts against each of the criteria has been completed as there is only preliminary data available at this first stage in the WelTAG process. The WelTAG seven-point assessment scale as set out in Table 1 has been used to present the scale of the impact and has been determined using professional judgement and information presented in the Impacts Assessment Report. The impacts considered and the means of assessment for each is summarised below:

- **Social Impacts** – The social impacts have been assessed with reference to the guidance in WebTAG Unit A4.1. The assessment is qualitative, and the topics covered are physical activity, security, severance, journey quality, option and non-use values, accessibility and personal affordability.
- **Cultural Impacts** – The Future Generations of Wales (2015) Act has a well-being goal of 'A Wales of vibrant culture and thriving Welsh language'. It is noted that this well-being goal will be achieved through 'a society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation'. For this assessment, the cultural assessment is a qualitative commentary on any impacts on cultural assets, the Welsh language and tourism. Cultural assets considered include arts and cultural centres, sports facilities and cultural heritage. Tourism includes visitor attractions and tourism destinations.
- **Environmental Impacts** – The environmental impacts appraisal for this Stage One report is based on WebTAG Unit A3. The topics covered are noise, air quality, greenhouse gases, landscape, townscape, historic environment, biodiversity and water environment. At this stage, surveys have not been undertaken and the appraisal has been undertaken using desk top analysis. The Impacts Assessment Report sets out the environmental data utilised to inform the appraisal.
- **Economic Impacts** – The economic appraisal is a qualitative statement at present and considers the changes in journey time, reliability and accidents as well as transport costs and wider economic impacts.

3.3 Intervention Impact Assessment

3.3.1 The WelTAG seven-point assessment scale, as set out in Table 1 has been used to present the scale of the impact of each of the interventions against the WelTAG criteria. This is set out in Table 15. A commentary on the performance of each intervention against the criteria is contained in Appendix D with a table for each of the impact criteria.

3.3.2 The impact appraisal provides a high-level qualitative assessment of the potential contribution to social, cultural, environmental and economic areas of well-being. Limited information is available at Stage One to assess the environmental impacts. The summary of the impact assessment in the table highlights interventions which may give rise to significant beneficial impacts as well as potentially adverse effects.

3.3.3 At this stage, the impacts appraisal only enables early identification of potential areas of concern regarding adverse impacts and where benefits may arise to be identified. These would need to be fully considered in a Stage Two Appraisal to be identified.

Table 15 Impact Assessment Summary

Impacts	Short/ Long Term	Intervention													
		MND.1	MND.2	ALT.1	ALT.2	ALT.3	ALT.4	ALT.5	ALT.6	ALT.7	ALT.8	ALT. 9	ERS.1	ERS.2	ERS.3	ERS.4
Social																
Physical Activity		+	0	+++	0	0	0	0	0	0	++	0	0	0	0	0
Journey Quality	Short Term	+	0	++	++	+	+	+	0	++	++	+	0	+	+	+
	Long Term					++	++	++	++					++	++	
Accidents		+	0	0	0	0	0	0	0	0	0	0	+++	++	++	++
Security		+	++	0	0	0	0	++	0	++	++	++	0	0	0	0
Access to Employment	Short Term	+	0	++	++	++	+	+	0	0	++	+	0	++	++	++
	Long Term						+++	+++	++	++		++		+++	+++	
Access to Services	Short Term	+	0	++	+++	++	+	+	0	0	++	+	0	+	++	++
	Long Term						++	+++	++	+		++		++	+++	
Affordability		0	0	+	0	0	0	0	0	0	0	+	0	0	0	0
Severance	Short Term	0	0	++	0	0	0	0	0	0	0	0	0	--	0	0
	Long Term													-		
Cultural																
Cultural Facilities	Short Term	+	0	++	++	++	+	+	0	0	++	+	0	+	++	++

Impacts	Short/ Long Term	Intervention														
		MND.1	MND.2	ALT.1	ALT.2	ALT.3	ALT.4	ALT.5	ALT.6	ALT.7	ALT.8	ALT. 9	ERS.1	ERS.2	ERS.3	ERS.4
	Long Term						++	++	++	+		++		++	+++	
Welsh Language		+	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tourism	Short Term	+	0	+	+	+	+	+	0	0	++	+	0	+	++	++
	Long Term						+++	++	++	+				+++	+++	
Environmental																
Noise		++	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Air Quality		+	0	+	+	+	+	0	0	0	+	0	+	0	0	+
Landscape		NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	0	--	--	0
Historic Environment		NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	0	--	-	NDA
Biodiversity		NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
Water Environment		NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
Economic																
Journey Time Changes		+	0	-	+	+	++	+	+	0	0	-	-	++	++	++
Journey Time Reliability Changes	Short Term	+	0	++	++	++	++	++	0	+	0	0	++	++	++	++
	Long Term													+++	+++	
Transport Costs		0	0	++	-	0	0	0	0	0	0	0	0	0	0	0

Impacts	Short/ Long Term	Intervention													
		MND.1	MND.2	ALT.1	ALT.2	ALT.3	ALT.4	ALT.5	ALT.6	ALT.7	ALT.8	ALT. 9	ERS.1	ERS.2	ERS.3	ERS.4
Accidents		+	0	0	0	0	0	0	0	0	0	0	+++	++	++	++
Wider Economic Impacts		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Land and Property	Short Term	0	-	-	-	0	0	-	0	0	-	-	0	--	-	-
	Long Term				--	--		--	-	-				---	--	

4 Financial Case

4.1 Overview

4.1.1 The financial case *'tells you 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 life-time of the project and the implications of these for the balance sheet, income and expenditure accounts for public sector organisations'.*

4.2 Assessment

4.2.1 This WelTAG report represents the Stage One: Strategic Outline Case and the details to inform the financial case are of a preliminary nature at this stage. Key considerations are affordability, long term financial viability and potential sources of funding. For this stage of WelTAG only the initial implementation cost has been considered in order to identify any clear affordability risks. The high level assessment of the financial case is set out for each of the interventions in comparison to the Do Minimum in Chapter 2.

4.2.2 At this stage, detailed data on the revenue and capital implications are not available, hence a qualitative assessment of the financial case has been undertaken. This is based on whether the intervention is likely to be Low Cost (up to £5M), Medium Cost (£5-20M) or High Cost (£20M+). This was previously summarised in Chapter 2 for each intervention. Some interventions would be very high cost (such as more than £100M and this is noted and described.

4.2.3 Further work will be required to determine the forecast lifetime costs of the project with a greater certainty for the options selected for the Stage Two appraisal.

4.2.4 The financial case for each intervention is presented below.

<table>
<tr><th colspan="2">MND.1: Study Area Wide Network Management</th></tr>
<tr><th>Short Term and Medium Term Measures (within 5 years)</th><th>Long Term Measures (5 years and beyond)</th></tr>
<tr><td colspan="2">Costs: The indicative cost range is identified as low although this will require further exploration of revenue and operational costs.

<table>
<tr><td>High (>£20M)</td><td>Medium (£5-20M)</td><td>Low (<£5M)</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Affordability and Funding: The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.</td></tr>
</table>

MND.2: Freight Measures	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as low as is based on initial studies only. This will require further exploration of revenue and operational costs. High (>£20M) | Medium (£5-20M) | **Low (<£5M)**	Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ALT.1: Active Travel Routes and Infrastructure	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk. However, it is noted that this level of cost could represent a substantial proportion of current Welsh Government funding levels for Active Travel. Further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	

ALT.2: Strategic Bus Corridors	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as low although this will require further exploration of revenue and operational costs, particularly in relation to increases in bus services. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Costs The indicative cost range is identified as high as this includes a potential rapid bus transit connection, although this will require further exploration of revenue and operational costs. **High (>£20M)** | Medium (£5-20M) | Low (<£5M)
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding There may be an affordability and funding risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ALT.3: South Wales Metro	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs specifically related to rail service enhancements. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	As Strategic Bus Corridors
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	

ALT.4: South Wales Mainline	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs specifically related to rail service enhancements. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Costs The indicative cost range is identified as high. The scale of the improvements is likely to mean that the cost range would be very high, potentially of more than £1 billion[1], although this will require further exploration of capital, revenue and operational costs. **High (>£20M)** | Medium (£5-20M) | Low (<£5M)
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding The cost ranges indicate an affordability and funding risk given the scale of investment; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ALT.5: Swansea Bay Metro	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs related to rail and bus service enhancements. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Costs The indicative cost range is identified as high. The scale of the improvements is likely to mean that the cost range would be very high, potentially of more than £200 million[2], although this will require further exploration of capital, revenue and operational costs. **High (>£20M)** | Medium (£5-20M) | Low (<£5M)

[1] The Case for Rail Investment in Wales costs SWML improvements at £1.04bn

[2] From report as above

ALT.5: Swansea Bay Metro	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding The cost ranges indicate an affordability and funding risk given the scale of investment; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ALT.6: West and Mid Wales Rail Connections	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as low as it involves the business case and project development work. High (>£20M) | Medium (£5-20M) | Low (<£5M)	Costs The indicative cost range is identified as medium although this will require further exploration of capital, revenue and operational costs. High (>£20M) | Medium (£5-20M) | Low (<£5M)
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ALT.7: West Wales Parkway	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as low as it involves the business case and project development work. High (>£20M) | Medium (£5-20M) | **Low (<£5M)**	Costs The indicative cost range is identified as high although this will require further exploration of capital, revenue and operational costs. **High (>£20M)** | Medium (£5-20M) | Low (<£5M)
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding There may be an affordability and funding risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ALT.8: Public Transport Interchanges	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs. The scale of costs depends on which interchanges are taken forward and the level of upgrade. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	

ALT.9: Park & Ride and Park & Share M4 Corridor Strategy	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs. The scale of costs depends on which and how many sites are taken forward and the level of works required. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	

ERS.1: J36-38 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as low although this will require further exploration of revenue and operational costs. High (>£20M) | Medium (£5-20M) | **Low (<£5M)**	
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	

ERS.2: J38-43 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Costs The indicative cost range is identified as high. The level of costs is dependent on measures taken forward, but some potential options would be very high in cost, of more than £1 billion, although this will require further exploration of capital, revenue and operational costs. Moreover, the M4 structure and the Briton Ferry bridge may need renewal as part of a Do Minimum thus is not all additional cost. **High (>£20M)** | Medium (£5-20M) | Low (<£5M)
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding The very high level of costs indicates an affordability and funding risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ERS.3: J43-47 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as medium although this will require further exploration of revenue and operational costs. High (>£20M) | **Medium (£5-20M)** | Low (<£5M)	Costs The indicative cost range is identified as high, although this will require further exploration of revenue and operational costs and would depend on the option taken forward. Moreover, the River Tawe bridge may need renewal as part of a Do Minimum thus is not all additional cost. **High (>£20M)** | Medium (£5-20M) | Low (<£5M)

ERS.3: J43-47 Improvements package	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Affordability and Funding The cost ranges do not indicate an identifiable affordability risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	Affordability and Funding There is an affordability and funding risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.

ERS.4: Junction Improvements	
Short Term and Medium Term Measures (within 5 years)	**Long Term Measures (5 years and beyond)**
Costs The indicative cost range is identified as high to address issues at a number of junctions, although this will require further exploration of capital costs. High (>£20M) | Medium (£5-20M) | Low (<£5M)	
Affordability and Funding There is an affordability and funding risk; however further analysis (in a Stage Two assessment) in respect of costs and affordability, and funding, will be necessary.	

4.3 Summary

4.3.1 The interventions in each cost and affordability and funding category are summarised in Table 16.

4.3.2 The Financial Case highlights that a number of the interventions are of high (>£20M) or very high cost (>£100M) with subsequent affordability and funding risks, namely:

- Very High Cost with Affordability and Funding Risks (long term interventions):
  - South Wales Main Line.
  - Swansea Bay Metro.
  - J38-43 Improvements Package.
  - J43-47 Improvements Package.
- High Cost with Affordability and Funding Risks:

- Junction Improvements (short to medium term).
- Strategic Bus Corridors (long term).
- West Wales Parkway (long term).

4.3.3 Whilst there are significant risks in funding and affordability with the above interventions, these interventions may also provide the highest potential benefits. A Stage Two Appraisal would enable the outline business case to be established to determine if the higher cost interventions are worthy of further consideration.

Table 16 Financial Case Summary

Cost Range and Affordability and Funding Category	Short and Medium Term Interventions	Long Term Interventions
Very High Cost with Affordability and Funding Risks		ALT.4: South Wales Main Line ALT.5: Swansea Bay Metro ERS.2: J38-43 Improvements Package ERS.3: J43-47 Improvements Package
High Cost with Affordability and Funding Risks	ERS.4: Junction Improvements	ALT.3: Strategic Bus Corridors ALT.7: West Wales Parkway
Medium Cost with no identifiable Affordability and Funding Risks	ALT.1: Active Travel Routes and Infrastructure ALT.2: Strategic Bus Corridors ALT.3: South Wales Metro ALT.4: South Wales Main Line ALT.5: Swansea Bay Metro ALT.8: Public Transport Interchanges ALT.9: Park & Ride and Park & Share M4 Corridor Strategy ERS.2: J38-43 Improvements Package ERS.3: J43-47 Improvements Package	MND.2: Freight Measures ALT.1: Active Travel Routes and Infrastructure ALT.6: West and Mid Wales Rail Connections

Cost Range and Affordability and Funding Category	Short and Medium Term Interventions	Long Term Interventions
Low Cost with no identifiable Affordability and Funding Risks	MND.1: Study Area Wide Network Management MND.2: Freight Measures ALT.6: West and Mid Wales Rail Connections ALT.7: West Wales Parkway ERS.1: J36-38 Improvements Package	

5 Commercial Case

5.1 Overview

5.1.1 The commercial case '*tells you if a scheme will be commercially viable, whether it is going to be possible to procure the scheme and then to continue it into the future. It focuses in particular on the level and type of involvement of the private sector in each option'*.

5.2 Assessment

5.2.1 It not considered possible at this stage to determine the commercial case of each intervention, given the preliminary nature of the information available. However, there would be on-going revenue support required for each of the options, but as detailed in the impact assessment tables these will be greatest for the options requiring public transport subsidy or the larger maintenance costs associated with significant highway infrastructure. At this stage, the extent of each is unknown but the relative level of revenue support required has been identified in Table 17. This is based on low, medium or high revenue implications.

5.2.2 It is assumed that highway schemes would be procured using conventional options, and no significant risks are currently identified. For public transport operations, further investigation of procurement and operational arrangements would be necessary.

Table 17 Revenue Costs and Commercial Risks Summary

Revenue Cost Range and Potential Commercial Risks Category	Short and Medium Term Interventions	Long Term Interventions
High Revenue Implications and Commercial Risks	ALT.3: South Wales Metro	ALT.2: Strategic Bus Corridors ALT.5: Swansea Bay Metro ALT.9: Park & Ride and Park & Share M4 Corridor Strategy ERS.2: J38-43 Improvements Package
Medium Revenue Implications and Commercial Risks	ALT.2: Strategic Bus Corridors ALT.4: South Wales Main Line ERS.2: J38-43 Improvements Package ERS.3: J43-47 Improvements Package	ALT.4: South Wales Main Line ALT.6: West and Mid Wales Rail Connections ALT.7: West Wales Parkway ERS.3: J43-47 Improvements Package
Low Revenue Implications and Commercial Risks	MND.1: Study Area Wide Network Management MND.2: Freight Measures ALT.1: Active Travel Routes and Infrastructure	ALT.8: Public Transport Interchanges ERS.4: Junction Improvements

Revenue Cost Range and Potential Commercial Risks Category	Short and Medium Term Interventions	Long Term Interventions
	ALT.5: Swansea Bay Metro ALT.8: Public Transport Interchanges ERS.1: J36-38 Improvements Package ERS.4: Junction Improvements	

6 Management Case

6.1 Overview

6.1.1 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 life time. It covers the arrangements for the procurement, construction and on-going operation of the intervention, details of the monitoring arrangements and the undertaking of the evaluation plan. The management case should embed the five ways of working'*.

6.2 Programme Management

6.2.1 The Stage One interventions would be dependent on a range of delivery and programming mechanisms to take forward. The intervention packages for Managing the Overall Network and Demand and Improving M4 Efficiency, Reliability and Safety would be mainly within the remit of the Congestion Pinch Points Programme led by Network Management alongside the Local Authorities as appropriate.

6.2.2 It is recommended that the following interventions are taken forward within the Congestion Pinch Points Programme (subject to Ministerial approval, availability of resources) and led by Network Management to tackle road-based congestion on the M4, namely:

- Study Area Wide Network Management;
- Junction 36-38 Improvements Package;
- Junctions 38-43 Improvements Package;
- Junctions 43-47 Improvements Package; and
- Junction Improvements.

6.2.3 The provision of the Alternatives to M4 Travel interventions would be within the remit of Welsh Government Policy and Planning, working alongside the Local Authorities, Transport for Wales, Network Rail and transport operators such as the bus companies. Some of the interventions are already part of existing programmes, such as the South Wales Metro and will be delivered by relevant organisations:

- Active Travel Routes and Infrastructure;
- Freight Measures
- Park and Ride and Park and Share M4 Corridor Strategy;
- Public Transport Interchanges;
- South Wales Mainline;
- South Wales Metro;
- Strategic Bus Corridors;
- Swansea Bay Metro;
- West and Mid Wales Rail Connections; and
- West Wales Parkway.

6.3 Review Group

6.3.1 At Stage One, the guidance sets out that the management case should establish which organisations and groups might sit on the Review Group that meets at the end of each WelTAG Stage. It is recommended that Welsh Government establish an appropriate Review Group for the ongoing WelTAG studies, covering the key stakeholders and the four areas of well-being.

7 Conclusions and Next Steps

7.1 Overview

7.1.1 The Stage One WelTAG Study has developed potential interventions to address the problems of congestion on the M4 corridor. The problems of the corridor are demonstrated by the evidence collected as part of the study as well as the feedback from stakeholders. The range of interventions developed seek to provide a holistic approach to tackling the congestion problems and subsequent impacts on the social, economic, environmental, and cultural well-being of south west Wales.

7.1.2 This section sets out recommendations for next steps to investigate and take forward the potential interventions to deliver improvements to the M4 corridor.

7.2 Pinch Point Programme

7.2.1 The interventions considered in this strategic outline business case seek to address the key Strategic Case criteria (i.e. problems, objectives and well-being objectives) and are anticipated to have an overall beneficial Transport Case, subject to the appraisal in a next stage WelTAG study.

7.2.2 Of the interventions, those that are recommended to be taken forward within the Congestion Pinch Points Programme for Stage Two WelTAG studies and strategies to tackle road-based congestion on the M4 are:

- Study Area Wide Network Management.
- Junction 36-38 Improvements Package.
- Junctions 38-43 Improvements Package.
- Junctions 43-47 Improvements Package.
- Junction Improvements for Junctions 36, 48 and 49.

7.2.3 The studies recommended can be taken forward in tandem or can be prioritised based on the Stage One appraisal. On the basis of the scale of the problems and likely benefits of interventions, it is recommended the package of improvements for Junctions 38 to 43 are taken forward as a priority with early identification of potential solutions.

7.2.4 The aim of the Stage Two appraisals will be to firstly carry out design development to identify a scheme-specific preferred option. This will require:

- Detailed investigation of transport conditions (flows, delays etc) – building on data collected for Stage One.
- Design development of scheme concepts (building on Stage One outline proposals) – to identify a long list and select no more than 2-3 short-listed options in each part of the corridor with an outline design at a level of detail sufficient to identify broad feasibility and preliminary costs.

7.2.5 It is essential that all schemes taken forward consider the interaction with other modes and opportunities to encourage modal shift away from the private car, in particular active travel should be considered as part of all emerging interventions. The interventions present a package that when delivered in tandem can tackle the problems associated with the corridor.

7.2.6 The Stage Two studies will provide an outline business case for options, with a focus on the Transport Case. It will involve detailed consideration of the transport impact (e.g. impact on delays and travel time). The approach to the transport assessment will include junction

modelling and / or area-wide strategic modelling to inform a cost-benefit appraisal. All schemes solutions should aim to be well aligned with the overall corridor package and other transport programmes.

7.2.7 The key outputs from this next stage assessment in each Stage Two study is a preferred scheme (at preliminary design level) which has beneficial impacts against Transport Case criteria – with key uncertainties and risks identified for further investigation at Stage Three appraisal.

Junctions 38 – 43

7.2.8 As a result of the study, the priority of the next steps will be to investigate the feasibility and benefits of short to medium term measures identified between Junctions 38 and 43, as a means to tackle congestion, poor journey times and air quality. This would lead to a Stage Two WelTAG Study appraisal.

7.2.9 A Stage Two Study would need to consider the outline business case for measures including:

- Junction 38-43 variable speed measures and opportunities to enhance capacity
- Improvements to junction arrangements
- Considering the role of the alternative routes, such as Harbour Way and A48
- Capacity enhancements between Junctions 42-43 (A465 Heads of the Valley to A483 Fabian Way)
- Resilience and communication measures
- Improvements to public transport and active travel integrated with the above and
- Longer term solutions

7.2.10 The outcome Stage Two appraisal, would establish the feasibility of interventions and consider the case for investment, value for money and likely impacts and benefits.

Junctions 36 – 38

7.2.11 The WelTAG Stage One study has identified existing issues with traffic speeds and accidents between Junctions 36 and 38, which would be investigated further as a separate study and identify suitable measures to improve road safety and network reliability.

Junctions 43 – 47

7.2.12 Further short, medium and long term improvement options identified between Junctions 43 and 47 would also be progressed to a separate Stage Two WelTAG study, in order to tackle congestion, poor journey times and air quality.

Junctions Enhancements

7.2.13 With regards to enhancements to Junctions 36, 48 and 49, these are also being appraised separately through the WelTAG process. However, longer term measures for Junctions 48 and 49 will also need to be considered beyond the current studies.

7.3 Multi-modal Interventions

7.3.1 In addition to the measures identified above to improve M4 efficiency, reliability and safety, the Stage One study has identified a range of potential investment to provide alternatives to M4 travel and measures to manage the network and demand.

7.3.2 The study has identified short, medium and long term improvement options across the study area in terms of active travel, rail, bus corridors, public transport interchanges, park

and ride/share, low emission vehicle fuelling, network resilience, communications and freight measures.

7.3.3 These interventions sit outside of the Congestion Pinch Points Programme and will require the involvement of a range of transport stakeholders to take them forward including the Department for Transport, Network Rail and Local Authorities. It is recommended that these interventions are addressed by the Planning and Policy team in order to inform the Wales Transport Strategy and other transport programmes and to work with stakeholders to achieve them as appropriate.

APPENDIX A

Impacts Assessment Report

APPENDIX B

Stakeholder Consultation Paper

Appendix B: Stakeholder Consultation Note

1. Introduction

This note outlines the consultations undertaken as part of the Stage One WelTAG Study, summarises the findings and how the stakeholder inputs have informed the study. The purpose of the engagement during the study was to discuss and confirm problems and opportunities and appraise initial objectives as well as develop and appraise initial options.

2. Consultation Methodology

In order to inform the Stage One WelTAG appraisal the following consultation has been undertaken:

- Face to face meetings with each of the local authorities in the study area.
- Face to face meetings with key transport stakeholders.
- An invitation to key businesses and organisations in the study area, together with wider stakeholders to provide written representations to the consultation process.
- Two stakeholder workshops:
    - **Workshop One** – To inform and confirm the problems and opportunities and agree the study objectives; and
    - **Workshop Two** – To present the revised study objectives and identify and discuss potential transport options.

Arcadis prepared a one-page summary note outlining the study, which was shared with all the stakeholders invited to take part in the consultation, which is included in **Annex A**. A further summary note was prepared with progress which was shared with some interested parties and is also included in **Annex A**.

3. Local Authority Meetings

Arcadis met key officers from each of the local authorities in the study area and had face to face meetings to discuss the proposed developments within the study area, key transportation issues both on the motorway and on the links to the motorway and to identify potential solutions. It was considered important to hold a focused meeting with each of the local authorities, to ensure the key transportation documents, as well as development and transport proposals were captured within the Stage One report. The feedback received during the meetings is presented in Chapter 8 of the Impacts Assessment Report.

4. Key Transport Stakeholder Meetings

Arcadis met key transport stakeholders. This enabled stakeholders unable to attend the workshops to input into the study, as well as for the study team to draw out more detailed information. Meetings were held with

- Network Rail;
- Transport for Wales; and
- South Wales Trunk Road Agency (SWTRA).

The feedback received during the meetings is presented in Chapter 8 of the Impacts Assessment Report.

In addition, Arcadis met with Welsh Government's Policy and Planning to discuss the emerging list of interventions from the study in advance of the second stakeholder workshop.

5. Written Representation

Key Business and Organisations

In addition to the stakeholders invited to attend the workshops, key organisations and businesses located along the M4 corridor were invited to provide written representation to the study. The organisations were identified through consultation with each of the four local authorities in the study area and are as follows:

- Abertawe Bro Morgannwg University Health Board
- ABMU
- Amazon
- AMSS
- Calsonic International Europe
- Castell Howell
- CGI
- DVLA
- Dyfed Steels
- Ford
- G4S, operator of Parc Prison
- Gestamp
- Hywel Dda University Health Board's
- Intertissue
- Irish Ferries
- John Raymond Transport
- McArthur Glen
- N R Evans
- Ortho-Clinical Diagnostics
- Owens Transport
- Pont Abraham Services
- Rockwool Rockpanel B V
- RNA Plant
- Sarn Park (Services)
- Sony UK Technology Centre
- Swansea University
- Swansea West Services
- TATA
- Tata Steel
- Teddington Engineered Solutions Ltd
- TRJ
- Zimmer Biomet Europe

Wider Stakeholders

A wider list of stakeholders was identified by Welsh Government and were invited to provide written representation to the consultation:

Culture:

- Arts Council
- National Museum of Wales
- Welsh Language Commissioner
- Sports Wales
- CADW
- British Council
- National Library

Economic:

- Confederation of British Industry's
- Federation of Small Businesses
- Business in the Community
- Constructing Excellence in Wales
- Transport for Wales
- National Infrastructure Commission
- Cardiff Business School

Social:

- Wales Co-op centre
- Bevan Foundation
- Community Transport Association
- Police
- Equality and Human Rights Commission
- Welsh Council for Voluntary Action

Environmental:

- National Parks
- Natural Resources Wales
- National Trust
- Wales Environment Link
- Wildlife Trusts Wales

- Health Board

Transport Organisations:

- New Franchise Operator and Development Partner
- Welsh Local Government Association
- Regional Transport Authority representative
- Public Transport representative
- Freight representative
- Sustrans
- Disability Wales
- Children's Commissioner
- Older People's Commissioner
- Design Commission for Wales
- Future Generations Commissioner's Office
- Wales Audit Office
- Youth Parliament
- Royal Town Planning Institute

The organisations listed above were invited to provide their views on the existing problems and future issues if no action is taken, as well as potential solutions to be delivered to overcome the identified problems. Three responses were received. The key theme from the responses was the importance of continued communication and early engagement with stakeholders throughout the process and any future stages of WelTAG along the M4 study corridor.

6. Stakeholder Workshop One

Overview

A key element of the consultation undertaken was the feedback received at the two stakeholder workshops. The first stakeholder workshop was held on Thursday 6th September 2018, between 10:00 and 13:00 at the Towers Hotel and Spa, Swansea. Arcadis was responsible for drafting and distributing the invitation letters to the stakeholders inviting them to the workshop event.

A wide group of stakeholders were invited to both events including representatives from each Local Authority in the study area, Welsh Government, Sustrans, the emergency services, Road Haulage Association, and Transport for Wales. The list of stakeholders was agreed with the client team.

The list of attendance recorded a total of 17 people attended the first workshop, representing the following organisations:

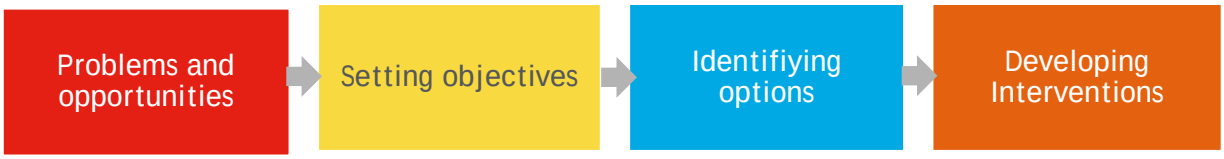
- Welsh Government
- South Wales Trunk Road Agency (SWTRA)
- Cardiff Capital Region Transport Authority
- Cardiff City Deal
- Swansea Council
- Neath Port Talbot County Borough Council
- Bridgend County Borough Council
- Vale of Glamorgan Council
- First Cymru
- Confederation of Passenger Transport
- Traws Cymru
- Regional Fire & Rescue Service

Network Rail were unavailable to attend and requested a separate meeting with Arcadis to discuss the study.

Workshop Format

Arcadis gave a presentation describing the study area, the study approach, the initial identified problems and opportunities, the draft objectives and the possible types of interventions. The workshop presentation slides are presented in **Annex B**

The workshop format comprised of small group discussions on the following four key themes.



Stakeholders discussed findings on each theme within small groups before feeding back to the wider group. Arcadis took notes of the feedback raised to inform the study. Stakeholders also recorded their own thoughts on the materials provided on each of the tables (materials included maps of the study area, a list of the problems identified by Arcadis to date, a list of the opportunities, a list of draft objectives and a list of potential solutions) which have been reviewed by the study team.

Identified Problems

The presentation to stakeholders provided a summary of the data gathered by Arcadis to date and the problems identified as part of the preliminary analysis:

- Traffic volumes
- Traffic growth
- Highway alignment
- Congestion
- Road safety
- Environmental constraints
- Future developments
- Reliance on the private car
- Public transport
- Social and economic

During the discussion's stakeholders identified the following problems as the key issues in the study area:

- Road network is subject to significant congestion and delays, particularly at peak periods, seasonal times or in an event of an accident.
- Physical barriers at junctions preventing continuous pedestrian, cycling and other non-motorised links.
- Severance issues comprising a lack of north-south movements along the M4 corridor.
- Perceived road safety issues along the M4 corridor.
- Planned future development will increase the demand along the M4 corridor ('washing line for new development').
- Inefficient public transport services and lack of connections to public transport interchanges.
- Perceived impact of local trips 'junction hopping' on the M4 corridor contributory factor to congestion.
- Journey time reliability, particularly the adverse economic impact on bus and haulage vehicles.
- Readability and perceived lack of 'real time' information of signage (such as directing traffic along the Port Talbot peripheral distributor road).
- Resilience of the road network, congestion spilling over onto the local authority road network, causing disruption to bus services. Some key local junctions are experiencing operational capacity issues (Sunny Croft and Briton Ferry McDonald's Roundabout, Port Talbot).
- Considerable number of accesses onto the M4 corridor, with high volumes of traffic flows entering/ exiting.
- Poor visibility from low sun a cause of congestion during specific times of the year.
- Limited park & share and park & ride facilities.

Identified Opportunities

During the workshop the following opportunities were presented to and agreed by stakeholders:

- Improve operational performance of the motorway and junctions.
- Enhance capacity of the motorway.
- Improve routing and communications.
- Accommodate forecast traffic generation from future developments.
- Improve road safety.
- Improve air quality and reduce noise.
- Enhance the heavy rail network.
- Enhance the sub-regional bus network.
- Improve opportunities for interchange (Park and Share and Park and Ride).
- Encourage uptake of low emissions/ electric vehicles.

Draft Objectives

Draft study objectives were developed in advance of the workshop based on national and locally specific objectives, including the Wellbeing of Future Generations (Wales) Act 2015 together with the local objectives for the Swansea Bay City Deal, Local Development Plans, Local Transport Plans and Port Talbot Waterfront Enterprise Zone.

The table below presents the draft objectives presented at Workshop One and the revised study objectives following feedback received from stakeholders. The main amendments where to:

- Amend the objective wording to 'improve the environment' rather than 'minimise the impact on the environment';
- Addition of the term 'cultural facilities', to ensure all four areas of well-being were covered by the objectives;
- The addition of an objective to 'improve communication and information to users and management of the motorway';
- Replacement of the term 'highway capacity' with 'highway efficiency'; and
- Addition of the term 'journey time reliability' alongside 'improving road safety'.

Development of the Study Objectives

Draft Objectives Presented at Workshop One	Proposed Objectives presented at Workshop Two
1) Improve highway capacity, resilience and performance of the motorway, interchanges and connecting road network	**1)** Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.
2) Improve road safety.	**2)** Improve road safety and journey time reliability.
3) Reduce noise, air quality and severance impact on communities.	**3)** Improve multi-modal travel options that reduce dependence on the motorway.
4) Promote transport options to reduce dependence on the motorway.	**4)** Facilitate regional growth and development to bring enhanced prosperity.
5) Facilitate regional growth and development to bring enhanced prosperity.	**5)** Improve access to local services, education, employment and cultural facilities to support social inclusion, health and well-being.
6) Facilitate access to services, education and employment to support social inclusion and health and well-being.	**6)** Improve the local and global environment, including air and noise pollution.

Draft Objectives Presented at Workshop One	Proposed Objectives presented at Workshop Two
7) Minimise impacts on the local and global environment.	7) Improve communication and information to users and management of the motorway

Emerging Options

Stakeholders were presented with a summary of the potential option ideas and a whole group high-level discussion took place.

Summary of Potential Option Ideas

Actions

The key actions from Workshop One included:

- Arcadis to share a copy of the presentation with the attendees of the workshop.
- Arcadis to update the draft study objectives based on the feedback received.
- Arcadis to meet with the SWTRA to discuss current trunk road constraints and future opportunities.
- Arcadis to review the identified problems based on the feedback received.

All of these actions were undertaken as part of the on-going project.

7. Stakeholder Workshop Two

Overview

A second stakeholder workshop was held on Thursday 21st March 2019, between 14:00 and 16:00 at the Towers Hotel and Spa, Swansea. The same stakeholders as invited to the first workshop were invited to the second workshop, with some additions where they had emerged as consultees during the study. There were 14 people in attendance at the second workshop, representing the following organisations:

- Welsh Government
- Cardiff Capital Region Transport Authority
- SWTRA
- Regional Fire & Rescue Service
- Swansea Council
- Arup (on behalf of the Junction 32 to 35 study)
- Road Haulage Association

Sustrans were unable to attend the second workshop and submitted a written response. Unfortunately, Bridgend County Borough Council, Carmarthenshire County Council and Neath Port Talbot Borough Council, were unable to attend the second workshop and the opportunity to have a separate briefing meeting was offered.

Workshop Format

Arcadis presented a brief overview of the study area, the study approach, the identified the problems and opportunities, the study objectives and the long list of identified interventions. The workshop presentation slides are presented in **Annex C.**

Study Objectives

The updated study objectives were presented to the workshop attendees. Stakeholders stated that it is essential that the objectives explicitly relate to the Well-being of Future Generations Act. At the workshop attendees suggested further variations were made to the objectives:

- Objective 4 was amended to include tourism and access to employment; and
- Objective 6 was amended to improve health and the environment.

Development of the Study Objectives

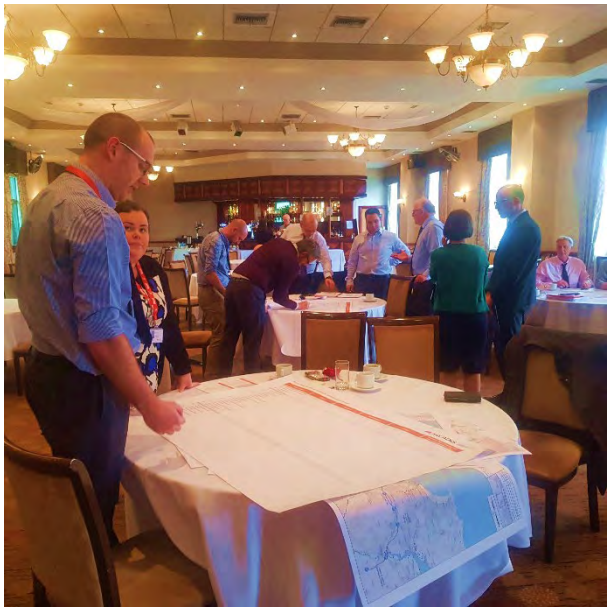
Proposed Objectives presented at Workshop Two	Amended Objectives
1) Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.	1) Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.
2) Improve road safety and journey time reliability.	2) Improve road safety and journey time reliability.
3) Improve multi-modal travel options that reduce dependence on the motorway.	3) Improve multi-modal travel options that reduce dependence on the motorway.
4) Facilitate regional growth and development to bring enhanced prosperity.	4) Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity.
5) Improve access to local services, education, employment and cultural facilities to support social inclusion, health and well-being.	5) Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being.

Proposed Objectives presented at Workshop Two	Amended Objectives
6) Improve the local and global environment, including air and noise pollution.	6) Improve health and the local and global environment, including reducing air and noise pollution.
7) Improve communication and information to users and management of the motorway	7) Improve communication and information to users and management of the motorway

Feedback on the Proposed Interventions

The list of the proposed interventions was presented at the workshop (as shown in **Annex C**). During the workshop, stakeholders in groups were asked to appraise the proposed interventions against the study objectives and the WelTAG impact areas (as shown in the photographs below).

Photos from Stakeholder Workshop Two



Stakeholders identified that all the interventions addressed at least one of the study objectives. Key points raised include:

- **Study Area Wide Network Management** – Planning interventions emphasise other solutions to achieve behavioural change from car travel including interventions such as education.
- **Freight Measures** – HGVs require consistent journey times and free flowing traffic. Secure freight parking facilities at regular intervals and implementation of a freight management strategy are required to avoid travel during known congested periods. The provision of regular dedicated freight parking facilities would reduce any adverse impact on adjacent residential areas.
- **Strategic Bus Corridors** – The infrastructure is already in place but is poorly advertised with no consistency of information.
- **South Wales Mainline Improvements** – Essential journey times improvements along the Mainline are required to promote modal shift to rail from road.
- **Public Transport Interchanges** – All rail interventions should include elements to improve and encourage travelling to stations by walking and cycling modes.
- **West Wales Parkway** – Potential adverse impact by attracting additional trips to the M4. It may result in reduction in services at existing surrounding stations (Neath) and reduce the ability for multi-modal trips and potentially access elsewhere.

- **Park & Ride and Park & Share M4 Corridor Strategy** – The current facilities are poorly advertised.
- **J38-43 Improvements Package** – Inefficient use of technology could adversely affect journey times, however reductions in speeds should improve road safety. The reduction in permitted speed may adversely impact regional prosperity. Possible opportunity to also develop and improve adjacent active travel infrastructure. Road building increases vehicle traffic and does not encourage other form transport.
- **J43-47 Improvements Package** – The crawler lane is inefficiently used and requires better signage. Indivisible loads are affected by weight restrictions on the bridge. Junction 45 Ynysforgan roundabout requires reconfiguration. Signalising junctions presents opportunities for better active travel routes, as users can safely cross busy roads rather than them being a barrier.

The feedback on the proposed interventions vs WelTAG impact areas has been summarised in **Annex D**.

Key Actions of the Workshop

The key actions from Workshop Two include:

- Arcadis to further amend the study objectives.
- Arcadis to develop a specific Active Travel intervention. Active Travel packages were considered a solution to the high-proportion of localised trips using M4 corridor (particularly through Port Talbot) and Active Travel connections between Neath and Swansea require improvements.
- Arcadis to investigate the need for a resilience strategy that will capture the impact of M4 closures due to accidents on the Emergency Services access and response procedures. In order to determine whether current procedures can be undertaken more swiftly and efficiently.
- Arcadis to include communications and information within the interventions.
- Arcadis to investigate and emphasise how transport can enable economic growth.

Following the workshop, the actions were addressed in the Strategic Outline Business Case report.

Annexes

ANNEX A – Stage One Study One Page Summary Notes

ANNEX B – Stakeholder Workshop One Presentation

ANNEX C – Stakeholder Workshop Two Presentation

ANNEX D – Summary Table of Proposed Interventions Vs WelTAG Impact Areas

ANNEX A - Stage One Study - One Page Summary Notes

Llywodraeth Cymru
Welsh Government

ARCADIS Design & Consultancy for natural and built assets

WelTAG Stage One Appraisal

M4 Junction 35 Pencoed to Junction 49 Pont Abraham Congestion Corridor Study

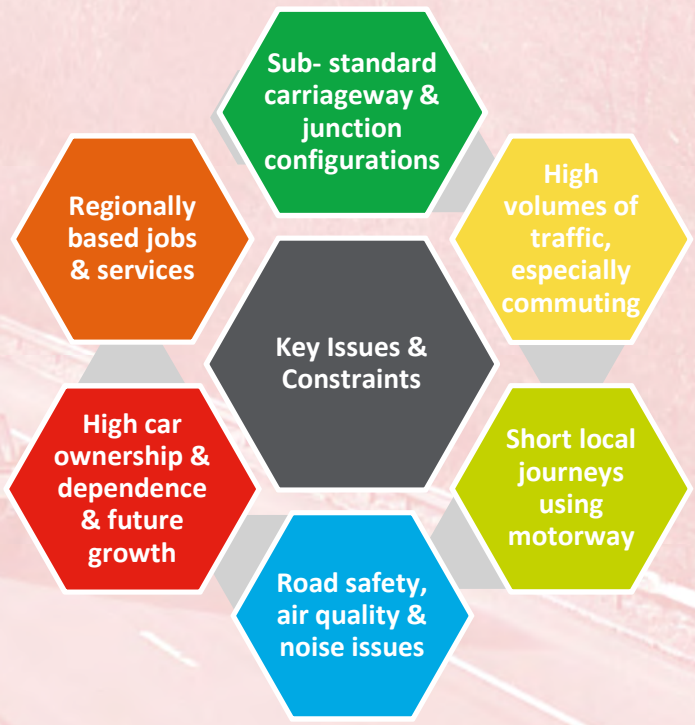
What is the purpose of the study?

Arcadis Consulting (UK) Limited has been appointed by the Welsh Government to prepare a Stage One WelTAG study on the M4 corridor between Junctions 35 and 49. This corridor has been identified by Welsh Government in the National Transport Finance Plan 2017 Update as a key corridor experiencing congestion. It is a Welsh Government priority for developing options to address both current and future problems along the corridor. The options will be developed using the Welsh Government's appraisal process, known as WelTAG. The study is the first stage of the WelTAG process called the Strategic Outline Case (five stages in total). The study will identify a short list of options to be taken forward to be looked at in more detail at Stage Two. The study is approximately 6 months duration, beginning in June 2018.

Our Study Approach

WelTAG is a process that identifies and provides evidence of the problems, sets out what is to be achieved (objectives), identifies a list of options, identifies the impact of options against social, environmental, economic and cultural criteria and determines how well the options contribute to achieving the study objectives.

In order to inform the study, we will be undertaking an appraisal of all relevant data to understand and evidence the current and future situation within the study area, including traffic data, accident data, existing public transport services, socio-economic data, proposed developments and environmental data.



Consultation and Engagement

As part of the data gathering exercise we will be holding a stakeholder workshop to discuss the existing problems and future issues if no action is taken, discuss objectives and potential options. We will then be holding a second workshop with stakeholders in the Autumn to discuss the proposed long list of options identified and option appraisal. The stakeholder workshops are anticipated in September and October 2018. Workshops with Transport for Wales and City Regions will also be held.

In addition to the workshops we will meet with each of the four local authorities in the study area separately, namely Bridgend County Council, City and County of Swansea, Neath Port Talbot County Council and Carmarthenshire County Council.

Outcomes

The outcomes of the study will be:

- A short list of multi-modal options to be looked at in more detail at Stage Two of the WelTAG process.
- A study report known as a Strategic Outline Case.
- An evidence report known as an Impacts Assessment Report.

For further details please contact Laura Norman on 07734 544963 or M4Junctions35to49@arcadis.com

WelTAG Stage One Appraisal – Emerging Options Update

M4 Junction 35 Pencoed to Junction 49 Pont Abraham Congestion Corridor Study

State of the Nation

Arcadis Consulting (UK) Limited has been appointed by the Welsh Government to prepare a Stage One WelTAG study on the M4 corridor between Junctions 35 and 49. A detailed analysis of evidence and feedback from stakeholders has identified problems, opportunities and constraints.

Consultation and Engagement

As part of the data gathering exercise extensive stakeholder consultation was undertaken, which comprised stakeholder workshops, focused consultations with local authorities and written consultation with a wider group of stakeholders (including Natural Resources Wales, Federation of Small Businesses, Health Boards) and key businesses in the region.

In Summer 2018 we held a stakeholder workshop to discuss the existing problems and future issues if no action is taken, and to discuss objectives and potential options. Stakeholders included emergency services, local authorities, trunk road agency, bus operators. In March 2019 we will be holding a second workshop with stakeholders to discuss the proposed long list of options identified and the appraisal of options.

Problems

- Road network is subject to significant congestion and delays, particularly at peak periods, summer or in an event of an accident (particularly J38-49).
- Many junctions experience queuing and delays (e.g. J36, 41, 43-49)
- Poor journey times and reliability impacts on the economy, particularly on access to tourist destinations, as well as bus services and haulage vehicles.
- Relatively low average trips lengths - local trips using the corridor.
- Parts of the highway network built to previous standards.
- Road safety issues.
- Air quality and noise impacts of traffic.
- Planned future development will increase the demand along the M4 corridor.
- Long journey times or poor availability of public transport services and lack of connections to public transport interchanges.
- Limited opportunities for park and ride and joining bus and rail services from the M4.

Opportunities

- Improve efficiency and capacity of links and junctions and connecting routes.
- Improve road safety.
- Improve air quality and reduce noise impacts from transport.
- Enhance transport interchanges.
- Enhance public transport.
- Encourage uptake of low emissions vehicles.
- Support and facilitate developments.

Outcomes

The outcomes of the study will be:

- A short list of multi-modal options to be looked at in more detail at Stage Two of the WelTAG process.
- A study report known as a Strategic Outline Case and an evidence report known as an Impacts Assessment Report.

For further details please contact Laura Norman.

07734 544963

M4Junctions35to49@arcadis.com

ANNEX B - Stakeholder Workshop One Presentation

ARCADIS Design & Consultancy for natural and built assets

M4 J35 Pencoed to J49 Pont Abraham (Inclusive)

WelTAG Stage One Workshop | 6th September 2018

ARCADIS Design & Consultancy for natural and built assets

Welcome and Introductions

ARCADIS Design & Consultancy for natural and built assets

Overview

Purpose of the Study

- Arcadis has been appointed by the Welsh Government to prepare a Stage One WelTAG Study for the 35 miles of the M4 Corridor, Junctions 35 to 49.

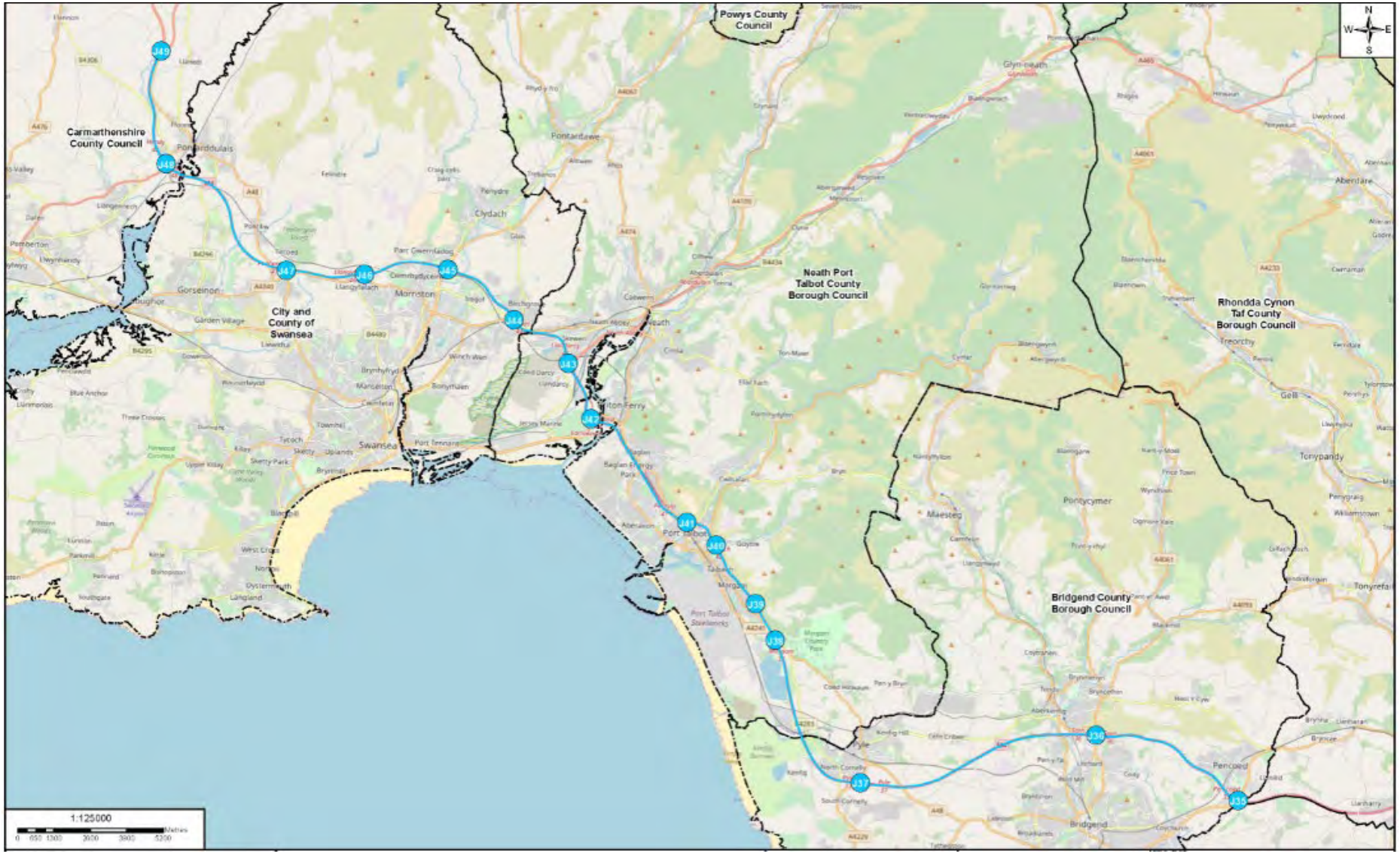
- The corridor has been identified by the Welsh Government in the National Transport Finance Plan 2017 Update, as a corridor experiencing congestion.

- It is a Welsh Government priority to develop options to address both current and future problems along the corridor.

- This will be a multi-modal study covering all modes of transport to address the issues of the M4 corridor.

ARCADIS Design & Consultancy for natural and built assets

Study Area

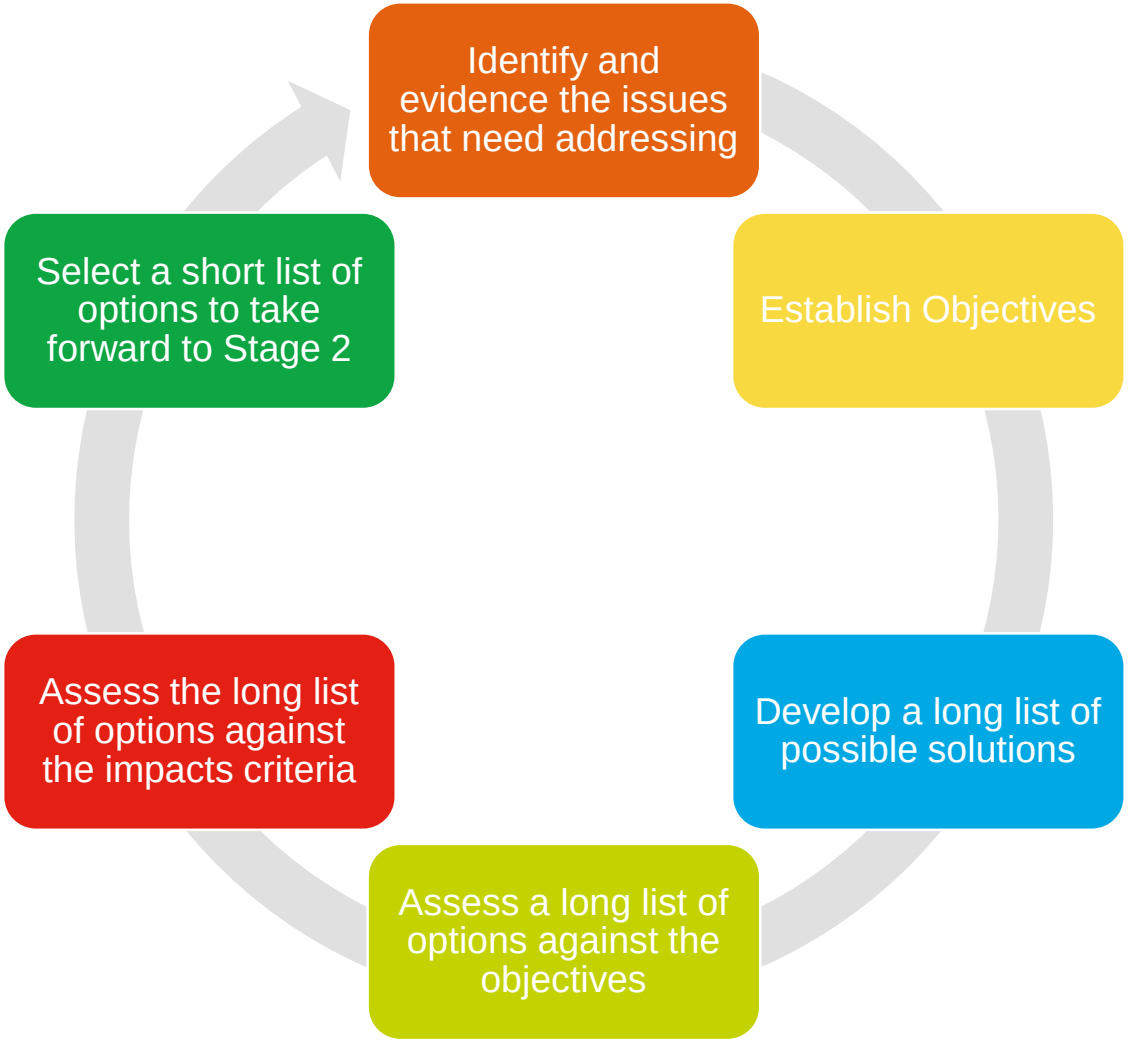


Study Approach

- The study is being undertaken in accordance with the Welsh Government's appraisal process, known as WelTAG (Welsh Transport Planning and Appraisal Guidance).
- The study is the first stage of the WelTAG process called the Strategic Outline Case. There are five cases in total.
- Problems and opportunities are being identified and study objectives are being developed.
- A long list of options to will be arrived at and appraised as to how each contributes to objectives and the five ways of working set out in the Future Generations Framework.
- The study will identify a short list of options to be taken forward to be looked at in more detail at Stage Two.

Study Approach

As part of the Strategic Outline Case we will:



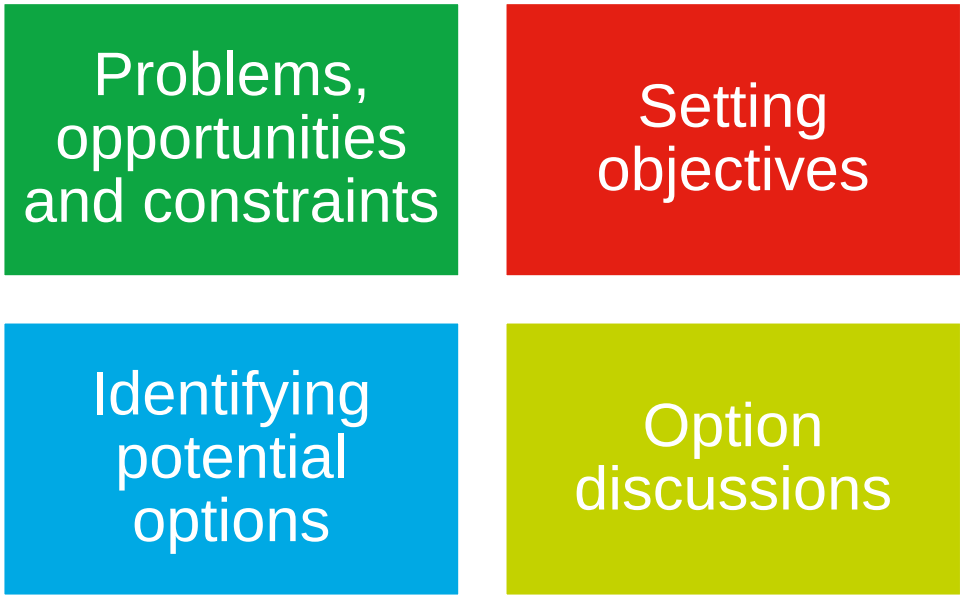
State of the Nation

In order to inform our study we are undertaking the following:

- **Review all relevant data** – current policy, environmental and highways constraints, traffic data, accident data, existing transport provision, socio-economic data and proposed developments
- **Consultation**
  - Meeting each of the four local authorities in the study area
  - Core stakeholders invited to a workshop
  - Invitation to wider stakeholders and key businesses to provide their views in writing

Workshop Format

- Small group discussions, with whole room feedback on:



- The session will conclude with a summary and next steps

ARCADIS Design & Consultancy for natural and built assets

Problems, Opportunities and Constraints

Problems:

Traffic Volumes – Annual Average Daily Traffic (AADT) DfT 2017

Problems:

Traffic Growth – Comparison 2015 v 2017 AADTS

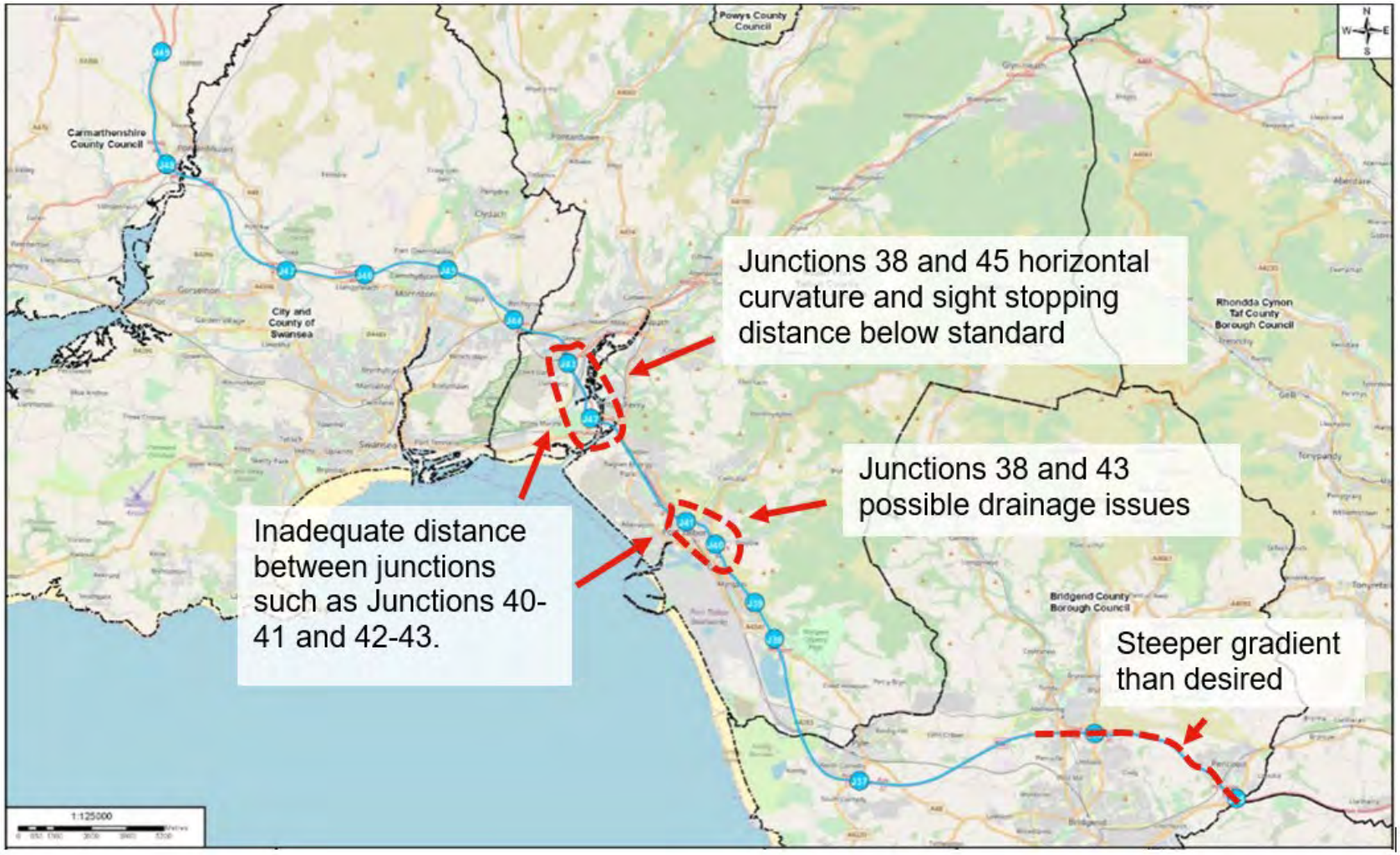
- Demand for travel within the study area is growing
- Noticeable increase in traffic between 2015 and 2017
- Particularly to the north of Swansea and Junctions 36 - 38

2015

2017

Problems:

- **Highway Alignment**



Problems:

Highway Alignment

- Junctions 38–45: horizontal curvature and sight stopping distance below standard
- Substandard length of the carriageway between successive merge or lane gain and diverge, or lane drop substandard along large sections, such as Junctions 40-41 and Junctions 42-43
- Junctions 35-37: steeper gradient than desired (reduction in safety with increasingly steeper gradients)
- Junctions 38-43: water observed on the motorway, which can cause aquaplaning and suggests possible drainage issues

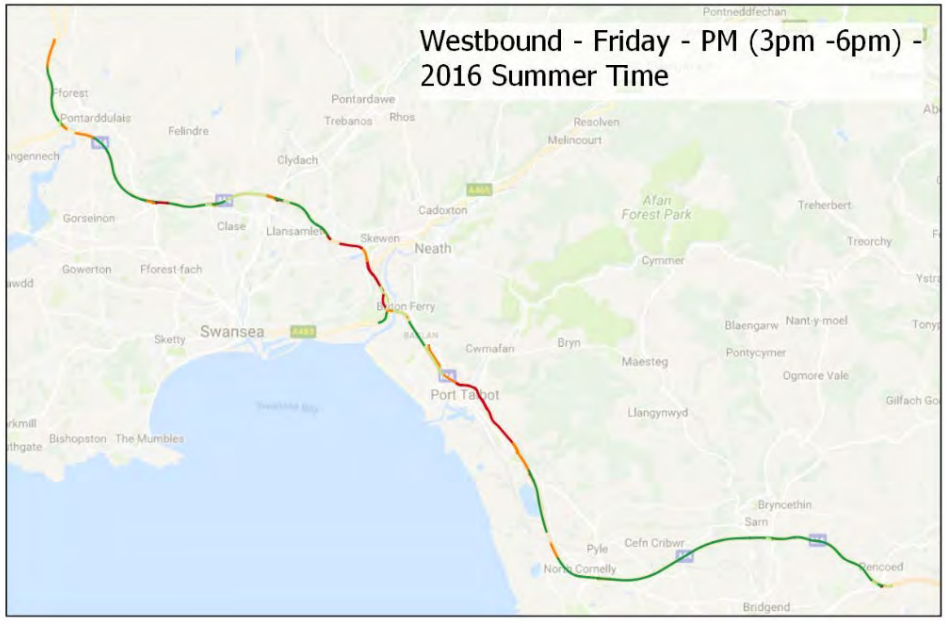
Problems:

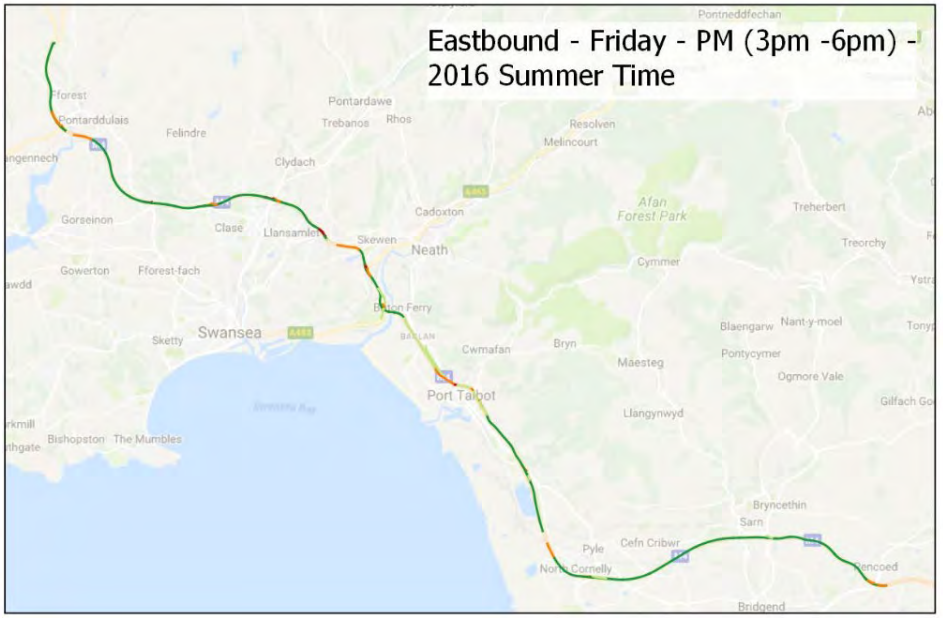
Congestion

- Analysis using Inrix and Trafficmaster speed data (consistent results) from Welsh Government
- Congestion a key issue for a large section of the corridor notably Junctions 38–45 but not isolated to this area
- Congestion varies throughout the day, days of the week and seasonally
- Congestion hotspots vary east and westbound
- Results in an unreliable transport network

Problems:

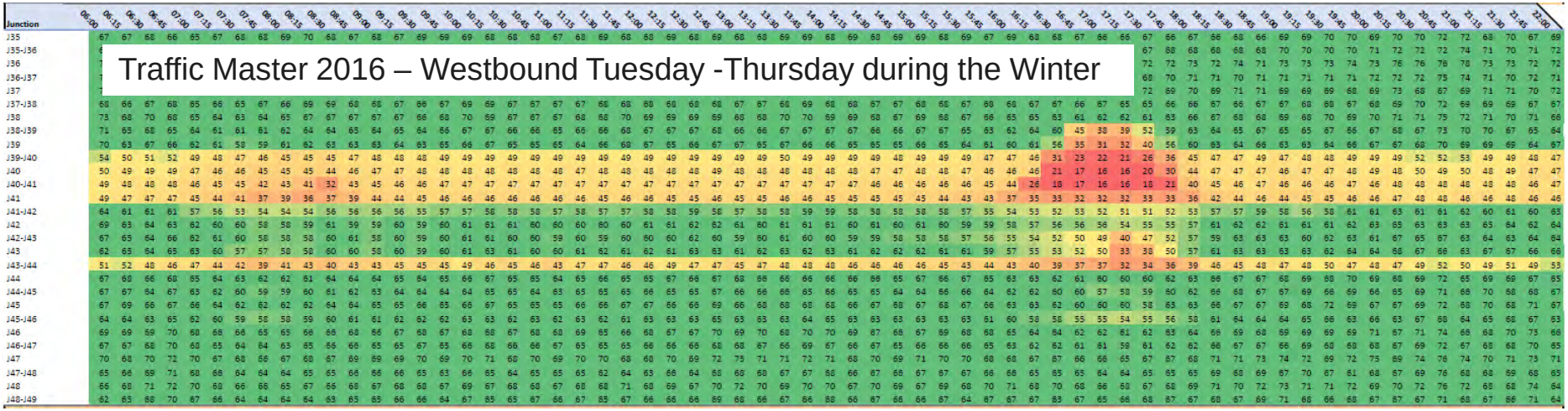
Congestion – Variations across the study area in average speed

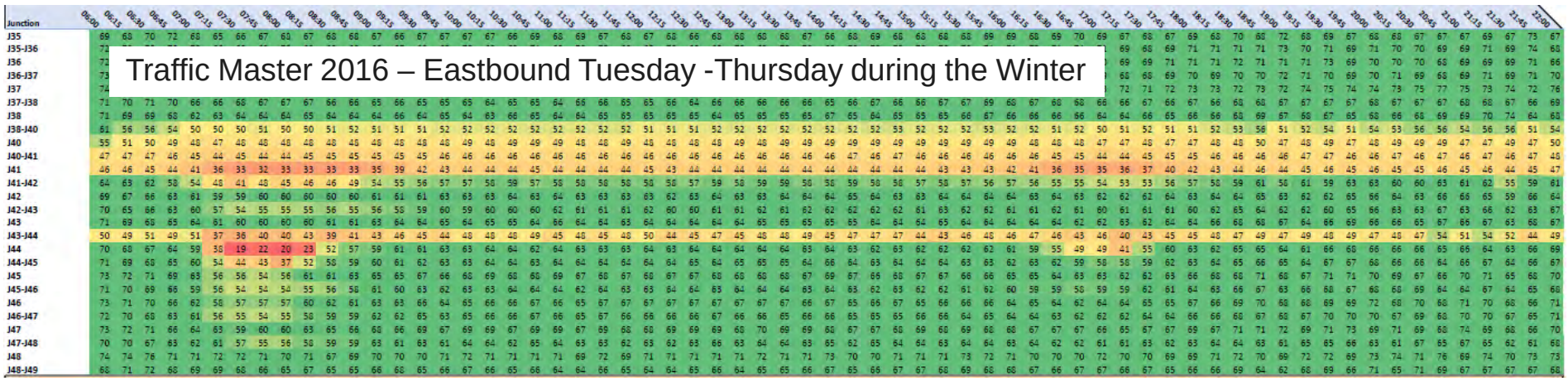




Problems:

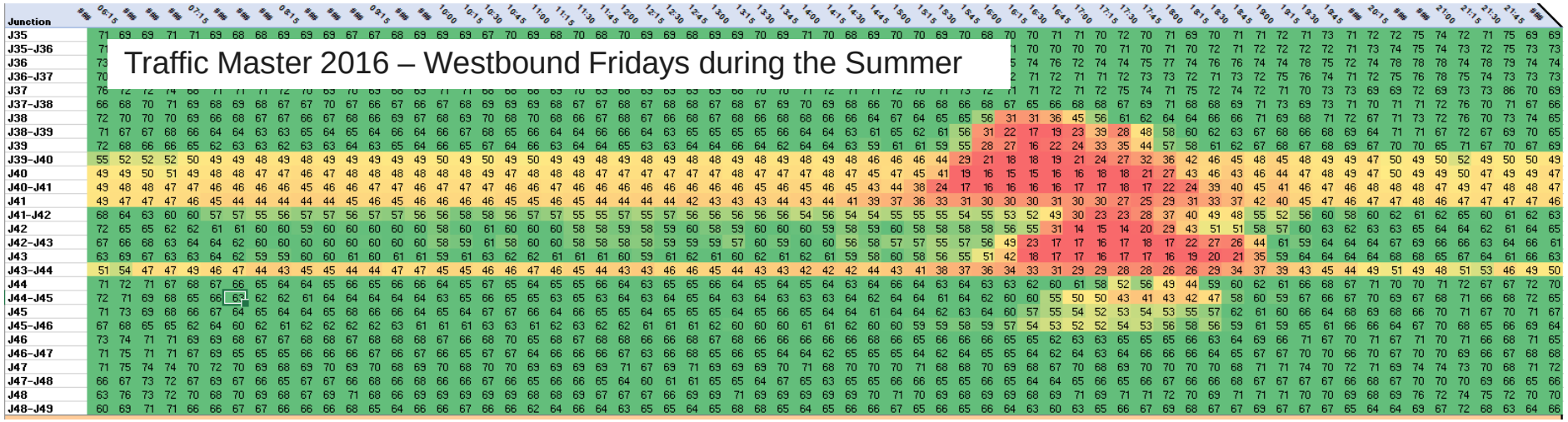
- **Congestion –** Variations eastbound and westbound

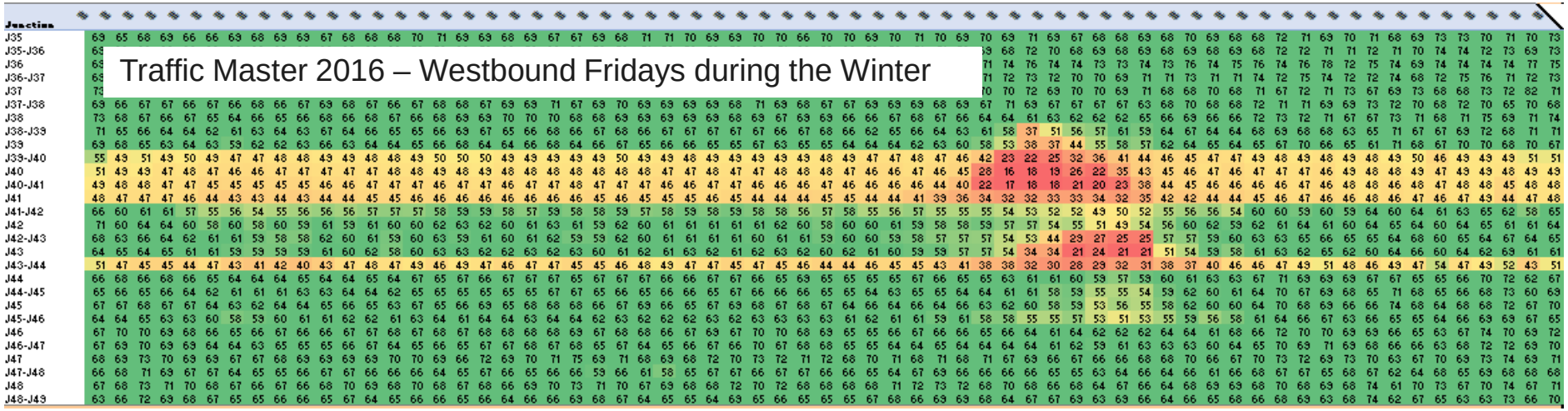




Problems:

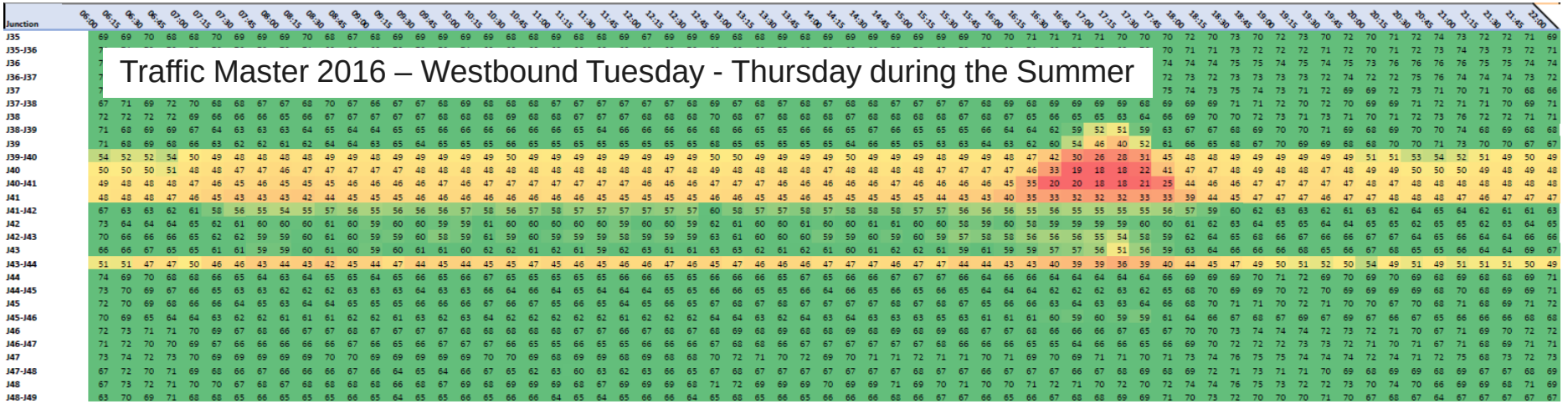
- **Congestion –** Seasonal variations with evident summer peaks

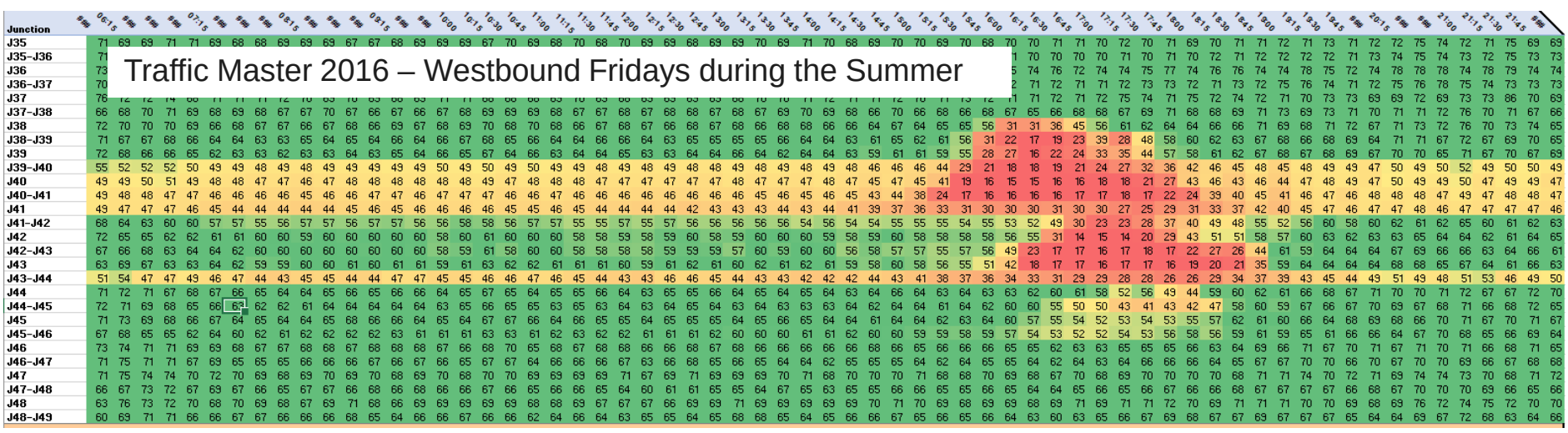




Problems:

- **Congestion –** Variations across days of the week and season

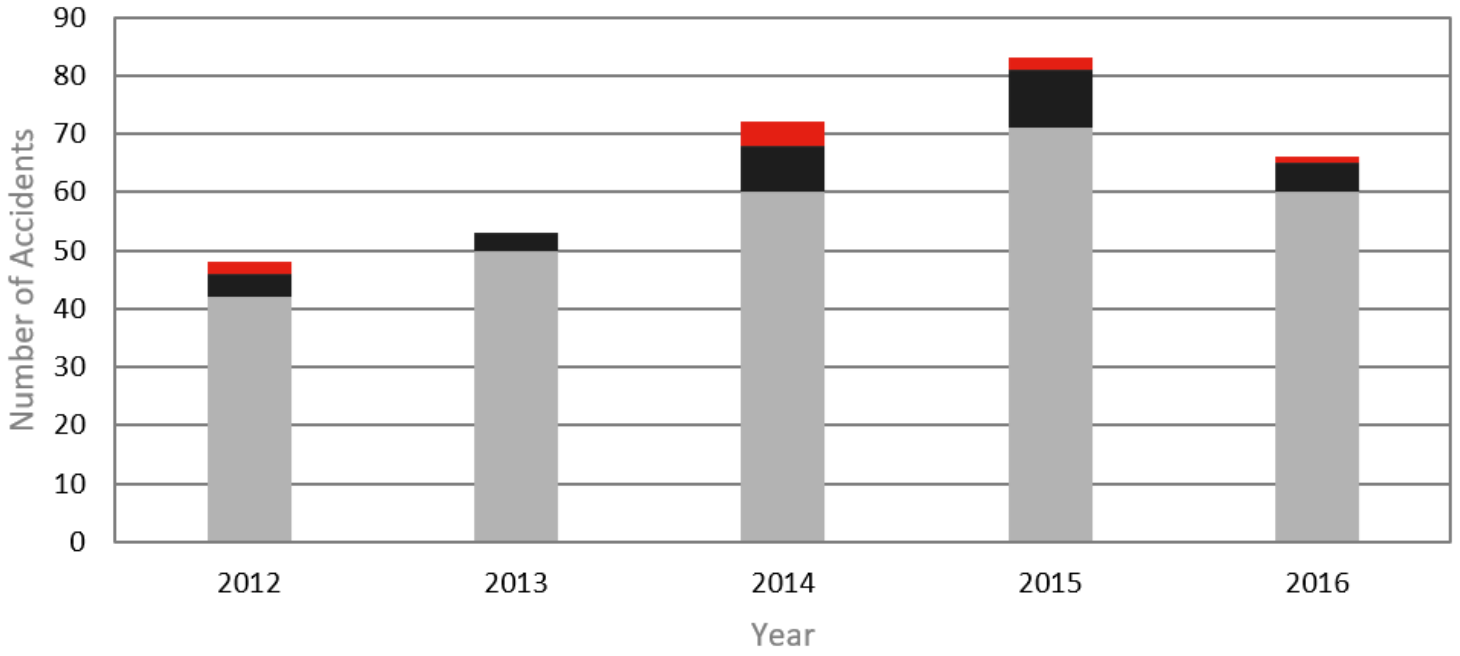




Problems:

Road Safety

- Preliminary analysis has been undertaken of the number of accidents solely on the motorway carriageway between 2012-2016
- General increase in the number of recorded accidents, however a slight reduction was recorded in 2016
- Limited resilience on the network when issues occur



Problems:

Road Safety

- Preliminary analysis has been undertaken on the recorded collision rate per kilometre (2012-2016)
- Link between Junctions 46-47 has the highest collision rate with 10 collisions per km

Link	Collision Rate per km	Slight	Serious	Fatal	Total
Junctions 46-47	10	24	1	1	26
Junctions 45-46	9	24	3	2	29
Junctions 41-42	9	43	1	1	45
Junctions 42-43	8	14	2	0	16
Junctions 36-37	6	36	11	3	50

Problems:

Road Safety

- Preliminary analysis has indicated that the link from Junction 36 to 37 had the highest number of serious and fatal accidents between 2012 - 2016

Link	Slight	Serious	Fatal	Total
Junctions 36-37	36	11	3	50
Junctions 45-46	24	3	2	29
Junctions 44-45	14	0	2	16
Junctions 41-42	43	1	1	45
Junctions 46-47	24	1	1	26

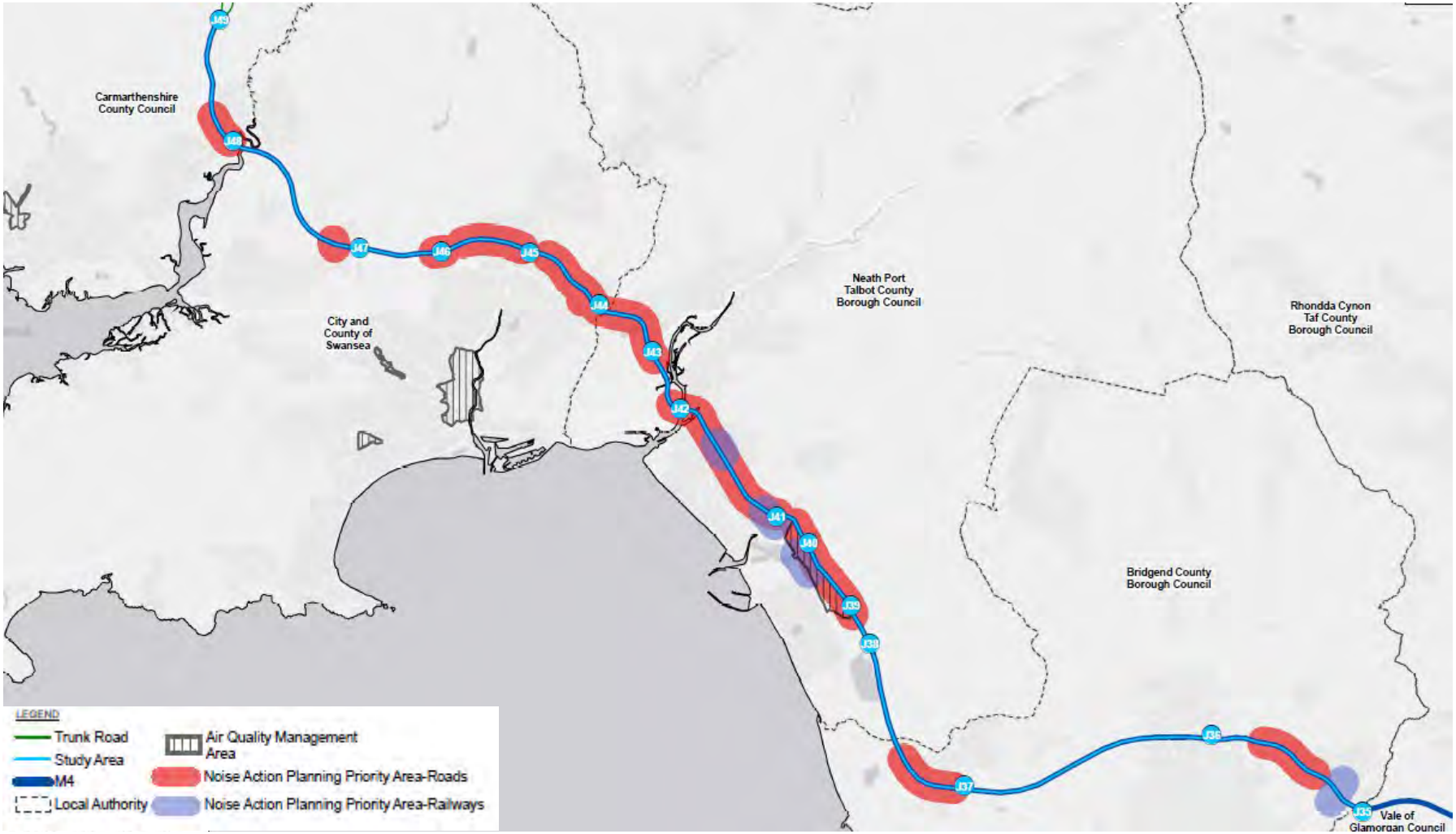
Problems:

Environmental Constraints

- Air quality – there are three Air Quality Management Areas in the motorway corridor
- Noise – there are a number of Noise Action Planning Priority Areas along the M4 and noise sensitive areas
- Temporary 50 mph Speed Limit extension between Junction 41 to Junction 42 came into force on 18th June 2018.
- It has been introduced to address nitrogen dioxide (NO2) levels which are currently above legal limits. The intention is that lower speed limits will reduce vehicle emissions and improve air quality, aiding compliance with NO2 limits set out in legislation. If successful in reducing NO2 levels, arrangements will be made to make the speed limits permanent.

Problems:

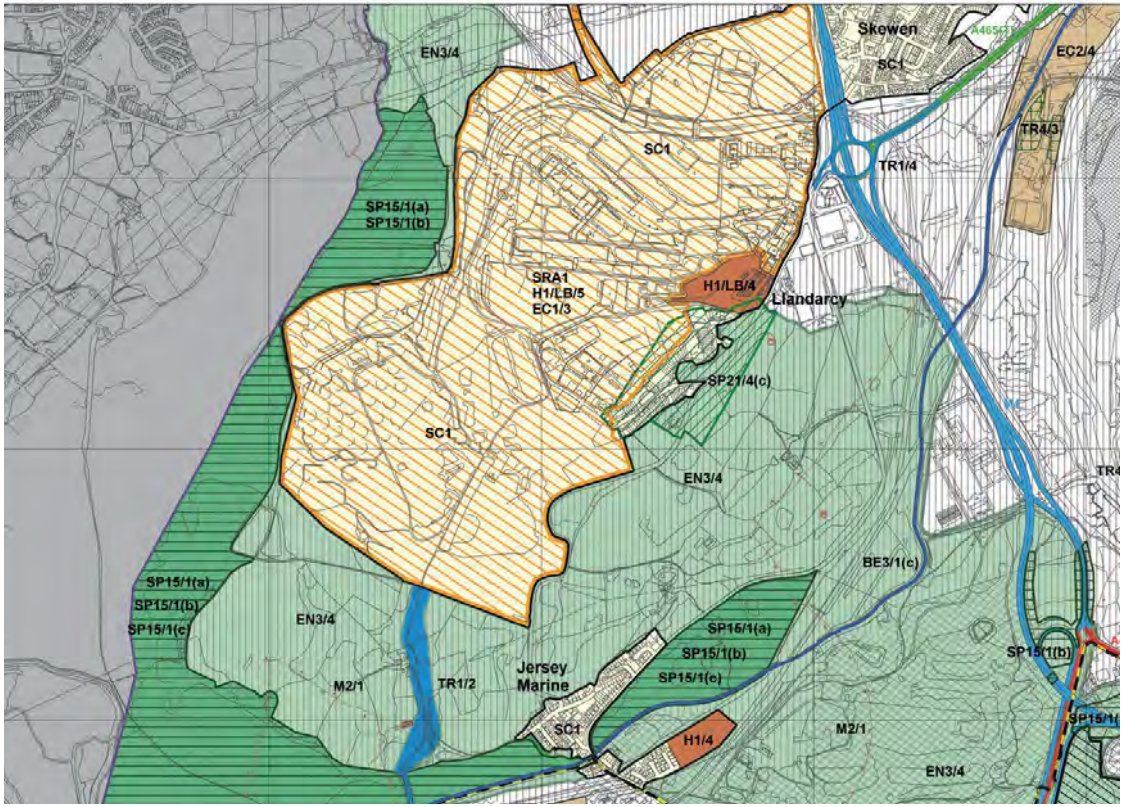
Environmental Constraints – AQMA and Noise Action Planning Priority Areas



Problems:

Future Developments

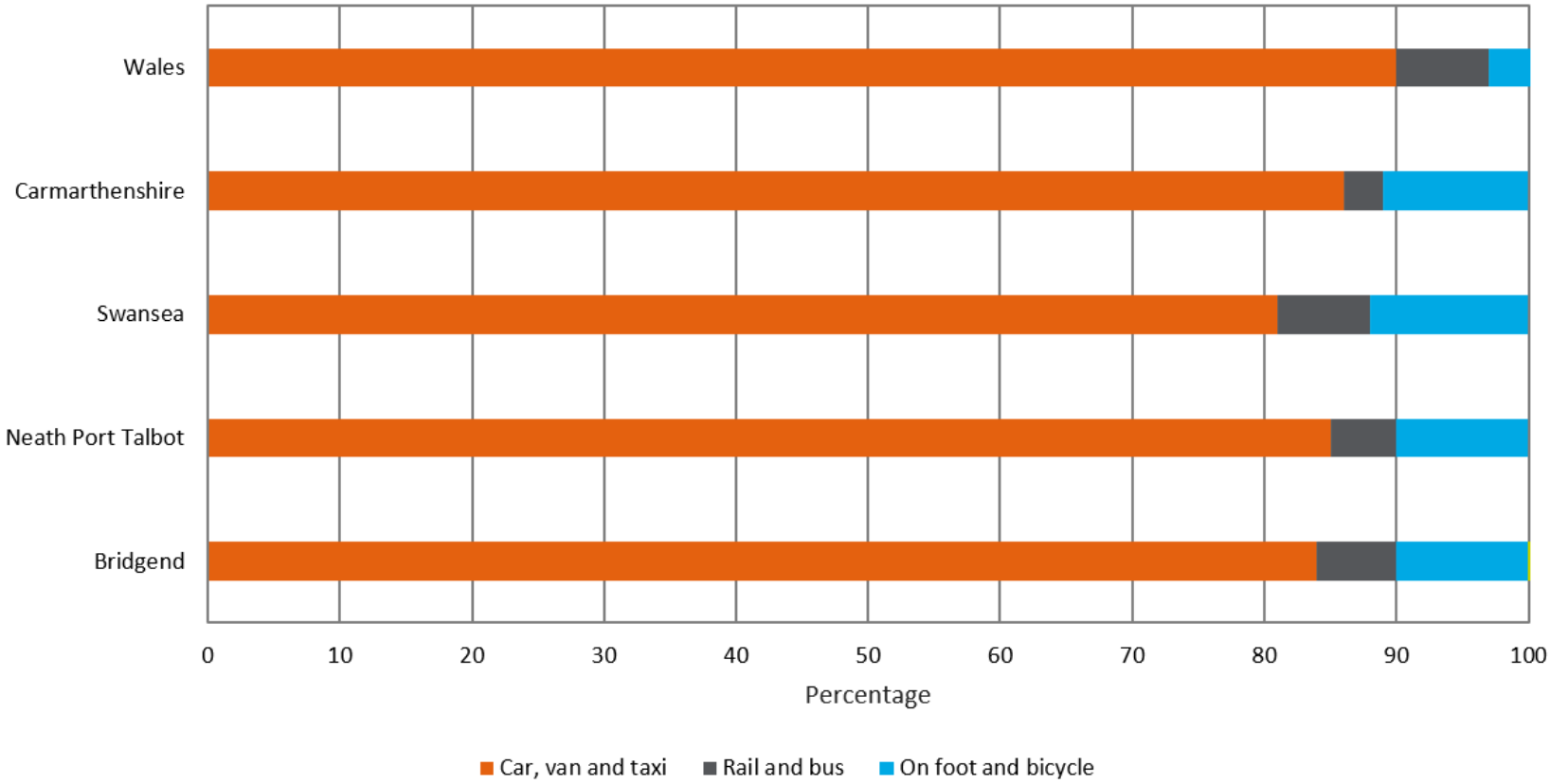
- There are a number of significant developments both within and within close proximity of the motorway that are expected to generate additional traffic demands



Problems:

Reliance on the private car

- The private car is the dominant mode of transport for residents of all four local authorities in the study area, although lower than Wales



Problems:

Public Transport

- Areas served and frequency of public transport services means they may not provide alternative to motorway use
- Lack of accessibility to key origins/ destinations (e.g. no rail station for Porthcawl)
- Access to public transport interchanges can be poor from strategic network

Problems:

Social and Economic

- The M4 corridor has a vital social and economic function including access to the town and city centres, health and education, strategic employment and ports for example.
- Traffic congestion and journey reliability will impact on the economy, with delays to freight/ businesses and journeys to works.
- Friday PM is the busiest period during the summer months showing the importance of the motorway to tourists and visitors.
- Motorway leads to severance in some communities.

Opportunities:

- Improve operational performance of the motorway and junctions
- Enhance capacity of the motorway
- Improve routeing and communications
- Accommodate forecast traffic generation from future developments
- Improve road safety
- Improve air quality and reduce noise
- Enhance the heavy rail network
- Enhance the sub-regional bus network
- Improve opportunities for interchange (Park and Share and Park and Ride)
- Encourage uptake of low emissions/ electric vehicles

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Setting Objectives

Draft Objectives:

- Improve highway capacity, resilience and performance of the motorway, interchanges and connecting road network
- Improve road safety
- Reduce noise, air quality and severance impacts on communities
- Promote transport options to reduce dependence on the motorway
- Facilitate regional growth and development to bring enhanced prosperity
- Facilitate access to services, education and employment to support social inclusion and health and well-being
- Minimise impacts on the local and global environment

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Identifying Options

Potential Options

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Summary and Next Steps

Summary and Next Steps

- **Workshop Outcomes:**
  - Discussion of problems, opportunities and constraints
  - Objective setting
  - Option identification and discussion
- **Next Steps:**
  - Appraisal of long list of options against objectives and impact criteria
  - Stage One report suggesting options for further consideration

Thank You

ANNEX C - Stakeholder Workshop Two Presentation

ARCADIS Design & Consultancy for natural and built assets

M4 J35 Pencoed to J49 Pont Abraham (Inclusive)

WelTAG Stage One Presentation | 21st March 2019

ARCADIS Design & Consultancy for natural and built assets

Overview

Study Remit

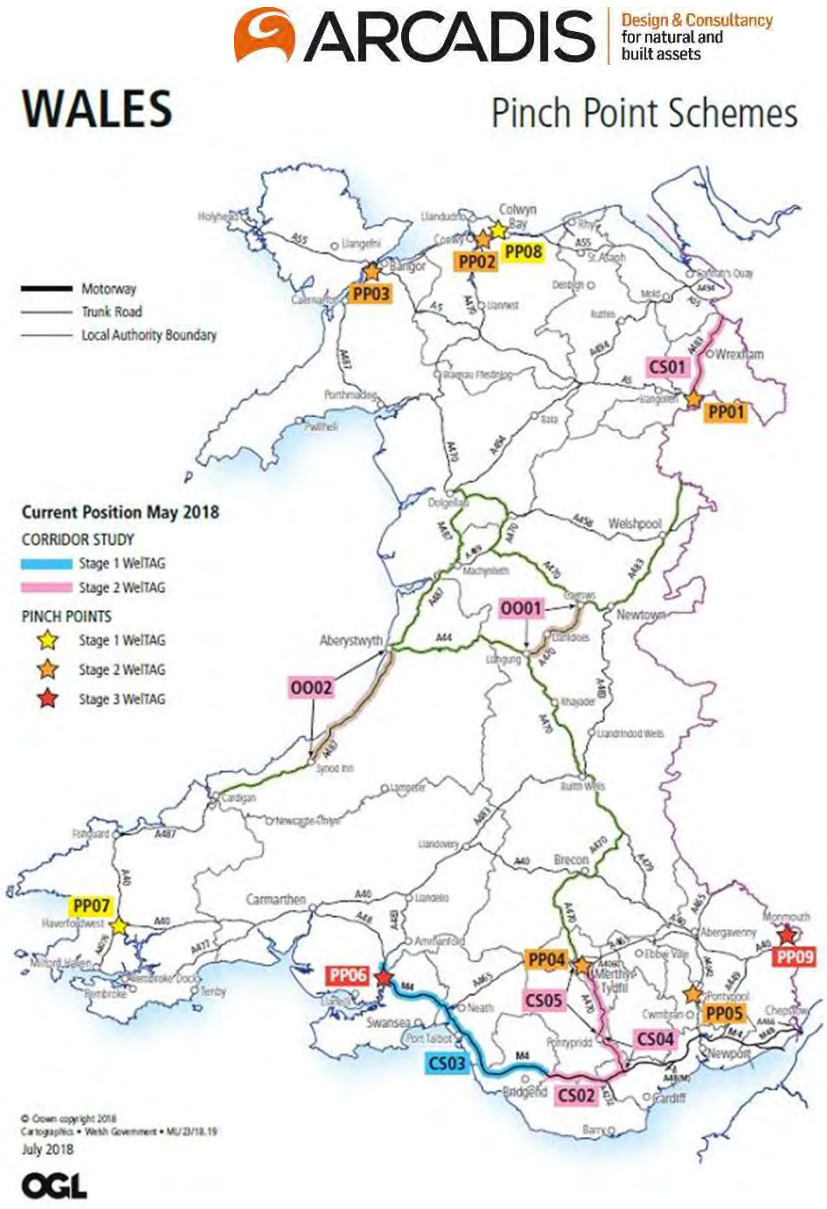
- Arcadis has been appointed by the Welsh Government to prepare a Stage One WelTAG Study for the 35 miles of the M4 Corridor, Junctions 35 to 49 as part of the Pinch Point Programme
- The corridor is identified in the National Transport Finance Plan 2017 Update, as a corridor experiencing congestion
- The corridor is a Welsh Government priority to develop options to address both current and future problems along the corridor, including congestion and air quality
- This is a multi-modal study covering all options to address the issues of the M4 corridor – including strategic public transport links
- The study considers the likely impacts on future development, using the South East Wales Traffic Model forecasts for 2026
- The study draws on all other studies and strategies for the corridor

Pinch Point Programme

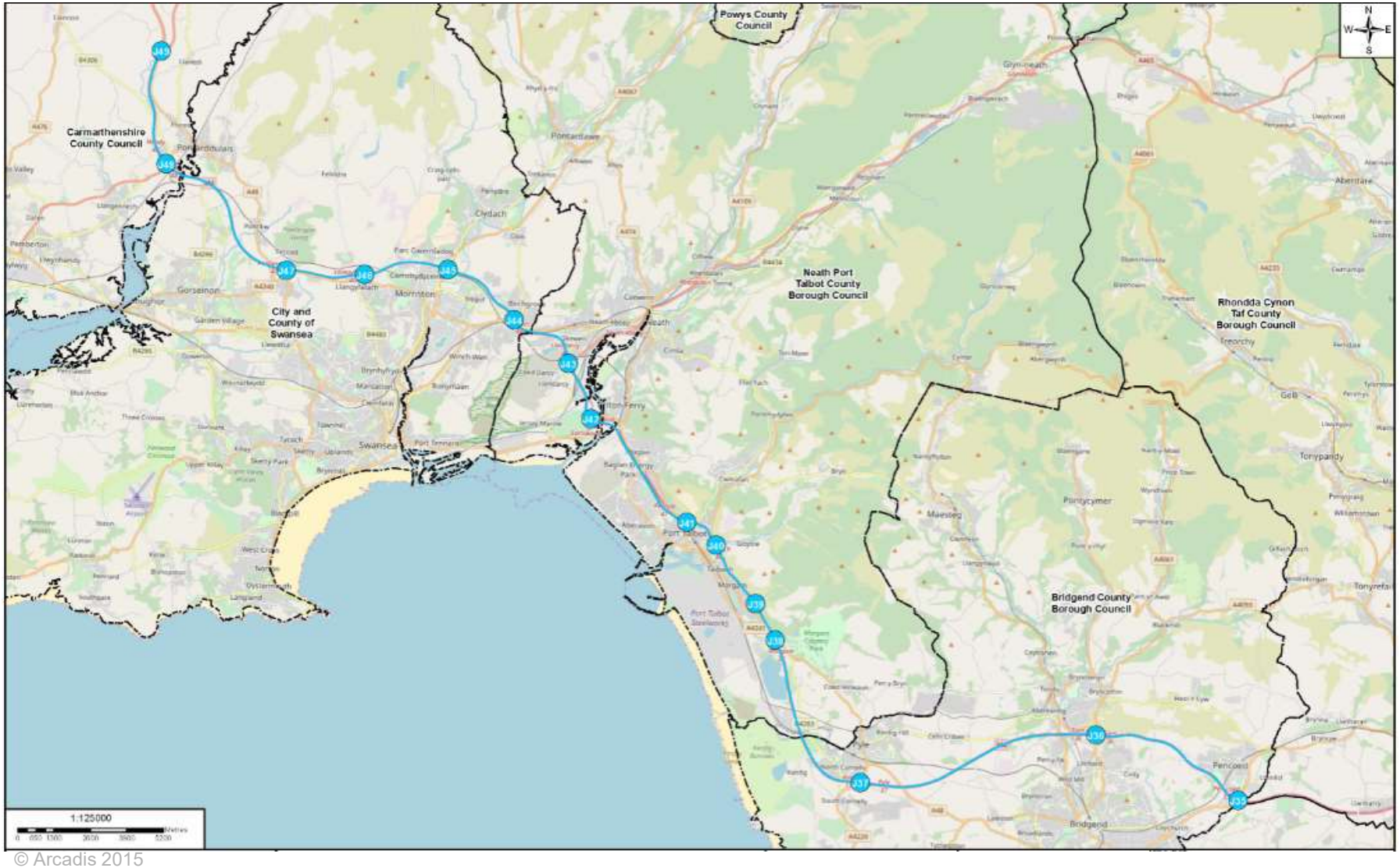
The Pinch Point and Overtaking Opportunity Studies are a series of projects aimed at tackling road-based congestion and improving the reliability of the Welsh Government Trunk Road and Motorways.

The programme consists of:

- The Mid Wales overtaking opportunity study with two distinct priority lengths.
- 3 x Corridor based studies.
- 9 x Location specific studies.

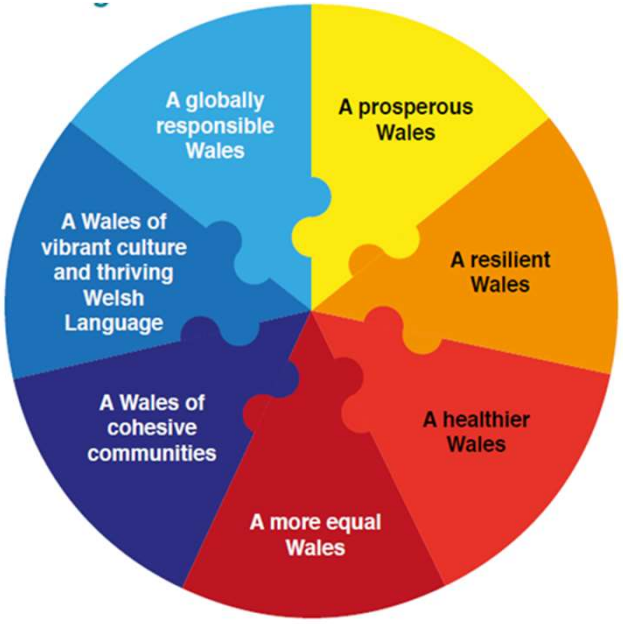


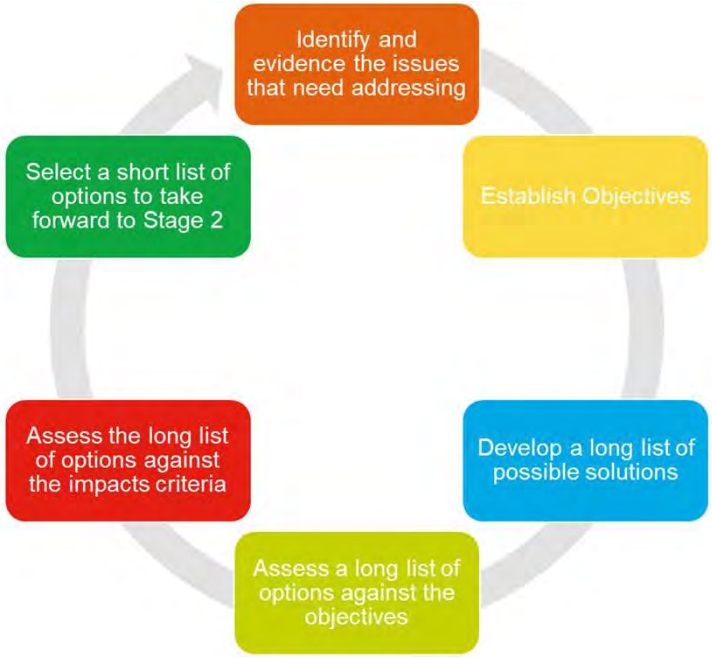
Study Area



Study Approach

- The study is being undertaken in accordance with the Welsh Government's appraisal process, WelTAG (Welsh Transport Planning and Appraisal Guidance).
- The study is the first stage of the WelTAG process called the Strategic Outline Case. There are five cases in total.
- A long list of options is being arrived at and appraised as to how each contributes to objectives and the five ways of working set out in the Future Generations Framework.
- The study will identify a list of options to be taken forward to be looked at in more detail at Stage Two.





Evidence

Evidence for the Study is from:

- **Studies and strategy documents** – e.g. WelTAG studies for J36, J48, and J41-42; draft report on the Case for Rail Investment in Wales
- **Transport Data** – South East Wales Transport Model; Swansea Traffic Model, mobile phone data; traffic counts; accident data; speed data; existing transport provision; appraisal of existing highways
- **Development proposals** – Local Development Plan proposals for sites of significant scale and strategic impact
- **Environmental Constraints** – air quality, noise, heritage, landscape, water
- **Social, Economic and Cultural** – data on demographics and facilities

Stakeholder Consultation

In order to inform the study the following consultation has been undertaken:

- Face to face meetings with each of the local authorities in the study area (Bridgend, Neath Port Talbot, Swansea and Carmarthenshire)
- First Stakeholder Workshop (17 attendees from a wide range of organisations)
- Face to face meetings with other stakeholders including Network Rail, Welsh Government departments, Transport for Wales
- Invitation to key businesses and organisations in the study area to provide written representation to the consultation process (33 invited)
- Invitation to a list of wider stakeholders to provide written representation to the consultation process (40 organisations).
- Overall more than 100 individuals and organisations have been contacted

Letters received from key businesses/ stakeholders – McArthurGlen, Roadchef and Tata Steel

Stakeholder Workshop 1: Outcomes

The outcomes of the workshop held in September were:

- **Problems:**
  - A detailed discussion on the problems
  - Identification of additional problems
  - Confirmed many of the identified problems

- **Opportunities:** Confirmation of the identified opportunities

- **Objectives:**
  - Constructive feedback on the suggested objectives
  - Objectives amended accordingly

- **Options identification:**
  - Identified options which have informed the development of the long list

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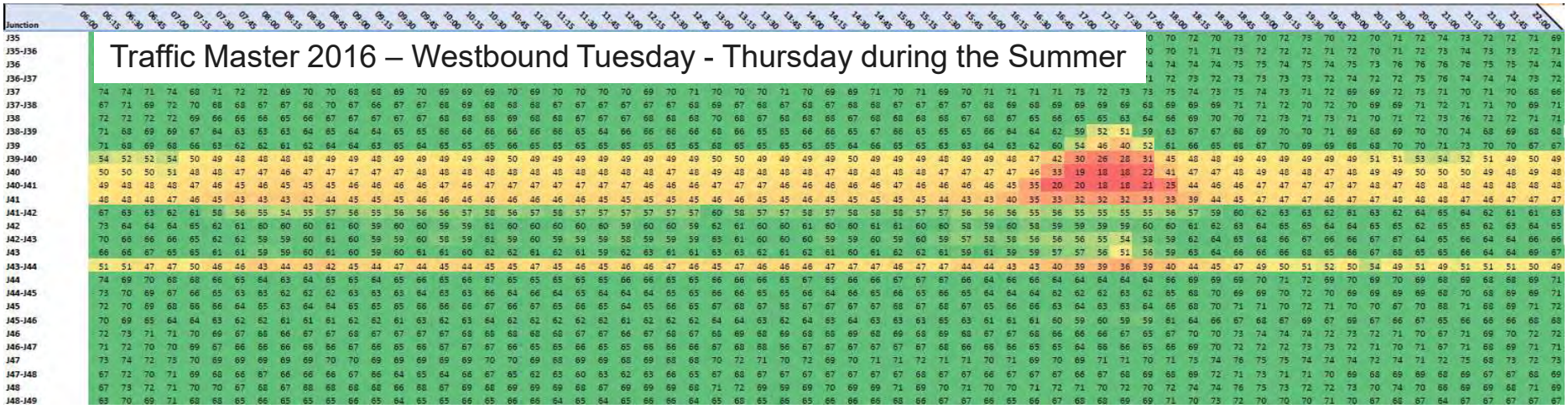
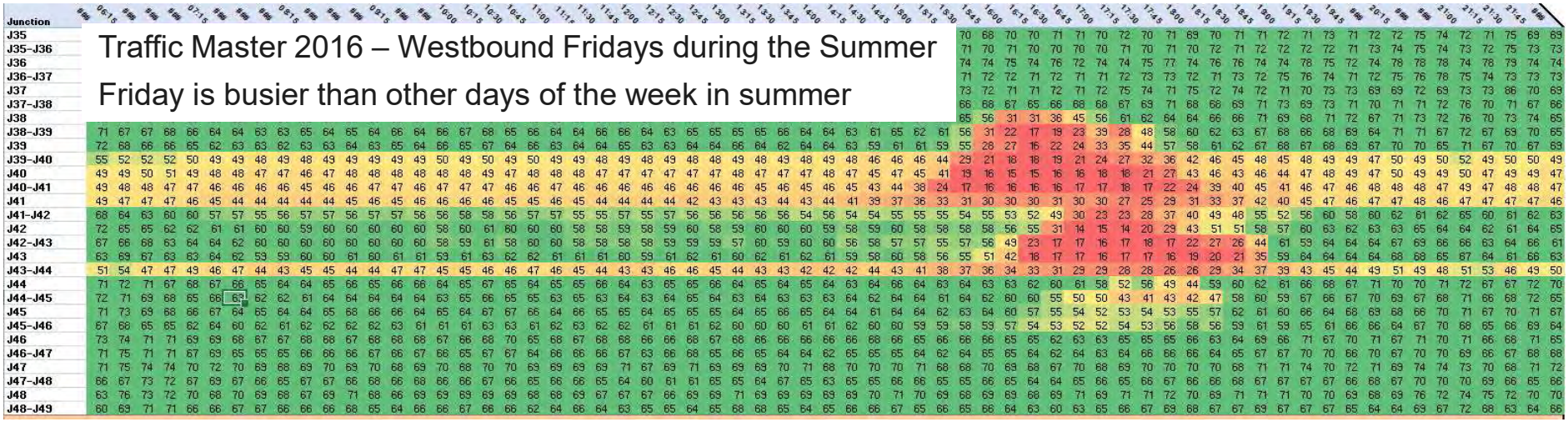
Problems

Congestion and Delay

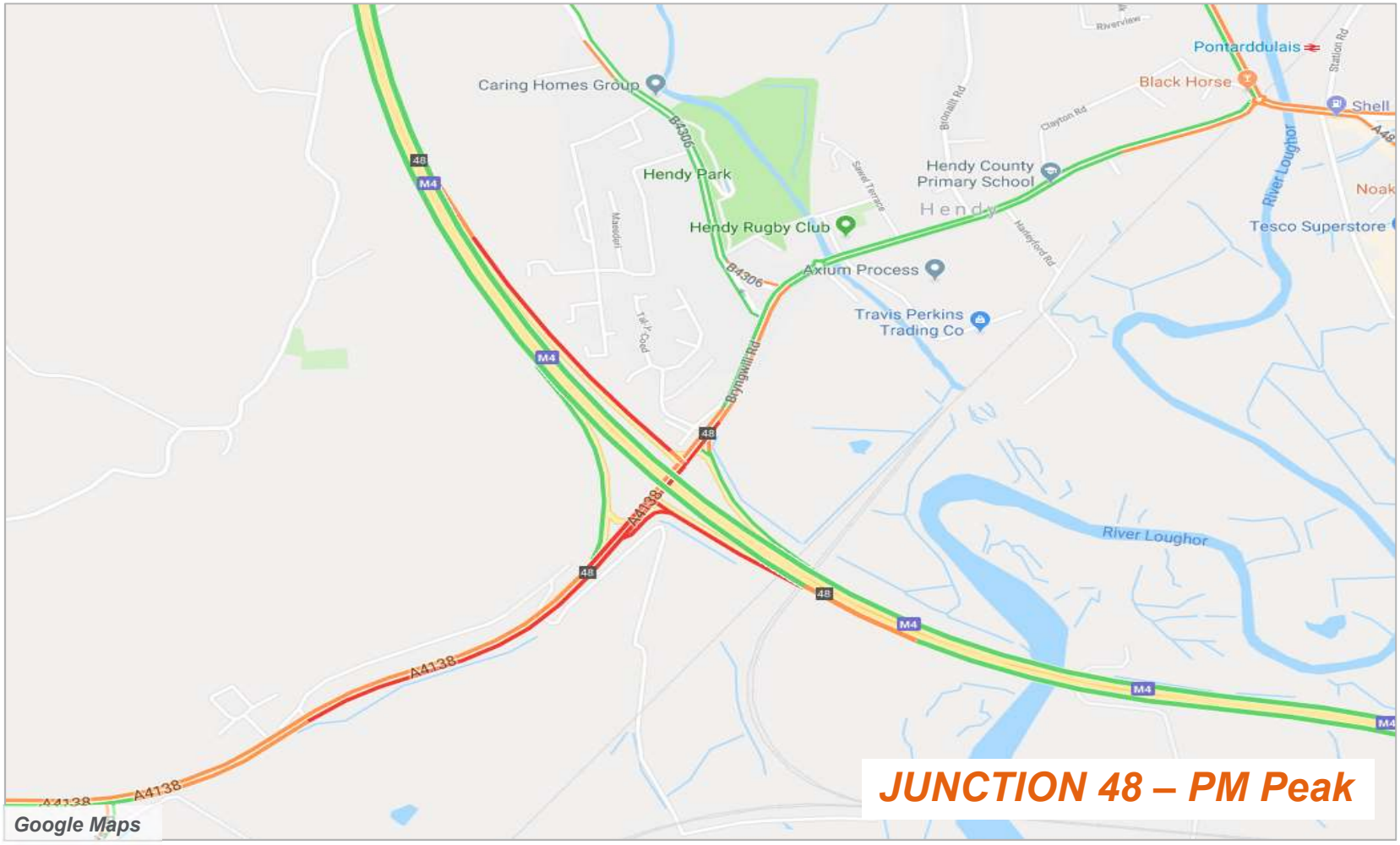
- Road network is subject to significant congestion and delays, particularly at peak periods, summer or in an event of an accident (particularly J38-45).





Congestion and Delay

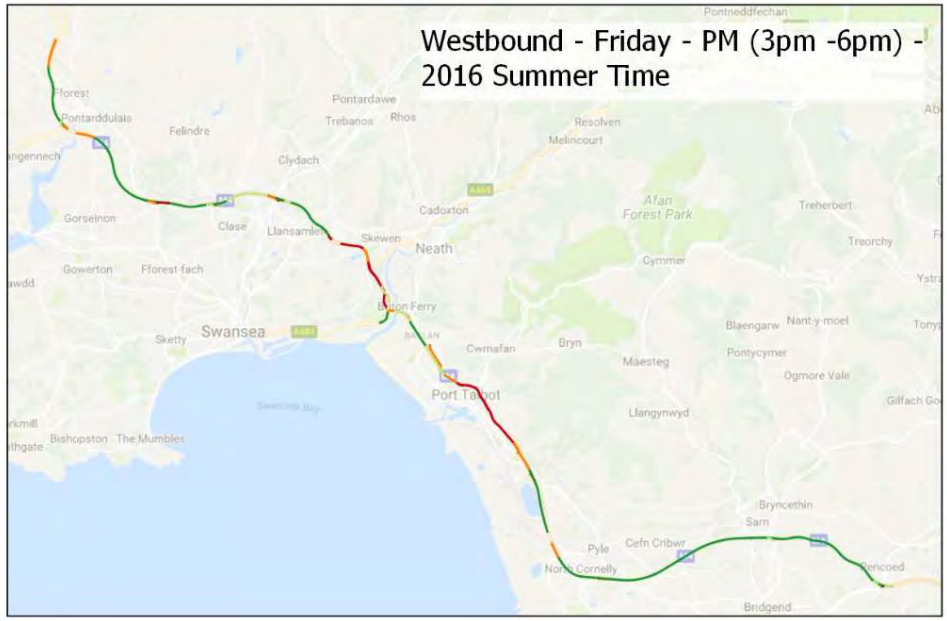
- Many junctions experience queuing and delays such as Junctions 36, 41, 43-49.

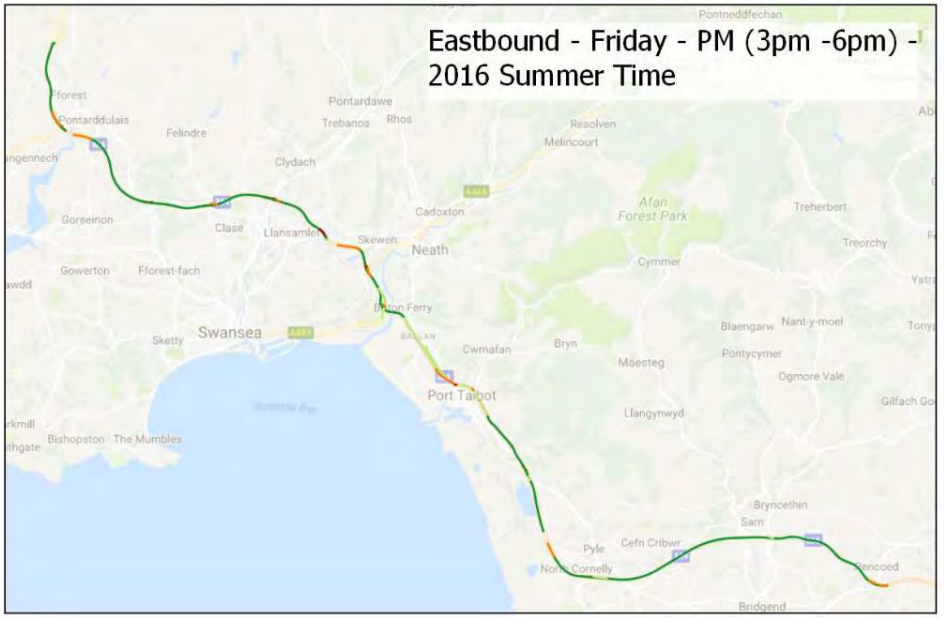


JUNCTION 48 – PM Peak

Poor Journey Times

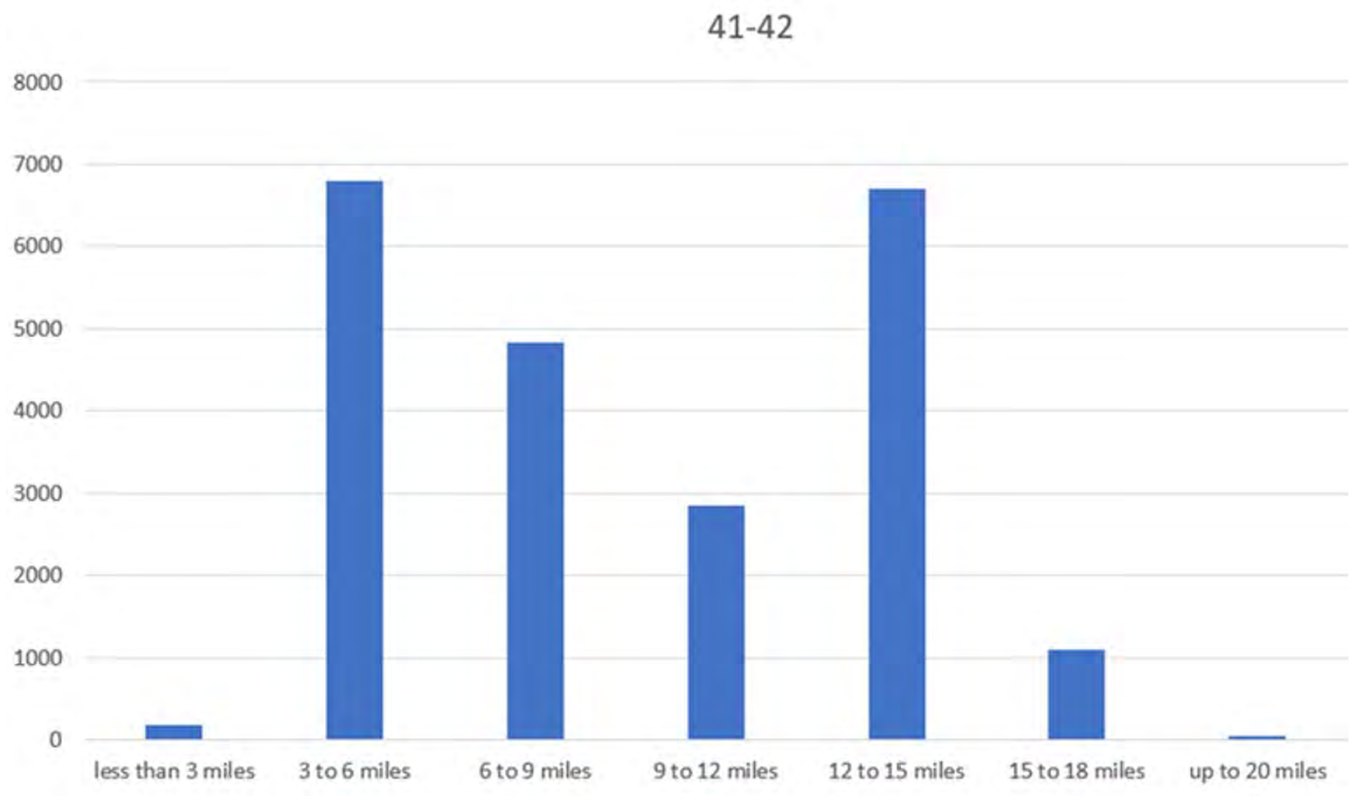
- Congestion leads to variations across the study area in average speed
- Poor journey times and reliability impacts on the economy, particularly on access to tourist destinations, as well as bus services and haulage vehicles.





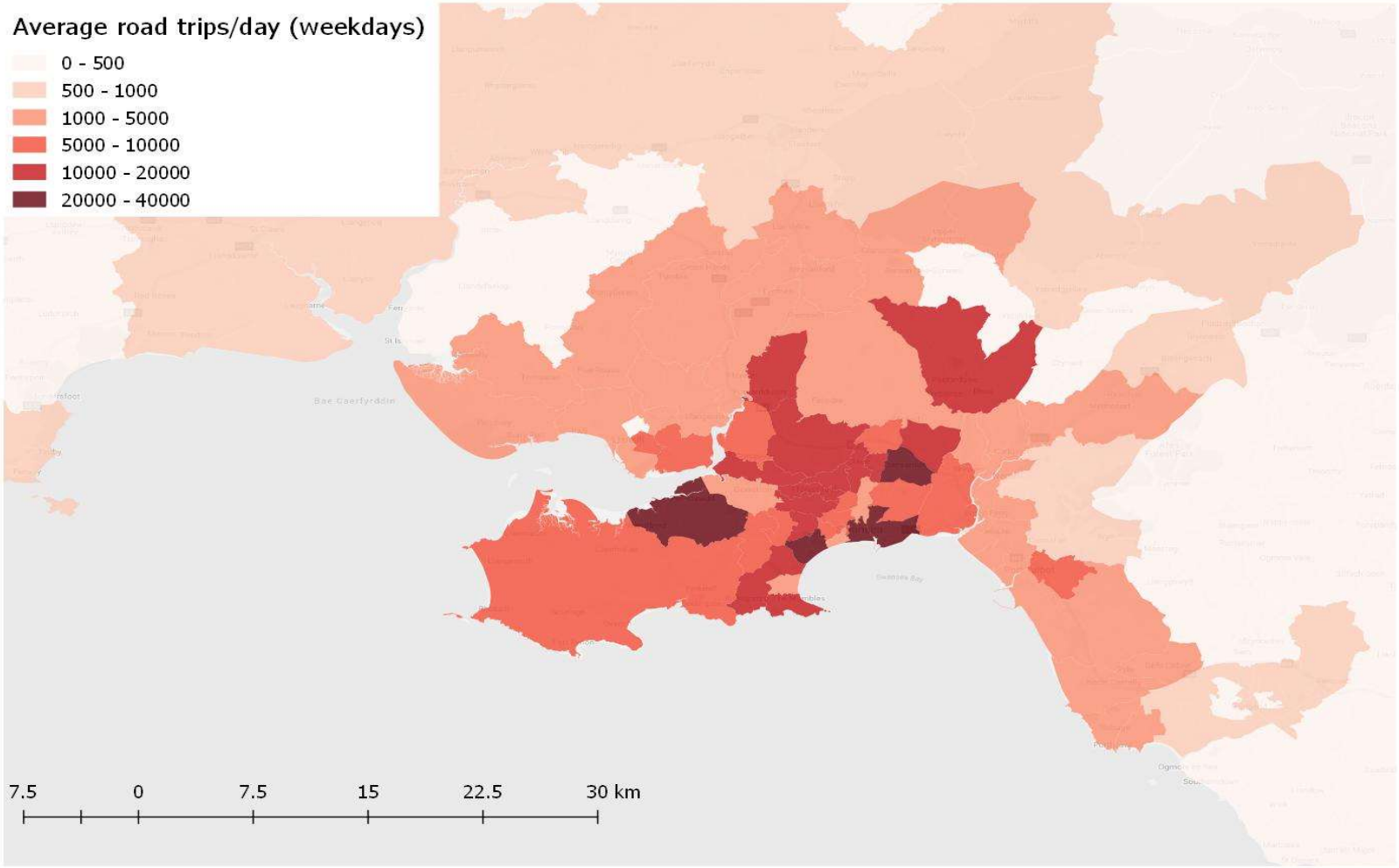
Low Average Trip Lengths

- Analysis of Swansea traffic model data shows there is a high proportion of short trips of 3 to 6 miles, particularly around J41-43
- Between J41 and 42, average distance travelled is 9 miles
- Average trip distance increases further west
- Local trips using the corridor



Trip Patterns

- Mobile phone data shows largest volumes of trips are relatively local to and from the key settlements

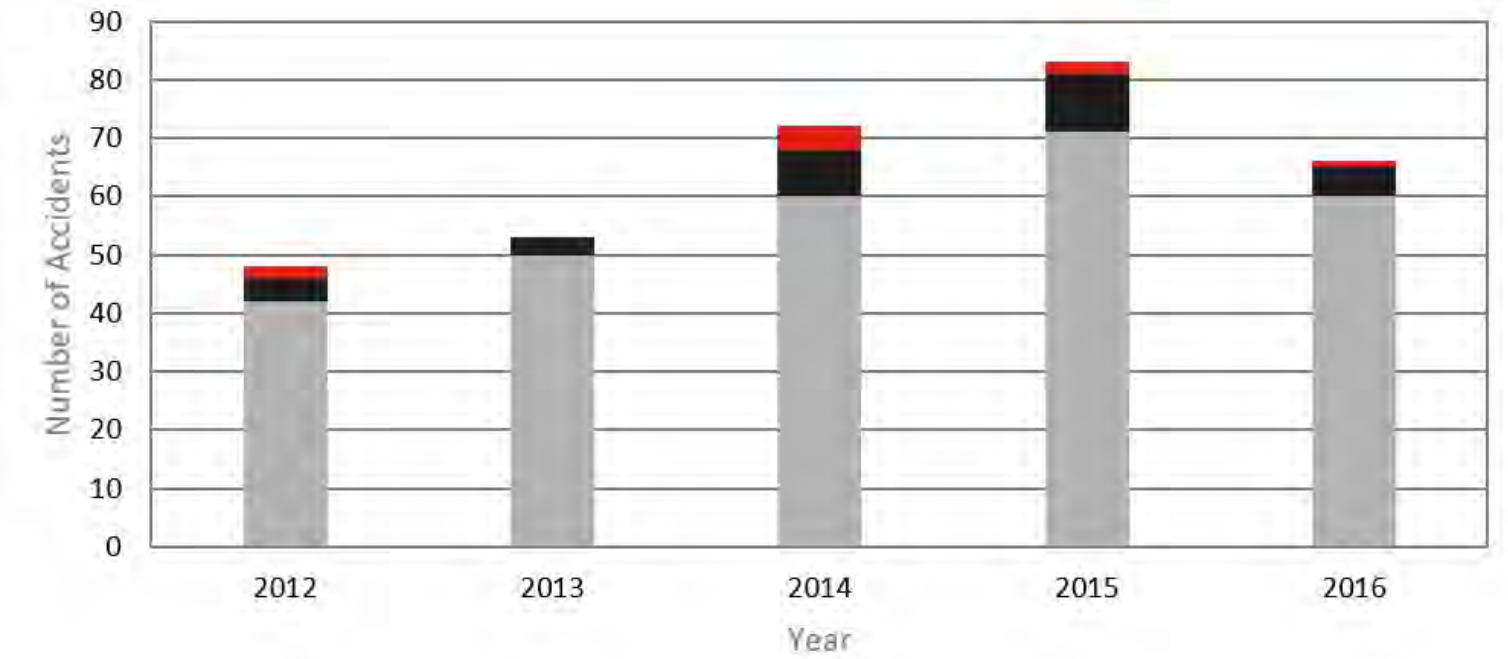


Highway Alignment

Parts of the highway network are built to previous standards

Road Safety Issues

- General increase in the number of recorded accidents between 2012 and 2016, however a slight reduction was recorded in 2016
- Limited resilience on the network when issues occur



Road Safety Issues

Average traffic speeds are in on some sections in the off peak (e.g. Junctions 36-38 more than 70mph)

Traffic Master 2016 – Westbound Fridays during the Summer

Traffic Master 2016 – Westbound Fridays during the Winter

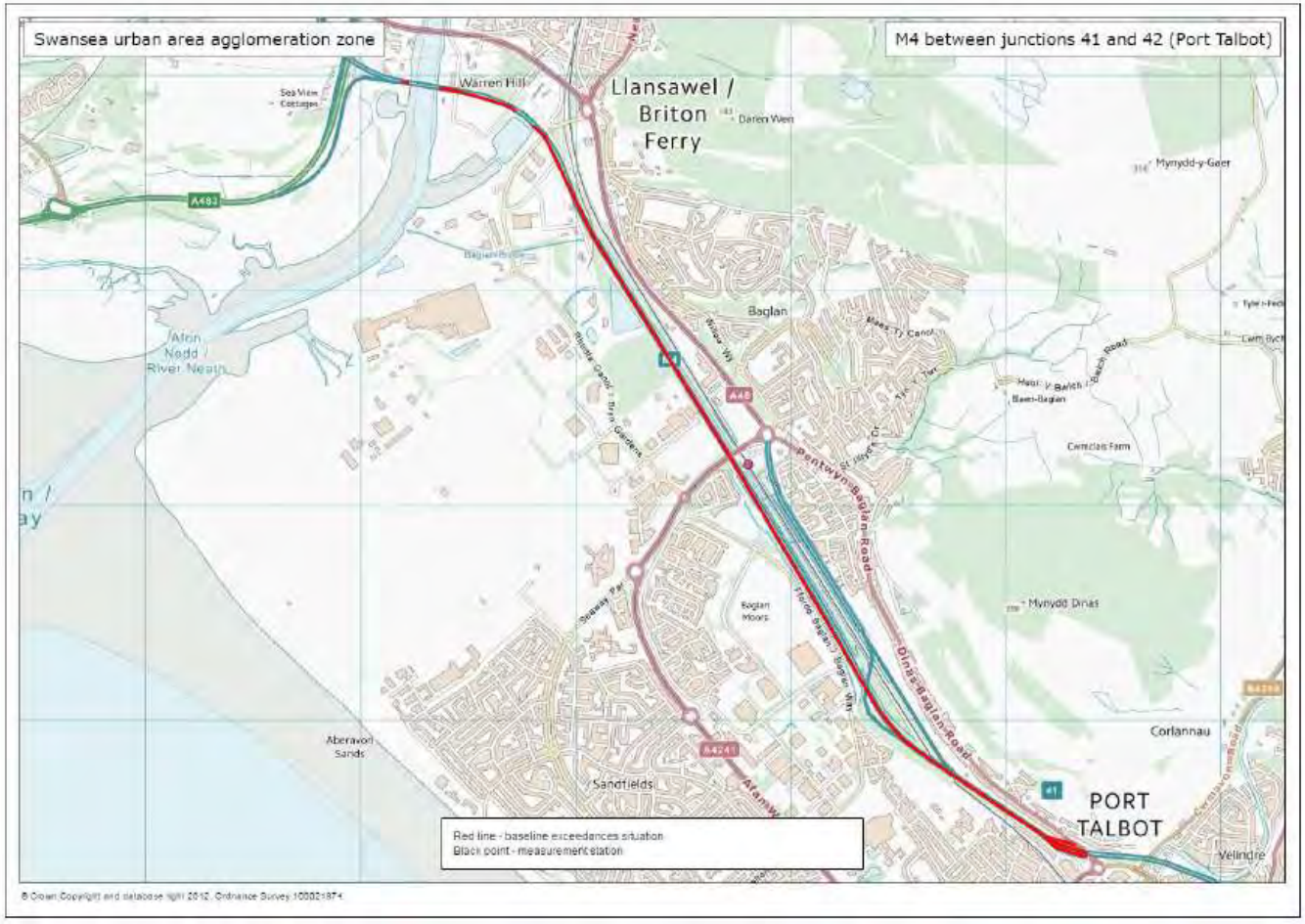
Road Safety Issues

- Link from Junctions 46-47 has the highest collision rate with 10 collisions per km
- Link from Junctions 36-37 has the highest number of fatal or serious accidents (potentially related to speed)

Link	Collision Rate per km	Slight	Serious	Fatal	Total
Junctions 46-47	10	24	1	1	26
Junctions 45-46	9	24	3	2	29
Junctions 41-42	9	43	1	1	45
Junctions 42-43	8	14	2	0	16
Junctions 36-37	6	36	11	3	50

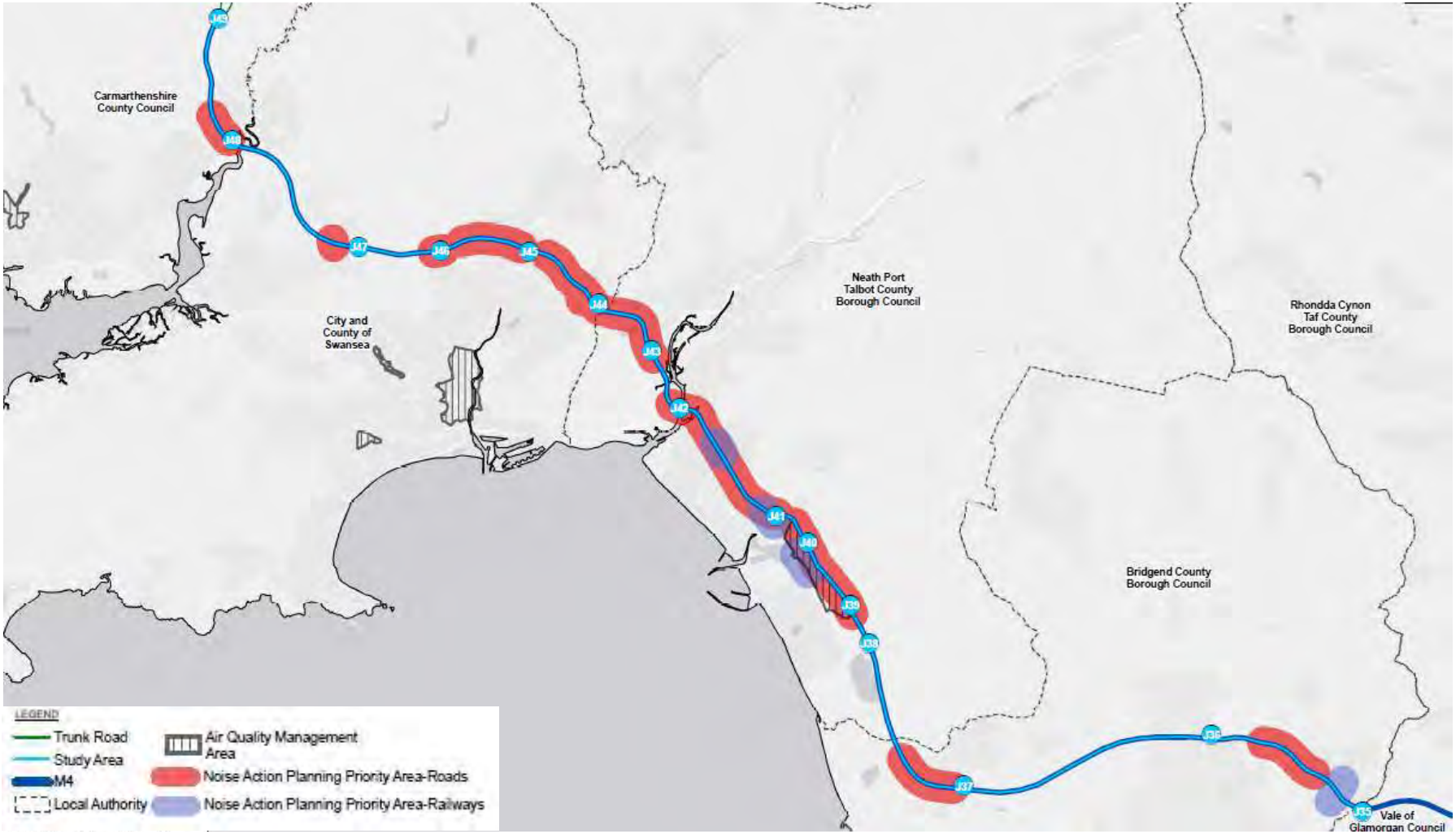
Air Quality

- The Defra NO_2 exceedance situation in 2015 for Swansea urban area covers Junctions 41-42
- The WelTAG study takes account of the measures being developed



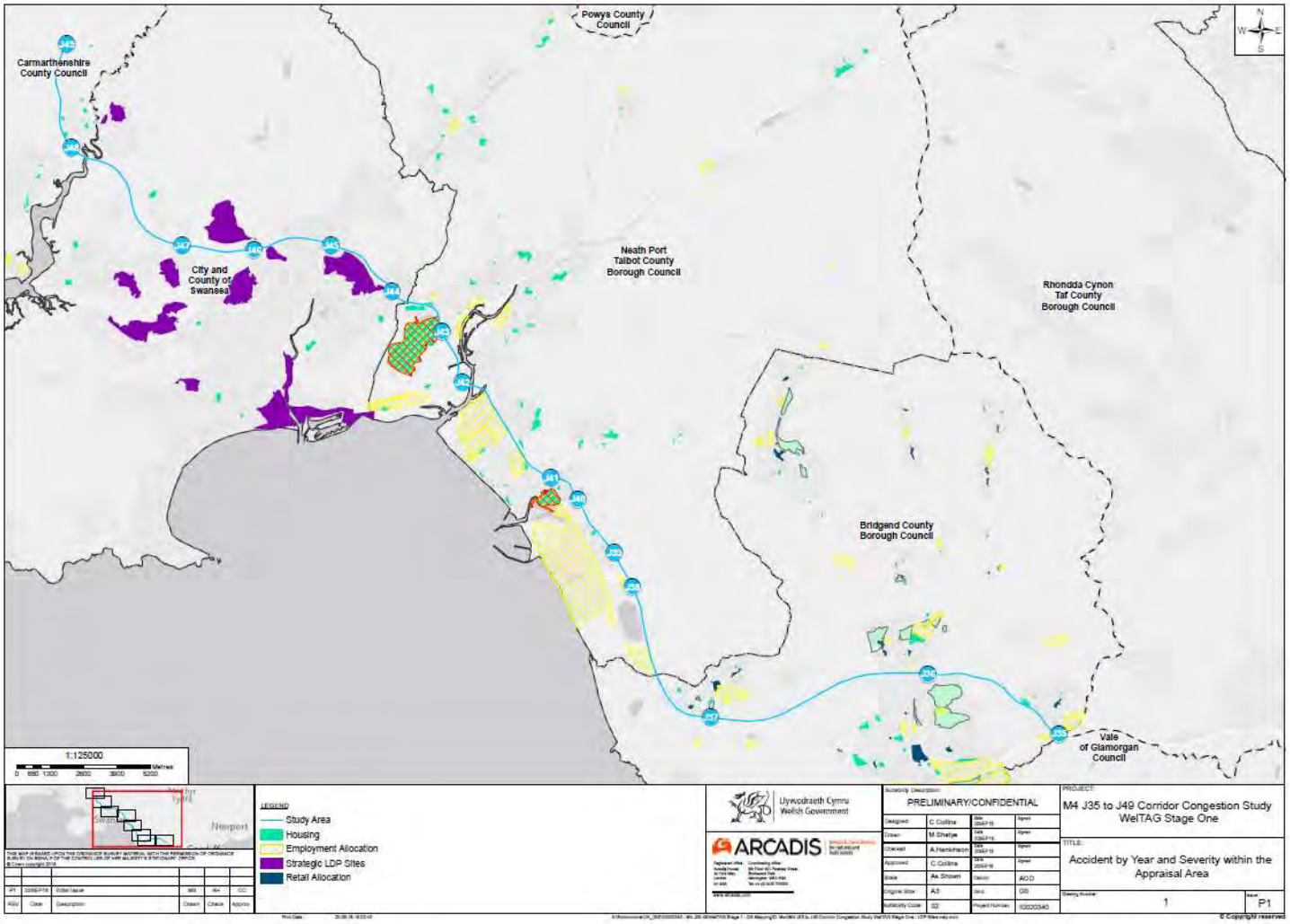
Air Quality and Noise

- Air Quality Management Area along the corridor in the vicinity of Junctions 39 and 41
- Noise – Noise Action Planning Priority Areas along the M4



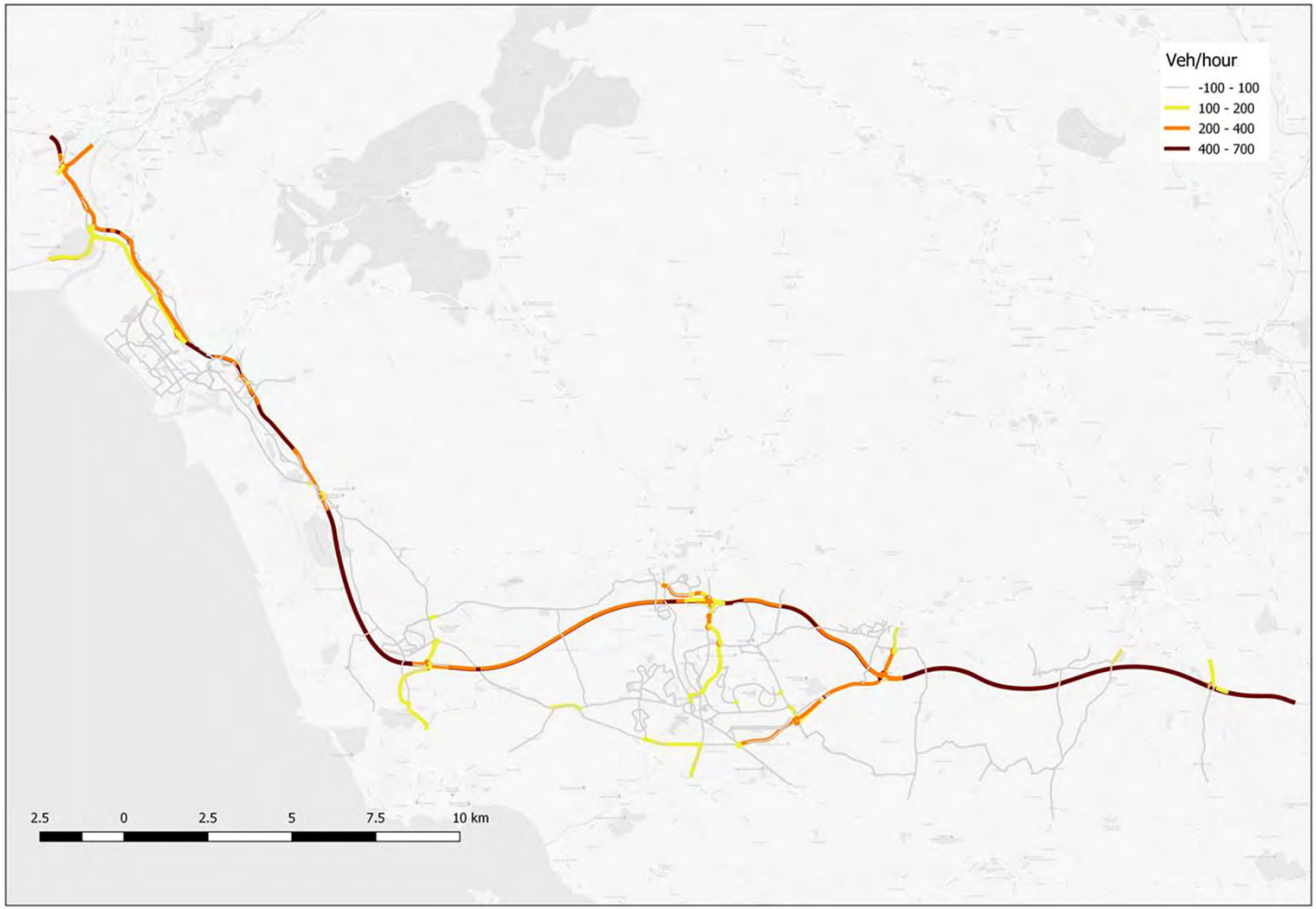
Future Development

- There are significant developments within close proximity of the motorway that are expected to generate additional traffic demands and multi-modal provision



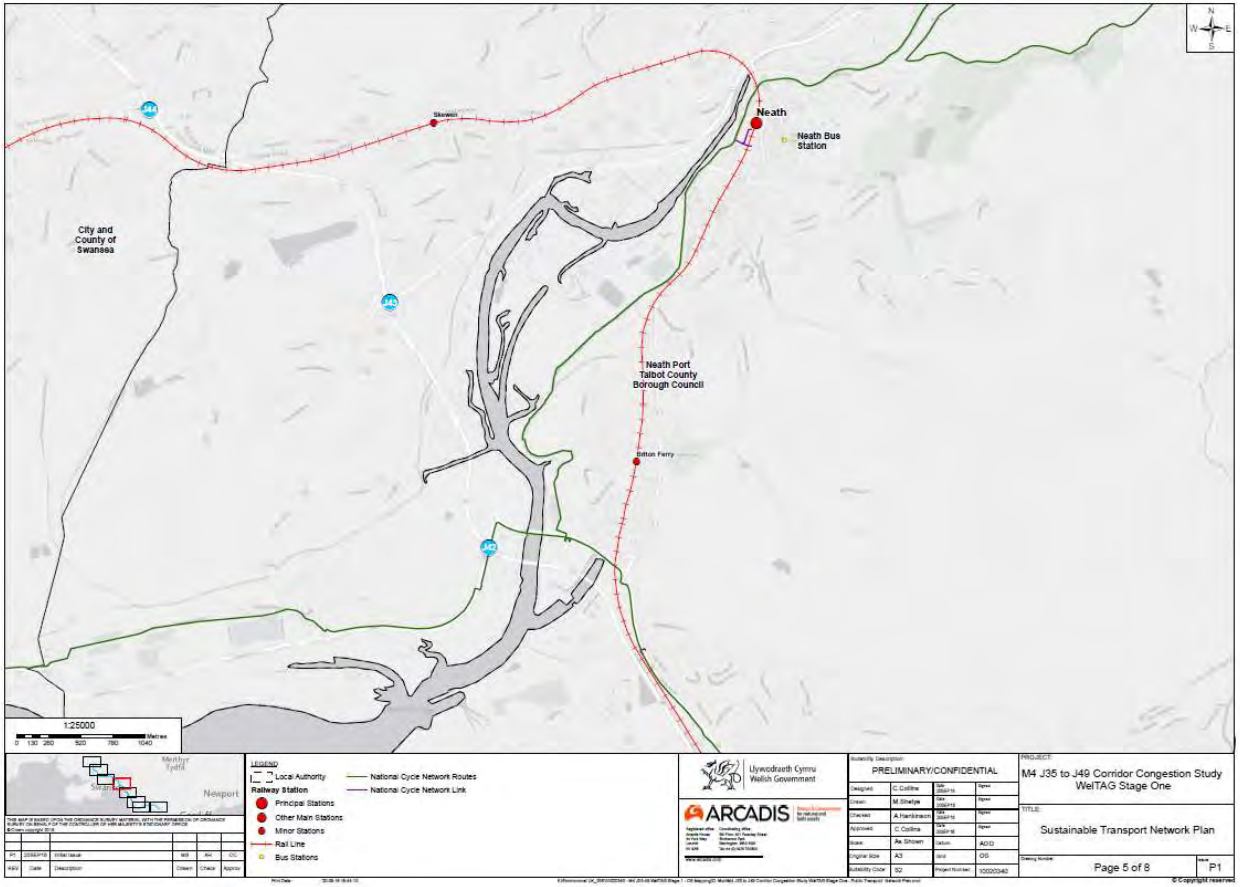
Traffic Growth Forecasts

- SEWTM forecasts substantial increase in traffic on most sections of the corridor between 2015 and 2026 (increase 20% in AM peak from J35 to 36)



Access to Public Transport

- Long journey times or poor availability of public transport services and lack of connections to public transport interchanges.
- Limited opportunities for park and ride and joining bus and rail services from the M4.
- Significant increase in rail patronage in the last 5 years – particularly at the stations along the M4 corridor



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Opportunities

Opportunities

- Improve efficiency and capacity of links and junctions and connecting routes
- Improve road safety
- Improve air quality and reduce noise impacts from transport
- Enhance transport interchanges
- Enhance public transport
- Encourage uptake of low emissions vehicles
- Support and facilitate developments

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Study Objectives

Study Objectives

1. Improve highway efficiency and resilience of the motorway, interchanges and connecting road network.
2. Improve road safety and journey time reliability.
3. Improve multi-modal travel options that reduce dependence on the motorway.
4. Facilitate regional growth and development to bring enhanced prosperity.
5. Improve access to local services, education, employment and cultural facilities to support social inclusion, health and well-being.
6. Improve the local and global environment, including reducing air and noise pollution.
7. Improve communication and information to users and management of the motorway

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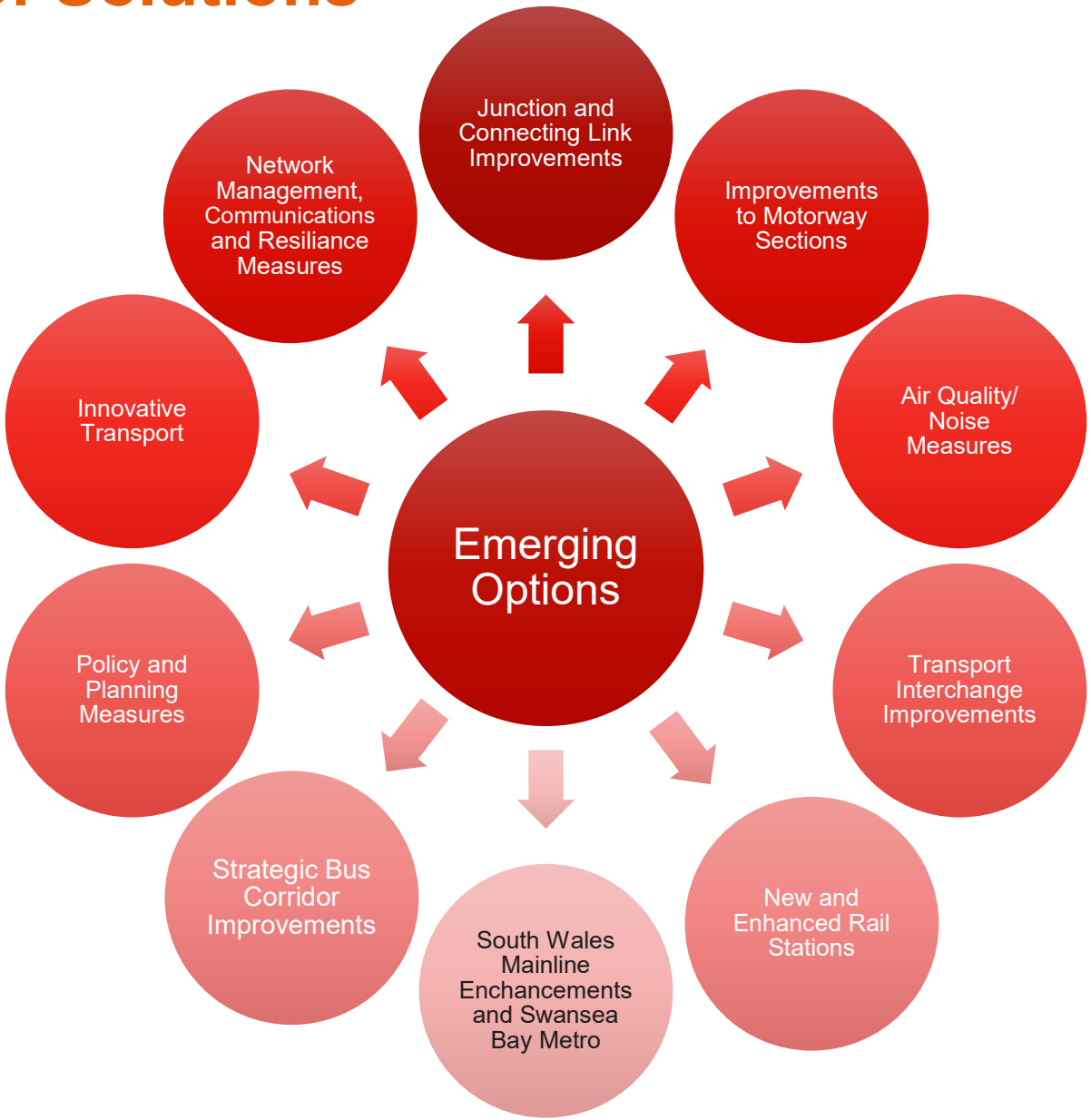
Emerging Interventions

Types of Solutions

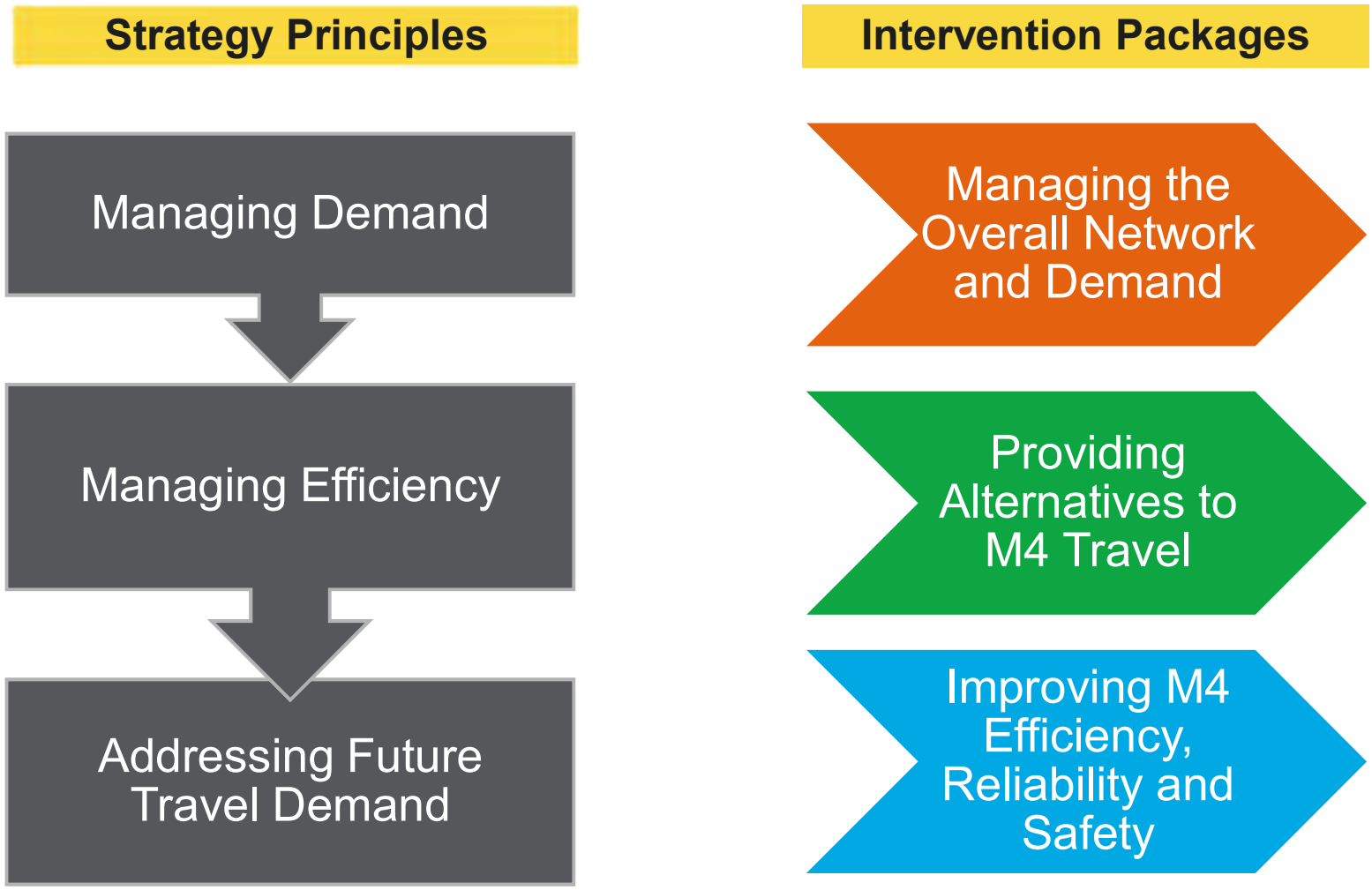


Identification of the Long List of Options:

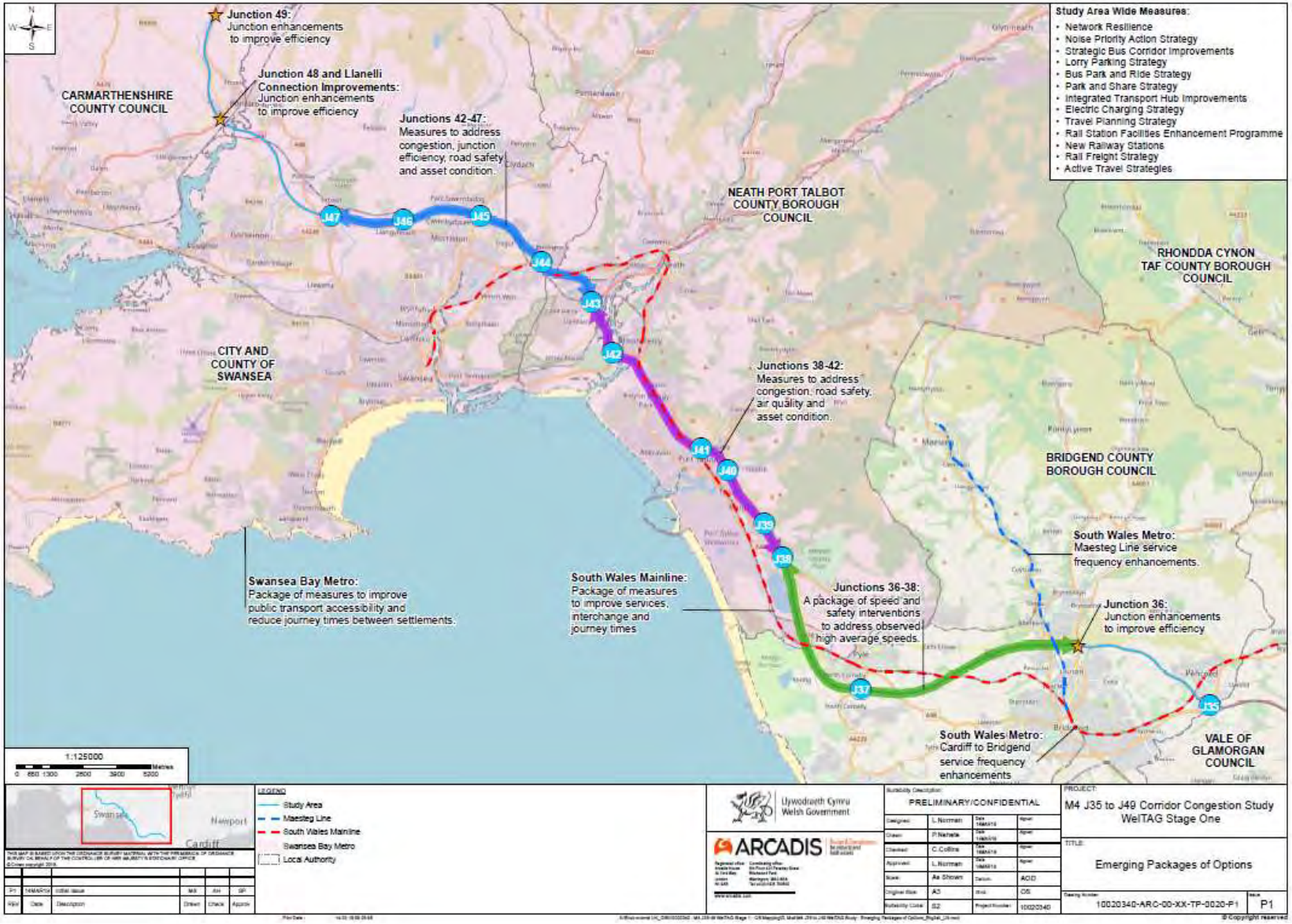
In order to inform the identification of options a range of sources have been used:

- Policies and Plans (e.g. LDPs, LTPs)
- Programmes (e.g. NTFP, South Wales Metro)
- Strategies and Studies (e.g. Welsh Route Study, Case for Rail Investment in Wales, J36 WelTAG Stage One)
- Stakeholder workshop (September 2018)
- Stakeholder consultation meetings (e.g. Local Authorities, Trunk Road Agency, Network Rail, Transport for Wales)
- Study team

Developing Interventions



Emerging Packages of Options



Managing the Overall Network and Demand

Ref.	Option Packages	Short Term and Medium Term Measures (within 5 years)	Long Term Measures (5 years and beyond)
MND.1	Study Area Wide Network Management	Potential short term interventions to commission and complete for the corridor a: • Resilience Study; • Noise Priority Areas Action Plan; • Low Emission Vehicle Fuelling Strategy; and • Travel Planning Strategy The outcome of these studies would inform additional short, medium and longer term measures.	
MND.2	Freight Measures	Potential short term interventions to commission and complete for the corridor a: • Rail Freight Strategy; and • Lorry Parking Strategy. The outcome of these studies would inform additional short, medium and longer term measures.	

Providing Alternatives to M4 Travel

Ref.	Options	Short Term and Medium Term Measures (within 5 years)	Long Term Measures (Beyond 5 years)
ALT.1	Active Travel Routes	• Development of active travel routes. This will focus on providing alternatives for short journeys, focusing on connecting to transport interchanges and key employment sites.	
ALT.2	Strategic Bus Corridors	Potential short and medium term interventions: • Connecting key settlements; • Priority measures on key routes; • Consideration of regional bus services; and • Active travel connections to bus services.	Potential long term intervention: • Consideration of rapid transit from Porthcawl to Bridgend.
ALT.3	South Wales Metro	Potential short and medium term interventions: • First-class service from Swansea to Manchester from 2024; • Introduction of a new two and three-car DMUs on the Milford Haven to Manchester service by 2023; • 2tph between Cardiff and Bridgend via Vale of Glamorgan from December 2023; • 4tph between Cardiff and Bridgend (direct, Monday to Saturday) from December 2019; and • Maesteg Line – four Metro style services per hour from Maesteg through to Bridgend and beyond	• See above for Strategic Bus Corridors

Providing Alternatives to M4 Travel

Ref.	Options	Short Term and Medium Term Measures (within 5 years)	Long Term Measures (Beyond 5 years)
ALT.4	South Wales Mainline Enhancements	Potential short and medium term interventions: • Infrastructure upgrades to provide direct services from Pembroke Dock to London via Carmarthen on new trains; and • Improved service frequency to local stations between Cardiff Central and Swansea.	Potential long term interventions: • Journey time reductions through line speed upgrades to over 100mph throughout the SWML (including west of Swansea); • Additional regional services; and • Electrification of line from Cardiff to Swansea.
ALT.5	Swansea Bay Metro	Potential short and medium term: • Swansea Bay and Western Valleys Metro Proposal – Business Case Development. Funding has been allocated to undertake initial feasibility study; • Park and Ride provision at key stations; and • Integration measures for active travel and bus routes to maximise the rail network's reach.	Potential long term interventions: • A new dedicated Swansea Bay commuter rail network serving a range of new and existing stations (for example, Landore, Felindre, Winch Wen); • Two initial routes (including some new infrastructure) could be operated using the rolling stock based on the tram-train that will be procured for the South Wales Metro: A Llanelli – Pontarddulais – Swansea 'Metro' service; A Port Talbot – Neath - Swansea 'Metro' service (subject to operational feasibility); and • LRT/ ultra light rail opportunities.

Providing Alternatives to M4 Travel

Ref.	Options	Short Term and Medium Term Measures (within 5 years)	Long Term Measures (Beyond 5 years)
ALT.6	West and Mid Wales Rail Connections		Potential long term interventions: • Improved connectivity to the Heart of Wales Line; and • Options to reduce journey times to Llanelli, Carmarthen and West Wales through new alignment options and reduced stops.
ALT.7	West Wales Parkway		Potential long term interventions: • Development of a parkway station on the Swansea District Line (SDL) perhaps at Llandarcy (inc. additional services) and/or route/station alternatives such as Felindre. This may require a link between SDL and the main line near Llansamlet.
ALT.8	Park & Ride and Park & Share M4 Corridor Strategy	Potential short, medium term and long interventions: • Enhancements to existing bus park and ride sites; • New bus based park and ride sites; and • Additional park and share sites.	
ALT.9	Public Transport Interchanges	Potential short, medium term and longer interventions: • Rail and bus station enhancements (e.g., Pyle, Swansea, Llanelli); • Integration of bus/ rail/ cycling/ park and ride; • Active Travel connections; and • New stations (e.g. Landore, Cockett, Brackla)	ALT.8

Improving M4 Efficiency, Reliability and Safety

Ref.	Options	Short Term and Medium Term Measures (within 5 years)	Long Term Measures (Beyond 5 years)
ERS.1	J36-38 Improvements package	Potential short term interventions: • Undertaking a detailed corridor study (focusing on accidents and traffic speeds) to identify measures to address high vehicle speeds. The outcome of this study would inform other short and medium term measures.	
ERS.2	J38-43 Improvements Package	Potential short to medium term interventions: • Permanent 50mph speed limit • Variable speed limit; • Signing and diversion to Harbour Way; • Upgrades to Harbour Way including possibility of new westbound on-slip at Baglan; • Junctions 40 and 41 consideration of junction arrangements; • Improvements to Junction 43 to facilitate development and improve connectivity between A465 and A483; and • Consideration of congestion and renewal issues on A48 and Briton Ferry Bridge.	Potential long term interventions: • Renewal of Briton Ferry Bridge; • Widening of M4 to 3 lanes from J38-42; • Widening of M4 to 4 lanes in each direction from J42-43 (potential off mainline running?); • Smart Motorway to provide 3 lanes in each direction from J38-42; • New M4 section between J38 and J42 – to north-east or south-west?; and • Further Improvements to J43 to improve connectivity between A465 and A483.

Improving M4 Efficiency, Reliability and Safety

Ref.	Options	Short Term and Medium Term Measures (within 5 years)	Long Term Measures (Beyond 5 years)
ERS.3	J43-47 Improvements Package	Potential short to medium term interventions: • Junction efficiency improvements to Junctions 44-47; and • Consideration of crawling line design between J45 and J46.	Potential long-term interventions: • Increased lane provision to 3 lanes in both directions on section (such as Smart Motorway and widening); and • Renewal of River Tawe Bridge (Ynysforgen).
ERS.4	Junction Improvements	Potential short to medium term interventions: • Junction 36 enhancements to improve efficiency; • Junction 48 and Llanelli corridor connection improvements; and • Junction 49 enhancements to improve efficiency	

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Group Discussion 1:

Interventions v Objectives

Group Discussion 1:

The purpose of the discussion is to understand:

- Are there any interventions missing?
- Are any amendments needed to the suggested interventions?
- The relationship between the interventions and study objectives.

Please provide:

- A tick if there is a positive relationship
- A cross if there is a negative relationship
- Any comments

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Group Discussion 2:

Interventions v WelTAG Impact Areas

Group Discussion 2:

The purpose of the discussion is to understand:

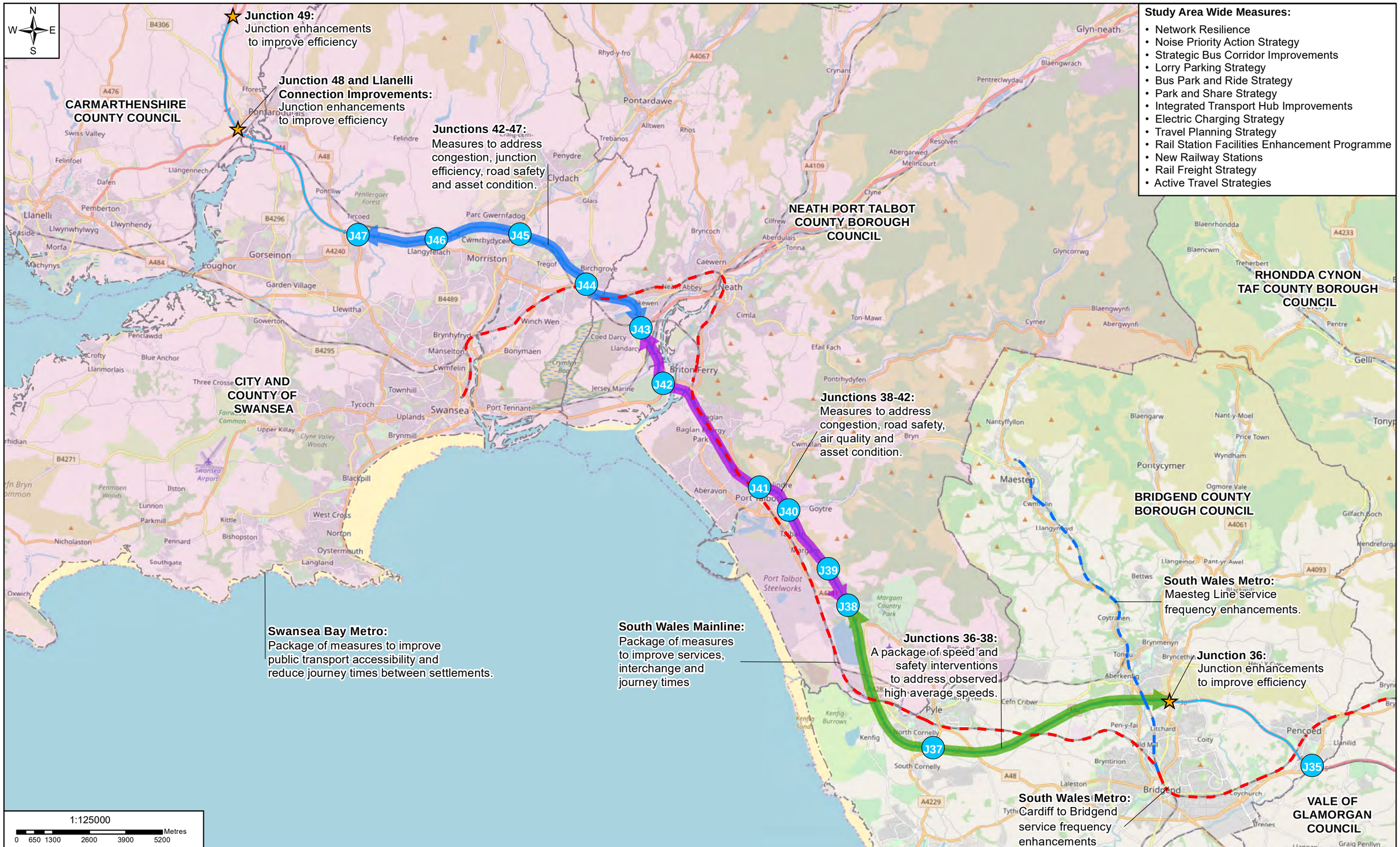
- Impacts of the interventions against the four aspects of well-being (Cultural, Economic, Environment and Social)
- Are the interventions deliverable?
  - **Financial Case** – Is the option affordable in the first place and what is the long term financial viability?
  - **Commercial Case** – Is the scheme commercially viable? Is going to be possible to procure the scheme?
  - **Management Case** – Is the option achievable?

Please provide feedback on the forms provided
Indicating short and long terms impacts, where applicable

Next Steps

- Appraisal of interventions against objectives and impacts (social, cultural, economic, environmental)
- Stage One report suggesting options for further consideration in April 2019

For further details please contact Laura Norman at
M4Junctions35to49@arcadis.com



Study Area Wide Measures:

- Network Resilience
- Noise Priority Action Strategy
- Strategic Bus Corridor Improvements
- Lorry Parking Strategy
- Bus Park and Ride Strategy
- Park and Share Strategy
- Integrated Transport Hub Improvements
- Electric Charging Strategy
- Travel Planning Strategy
- Rail Station Facilities Enhancement Programme
- New Railway Stations
- Rail Freight Strategy
- Active Travel Strategies

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REV	Date	Description	Drawn	Check	Approv
P1	14MAR19	Initial Issue	MS	AH	SP

LEGEND

- Study Area
- Maesteg Line
- South Wales Mainline
- Swansea Bay Metro
- Local Authority

Llywodraeth Cymru
Welsh Government

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Suitability Description: PRELIMINARY/CONFIDENTIAL

Designed	L.Norman	Date 14MAR19	Signed
Drawn	P.Nehete	Date 14MAR19	Signed
Checked	C.Collins	Date 14MAR19	Signed
Approved	L.Norman	Date 14MAR19	Signed
Scale:	As Shown	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10020340

PROJECT:
M4 J35 to J49 Corridor Congestion Study
WelTAG Stage One

TITLE:
Emerging Packages of Options

Drawing Number: 10020340-ARC-00-XX-TP-0020-P1
Issue: P1

Print Date : 14-03-19 09:25:46

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ANNEX D – Summary Table of Proposed Interventions Vs WelTAG Impact Areas

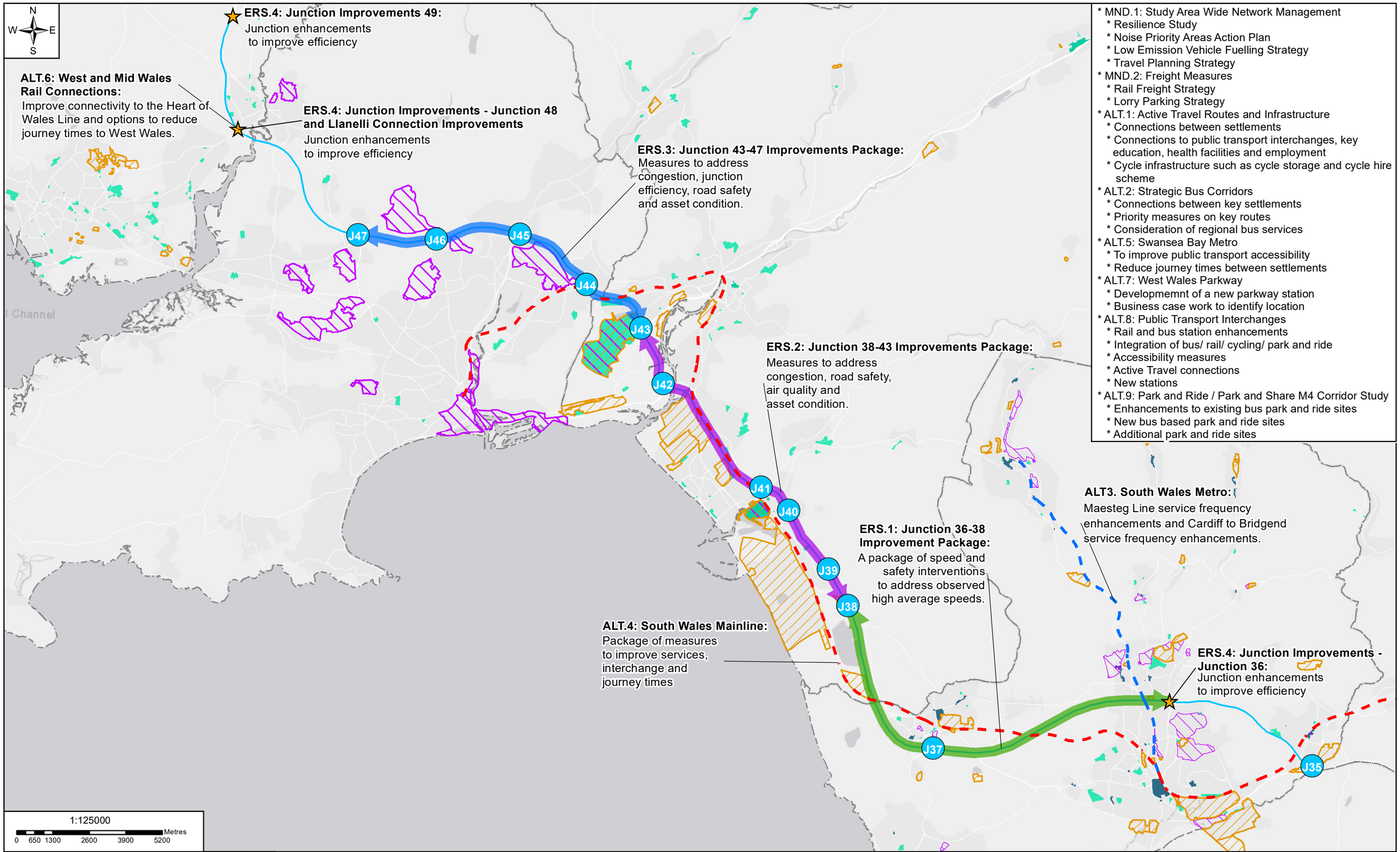
Interventions vs Study Objectives

Option Packages		Cultural	Economic	Environmental	Social	Financial Case, Commercial Case and Management Case
MND.1	Study Area Wide Network Management (Short term)	• Travel planning to help with a more cohesive/equal wales- Encourage active travel model. • Improve access.	• Help make more prosperous communities (Active travel) More resilient communities (Local width) • Improve resilience safeguard economic performance.	• Some benefit (Active travel) from travel planning. • Positive impact on Air and Noise. • Resilience planning.	• Long term benefits- Improves accessibility for local community. • Travel planning. Linking communities.	-
MND.2	Freight Measures (Short Term)	• Servicing of special events. • No direct impact but remove freight at key tourism movement periods.	• Some economic impact from more efficient transport of freight	• Potential benefit from taking freight of road. • Greater uptake of Euro 6. • Maximise rail freight opportunities	• Lorry parking to reduce impact on adjacent residential Improved safety for drivers.	-
ALT.1	Strategic Bus Corridors (Short Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Help create opportunity & improve productivity, create prosperity through communities. • Enhance links to remote economic hubs.	• Nodal shift from private car to public transport should improve air quality /Noise. • Benefits of shred transport nodes.	• Improves options to travel in terms of modes and more of the population/groups from the community. • Link remote communities (Active Travel etc).	• Revenue impact on new services- Dependent on patronage.
	Strategic Bus Corridors (Long Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Help create opportunity & improve productivity, create prosperity through communities.	• Nodal shift from private car to public transport should improve air quality /Noise. • Benefits of shared transport nodes,	• Improves options to travel in terms of modes and more of the population/groups from the community.	-
ALT.2	South Wales Metro (Short term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Smart ticketing improves accessibility to IT. • Help create opportunity & improve productivity, create prosperity through communities. • Improved access to employment opportunities • Enhance links to remote economic hubs.	-	-	-
	South Wales Metro (Long Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Help create opportunity & improve productivity, create prosperity through communities. • Enhance links to remote economic hubs.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	-
ALT.3	South Wales Mainline Enhancements (Short Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Help create opportunity & improve productivity, create prosperity through communities. • Enhance links to remote economic hubs.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	-
	South Wales Mainline Enhancements (Long Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Help create opportunity & improve productivity, create prosperity through communities. • Enhance links to remote economic hubs.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	-
ALT.4	Swansea Bay Metro (Short Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	• Help create opportunity & improve productivity, create prosperity through communities.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	-
	Swansea Bay Metro (Long Term)	• Improves access to services/employment opportunity to travel. • Equality help cohesive communities. • Enhance links to remote tourism locations	Help create opportunity & improve productivity, create prosperity through communities. Potential to link large student transport movements- benefits to university of city.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	• High cost.
ALT.5	West and Mid Wales Rail Connections (Long Term)	• Improves access to services/employment opportunity to travel. • Equality, help cohesive communities.	• Help create opportunity & improve productivity, create prosperity through communities. • Need to rival equivalent road journey time to remote uptake.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	-

Option Packages		Cultural	Economic	Environmental	Social	Financial Case, Commercial Case and Management Case
ALT.6	West Wales Parkway (Long Term)	• Improves access to services/employment opportunity to travel. • Equality, help cohesive communities.	• Help create opportunity & improve productivity, create prosperity through communities. • Possible (net) negative impact on stations when use service? To be tested. Increased trips attracted to M4. • Remove unnecessary city bound traffic. Benefit city traffic movement.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community. • Negative impact may isolate city-based retail hubs.	-
ALT.7	Park & Ride and Park & Share M4 Corridor Strategy (Short & Long term)	• Improves access to services/employment opportunity to travel. • Equality, help cohesive communities.	• Help create opportunity & improve productivity, create prosperity through communities.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community. • Active Travel links required (poor access from Swansea to the north of M4).	
ALT.8	Public Transport Interchanges (Short & Long Term)	• Improves access to services/employment opportunity to travel. • Equality, help cohesive communities.	• Help create opportunity & improve productivity, create prosperity through communities.	• Nodal shift from private car to public transport should improve air quality /Noise.	• Improves options to travel in terms of modes and more of the population/groups from the community.	-
ERS.1	J36-38 Improvements package (Short Term)	• Minor impact on equality, cohesiveness and a healthy Wales. • Reducing time travelling= negative impact.	• Improves through flow of traffic. Makes economic connections reliable less barriers to business.	• Potential negative impact on - Loss of habitat - Increased emission - Impact on landscapes. • Widening needs to be supported with greater EV infrastructure.	• Community severance.	-
ERS.2	J38-43 Improvements Package (Short Term)	• Minor impact on equality, cohesiveness and a healthy Wales. • Reducing time travelling= negative impact.	• Improves through flow of traffic. Makes economic connections reliable less barriers to business.	• Potential negative impact on -Loss of habitat - Increased emission - Impact on landscapes.	• Neutral impact on most indicators.	• Long term services are more difficult to justify business case.
	J38-43 Improvements Package (Long Term)	• Minor impact on equality, cohesiveness and a healthy Wales. • Reducing time travelling= negative impact.	• Improves through flow of traffic. Makes economic connections reliable less barriers to business.	• Potential negative impact on -Loss of habitat - Increased emission - Impact on landscapes.	• Neutral impact on most indicators.	-
ERS.3	J43-47 Improvements Package (Short Term)	• Minor impact on equality, cohesiveness and a healthy Wales. • Reducing time travelling= negative impact. • Potential to impact links to tourism. •	• Improves through flow of traffic. Makes economic connections reliable less barriers to business.	• Potential negative impact on -Loss of habitat - Increased emission - Impact on landscapes.	• Neutral impact on most indicators.	• Long term services are more difficult to justify business case.
	J43-47 Improvements Package (Long Term)	• Minor impact on equality, cohesiveness and a healthy Wales. • Reducing time travelling= negative impact. • Potential to impact links to tourism. •	• Improves through flow of traffic. Makes economic connections reliable less barriers to business.	• Potential negative impact on -Loss of habitat - Increased emission - Impact on landscapes.	• Neutral impact on most indicators.	-
ERS.4	Junction Improvements (Short Term)	• Minor impact on equality, cohesiveness and a healthy Wales. • Reducing time travelling= negative impact.	• Improves through flow of traffic. Makes economic connections reliable less barriers to business.	• Potential negative impact on: -Loss of habitat - Increased emission - Impact on landscapes.	• Severance. active travel enhancement Jn 46+47 particularly	-

APPENDIX C

Plan of Interventions



REV	Date	Description	Drawn	Check	Approv
P1	04JUL19	Initial Issue	YG	AH	SP

LEGEND
- Study Area
- Maesteg Line
- South Wales Mainline
- Employment Allocation
- Strategic LDP Sites
- Housing Allocation
- Retail Allocation
- Local Authority

Llywodraeth Cymru
Welsh Government

ARCADIS Design & Consultancy for natural and built assets
Registered office: Arcadis House 34 York Way London N1 9AB
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Suitability Description: PRELIMINARY/CONFIDENTIAL

Designed	L.Norman	Date 04JUL19	Signed
Drawn	Y. Giri	Date 04JUL19	Signed
Checked	C.Collins	Date 04JUL19	Signed
Approved	L.Norman	Date 04JUL19	Signed
Scale:	As Shown	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10020340

PROJECT:
M4 J35 to J49 Corridor Congestion Study
WelTAG Stage One

TITLE:
Local Development Plan Site Allocations & Emerging Packages of Options

Drawing Number: 10020340-ARC-00-XX-TP-0020-P1
Issue: P1

Print Date : 04-07-19 13:41:15
K:\Environmnet UK_GIS\10020340 - M4 J35-49 WelTAG Stage 1 - OS Mapping\D. Mxd\M4 J35 to J49 WelTAG Study - Emerging Packages of Options_English_LN_LDP_Site_Allocations_A3.mxd

APPENDIX D

Impact Appraisal Tables

Social

Physical Activity

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The delivery of a travel planning strategy and associated measures has the potential to encourage more journeys to be undertaken by active travel modes (for example cycle purchase schemes, cycle parking, changing and storage facilities at workplaces).	+
MND.2	Freight Measures	A neutral impact on physical activity is predicted.	0
ALT.1	Active Travel Routes	The delivery of active travel routes connecting key settlements, public transport interchanges, employment and services, together with supporting measures such as cycle storage and changing facilities has the potential to significantly improve physical activity levels.	+++
ALT.2	Strategic Bus Corridors	A neutral impact on physical activity is predicted at this stage, although there could be some benefits in encouraging walking and cycling to bus stops and interchanges.	0
ALT.3	South Wales Metro	A neutral impact on physical activity is predicted at this stage, although there could be some benefits in encouraging walking and cycling to interchanges.	0
ALT.4	South Wales Mainline Enhancements	A neutral impact on physical activity is predicted at this stage, although there could be some benefits in encouraging walking and cycling to interchanges.	0
ALT.5	Swansea Bay Metro	A neutral impact on physical activity is predicted at this stage, although there could be some benefits in encouraging walking and cycling to bus stops and interchanges.	0
ALT.6	West and Mid Wales Rail Connections	A neutral impact on physical activity is predicted at this stage, although there could be some benefits in encouraging walking and cycling to interchanges.	0
ALT.7	West Wales Parkway	A neutral impact on physical activity is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.8	Public Transport Interchanges	The delivery of new and enhanced public transport interchanges that are well-connected by active travel routes and have associated measures, such as secure cycle parking with natural surveillance has the potential to encourage more journeys to public transport hubs to be undertaken by active travel modes.	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	A neutral impact on physical activity is predicted.	0
ERS.1	J36-38 Improvements Package	A neutral impact on physical activity is predicted.	0
ERS.2	J38-43 Improvements Package	A neutral impact on physical activity is predicted.	0
ERS.3	J43-47 Improvements Package	A neutral impact on physical activity is predicted.	0
ERS.4	Junction Improvements	A neutral impact on physical activity is predicted.	0

Journey Quality

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The identification and delivery of measures to improve resilience of the network, which might reduce levels of congestion at critical times, improve communications, improve incident response and clear up operations for example have the potential to improve journey quality for road users. However, this intervention does not address the underlying cause of the congestion or incident.	+
MND.2	Freight Measures	A neutral impact on journey quality is predicted.	0
ALT.1	Active Travel Routes	The provision of high-quality active travel routes connecting key destinations has the potential to beneficially impact on journey quality.	++

Ref.	Option Package	Commentary (short and long term)	Score
ALT.2	Strategic Bus Corridors	The provision of current standard facilities (bus stops and new buses) has the potential to provide a high quality journey experienced by travellers, together with priority measures along key routes to reduce journey times and journey reliability.	++
ALT.3	South Wales Metro	Short-term – The increase in service frequency on Transport for Wales services within the appraisal area has the potential to increase journey quality, however the measures within the proposal would not improve all aspects of journeys, such as capacity of Park and Ride stations and station facilities for example.	+
		Long-term – The provision of current standard facilities (bus stops and new buses) has the potential to provide a high-quality journey experienced by travellers, together with priority measures to reduce journey times and journey reliability.	++
ALT.4	South Wales Mainline Enhancements	Short-term – The increase in service frequency to local stations between Cardiff and Swansea, plus direct services to Pembroke Dock from London has the potential to increase journey quality, however the measures within the proposal would not improve all aspects of journeys, such as capacity of Park and Ride stations and station facilities for example.	+
		Long-term -The proposed measures have the potential to improve journey times, journey reliability and service frequency, hence has the potential to increase journey quality, however the measures within the proposal would not improve all aspects of journeys, such as capacity of Park and Ride stations and station facilities for example.	++
+ALT.5	Swansea Bay Metro	Short-term – The improved integration at rail stations and Park and Ride provision has the potential to improve journey, but this intervention does not consider the station environment or the quality of the service.	+
		Long-term – It is assumed that any new public transport routes and associated stations would be delivered to modern standards and would provide high quality user experience. The quality of the service (i.e. reliability and frequency) would impact on the users' overall experience.	++
ALT.6	West and Mid Wales Rail Connections	Short-term – A neutral impact on journey quality is predicted.	0
		Long-term – The proposed measures have the potential to improve journey times and the reliability of services, however it does not address the physical environment experienced by users.	++
ALT.7	West Wales Parkway	Long-term – It is assumed a modern standard station would be provided that would deliver a high quality user experience.	++

Ref.	Option Package	Commentary (short and long term)	Score
ALT.8	Public Transport Interchanges	The provision of modern standard new and enhanced public transport interchanges has the potential to have a beneficial impact on journey quality.	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	The provision of current standard facilities has the potential to provide a high quality journey experienced by travellers.	+
ERS.1	J36-38 Improvements Package	A neutral impact on journey quality is predicted.	0
ERS.2	J38-43 Improvements Package	Short-term – The proposed measures have the potential to improve journey times and journey reliability, however this could in turn increase the attractiveness of the route.	+
		Long-term – The provision of a new section of M4 or widening of the motorway within the section has the potential to have a beneficial impact on journey quality, through improved journey times and journey reliability, however this could in turn increase the attractiveness of the route.	++
ERS.3	J43-47 Improvements Package	Short-term – The proposed measures have the potential to improve journey times and journey reliability, however this could in turn increase the attractiveness of the route.	+
		Long-term – The proposed measures have the potential to improve journey times and journey reliability through increased lane provision, however this could in turn increase the attractiveness of the route.	++
ERS.4	Junction Improvements	The provision of efficiency improvements at junctions has the potential to improve the experience of road users, however this could in turn increase the attractiveness of the route.	+

Accidents

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The development of a Resilience Study as part of this intervention has the potential to how to identify measures that would minimise the frequency and impact of incidents and breakdown along the strategic road network within the study area.	+
MND.2	Freight Measures	A neutral impact on accidents is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.1	Active Travel Routes	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.2	Strategic Bus Corridors	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.3	South Wales Metro	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.4	South Wales Mainline Enhancements	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.5	Swansea Bay Metro	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.6	West and Mid Wales Rail Connections	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.7	West Wales Parkway	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.8	Public Transport Interchanges	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ERS.1	J36-38 Improvements Package	This package of intervention would undertake a detailed corridor study focusing on accidents and traffic speeds, in order to identify measures to address high vehicle speeds. The outcome of the study would inform other short and medium term measures.	+++
ERS.2	J38-43 Improvements Package	The package of measures in the short and longer term have the potential to reduce the frequency and severity of accidents.	++

Ref.	Option Package	Commentary (short and long term)	Score
ERS.3	J43-47 Improvements Package	The package of measures in the short and longer term have the potential to reduce the frequency and severity of accidents.	++
ERS.4	Junction Improvements	The package of measures in the short term have the potential to reduce the frequency and severity of accidents.	++

Security

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The identification and delivery of measures to improve resilience, such as better communications and response to breakdown and incidents has the potential to improve the security for some transport users.	+
MND.2	Freight Measures	The identification and delivery of short, medium and long term freight measures, such as dedicated lorry parking facilities has the potential to improve the security of users as well as goods being carried.	++
ALT.1	Active Travel Routes	A neutral impact on security is predicted.	0
ALT.2	Strategic Bus Corridors	A neutral impact on security is predicted.	0
ALT.3	South Wales Metro	A neutral impact on security is predicted.	0
ALT.4	South Wales Mainline Enhancements	A neutral impact on security is predicted.	0
ALT.5	Swansea Bay Metro	It is assumed that the delivery of new public transport interchanges / Park and Ride facilities would be delivered to current standards, incorporating CCTV, lighting for example to ensure a high level of security.	++
ALT.6	West and Mid Wales Rail Connections	A neutral impact on security is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.7	West Wales Parkway	It is assumed that the delivery of new West Wales Parkway would be delivered to current standards, incorporating CCTV, lighting for example to ensure a high level of security.	++
ALT.8	Public Transport Interchanges	It is assumed that the delivery of new rail and bus stations and enhancements to existing stations will be delivered to current standards, incorporating CCTV, lighting for example to ensure a high level of security.	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	It is assumed that the delivery of new Park and Ride facilities would be delivered to current standards, incorporating CCTV, lighting for example to ensure a high level of security.	++
ERS.1	J36-38 Improvements Package	A neutral impact on security is predicted.	0
ERS.2	J38-43 Improvements Package	A neutral impact on security is predicted.	0
ERS.3	J43-47 Improvements Package	A neutral impact on security is predicted.	0
ERS.4	Junction Improvements	A neutral impact on security is predicted.	0

Access to Employment

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The identification and delivery of measures to improve resilience of the network, which might reduce levels of congestion at critical times, improve communications, improve incident response and clear up operations for example together with travel planning measures has the potential to have a slight beneficial impact on access to employment.	+
MND.2	Freight Measures	A neutral impact on access to employment is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.1	Active Travel Routes	The delivery of improved active travel connections to key employment areas, with improved connections to public transport interchanges has the potential to have a beneficial impact on access to employment, especially has a noticeable proportion of journeys in the appraisal area are relatively short distance.	++
ALT.2	Strategic Bus Corridors	The delivery of improved strategic bus corridors to key employment areas has the potential to have a beneficial impact on access to employment.	++
ALT.3	South Wales Metro	A moderate beneficial impact on access to employment is predicted, through increased service frequencies between the Bridgend/ Maesteg, Cardiff and the Vale of Glamorgan,	++
ALT.4	South Wales Mainline Enhancements	Short-term – In particular the improved service frequency to local stations between Cardiff and Swansea, together with infrastructure to enable direct services between London and Pembroke Dock.	+
		Long-term – The potential to reduce journey times and increase capacity on the South Wales Mainline has the potential to have a beneficial impact on access to employment both within the appraisal area and beyond.	+++
ALT.5	Swansea Bay Metro	Short-term – The delivery of Park and Ride provision at key stations, as well as improving the accessibility of rail stations by active travel and bus services has the potential to improve sustainable access to employment.	+
		Long-term – The delivery of additional public transport services within the Swansea Bay area has the potential to have a major beneficial impact on accessing employment by improving the accessibility of public transport.	+++
0ALT.6	West and Mid Wales Rail Connections	Short-term – A neutral impact on access to employment is predicted.	0
		Long-term – A moderate beneficial impact is predicted at this stage.	++
ALT.7	West Wales Parkway	Short-term – A neutral impact on access to employment is predicted.	0
		Long-term – The provision of a West Wales Parkway Station has the potential to have a beneficial impact on access to employment.	++

Ref.	Option Package	Commentary (short and long term)	Score
ALT.8	Public Transport Interchanges	The delivery of new and enhanced existing public transport interchanges has the potential to have a moderate beneficial impact on access to employment.	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Short-term – The provision of new and enhanced Park and Ride/ Share sites across the appraisal area has the potential to have a slight beneficial impact on improving access to employment in the short term.	+
		Long-term – The provision of new and enhanced Park and Ride/ Share sites across the appraisal area has the potential to have a moderate beneficial impact on improving access to employment in the long-term as the strategy is delivered.	++
ERS.1	J36-38 Improvements Package	A neutral impact on access to employment is predicted.	0
ERS.2	J38-43 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to employment by road based modes of transport.	++
		Long-term – A major beneficial impact on access to employment is predicted in the longer term through improving strategic connections.	+++
ERS.3	J43-47 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to employment by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	++
		Long-term – A major beneficial impact on access to employment is predicted in the longer term.	+++
ERS.4	Junction Improvements	The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to employment by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	++

Access to Services

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The identification and delivery of measures to improve resilience of the network, which might reduce levels of congestion at critical times, improve communications, improve incident response and clear up operations for example, together with travel planning measures has the potential to have a slight beneficial impact on access to services.	+
MND.2	Freight Measures	A neutral impact on access to services is predicted.	0
ALT.1	Active Travel Routes	The delivery of improved active travel connections to services, with improved connections to public transport interchanges has the potential to have a beneficial impact on access to services.	++
ALT.2	Strategic Bus Corridors	The delivery of improved strategic bus corridors to key services has the potential to have a beneficial impact on access to services.	+++
ALT.3	South Wales Metro	A moderate beneficial impact on access to services is predicted, through increased service frequencies between the Bridgend/ Maesteg, Cardiff and the Vale of Glamorgan,	++
ALT.4	South Wales Mainline Enhancements	Short-term – In particular the improved service frequency to local stations between Cardiff and Swansea, together with infrastructure to enable direct services between London and Pembroke Dock has the potential to have a beneficial impact on access to services.	+
		Long-term – The opportunity to reduce journey times and increase capacity on the South Wales Mainline has the potential to have a beneficial impact on access to services both within the appraisal area and beyond.	++
ALT.5	Swansea Bay Metro	Short-term – The delivery of Park and Ride provision at key stations, as well as improving the accessibility of rail stations by active travel and bus services has the potential to improve sustainable access to services.	+
		Long-term – The delivery of additional public transport services within the Swansea Bay area has the potential to have a major beneficial impact on accessing services by improving the accessibility of public transport.	+++
ALT.6	West and Mid Wales Rail Connections	Short-term – A neutral impact on access to services is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
		Long-term – A moderate beneficial impact is predicted at this stage.	++
ALT.7	West Wales Parkway	Short-term – A neutral impact on access to services is predicted.	0
		Long-term – The provision of a West Wales Parkway Station has the potential to have a beneficial impact on access to services.	+
ALT.8	Public Transport Interchanges	The delivery of new and enhanced existing public transport interchanges has the potential to have a beneficial impact on access to services	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Short-term – The provision of new and enhanced Park and Ride/ Share sites across the appraisal area has the potential to have a slight beneficial impact on improving access to services in the short term.	+
		Long-term – A moderate beneficial impact is predicted in the longer term as the strategy is delivered.	++
ERS.1	J36-38 Improvements Package	A neutral impact on access to services is predicted.	0
ERS.2	J38-43 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to services by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	+
		Long-term – A moderate beneficial impact on access to services is predicted in the longer term.	++
ERS.3	J43-47 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to services by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	++

Ref.	Option Package	Commentary (short and long term)	Score
		Long-term – A major beneficial impact on access to services is predicted in the longer term.	+++
ERS.4	Junction Improvements	The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to services by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	++

Affordability

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
MND.2	Freight Measures	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.1	Active Travel Routes	The delivery of measures to encourage the uptake of active travel modes has the potential to reduce the monetary cost of travel compared to journeys undertaken by other modes, particularly for journeys undertaken by the private car.	+
ALT.2	Strategic Bus Corridors	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.3	South Wales Metro	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.4	South Wales Mainline Enhancements	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.5	Swansea Bay Metro	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.6	West and Mid Wales Rail Connections	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.7	West Wales Parkway	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.8	Public Transport Interchanges	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Park and Share facilities have the potential to reduce the monetary costs of travel through encouraging car sharing.	+
ERS.1	J36-38 Improvements Package	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ERS.2	J38-43 Improvements Package	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ERS.3	J43-47 Improvements Package	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0
ERS.4	Junction Improvements	The option is unlikely to change the monetary costs of travel, hence a neutral impact is expected.	0

Severance

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	A neutral impact on severance is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
MND.2	Freight Measures	A neutral impact on severance is predicted.	0
ALT.1	Active Travel Routes	The delivery of new and enhanced active travel routes has the potential to reduce severance, thus the separation of residents from facilities/ services within their communities.	++
ALT.2	Strategic Bus Corridors	A neutral impact on severance is predicted. However, the impacts of the Bus Rapid Transit route from Porthcawl to Bridgend would need to be explored in further detail	0
ALT.3	South Wales Metro	A neutral impact on severance is predicted. However, the impacts of the Bus Rapid Transit route from Porthcawl to Bridgend would need to be explored in further detail	0
ALT.4	South Wales Mainline Enhancements	A neutral impact on severance is predicted.	0
ALT.5	Swansea Bay Metro	Short-term – A neutral impact on severance is predicted.	0
		Long-term – The delivery of new public transport routes has the potential to have an adverse impact on severance through the delivery of new infrastructure. However the route details are unknown at present and would be explored in further detail at later stages.	0
ALT.6	West and Mid Wales Rail Connections	A neutral impact on severance is predicted. However the impacts of the proposed new alignment options would need to be considered further when more details are known.	0
ALT.7	West Wales Parkway	A neutral impact on severance is predicted.	0
ALT.8	Public Transport Interchanges	A neutral impact on severance is predicted.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	A neutral impact on severance is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ERS.1	J36-38 Improvements Package	A neutral impact on severance is predicted.	0
ERS.2	J38-43 Improvements Package	Short-term – The potential to upgrade Harbour Way together with a new westbound on-slip at Baglan has the potential to have an adverse impact on the local community through changes in traffic volumes and routeing. The impact of the potential to consider the junction arrangements at Junctions 40 and 41 on community severance would need to be explored in further detail at later stages.	--
		Long-term – The potential to deliver a new M4 section between Junctions 38 and 43 has the potential to have a major adverse impact on the affected communities. However, there might be benefits for the communities currently severed by the existing M4, thus the overall impact is considered to be minor negative.	-
ERS.3	J43-47 Improvements Package	A neutral impact is predicted, as it is not considered that the proposed measures within this intervention would either benefit and adversely impact the existing severance caused by the M4 corridor. Although active travel connections will be considered and incorporated into the emerging junction efficiency improvements and potential connections may be included (such as to Morriston Hospital), a neutral impact is predicted at this stage as the location of the junctions and the volume of traffic using them is not expected to change. However, efficiency improvements have the potential to make them for attractive to road users.	0
ERS.4	Junction Improvements	Although active travel and bus connections will be considered and incorporated into the emerging scheme development, a neutral impact is predicted at this stage as the location of the junctions and the volume of traffic using them is not expected to change. However, efficiency improvements have the potential to make them for attractive to road users.	0

Cultural

Cultural Facilities

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The identification and delivery of measures to improve resilience of the network, which might reduce levels of congestion at critical times, improve communications, improve incident response and clear up operations for example has the potential to have a slight beneficial impact on access to cultural facilities.	+
MND.2	Freight Measures	A neutral impact on access to cultural facilities is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.1	Active Travel Routes	The delivery of improved active travel connections, with improved connections to public transport interchanges has the potential to have a beneficial impact on access to cultural facilities.	++
ALT.2	Strategic Bus Corridors	The delivery of improved strategic bus corridors to key employment areas has the potential to have a beneficial impact on access to cultural facilities.	++
ALT.3	South Wales Metro	A moderate beneficial impact on access to cultural facilities is predicted, through increased service frequencies between the Bridgend/ Maesteg, Cardiff and the Vale of Glamorgan,	++
ALT.4	South Wales Mainline Enhancements	Short-term – In particular the improved service frequency to local stations between Cardiff and Swansea, together with infrastructure to enable direct services between London and Pembroke Dock has the potential to have a beneficial impact on access to cultural facilities.	+
		Long-term – The opportunity to reduce journey times and increase capacity on the South Wales Mainline has the potential to have a beneficial impact on access to cultural facilities both within the appraisal area and beyond.	++
ALT.5	Swansea Bay Metro	Short-term – The delivery of Park and Ride provision at key stations, as well as improving the accessibility of rail stations by active travel and bus services has the potential to improve sustainable access to cultural facilities.	+
		Long-term – The delivery of additional public transport services within the Swansea Bay area has the potential to have a major beneficial impact on accessing cultural facilities by improving the accessibility of public transport.	++
0ALT.6	West and Mid Wales Rail Connections	Short-term – A neutral impact on access to cultural facilities is predicted.	0
		Long-term – A moderate beneficial impact is predicted at this stage.	++
ALT.7	West Wales Parkway	Short-term – A neutral impact on access to cultural facilities is predicted.	0
		Long-term – The provision of a West Wales Parkway Station has the potential to have a beneficial impact on access to cultural facilities.	+

Ref.	Option Package	Commentary (short and long term)	Score
ALT.8	Public Transport Interchanges	The delivery of new and enhanced existing public transport interchanges has the potential to have a beneficial impact on access to cultural facilities.	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Short-term – The provision of new and enhanced Park and Ride/ Share sites across the appraisal area has the potential to have a slight beneficial impact on improving access to cultural facilities.	+
		Long-term – A moderate beneficial impact is predicted in the longer term as the wider strategy is delivered.	++
ERS.1	J36-38 Improvements Package	A neutral impact on access to cultural facilities is predicted.	0
ERS.2	J38-43 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the improve access to cultural facilities by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	+
		Long-term – A moderate beneficial impact is predicted in the longer term.	++
ERS.3	J43-47 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the improve access to cultural facilities by road based modes of transport, however this option will have minimal beneficial impact on improving access by active travel and rail.	++
		Long-term – A major beneficial impact is predicted in the longer term.	+++
ERS.4	Junction Improvements	The provision of measures to improve the efficiency of the existing strategic road network within the study area has the improve access to cultural facilities by road based modes of transport.	++

Welsh Language

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	A minor beneficial impact on Welsh Language may take place as the communications strategy leads to improved bilingual signing and information.	+
MND.2	Freight Measures	A neutral impact on Welsh Language is predicted.	0
ALT.1	Active Travel Routes	A neutral impact on Welsh Language is predicted.	0
ALT.2	Strategic Bus Corridors	A neutral impact on Welsh Language is predicted.	0
ALT.3	South Wales Metro	A neutral impact on Welsh Language is predicted.	0
ALT.4	South Wales Mainline Enhancements	A neutral impact on Welsh Language is predicted.	0
ALT.5	Swansea Bay Metro	A neutral impact on Welsh Language is predicted.	0
ALT.6	West and Mid Wales Rail Connections	A neutral impact on Welsh Language is predicted.	0
ALT.7	West Wales Parkway	A neutral impact on Welsh Language is predicted.	0
ALT.8	Public Transport Interchanges	A neutral impact on Welsh Language is predicted.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	A neutral impact on Welsh Language is predicted.	0

Ref.	Option Package	Commentary (short and long term)	Score
ERS.1	J36-38 Improvements Package	A neutral impact on Welsh Language is predicted.	0
ERS.2	J38-43 Improvements Package	A neutral impact on Welsh Language is predicted.	0
ERS.3	J43-47 Improvements Package	A neutral impact on Welsh Language is predicted.	0
ERS.4	Junction Improvements	A neutral impact on Welsh Language is predicted.	0

Tourism

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The identification and delivery of measures to improve resilience of the network, which might reduce levels of congestion at critical times, improve communications, improve incident response and clear up operations for example has the potential to have a beneficial impact on tourism, particularly at peak network times (such as summer Friday afternoon travelling westbound).	+
MND.2	Freight Measures	A neutral impact on access to cultural facilities is predicted.	0
ALT.1	Active Travel Routes	The delivery of improved active travel connections, with improved connections to public transport interchanges has the potential to have a beneficial impact on tourism but this would be only for attractions and leisure facilities within the local study area. There would not be an impact on regional tourism.	+
ALT.2	Strategic Bus Corridors	The delivery of improved strategic bus corridors to key employment areas has the potential to have a beneficial impact on access to tourism facilities.	+
ALT.3	South Wales Metro	A minor beneficial impact on tourism is predicted, through increased service frequencies between the Bridgend/ Maesteg, Cardiff and the Vale of Glamorgan	+

Ref.	Option Package	Commentary (short and long term)	Score
ALT.4	South Wales Mainline Enhancements	Short-term – In particular the improved service frequency to local stations between Cardiff and Swansea, together with infrastructure to enable direct services between London and Pembroke Dock has the potential to have a moderate beneficial impact on tourism, particularly for journeys to Swansea/ Gower and West Wales.	++
		Long-term – The opportunity to reduce journey times and increase capacity on the South Wales Mainline has the potential to have a beneficial impact on a tourism both within the appraisal area and beyond, particularly for journeys to Swansea/ Gower and West Wales.	+++
ALT.5	Swansea Bay Metro	Short-term – The delivery of Park and Ride provision at key stations, as well as improving the accessibility of rail stations by active travel and bus services has the potential to improve sustainable access to tourism facilities.	+
		Long-term – The delivery of additional public transport services within the Swansea Bay area has the potential to have a moderate beneficial impact on tourism by improving the accessibility of public transport in the Swansea/ Gower region.	++
ALT.6	West and Mid Wales Rail Connections	Short-term – A neutral impact on tourism is predicted.	0
		Long-term – A moderate beneficial impact is predicted at this stage.	++
ALT.7	West Wales Parkway	Short-term – A neutral impact on tourism is predicted.	0
		Long-term – The provision of a West Wales Parkway Station has the potential to have a beneficial impact on tourism.	+
ALT.8	Public Transport Interchanges	The delivery of new and enhanced existing public transport interchanges has the potential to have a beneficial impact on tourism.	++
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Short-term – The provision of new and enhanced Park and Ride/ Share sites across the appraisal area has the potential to have a slight beneficial impact on tourism.	+
		Long-term – A minor beneficial impact is predicted in the longer term as the wider strategy is delivered.	+

Ref.	Option Package	Commentary (short and long term)	Score
ERS.1	J36-38 Improvements Package	A neutral impact on access to tourism is predicted.	0
ERS.2	J38-43 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to tourism by road based modes of transport particularly for trips to and from West and Mid Wales.	++
		Long-term – A major beneficial impact is predicted in the longer term.	+++
ERS.3	J43-47 Improvements Package	Short-term – The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to tourism by road based modes of transport particularly for journeys to and from west and mid Wales.	++
		Long-term – A major beneficial impact is predicted in the longer term.	+++
ERS.4	Junction Improvements	The provision of measures to improve the efficiency of the existing strategic road network within the study area has the potential to improve access to tourism by road based modes of transport.	++

Environmental

Noise

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	Development of a strategy for noise priority areas (such as noise abatement measures) has the potential to have a moderate beneficial impact on noise.	++
MND.2	Freight Measures	A neutral impact is anticipated.	0
ALT.1	Active Travel Routes	Some limited potential to be beneficial in reducing noise emissions. Noise reduction would be dependent upon the numbers of journeys switching to these forms of transport. At this stage a neutral impact is anticipated.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.2	Strategic Bus Corridors	Potential short and medium term interventions have some limited potential to be beneficial in reducing noise emissions. Noise reduction would be dependent upon the numbers of journeys switching to these forms of transport. Long term intervention of rapid transit from Porthcawl to Bridgend may remove vehicles from the road network resulting in a reduction in noise emissions However, these effects are likely to be localised to Porthcawl to Bridgend, and therefore may not have a significant beneficial effect on the M4 transport corridor. Localised noise impacts associated with rapid transit. At this stage a neutral impact is anticipated.	0
ALT.3	South Wales Metro	These measures may have a greater potential to be beneficial in reducing noise emissions by possibly achieving a greater reduction in vehicle numbers that would result in a reduction in noise levels along section of M4 that would be served by the Metro. Localised noise impacts associated with the metro. At this stage a neutral impact is anticipated.	0
ALT.4	South Wales Mainline Enhancements	These measures may have a greater potential to achieve a switch away from use of the M4 to rail along section of M4 that would have an alternative rail option for travel. A significant reduction in vehicle numbers would be required to achieve a noticeable drop in noise levels. There may be some localised increase in noise at receptors close to the infrastructure upgrades. At this stage a neutral impact is anticipated.	0
ALT.5	Swansea Bay Metro	These measures have the potential to be beneficial in reducing noise emissions however a significant reduction in vehicle numbers would be required to achieve noticeable effects. The location of any Metro proposals and park and ride infrastructure would require careful consideration regarding its location to avoid localised adverse noise impacts. Potential effects associated with new commuter rail network.	0
ALT.6	West and Mid Wales Rail Connections	These measures have the potential to be beneficial in reducing noise emissions in the long term, however a significant reduction in vehicle numbers would be required to achieve noticeable effects. Potential for noise effects associated with new rail alignments.	0
ALT.7	West Wales Parkway	These measures have the potential to be beneficial in reducing noise emissions in the long term, however a significant reduction in vehicle numbers would be required to achieve noticeable effects. There may be some localised adverse noise effects in the vicinity of the new Parkway Station and possible links between SDL and the main line.	0
ALT.8	Public Transport Interchanges	These measures have the potential to be beneficial in reducing noise emissions in the medium and long term, however a significant reduction in vehicle numbers would be required to achieve noticeable effects. There may be some localised adverse noise effects in the vicinity of station enhancements (e.g. new Landore, Cockett and Brackla stations).	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	These measures have the potential to be beneficial in reducing noise emissions in the short and medium term, however a significant reduction in vehicle numbers would be required to achieve noticeable effects. There may be some localised adverse noise effects in the vicinity of the bus-based park and ride sites and additional park and share sites. New buses have the potential to be quieter than existing ones in service.	0

Ref.	Option Package	Commentary (short and long term)	Score
ERS.1	J36-38 Improvements Package	At this stage a neutral impact is anticipated.	0
ERS.2	J38-43 Improvements Package	Majority of M4 is Noise Action Planning Priority Area – Roads. An overall reduction in vehicle speeds has the potential to reduce noise levels at receptors in the short to medium term. The diversion and upgrades to Harbour Way and junction improvements / widening of M4 both ways may result in some localised increase in noise levels at some receptor locations, particularly on the elevated section of Harbour Way where it passes close to residential properties on the east side. However, conversely it might lead to additional noise along the Harbour Way route. Longer term potentially significant noise impacts associated with new M4 section between Junction 38 and 42. At this stage a neutral impact is anticipated.	0
ERS.3	J43-47 Improvements Package	Majority of M4 between Junctions 43 and 46 is Noise Action Planning Priority Area – Roads. The junction efficiency improvements and crawling lane have the potential to increase vehicle speeds with improved flow and as such noise levels may increase in the short, medium and long term as measures are implemented. Further assessment would be required to more fully understand current effects from traffic build-up. Longer term increased lane provision would have potential to attract additional vehicles and increase vehicle speeds and with improved flow noise levels may increase. Further assessment would be required to fully understand effects. At this stage a neutral impact is anticipated.	0
ERS.4	Junction Improvements	Junction 38 is located in Noise Action Planning Priority Area – Roads. The junction enhancement and corridor connection improvements have the potential to increase vehicle speeds with improved flow and as such noise levels may increase in the short to medium term as measures are implemented. Further assessment would be required to more fully understand current effects from traffic build-up and the effect on nearby receptors. At this stage a neutral impact is anticipated.	0

Air Quality

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The Low Emission Vehicle Fuelling Strategy and Travel Planning Strategy have the potential to reduce vehicle emissions by encouraging alternative fuels and modes of transport and therefore would help to improve air quality. However, as the measures are at a strategy level, the full extent of the impact cannot be determined at this stage. A minor positive impact is assumed given the nature of the strategies.	+
MND.2	Freight Measures	The Rail Freight Strategy may remove lorries from the M4 transport corridor and may therefore improve air quality.	0

Ref.	Option Package	Commentary (short and long term)	Score
		However, the Lorry Parking Strategy may result in more lorries using the M4 transport corridor, which may be detrimental to air quality. The lorry parks themselves could also cause a localised increase in emissions. There are areas along the M4 transport corridor that experience poor air quality (such as Taibach and Margam), therefore these would need to be considered when locating the lorry parks. The proximity to sensitive receptors, such as residential properties, schools and hospitals would also need to be considered when locating the lorry parks. At this stage a neutral impact is anticipated.	
ALT.1	Active Travel Routes	The interventions included within this option may encourage vehicle users to opt for active travel options, rather than using their vehicles. This may therefore have a limited beneficial effect on air quality, should the interventions have a successful uptake. However, it is considered that this would be a localised effect and is unlikely to have a significant beneficial effect on the M4 transport corridor.	+
ALT.2	Strategic Bus Corridors	In terms of short-term interventions, the improvement of bus services and connections could reduce the number of vehicles on the road network. This may therefore have a beneficial effect on air quality, should the interventions be effective. However, it is considered that this is likely to be a localised effect, to some extent, and may not have a significant beneficial effect on the M4 transport corridor. The long-term intervention may remove vehicles from the road network between Porthcawl to Bridgend. It is likely that this would result in beneficial air quality effects, however, these effects are likely to be localised to Porthcawl to Bridgend, and therefore may not have a significant beneficial effect on the M4 transport corridor. Should the rapid transit route comprise a new corridor, with diesel fuelled buses, the proximity of the corridor to sensitive receptors, such as residential properties, schools and hospitals would need to be considered.	+
ALT.3	South Wales Metro	In terms of short-term interventions, the improvement of train services and connections could reduce the number of vehicles on the road network, including the M4 transport corridor. This may therefore have a beneficial effect on air quality, should a sufficient number of people switch from using their vehicles to using rail services as a result of the interventions. The long-term intervention may remove vehicles from the road network between Porthcawl to Bridgend. It is likely that this would result in beneficial air quality effects, however, these effects are likely to be localised to Porthcawl to Bridgend, and therefore may not have a significant beneficial effect on the M4 transport corridor. Should the rapid transit route comprise a new corridor, with diesel fuelled trains or buses, the proximity of the corridor to sensitive receptors, such as residential properties, schools and hospitals would need to be considered.	+
ALT.4	South Wales Mainline Enhancements	In terms of both short and long-term interventions, the improvement of train services and connections could reduce the number of vehicles on the road network, including the M4 transport corridor. This may therefore have a beneficial effect on air quality, should a sufficient number of people switch from using their vehicles to using rail services as a result of the interventions. Additionally, the electrification of the line from Cardiff to Swansea would be beneficial in terms of air quality, in the vicinity of the railway line.	+

Ref.	Option Package	Commentary (short and long term)	Score
ALT.5	Swansea Bay Metro	In regard to the short and medium term interventions, these could reduce the number of vehicles in the Swansea Bay area should a sufficient number of people switch from using their vehicles to using alternative modes of transport, as a result of the interventions. This could therefore result in air quality improvements. However, the extent of the interventions is not defined at this stage, therefore the degree of air quality improvement as a result of the interventions along the M4 transport corridor cannot be determined at this stage. Additionally, the proximity to sensitive receptors, such as residential properties, schools and hospitals would need to be considered when locating the Park and Ride provisions, as these could have adverse impacts on air quality in the local area. The long-term interventions could reduce the number of vehicles on the road network, including the M4 transport corridor. This may therefore have a beneficial effect on air quality, should a sufficient number of people switch from using their vehicles to using rail/metro services as a result of the interventions. The proximity of any new routes to sensitive receptors, such as residential properties, schools and hospitals would need to be considered, should the trams/trains not be 100% electric.	0
ALT.6	West and Mid Wales Rail Connections	The long-term interventions could reduce the number of vehicles on the road network, including the M4 transport corridor. This may therefore have a beneficial effect on air quality, should a sufficient number of people switch from using their vehicles to using rail services as a result of the interventions. The locations of sensitive receptors, such as residential properties, schools and hospitals would need to be considered when planning new alignment options, should the trains not be 100% electric.	0
ALT.7	West Wales Parkway	The long-term interventions could reduce the number of vehicles on the road network, including the M4 transport corridor. This may therefore have a beneficial effect on air quality, should a sufficient number of people switch from using their vehicles to using rail services as a result of the interventions. The locations of sensitive receptors, such as residential properties, schools and hospitals would need to be considered when locating the parkway station and the link between Swansea District Line and the main line, should the trains not be 100% electric.	0
ALT.8	Public Transport Interchanges	The interventions have the potential to improve air quality in the local area, including the M4 transport corridor, should a sufficient number of people switch from using their vehicles to using public transport/active travel as a result of the interventions. Should the new stations include car parking facilities, the proximity of the car parks to sensitive receptors, such as residential properties, schools and hospitals would need to be considered.	+
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	The interventions should reduce the number of vehicles on the road network, should a sufficient number of people use the Park & Ride and Park & Share provisions. This could therefore result in air quality improvements. However, the extent of the interventions is not defined at this stage, therefore the degree of air quality improvement as a result of the interventions along the M4 transport corridor cannot be predicted. Additionally, the proximity to sensitive receptors, such as residential properties, schools and hospitals would need to be considered when locating the Park & Ride and Park & Share provisions, as these could have adverse impacts on air quality in the local area.	0

Ref.	Option Package	Commentary (short and long term)	Score
ERS.1	J36-38 Improvements Package	Should the measures to address high vehicle speeds on the M4 transport corridor be successful, this has the potential to reduce vehicle emissions, which would be beneficial in terms of air quality.	+
ERS.2	J38-43 Improvements Package	The short to medium term interventions which involve limiting vehicle speeds, alleviating congestion and improving flows should reduce emissions and therefore have a beneficial impact on air quality along the M4 transport corridor. However, the re-routing of vehicles onto other roads could have an adverse effect on air quality. For example, Harbour Way is adjacent to an AQMA, therefore an increase in vehicles along this road, could worsen air quality within the AQMA. Additionally, the reduction of congestion on the M4 could attract more vehicles, which could have an adverse air quality impact. The long term interventions involving increasing the capacity of the M4 and improving connectivity should help to alleviate congestion and reduce emissions, which should have a beneficial impact on air quality along the M4 transport corridor. However, widening of the M4 could have adverse air quality impacts for the sensitive receptors adjacent to the M4. The intervention relating to a new M4 section between J38 and J42 could have significant beneficial effects in terms of air quality at sensitive receptor locations in the vicinity of the M4 between these junctions. However, adverse air quality impacts could occur where the new sections connect with the existing M4 and, if the scheme involves a tunnel, at the tunnel portals and ventilation shafts. Therefore, consideration would need to be given to the siting of these in relation to the locations of sensitive receptors. Additionally, a new section could attract more vehicles, therefore there could be an adverse air quality impact on the M4 transport corridor north of J42 and east of J38.	0
ERS.3	J43-47 Improvements Package	The short to medium term interventions should help to alleviate congestion, which should reduce emissions and therefore have a beneficial impact on air quality along the M4 transport corridor. The long term intervention to increase lane provision to 3 lanes between J43 and 47 should help to alleviate congestion and reduce emissions, which should have a beneficial impact on air quality along the M4 transport corridor. However, widening of the M4 could have adverse air quality impacts for the sensitive receptors adjacent to the M4. Additionally, the reduction of congestion on the M4 could attract more vehicles, which could have an adverse air quality impact.	0
ERS.4	Junction Improvements	The interventions to increase the efficiency at junctions may help to alleviate congestion, and therefore may have a beneficial impact on air quality in the vicinity of the junctions.	+

Landscape and Townscape

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	No scheme information and data is available for an assessment at this stage.	NDA
MND.2	Freight Measures	No scheme information and data is available for an assessment at this stage.	NDA
ALT.1	Active Travel Routes	Short, medium and long term effect of provision of any new infrastructure would potentially result in localised effects and would need to take into consideration any landscape designations, landscape character and visual impacts, as well as appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage	NDA
ALT.2	Strategic Bus Corridors	Short term effect of provision any new corridors or improvements to existing corridors would potentially result in localised effects and would need to take into consideration any landscape designations, landscape character and visual impacts, as well as appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage	NDA
ALT.3	South Wales Metro	Any new corridors for rapid transit would potentially result in effects and would need to take into consideration any landscape designations, landscape character and visual impacts, as well as appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage	NDA
ALT.4	South Wales Mainline Enhancements	Potential short term localised effects on landscape designations, landscape character and visual impacts resulting from infrastructure upgrades. Consideration should be given to appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage	NDA
ALT.5	Swansea Bay Metro	Short term provision any park and ride facilities would potentially result in localised effects and would need to take into consideration effects on landscape designations, landscape character and visual impacts. Longer term potentially significant effects associated with provision of a new commuter rail network. Consideration should be given to appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage	NDA
ALT.6	West and Mid Wales Rail Connections	Potentially significant effects associated with provision new rail alignments on landscape designations, landscape character and visual impacts. Consideration should be given to appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage	NDA
ALT.7	West Wales Parkway	Potentially significant effects associated with provision a parkway station and possible links between SDL and the main line on landscape designations, landscape character and visual impacts. Consideration should be given to appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage.	NDA

Ref.	Option Package	Commentary (short and long term)	Score
ALT.8	Public Transport Interchanges	Potentially significant effects (short, medium and longer term) associated with provision station enhancements/ new stations. Consideration should be given to appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage.	NDA
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Potentially significant effects associated with provision bus-based park and ride sites and additional park and share sites on landscape designations, landscape character and visual impacts. Consideration should be given to appropriate mitigation measures including landscaping. No scheme information and data is available for an assessment at this stage.	NDA
ERS.1	J36-38 Improvements Package	No landscape or townscape impacts are anticipated at this stage.	0
ERS.2	J38-43 Improvements Package	Short term upgrades and improvements would potentially result in localised effects and would need to take into consideration landscape designations (including the Registered Landscape of Outstanding and Special Interest which lies to the east of the motorway from south of Junction 38 to south of Junction 40), landscape character and visual impacts. Consideration should be given to appropriate mitigation measures including landscaping. Potential long term significant effects associated with renewal of Briton Ferry Bridge, motorway widening, junction improvements and provision of new section on M4 motorway on landscape designations, landscape character and visual impacts (landscape and townscape – including significant visual impact and potential loss of residential property surrounding any works at Port Talbot). Consideration should be given to appropriate mitigation measures including landscaping. There may also be benefits for the existing townscape. A moderate negative impact is assumed at this stage.	–
ERS.3	J43-47 Improvements Package	Potentially significant effects associated with widening to three lanes and renewal of River Tawe Bridge. Need to take into consideration landscape designations, landscape character and visual impacts (in particular at Llandarcy, Birchgrove and North Swansea) and potential loss of residential property. Consideration should be given to appropriate mitigation measures including landscaping. A moderate negative impact is assumed at this stage.	–
ERS.4	Junction Improvements	Short term to medium term junction improvements and corridor connection improvements would potentially result in localised effects and would need to take into consideration landscape designations, landscape character and visual impacts. Consideration should be given to appropriate mitigation measures including landscaping. A neutral impact is assumed at this stage.	0

Historic Environment

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	No scheme information and data is available for an assessment at this stage.	NDA

Ref.	Option Package	Commentary (short and long term)	Score
MND.2	Freight Measures	No scheme information and data is available for an assessment at this stage.	NDA
ALT.1	Active Travel Routes	The potential short, medium and long term effect of provision of any new infrastructure would be dependent upon proximity to designated sites/ assets and potential effect on their settings, as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.2	Strategic Bus Corridors	Short term effected of provision any new corridors or improvements to existing corridors would potentially result in localised effects, dependent upon proximity to designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.3	South Wales Metro	Short term effected of provision any new corridors associated with provision of metro would potentially result in localised effects, dependent upon proximity to designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.4	South Wales Mainline Enhancements	Potential short term localised effects resulting from infrastructure upgrades dependent upon proximity to designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.5	Swansea Bay Metro	Short term provision any park and ride facilities would potentially result in localised effects and would need to take into consideration proximity to designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. Longer term potentially significant effects associated with provision of a new commuter rail network. No scheme information and data is available for an assessment at this stage.	NDA
ALT.6	West and Mid Wales Rail Connections	Potentially significant effects associated with provision new rail alignments on designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.7	West Wales Parkway	Potentially significant effects associated with provision a parkway station and possible links between SDL and the main line on designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.8	Public Transport Interchanges	Potentially significant effects (short, medium and longer term) associated with provision station enhancements/ new stations on designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Potentially significant effects associated with provision bus-based park and ride sites and additional park and share sites on designated sites/ assets and potential effect on their settings as well as potential for unknown	NDA

Ref.	Option Package	Commentary (short and long term)	Score
		archaeology. No scheme information and data is available for an assessment at this stage.	
ERS.1	J36-38 Improvements Package	A neutral impact is identified at this stage.	0
ERS.2	J38-43 Improvements Package	Short term and medium term upgrades and improvements need to take into consideration designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. Potential effects on Registered Landscape of Outstanding and Special Interest which lies to the east of the M4 from south of Junction 38 to south of Junction 40. Margam Park Conservation Area (120m east of Junction 38). Scheduled Ancient Monument 260m to east of Junction 38. Between Junction 39 and Junction 40 there are 15 Listed Buildings (the closest lying 80m to the east). Between Junctions 40 and 41 there are 12 Listed Buildings (the closest lying 30m to the north). Between Junctions 41 and 42 there are 14 Listed Buildings (the closest lying 30m to the south) Between Junctions 42 and 43 there are 4 Listed Buildings (the closest lying 70m to the north east). Potential long term significant effects associated with renewal of Briton Ferry Bridge, motorway widening between Junctions 42 and 43, junction improvements and provision of new section on M4 motorway between Junction 38 and 42. A potential moderate negative impact is anticipated at this stage given the proximity to heritage assets.	--
ERS.3	J43-47 Improvements Package	Longer term potentially significant effects associated with widening to 3 lanes and renewal of River Tawe Bridge. Need to take into consideration designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. Three Scheduled Ancient Monuments located within 120m of motorway between Junctions 44 and 45. Llandeilo Castel Mound Scheduled Monument lies to the adjacent and to the south of the motorway and could be potentially be affected by widening to 3 lanes. A potential minor negative impact is anticipated at this stage given the proximity to heritage assets.	-
ERS.4	Junction Improvements	Short term to medium term junction improvements and corridor connection improvements would potentially result in localised effects and would need to take into consideration designated sites/ assets and potential effect on their settings as well as potential for unknown archaeology. No scheme information and data is available for an assessment at this stage.	NDA

Biodiversity

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	No scheme information and data is available for an assessment at this stage.	NDA
MND.2	Freight Measures	No scheme information and data is available for an assessment at this stage.	NDA
ALT.1	Active Travel Routes	Short, medium and long term effect of provision of any new infrastructure would potentially result in localised effects and would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects. No scheme information and data is available for an assessment at this stage.	NDA
ALT.2	Strategic Bus Corridors	Short term effect of provision any new corridors or improvements to existing corridors would potentially result in localised effects and would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Longer term consideration of operational effects on protected species. Any new corridors for rapid transit would potentially result in effects and would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Longer term consideration of operational effects. No scheme information and data is available for an assessment at this stage	NDA
ALT.3	South Wales Metro	Short term N/A Any new corridors for rapid transit would potentially result in effects and would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Longer term consideration of operational effects. No scheme information and data is available for an assessment at this stage	NDA
ALT.4	South Wales Mainline Enhancements	Any infrastructure upgrades would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Longer term consideration of operational effects. No scheme information and data is available for an assessment at this stage	NDA
ALT.5	Swansea Bay Metro	Short term provision any park and ride facilities would potentially result in localised effects and would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Longer term potentially significant effects associated with provision of a new commuter rail network on sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. No scheme information and data is available for an assessment at this stage	NDA
ALT.6	West and Mid Wales Rail Connections	Potentially significant effects associated with provision of new rail alignments on sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. No scheme information and data is available for an assessment at this stage	NDA

Ref.	Option Package	Commentary (short and long term)	Score
ALT.7	West Wales Parkway	Potentially significant effects associated with provision a parkway station and possible links between SDL and the main line on sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. No scheme information and data is available for an assessment at this stage	NDA
ALT.8	Public Transport Interchanges	Potentially significant effects (short, medium and longer term) associated with provision of station enhancements/ new stations on sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. No scheme information and data is available for an assessment at this stage	NDA
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Potentially significant effects associated with provision of bus-based park and ride sites and additional park and share sites on sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. No scheme information and data is available for an assessment at this stage	NDA
ERS.1	J36-38 Improvements Package	No scheme information and data is available for an assessment at this stage.	NDA
ERS.2	J38-43 Improvements Package	Short and medium term upgrades and improvements would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Potential long-term significant effects associated with renewal of Briton Ferry Bridge, motorway widening, junction improvements and provision of new section on M4 motorway between Junctions 38 and 42 on sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Sections of Ancient Woodland is located either side of the M4 between J38 and J39 – constraint for widening to 3 lanes. Earlswood Road Cutting and Ferryboat Inn Quarries SSSI is located adjacent to Junction 42. Ecological surveys would be required to more fully understand potential impacts from the proposed options on nearby ecological receptors. No scheme information and data is available for an assessment at this stage.	NDA
ERS.3	J43-47 Improvements Package	Short to medium term provision of crawling lane between J45 and J46 would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Ancient woodland lies adjacent to the M4 motorway. Longer term potentially significant effects associated with widening to 3 lanes (Ancient woodland at Junction 43, between Junctions 43 and 44, west of Junction 45 and between Junctions 46 and 47). Potential effects associated with renewal of River Tawe Bridge. Need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Ancient Woodland located adjacent to some sections of the M4 between J44 – J47	NDA

Ref.	Option Package	Commentary (short and long term)	Score
		Ecological surveys would be required to more fully understand potential impacts from the proposed options on nearby ecological receptors. No scheme information and data is available for an assessment at this stage	
ERS.4	Junction Improvements	Short term to medium term junction improvements and corridor connection improvements would potentially result in localised effects and would need to take into consideration sites designated for nature conservation interest, potential habitat loss/fragmentation and effects on protected species. Areas of Ancient Woodland close to Junction 49. Carmarthen Bay and Estuaries SAC and Bury Inlet and Loughor Estuary SSSI adjacent to M4 (approximately 320m south east of Junction 48).	NDA

Water Environment

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	No scheme information and data is available for an assessment at this stage.	NDA
MND.2	Freight Measures	No scheme information and data is available for an assessment at this stage.	NDA
ALT.1	Active Travel Routes	Short, medium and long term effect of provision of any new infrastructure would potentially result in localised effects and would need to take into consideration flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.2	Strategic Bus Corridors	Short term effect of provision any new corridors or improvements to existing corridors would potentially result in localised effects and would need to take into consideration flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.3	South Wales Metro	Any new corridors for rapid transit would potentially result in effects and would need to take into consideration flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.4	South Wales Mainline Enhancements	Potential short term localised effects resulting from infrastructure upgrades on flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA

Ref.	Option Package	Commentary (short and long term)	Score
ALT.5	Swansea Bay Metro	Short term provision any park and ride facilities would potentially result in localised effects and would need to take into consideration flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.6	West and Mid Wales Rail Connections	Potential effects associated with provision of new rail alignments on flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.7	West Wales Parkway	Potential effects associated with provision a parkway station and possible links between SDL and the main line on flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.8	Public Transport Interchanges	Potentially significant effects (short, medium and longer term) associated with provision station enhancements/ new stations on flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Potentially significant effects associated with provision bus-based park and ride sites and additional park and share sites on flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. No scheme information and data is available for an assessment at this stage.	NDA
ERS.1	J36-38 Improvements Package	No scheme information and data is available for an assessment at this stage.	NDA
ERS.2	J38-43 Improvements Package	Short term upgrades and improvements would potentially result in localised effects and would need to take into consideration on flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. Upgrades to Harbour Way would potentially affect areas under Flood Zone C2. Junction 41 is on the edge of Flood Zone C1. Potential long term significant effects associated with renewal of Briton Ferry Bridge (Flood Zone B and C2), motorway widening between Junctions 38 and 40 Flood Zone B and C2 to west, between Junctions 40 and 41 at River Afan Flood Zones C1 and C2 and between Junctions 42 and 43 Flood Zone C2 where the scheme crosses the River Neath, Junction improvements and provision of new section on M4 motorway. No scheme information and data is available for an assessment at this stage.	NDA
ERS.3	J43-47 Improvements Package	Short to medium term provision of crawling lane between J45 and J46 would need to take into consideration flood risk zones (at J45), main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation.	NDA

Ref.	Option Package	Commentary (short and long term)	Score
		Longer term potentially significant effects associated with widening to 3 lanes and renewal of River Tawe Bridge. No scheme information and data is available for an assessment at this stage.	
ERS.4	Junction Improvements	Short term to medium term Junction improvements and corridor connection improvements would potentially result in localised effects and would need to take into consideration flood risk zones, main rivers, watercourses, groundwater, aquifers and the potential for effects on water quality during construction and operation. Flood Zones B and C2 (River Loughor) located close to Junction 49. No scheme information and data is available for an assessment at this stage.	NDA

Economic

Journey Time Changes

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	VMS signs could reduce people's journey times when there is congestion by diverting them to alternative routes. However the messages must be kept up to date otherwise people will have longer journey times by taking unnecessary diversions.	+
MND.2	Freight Measures	These measure are unlikely to have an impact on journey times. Neutral.	0
ALT.1	Active Travel Routes	For people who switch to active travel from motorised routes their journeys are likely to take longer	-
ALT.2	Strategic Bus Corridors	Reduction in bus journey times. Likely to lead to an increase in journey times for cars and goods vehicles if priority is provided to buses at junctions and if road space is re-allocated to buses.	+
ALT.3	South Wales Metro	Higher frequency of services and bus priority measures would lead to shorter door to door journey times for passengers. New routes would also decrease passenger journey times. Could lead to increase journey times for motorised users (such as through increased level crossing closures).	+
ALT.4	South Wales Mainline Enhancements	New stations would increase rail journey times for existing passengers whose trains now call at these additional stops. Other measures to increase rail speeds would lead to decreased journey times and could provide some offset to the increase times caused by additional stations.	++
ALT.5	Swansea Bay Metro	Higher frequency of services and bus priority measures would lead to shorter door to door journey times for passengers. New routes would also decrease passenger journey times. Could lead to increase journey times for motorised users.	+
ALT.6	West and Mid Wales Rail Connections	Better bus connections to the stations would decrease journey times for people using bus and then rail. New rail routes would decrease journey time for passengers who wished to use them e.g. Heart of Wales line services avoiding the Llanelli loop but longer journeys for people wishing to go to Llanelli.	+
ALT.7	West Wales Parkway	New stations would increase rail journey times for existing passengers whose trains now call at these additional stops. Other measures to increase rail speeds would lead to decreased journey times and could provide some offset to the increase times caused by additional stations A new station on the mainline west of Swansea would reduce overall journey times for passengers going to Cardiff and beyond, if it was served by the fast London services. Journey time for existing passengers would have an increased journey time due to the additional stop. If new station only served by local trains, then unattractive to longer distance passengers and	0

Ref.	Option Package	Commentary (short and long term)	Score
		travellers from West Wales likely to remain using car or their current rail station.	
ALT.8	Public Transport Interchanges	If the existing routes and frequencies remain the same, then there is no impact on journey times.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Unless a significant number of cars are removed from the M4 then there would be negligible impact on journey times for other uses of the M4. People using park and ride likely to have longer journey times due to interchange time and waiting for the bus service.	-
ERS.1	J36-38 Improvements Package	This measure might reduce average journey times outside of the peak periods by addressing high average speeds	-
ERS.2	J38-43 Improvements Package	Decrease in highway journey times and for users of coach services	++
ERS.3	J43-47 Improvements Package	Decrease in highway journey times and for users of coach services	++
ERS.4	Junction Improvements	Decrease in highway journey times and for users of bus/coach services that go through these junctions	++

Journey Time Reliability Changes

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	Increase in reliability of journey times for car/bus users	+
MND.2	Freight Measures	No impact is expected	0
ALT.1	Active Travel Routes	Increase in reliability of journey times for people who now walk/cycle	++ (for cyclists)

Ref.	Option Package	Commentary (short and long term)	Score
ALT.2	Strategic Bus Corridors	Increase in reliability of journey times for bus users. Could be a decrease in reliability for car users if road space reallocated to buses and buses get priority at junctions.	++
ALT.3	South Wales Metro	Increase in reliability of journey times for bus users	++
ALT.4	South Wales Mainline Enhancements	Increase in reliability of journey times for rail users	++
ALT.5	Swansea Bay Metro	Increase in reliability of journey times for bus users	++
ALT.6	West and Mid Wales Rail Connections	No impact on reliability of journey times	0
ALT.7	West Wales Parkway	Improvement in reliability of end to end journey times if can use rail to avoid congested western end of M4	+
ALT.8	Public Transport Interchanges	No impact on reliability of journey times	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	No impact on reliability of journey times for sharers. For park and ride slight deterioration in reliability of journey times as have an interchange with bus service which provides opportunity for issues to arise e.g. bus service is cancelled.	0
ERS.1	J36-38 Improvements Package	Improvement in car/bus/heavy goods vehicles journey time reliability	++
ERS.2	J38-43 Improvements Package	Short -term – Improvement in car/bus/heavy goods vehicles journey time reliability, a moderate beneficial impact is predicted in the short term.	++
		Long-term – Improvement in car/bus/heavy goods vehicles journey time reliability, a major beneficial impact is predicted in the long term.	+++

Ref.	Option Package	Commentary (short and long term)	Score
ERS.3	J43-47 Improvements Package	Short -term – Improvement in car/bus/heavy goods vehicles journey time reliability, a moderate beneficial impact is predicted in the short term.	++
		Long-term – Improvement in car/bus/heavy goods vehicles journey time reliability, a major beneficial impact is predicted in the long term.	+++
ERS.4	Junction Improvements	Improvement in car/bus/heavy goods vehicles journey time reliability	++

Transport Cost

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	No impact on user costs	0
MND.2	Freight Measures	Heavy goods vehicles have a high cost per mile so longer distance or longer time journeys increase costs. Having to transfer goods e.g. from road to rail is very expensive and so only cost effective for long journeys by rail, otherwise total costs rise	0
ALT.1	Active Travel Routes	If walk/cycle is a substitute for public transport or car trip then user costs go down	++ (for cyclists)
ALT.2	Strategic Bus Corridors	If the additional trips are made by older people the Welsh Government costs go up due to concessionary fares.	-
ALT.3	South Wales Metro	Public transport fares are often than car fuel costs, if free parking is available so people may perceive that their travel cost have gone up. There is a saving if use of public transport means they do not have to purchase and maintain a car.	0
ALT.4	South Wales Mainline Enhancements	Rail fares can be higher than fuel costs, especially if passengers have to pay to park at the station but would have free parking for a car at their final destination.	0

Ref.	Option Package	Commentary (short and long term)	Score
ALT.5	Swansea Bay Metro	If the additional trips are made by older people the Welsh Government costs go up due to concessionary fares on buses.	0
ALT.6	West and Mid Wales Rail Connections	Rail fares can be higher than fuel costs, especially if passengers have to pay to park at the station but would have free parking for a car at their final destination.	0
ALT.7	West Wales Parkway	Rail fares can be higher than fuel costs, especially if passengers have to pay to park at the station but would have free parking for a car at their final destination.	0
ALT.8	Public Transport Interchanges	No impact on passenger costs. Could increase Welsh Government subsidy if more subsidised trips are made as consequence of public transport becoming more attractive.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Park and ride cost of a bus fare in addition to driving can be more expensive than driving the whole way, depending on level of car park charge (if any) that would otherwise be paid at the final destination. Park and share would lead to reduction in journey costs if fuel costs are shared.	0
ERS.1	J36-38 Improvements Package	Minimal likely impact on travel costs. If speeds decrease then fuel consumption goes up and costs decrease.	0
ERS.2	J38-43 Improvements Package	Minimal likely impact on travel costs. If speeds increase then fuel consumption goes up and costs increase. If traffic spends less time in queuing traffic then fuel costs can go down slightly.	0
ERS.3	J43-47 Improvements Package	Minimal likely impact on travel costs. If speeds increase then fuel consumption goes up and costs increase. If traffic spends less time in queuing traffic then fuel costs can go down slightly.	0
ERS.4	Junction Improvements	Minimal likely impact on travel costs. If speeds increase then fuel consumption goes up and costs increase. If traffic spends less time in queuing traffic then fuel costs can go down slightly.	0

Accidents

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	The development of a Resilience Study as part of this intervention has the potential to how to identify measures that would minimise the frequency and impact of incidents and breakdown along the strategic road network within the study area.	+
MND.2	Freight Measures	A neutral impact on accidents is predicted.	0
ALT.1	Active Travel Routes	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.2	Strategic Bus Corridors	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.3	South Wales Metro	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.4	South Wales Mainline Enhancements	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.5	Swansea Bay Metro	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.6	West and Mid Wales Rail Connections	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.7	West Wales Parkway	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.8	Public Transport Interchanges	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	A neutral impact on accidents is predicted. Further details and quantification of impacts would be undertaken at later WelTAG stages.	0

Ref.	Option Package	Commentary (short and long term)	Score
ERS.1	J36-38 Improvements Package	This package of intervention would undertake a detailed corridor study focusing on accidents and traffic speeds, in order to identify measures to address high vehicle speeds. The outcome of the study would inform other short and medium term measures.	+++
ERS.2	J38-43 Improvements Package	The package of measures in the short and longer term have the potential to reduce the frequency and severity of accidents.	++
ERS.3	J43-47 Improvements Package	The package of measures in the short and longer term have the potential to reduce the frequency and severity of accidents.	++
ERS.4	Junction Improvements	The package of measures in the short term have the potential to reduce the frequency and severity of accidents.	++

Wider Economic Impacts

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	Network management measures should help reduce traffic across the road network. Reduced traffic will have a positive wider economic impact in the short and long term by reducing businesses travel costs and improving connectivity between businesses, their customers, supply chain and labour supply. It should lead to agglomeration effects as businesses become effectively closer together, thus boosting each firm's productivity.	+
MND.2	Freight Measures	Measures that improve connectivity and create greater operational efficiencies for the freight business (rail and road) should have a positive wider economic impact in the short and medium term. The reasons are essentially the same as described for MND.1 above.	+
ALT.1	Active Travel Routes	Active travel measures principally create positive impacts on human health and wellbeing and environmental impacts as road traffic is reduced and travellers use more sustainable travel modes. However, improved human health and wellbeing and reduced traffic can also have a positive wider economic impact as workers are less likely to take time off work and road congestion is improved.	+
ALT.2	Strategic Bus Corridors	Measures that improve public transport should have a positive wider economic impact. Public transport helps to reduce road congestion and connect businesses better to their labour force which has a positive wider economic impact for the reasons described at MND.1 above. It also has positive environmental and social benefits which can have positive 'spill-over' effects to the wider economy.	+

Ref.	Option Package	Commentary (short and long term)	Score
ALT.3	South Wales Metro	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ALT.4	South Wales Mainline Enhancements	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ALT.5	Swansea Bay Metro	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ALT.6	West and Mid Wales Rail Connections	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ALT.7	West Wales Parkway	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ALT.8	Public Transport Interchanges	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	Measures that improve public transport should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for ALT.2 above.	+
ERS.1	J36-38 Improvements Package	Measures that improve the efficiency, reliability and safety on the M4 and reduce congestion and traffic should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for MND.1 above.	+
ERS.2	J38-43 Improvements Package	Measures that improve the efficiency, reliability and safety on the M4 and reduce congestion and traffic should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for MND.1 above.	+
ERS.3	J43-47 Improvements Package	Measures that improve the efficiency, reliability and safety on the M4 and reduce congestion and traffic should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for MND.1 above.	+
ERS.4	Junction Improvements	Measures that improve the efficiency, reliability and safety on the M4 and reduce congestion and traffic should have a positive wider economic impact in the short and long term. The reasons are essentially the same as described for MND.1 above.	+

Land and Property

Ref.	Option Package	Commentary (short and long term)	Score
MND.1	Study Area Wide Network Management	A neutral impact on land and property is predicted.	0
MND.2	Freight Measures	The delivery of the measures identified within the proposed Rail Freight Strategy and Lorry Parking Strategy, in the short, medium and long term may require the purchase /impact on land and property. A minor adverse impact is predicted at this stage, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
ALT.1	Active Travel Routes	The delivery of the active travel routes in the short, medium and long term may require the purchase / impact on land and property. A minor adverse impact is predicted at this stage, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
ALT.2	Strategic Bus Corridors	Short-term – The delivery of Strategic Bus Corridors in the short, medium and long term may require the purchase / impact on land and property. A minor adverse impact is predicted at this stage, (it is assumed the majority of measures will be delivered within the adopted highway network) however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
		Long-term – The details of the potential rapid transit route from Porthcawl to Bridgend are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected by the route, for sections that are delivered outside of the adopted highway, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	–
ALT.3	South Wales Metro	Short-term – A neutral impact on land and property is predicted.	0
		Long-term – The details of the potential rapid transit route from Porthcawl to Bridgend are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected by the route, for sections that are delivered outside of the adopted highway, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	–
ALT.4	South Wales Mainline Enhancements	A neutral impact on land and property is predicted at this stage, as it is assumed that the proposed interventions would be delivered on land within Network Rail ownership.	0
ALT.5	Swansea Bay Metro	Short-term – The delivery of Park and Ride provision at key stations may require the purchase /impact on land and property. A minor adverse impact is predicted at this stage, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-

Ref.	Option Package	Commentary (short and long term)	Score
		Long-term – The details of the potential new public transport routes across the Swansea Bay region are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	--
ALT.6	West and Mid Wales Rail Connections	Short-term – A neutral impact on land and property is predicted as in the short-term only a feasibility/ business case work are proposed.	0
		Long-term – The details of the potential new rail alignment are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected. However further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
ALT.7	West Wales Parkway	Short-term – A neutral impact on land and property is predicted as in the short-term only a feasibility/ business case work are proposed.	0
		Long-term – The details of the potential new Parkway Station (and potential rail connections if required) are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
ALT.8	Public Transport Interchanges	The details of the proposed public transport interchanges (enhancements and proposed new stations) are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
ALT.9	Park & Ride and Park & Share M4 Corridor Strategy	The details of the proposed Park and Ride/ Share sites (enhancements and proposed new sites) are at this stage unknown, however it is assumed that there is potential that some property/ land could be adversely affected, however further appraisal of impacts would be undertaken at further development stages when greater detail is known.	-
ERS.1	J36-38 Improvements Package	A neutral impact on land and property is predicted as it is assumed that any proposed measures would be delivered within the highway boundary.	0
ERS.2	J38-43 Improvements Package	Short-term – It is assumed that the majority of proposed measures would be delivered within the highway boundary, but the potential for a new westbound on-slip at Baglan would require the purchase and hence impact on land/property. If taken forward the impacts would be considered at greater detail at further stages.	--
		Long-term – A number of the proposed measures within this intervention would require significant additional land outside the ownership of the Welsh Government, hence would require the purchase of land/property and would have an adverse impact on land/property.	---

Ref.	Option Package	Commentary (short and long term)	Score
ERS.3	J43-47 Improvements Package	Short-term – It is assumed that the proposed measures would largely be delivered within land owned by the Local Authority / Welsh Government, however there is potential that land/property may need to be purchased or adversely impacted by the proposals.	-
		Long-term – The proposed increased lane provision as part of the proposed interventions could require the purchase of land and property and it is considered that there would be an adverse impact on land/property.	--
ERS.4	Junction Improvements	It is assumed that the majority of proposed measures would be delivered within the highway boundary (local authority/ Welsh Government ownership), however there is potential that land/property and would have an adverse impact on land/property.	-

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