Agenda Item: 18

Meeting of:	**Cabinet**
Date of Meeting:	**Monday, 17 June 2019**
Relevant Scrutiny Committee:	Environment and Regeneration
Report Title:	Penarth Cardiff Barrage Sustainable Transport Corridor WelTAG Stage One and Stage Two Update
Purpose of Report:	To update Cabinet on progress with the WelTAG Stage One Penarth Cardiff Barrage Sustainable Transport Corridor Study and make recommendations for the next steps to be considered as part of a Stage Two assessment.
Report Owner:	Cabinet Member for Neighbourhood Services and Transport
Responsible Officer:	Miles Punter - Director of Environment and Housing Services
Elected Member and Officer Consultation:	Cabinet Member for Neighbourhood Services and Transport Cabinet Member for Regeneration and Planning Head of Neighbourhood Services and Transport Group Manager Transport Services Passenger Transport Manager Operational Manager Engineering Accountant Environment and Housing Services Operational Manager Finance Head of Regeneration and Planning Legal Services (Committee Reports)
Policy Framework:	This report is a matter for Executive decision by Cabinet

Executive Summary:

- This Report provides Cabinet with an update on progress of the WelTAG Stage One Penarth Cardiff Barrage Sustainable Transport Corridor Study.
- The draft WelTAG Stage One Strategic Outline Case has been received from Capita and identified five options for Stage One appraisal encompassing:

  Option 1 | Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel Integrated Network Map.

  Option 2 | Bus Park & Ride and sustainable transport links across Cardiff Barrage

  Option 3 | Multi-modal sustainable transport interchange

  Option 4 | Opening Cardiff Barrage to private vehicles during peak periods and

  Option 5 | Do Minimum

- Following completion of the Stage One appraisal, the Report subsequently makes the following recommendations:

That OPTION 1 be progressed for further appraisal at WelTAG Stage Two.
That OPTION 2 be progressed for further appraisal at WelTAG Stage Two.
That OPTION 3 be taken forward to WelTAG Stage Two appraisal in conjunction with Transport for Wales.
It is recommended that OPTION 4 is not taken forward to WelTAG Stage Two due to their likely negative impact on many policy objectives, the study objectives and on many economic, environmental, social and cultural criteria.
Although OPTION 5 did not perform well in the appraisal, is recommended that the do minimum option be progressed to WelTAG Stage Two to provide the baseline against which the recommended options will be assessed.

Recommendations

1. That progress made on the Penarth Cardiff Barrage Sustainable Transport Corridor WelTAG Stage One Study relating to improving sustainable connectivity through the corridor between Penarth and Cardiff Barrage is noted.
2. That this matter is referred to Scrutiny Committee (Environment and Regeneration) for consideration.
3. That, subject to consideration by Scrutiny Committee (Environment and Regeneration) the progression of the WelTAG studies for the Penarth Cardiff Barrage Sustainable Transport Corridor to WelTAG Stage Two is endorsed.

Reasons for Recommendations

1. To update members on progress made on the scheme.
2. To allow this report to be scrutinised.
3. To support progression of the study to WelTAG Stage Two in principle.

1. Background

1.1 The Council has commissioned Capita to develop and appraise options for improving sustainable transport between Penarth and Cardiff Barrage. The appraisal of options is being undertaken in line with the Welsh Transport Appraisal Guidance (WelTAG 2017) including advice on the appraisal in relation to the Future Generations of Wales (2015) Act Well-being Goals.

1.2 The WelTAG Stage One Strategic Outline Case and Impacts Assessment Report has been submitted by Capita for consideration by the Council. The Report has considered problems, opportunities and constraints identified within the study area, and established several objectives to guide the appraisal.

1.3 To support development of the WelTAG Stage One process a Stakeholder workshop was held on 17 January, 2019 followed by a public drop in event on 24 January, 2019 with output from the two events captured within an associated WelTAG Stage One Consultation Report (Appendix C Refers).

1.4 Taking into consideration the baseline work completed and feedback received through the consultation, the following five options were subsequently established for a Stage One appraisal:

Option 1 | Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel Integrated Network Map

Option 2 | Bus Park & Ride and sustainable transport links across Cardiff Barrage

Option 3 | Multi-modal sustainable transport interchange

Option 4 | Opening Cardiff Barrage to private vehicles during peak periods

Option 5 | Do Minimum

1.5 The WelTAG Stage One study has been subject to review by Council Officers and the Penarth Project Board.

1.6 For Stage Two a formal Review Group will be established in line with the WelTAG guidance.

2. Key Issues for Consideration

2.1 The Draft WelTAG Stage One Strategic Outline Case has taken forward and appraised each of the five options in relation to the Five Case Business Model: the strategic, transport, management, financial and commercial case.

2.2 The WelTAG Stage One report is accompanied by the Impact Assessment Report (IAR) (Appendix B refers). Its purpose is to provide a permanent record of the appraisal work on the proposed transport intervention and contains the detailed evidence behind the summary of information provided to decision makers in the Stage reports. The IAR remains a live document for updating throughout the process.

2.3 The problems have been identified as follows:

Ref	PROBLEMS
1	Existing volumes of traffic and levels of congestion causes pollution and creates unreliable journey times and delays to private and business vehicles and bus services, particularly during peak periods.
2	Sustainable transport options available do not present an attractive alternative to car travel.
3	A lack of park and ride facilities in the area limits the opportunities for interchange between car and public transport, which reduces the attractiveness of public transport travel options.
4	High levels of car use and low levels of public transport usage and active travel, particularly for commuting journeys.
5	Bus services linking Penarth and Cardiff have slow journey times and are unreliable due to congestion problems along the bus corridors.
6	There are currently low levels of active travel for everyday journeys, which needs to be increased if the long-term health benefits of active travel are to be realised.
7	Environmental factors reduce the attractiveness of walking and cycling.
8	Safety issues act as a barrier to walking and cycling and the constrained nature of the built Environment.
9	A lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes within Penarth and between Penarth and Cardiff creates a poor-quality

	environment for walking and cycling and acts as a barrier to encouraging active travel.
10	A lack of facilities for cyclists at trip origin and destination discourages the use of active travel.
11	The topography of the area acts as a barrier to active travel and creates difficulties in providing active travel infrastructure.
12	Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the Penarth economy.
13	The high volume of traffic acts as a barrier to walking and cycling and to increasing levels of active travel.
14	Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.

2.4 The following opportunities were subject to consultation as part of the Stage One stakeholder consultation.

Ref	OPPORTUNITIES
1	Well-placed interventions may convert private vehicle trips into active and sustainable modes, thus reducing traffic congestion on existing routes
2	Buses between Cardiff and Penarth to run via the Barrage, which would significantly improve access to Cardiff/ Cardiff Bay from Penarth and Penarth Marina.
3	Opportunity to improve lighting provision across active travel routes as part of intervention.
4	Opportunity to include proposals as part of the wider Capital Region Metro project.
5	Improvements to existing/ development of new active travel routes and sustainable transport infrastructure could improve disabled accessibility to/ from/ within the study area.
6	To provide economic benefits to Penarth and Cardiff.
7	To provide economic benefits to the NHS via uptake of active travel modes, and thus reduce healthcare costs.
8	Headland Link would create an easy, flat, walking and cycling link between Cardiff Bay and Penarth Esplanade via Barrage.
9	Headland Link would create an exciting yet easy start/end to the Vale of Glamorgan section of the Wales Coast Path.
10	Headland Link has potential to increase levels of walking and cycling within/ to/ from Penarth, by providing commuters with a shorter and safe route to employers in the Bay.
11	Headland Link connection may bring Penarth Pier into the leisure offer of Cardiff Bay.

2.5 An extensive number of additional opportunities were also identified following completion of the consultation exercise. These have been included below with the full detail contained within the Stage One Consultation Report (Attached at Appendix C).

Ref	ADDITIONAL OPPORTUNITIES IDENTIFIED FROM STAKEHOLDER CONSULTATION
1	Expansion of walking buses project to more schools within study area.
2	To use right materials in interventions to reflect coastal location(s).
3	Expansion of NextBike/cycle hire scheme to Penarth.
4	Self-driving electric pods.
5	Monorail.
6	Reduce car usage and create modal shift to Active Travel.
7	Development opportunity left of the Custom House (Cardiff end of Headland Link).
8	Improve Active Travel links between Penarth and Cardiff Bay.
9	Improve Active Travel in Penarth.
10	Improve Public Transport provision into and out of Penarth.
11	Improve overall Health and Wellbeing of residents.
12	Include proposals as part of wider plan to increase rail provision in Study Area.
13	Reduction in vehicle ownership to create more space (freed up by parking).
14	Introduce shared spaces.
15	Link Cardiff and Vale tourism strategies.
16	Align with industrial strategy.
17	Maximise accessibility on-foot and cycle between Cogan and Penarth.
18	Improve priority for pedestrians and cycles at Cogan station using TfW improvements.
19	Expansion of 20mph limit zones.
20	Extend public transport links south of Penarth towards Sully/Barry.
21	Utilise advancements in technology to use electric buses across the Barrage.
22	Include SUDs legislation as part of designs.
23	Encourage high levels of footfall currently using Barrage to visit Penarth.
24	Prioritise bus movements into and out of Penarth.
25	Create a unified payment system for bus and rail; and
26	Increase of parking at Penarth outer Harbour (Park and Ride with Headland Project).

2.6 The objectives were set for the study in order to address the problems, opportunities and constraints as set out below. These were accompanied by details of what success would look like and how it would be measured:

Ref	OBJECTIVES
1	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel.
2	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.

3	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being.
4	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.
5	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.

2.7 The consideration of problems and opportunities, and subsequent identification of objectives established five proposed options for appraisal as follows:

Option 1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM
Option 2	Bus park and ride and sustainable transport links across Cardiff Barrage
Option 3	Multi-modal sustainable transport interchange at Cogan
Option 4	Opening Cardiff Barrage to private vehicles during peak periods
Option 5	Do Minimum

2.8 The long list of five potential options has been appraised against national, regional and local policy objectives to assess their suitability and strategic fit as potential solutions. Each option has also been assessed against the five study objectives, its ability to address identified problems and a qualitative assessment has been undertaken of the options against economic, environmental, social and cultural criteria.

2.9 The WelTAG Stage One report (Appendix A refers) also includes a consideration of issues affecting scheme development and delivery for each option within the long list. This includes issues such as statutory procedures, funding requirements and procurement options. An early stage assessment has also been undertaken of potential risk and deliverability issues affecting each option. Issues such as these will be further considered in later stages of the WelTAG appraisal process, as the recommended options are developed in greater detail.

2.10 Three of the options within the long list performed well in the appraisal and are those options that are focused on sustainable transport improvements. These are:

Option 1 | Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM

Option 2 | Bus park and ride and sustainable transport links across Cardiff Barrage

Option 3 | Multi-modal sustainable transport interchange at Cogan

2.11 Options 1, 2 and 3 were each assessed as likely to have:

• A mostly positive impact on existing policy objectives at the national, regional and local level.

• A positive or neutral impact on each of the goals of the Well-being of Future Generations (Wales) Act 2015.

• A positive impact on achieving each of the five study objectives and in addressing most of the identified problems within the study area.

• A positive impact on each of the economic, social and cultural criteria and a positive or neutral impact on most of the environmental criteria.

2.12 Option 4 | This option did not perform well in the appraisal. It was assessed as having the greatest negative collective impact on the study objectives, an adverse impact on many of the identified problems and likely to have a negative impact on many of the economic and environmental criteria. In terms of deliverability, public acceptability and potential opposition to the introduction of private vehicles on Cardiff Barrage is considered a risk. However, it should be noted that there was evidence of support for this option during the WelTAG consultation.

2.13 Option 5 | This option did not perform well in the appraisal. A do minimum approach is likely to result in a worsening of existing problems and was assessed as having a negative impact on many policy objectives, in addition to the study objectives. It was assessed as likely to have a negative impact on many economic, environmental, social and cultural criteria. The long-term impact of a do minimum option will adversely affect the goals of the Well-being of Future Generations (Wales) Act 2015.

2.14 Recommendations for Short List of Options:

It is recommended that OPTION 1 be progressed for further appraisal at WelTAG Stage Two.
It is recommended that OPTION 2 be progressed for further appraisal at WelTAG Stage Two.
It is recommended that OPTION 3 be progressed for further appraisal at WelTAG Stage Two in conjunction with Transport for Wales.
It is recommended that OPTION 4 is not taken forward to WelTAG Stage Two due to their likely negative impact on many policy objectives, the study objectives and on many economic, environmental, social and cultural criteria.
Although OPTION 5 did not perform well in the appraisal, is recommended that the do minimum option be progressed to WelTAG Stage Two to provide the baseline against which the recommended options will be assessed.

3. How do proposals evidence the Five Ways of Working and contribute to our Well-being Objectives?

3.1 The well-being goals and objectives of the Well-being of Future Generations (Wales) Act 2015 formed a key part of developing the strategic case and the table below summarises how each identified problem adversely impacts directly on achieving the well-being goals.

WELL-BEING GOAL HINDERED	Problem Reference (see previous table)
A Prosperous Wales	1, 2, 3
A Resilient Wales	4
A More Equal Wales	5
A Healthier Wales	6, 7
A Wales of Cohesive Communities	8, 9, 10, 11
A Wales of Vibrant Culture and Thriving Welsh Language	12
A Globally Responsible Wales	13, 14

3.2 In addition, each of the five objectives have been subject to consideration against the Five Ways of Working (collaboration, integration, involvement, long-term, prevention). Each of the objectives are subsequently considered to align with each element of the Five Ways of working with full details provided within the WelTAG Stage One report. Achieving the objectives would:

• Provide long term economic, social, environmental, health and wellbeing benefits.

• Prevent existing problems of traffic congestion and its associated negative economic and environmental impacts from worsening. Prevent health and wellbeing problems within local communities that are caused by sedentary lifestyles.

• Integrate with the Vale of Glamorgan's Wellbeing Plan, Active Travel INM and Local Transport Plan.

• Require collaboration between different parts of the local authority, neighbouring local authorities, local businesses and local communities.

• Require involvement between key stakeholders within the Vale of Glamorgan, Transport for Wales and the Welsh Government.

3.3 The three options recommended for WelTAG Stage Two appraisal (OPTION 1, OPTION 2 and OPTION 3) subsequently demonstrate positive compatibility with each of the five WelTAG objectives and hence robust alignment with the Five Ways of Working and Well-being goal objectives.

4. Resources and Legal Considerations

Financial

4.1 The Study has been financed by Welsh Government Capital Trust Grant funding.

4.2 The WelTAG Stage One value is £34,802.00 (excluding VAT). The WelTAG Stage Two value is £34,700.00 (excluding VAT). The total value for the WelTAG Stage One and Stage Two studies is £69,502.00 (excluding VAT).

4.3 An additional value currently capped at £22,500.00 (excluding VAT) has been allocated for the provision of WelTAG Stage One and Stage Two Project Management Services by consultants Arcadis.

Employment

4.4 Consultants Capita have been commissioned to undertake the technical work on this Project because the technical skills required to do so are not available within the Council.

4.5 Consultants Arcadis have been commissioned to provide Project Management Services on this Project to support the Council's Neighbourhood Services and Transport team in delivery of this study.

Legal (Including Equalities)

4.6 The appraisal of options has been undertaken in accordance with Welsh Government's latest version of WelTAG (December 2017) including advise on the appraisal in relation to the Well-being goals set out in the Well-being of the Future Generations (Wales) Act 2015.

4.7 The Vale of Glamorgan Local Development Plan (2017) was adopted by the Council on the 28th June 2017, which sets out the vision, objectives, strategy and policies for managing development in the Vale of Glamorgan. It also seeks to identify the infrastructure that will be required to meet anticipated growth in the Vale of Glamorgan area up to 2026. The LDP states that priority will be given to schemes that improve highway safety, accessibility, public transport, walking and cycling. The LDP's of the neighbouring Authorities of Bridgend, Cardiff and Rhondda Cynon Taff have also been noted.

4.8 The Vale of Glamorgan Local Transport Plan (2015) acknowledges the requirement for a collaborative approach for the future development of the Capital Region. The LTP seeks to identify the sustainable transport measures required to ensure Vale of Glamorgan Council adheres to current requirements and good practice, to allow for a sustainable transport environment for the

period 2015 to 2020, as well as looking forward to 2030. The plan therefore seeks to secure better conditions for pedestrians, cyclists and public transport users and to encourage a modal shift away from the single occupancy car. The LTP also 'seeks to tackle traffic congestion by securing improvements to the strategic highway corridors for commuters who may need to travel by car'.

4.9 The provision of a well organised transport network helps to increase mobility and accessibility.

5. Background Papers

None.

CAPITA

Penarth Cardiff Barrage Sustainable Transport Corridor Study

WelTAG Stage 1 Draft Report

March 2019

We | Listen Create Deliver

CAPITA

Project No: CS/096888 Doc Ref: CS/096888/01 Rev: P01

Client: Vale of Glamorgan Council
Issue Date: March 2019

Penarth Cardiff Barrage Sustainable Transport Corridor Study
WelTAG Stage 1 Draft Report

	Name	Signature	Date
Author	Gemma Thomas		21/03/2019
Checker	Martin Dolan		21/03/2019
Approver	Dave James		21/03/2019

Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:
01	21/03/19	Draft Report for Issue	Gemma Thomas	Dave James

CAPITA

GENERAL DISCLAIMER:

This report has been prepared by Capita Property and Infrastructure Limited (Capita) in favour of the Vale of Glamorgan Council ("the Client") and is for the sole use and benefit of the Client in accordance with the agreement between the Client and Capita dated 7th November 2018 under which Capita's services were performed. Capita accepts no liability to any other party in respect of the contents of this report. This report is confidential and may not be disclosed by the Client or relied on by any other party without the express prior written consent of Capita.

Whilst care has been taken in the construction of this report, the conclusions and recommendations which it contains are based upon information provided by third parties ("Third Party Information"). Capita has for the purposes of this report relied upon and assumed that the Third Party Information is accurate and complete and has not independently verified such information for the purposes of this report. Capita makes no representation, warranty or undertaking (express or implied) in the context of the Third Party Information and no responsibility is taken or accepted by Capita for the adequacy, completeness or accuracy of the report in the context of the Third Party Information on which it is based.

FREEDOM OF INFORMATION:

Capita understands and acknowledges the Authority's legal obligations and responsibilities under the Freedom of Information Act 2000 (the "Act") and fully appreciates that the Authority may be required under the terms of the Act to disclose any information which it holds. Capita maintains that the report contains commercially sensitive information that could be prejudicial to the commercial interests of the parties. On this basis Capita believes that the report should attract exemption from disclosure, at least in the first instance, under Sections 41 and/or 43 of the Act. Capita accepts that the damage which it would suffer in the event of disclosure of certain of the confidential information would, to some extent, reduce with the passage of time and therefore proposes that any disclosure (pursuant to the Act) of the confidential information contained in the report should be restricted until after the expiry of 24 months from the date of the report.

Contents

Supporting Information

Glossary of Terms

AQMA	Air Quality Management Area
BCR	Benefit – Cost Ratio
GRIP	Governance for Railway Investment Projects
HR	Human Resources
IAR	Impacts Assessment Report
INM	Integrated Network Map
LDP	Local Development Plan
NYA	Not Yet Assessed
TUPE	Transfer of Undertakings (Protection of Employment)
WBOFGA	Well-Being of Future Generations Act
WelTAG	Welsh Transport Appraisal Guidance

1. Introduction

1.1 Background and Study Context

The need to consider options for improving connectivity by sustainable transport along the Penarth Cardiff Barrage Corridor has been identified by the Vale of Glamorgan's Local Development Plan (LDP) (2017), which includes a policy to deliver sustainable transport improvements along the corridor between Penarth and Cardiff. The LDP also sets an objective that Penarth be promoted as a 'sustainable transport town' by implementing measures that improve connectivity within the town and 'to adjoining residential and commercial areas, including Cardiff Bay'.

The proximity of Penarth to Cardiff presents both challenges and opportunities in terms of connectivity and accessibility. The Vale of Glamorgan Public Service Board Well-being Assessment 2017 states that the 'Vale's location could be considered one of its greatest assets in maximising the economic well-being of our residents and the area' and the LDP highlights the proximity to Cardiff as a key factor in terms of employment. However, the location of the Vale is also a key factor in the area having the highest rate of out-commuting in Wales, the majority of which is commuting into Cardiff. These high levels of out commuting result in peak time congestion on the main distributor roads in the eastern Vale of Glamorgan, which has a negative impact on existing sustainable transport options for everyday journeys.

It is important to consider sustainable transport options to improve connectivity along the Penarth Cardiff Barrage Corridor to ensure the opportunities offered by Penarth's proximity to Cardiff are maximised. As stated in the Well-being Assessment 2017, 'Sustainable transport infrastructure and services can contribute to reducing negative impacts that cars have on the environment, reducing congestion, improving health and wellbeing, improving access to employment, health and education and other facilities and reducing the risk of road accidents.'

This WelTAG Stage 1 has been commissioned to strategically develop and appraise sustainable transport projects along the corridor linking Cardiff and Penarth.

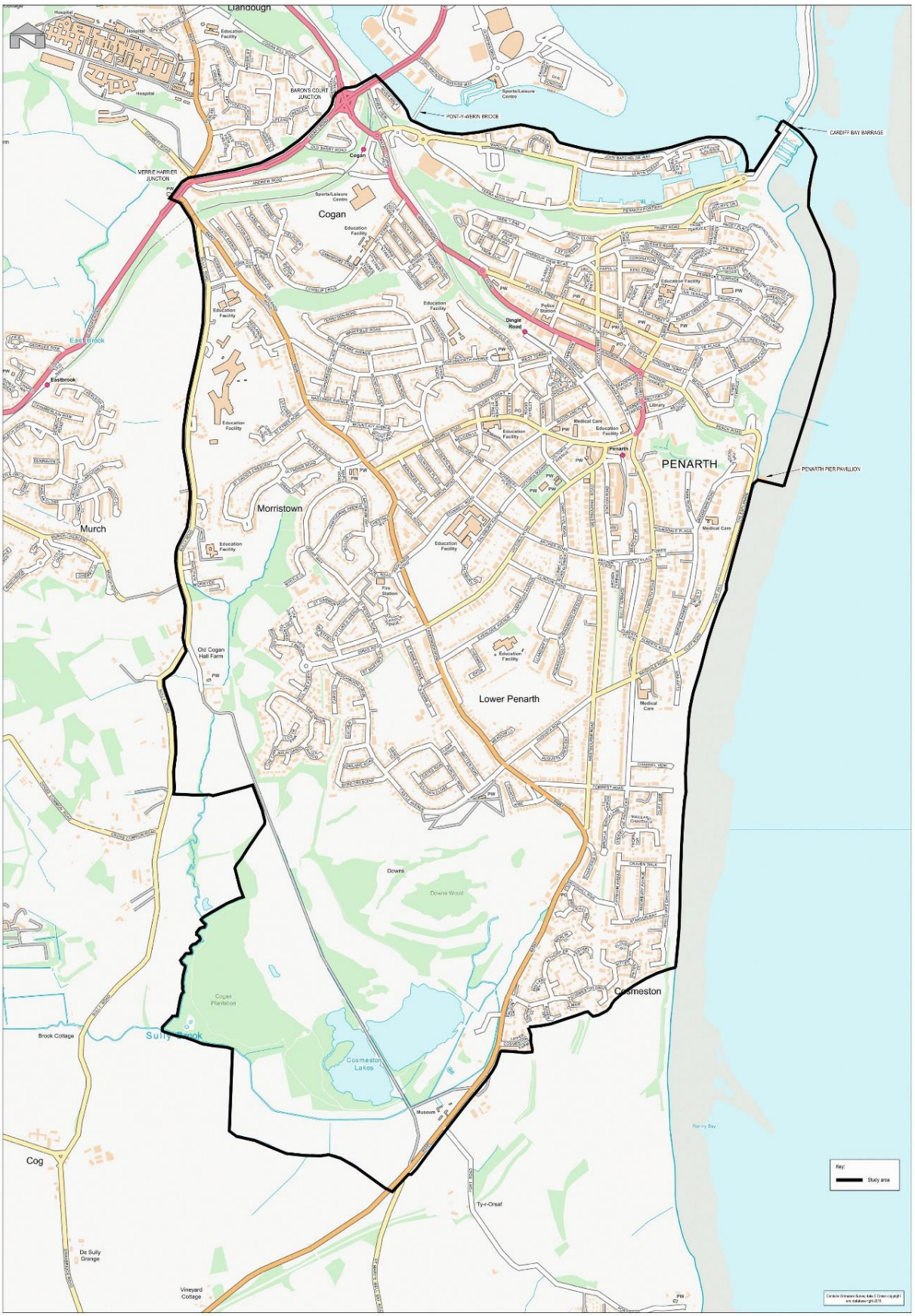
1.2 Purpose of the Study

Capita has been commissioned by the Vale of Glamorgan Council to develop and appraise sustainable transport options for the Penarth Cardiff Barrage Sustainable Transport Corridor. The appraisal of options has been undertaken in line with the Welsh Transport Appraisal Guidance (WelTAG 2017). The principles behind the Well-being of Future Generations (Wales) Act 2015 are embedded within the WelTAG process and have been an integral part of the development and appraisal of the options considered by this study. This report presents the Stage 1: Strategic Outline Case of the WelTAG process. In addition to the detail provided in this report, an accompanying Impact Assessment Report (IAR) provides a record of the detailed evidence and analysis that supports this WelTAG Stage 1 report.

1.3 The Study Area

A plan of the study area is included as Figure 1.1 below. The study area encompasses the town of Penarth, including the residential areas of Penarth Marina to the north, Cogan and Morristown to the east and Cosmeston to the south. Two key junctions on the A4055 highway network (Merrie Harrier Junction and Baron's Court Junction) define the northern boundary of the study area. Three train stations are located within the study area, namely Penarth, Dingle Road and Cogan. A summary of the current sustainable transport provision in the Penarth area, including bus and rail services and active travel infrastructure, is included in Appendix 1 of the IAR. Cardiff Barrage is included within the study area (despite being outside the Vale of Glamorgan local authority area) due to the importance of the link in considering sustainable transport options into Cardiff.

Figure 1.1 Penarth Cardiff Barrage Sustainable Transport Corridor Study Area



1.4 WelTAG 2017 (Stage One: Strategic Outline Case)

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

The guidance has been used to appraise options developed as part of this Penarth Cardiff Barrage Sustainable Transport Corridor Study to ensure that:

- As part of the Strategic Outline Case (WelTAG Stage 1), the appraisal process to produce a long list of options is compliant within current guidance; and
- An 'evidence' led approach has been adopted in selecting a short-list of options for consideration at the Outline Business Case (WelTAG Stage 2).

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

The Five Cases are as follows:

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

The level of detail that is contained within each Case is dependent upon the WelTAG stage that is being undertaken. At the Strategic Outline Case (WelTAG Stage 1), which is the subject of this report, the Strategic Case has been fully developed and the Transport Case is an initial assessment only. The other Cases are in preliminary form only and would be developed further at later stages in the WelTAG process.

At Stage 1 of the WelTAG process the purpose is to understand the issues of concern, explore the context and to present a wide list of possible solutions. These should be sufficient to be able to decide whether there are any solutions within the transport sector that are worth pursing and to select a short list of options for more detailed consideration. At Stage 2 further investigation is undertaken into the shortlisted options.

Each of the long list of options as part of this Stage 1 appraisal has been assessed in terms of impact, using the following 7 point likert scale:

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large Negative (- - -)

A statement outlining the methodology for undertaking scheme appraisal is included in Appendix 2 of the IAR.

1.5 Report Structure

This report is structured as follows:

- Chapter 2 – This chapter provides the Strategic Case. It outlines the case for change, clearly demonstrating a need for intervention and the problems and issues within the study and wider area. The chapter highlights the strategic fit both locally, regionally and nationally of the options developed. A summary of the output of the stakeholder consultation undertaken to investigate problems within the study area, the development of objectives and long list of options is also provided;
- Chapter 3 – This chapter provides the Transport Case. It outlines the results of the qualitative assessment undertaken into the economic, environmental, social and cultural impacts of the long list of options appraised.
- Chapter 4 – This chapter provides the Financial Case. This chapter discusses some of the capital and revenue costs that may be associated with the long list options, as well as highlighting the potential funding sources that may be available to undertake development work and implementation of a final preferred option.
- Chapter 5 – This chapter provides the Commercial Case. This provides a summary of the aspects that will need to be considered in procuring any future options for implementation.
- Chapter 6 – This chapter provides the Management Case. Details are provided of the governance arrangements and potential statutory procedures that may be involved in scheme delivery. An assessment of the deliverability of each of the long list of options is provided.
- Chapter 7 – This chapter provides a summary and conclusion to the report, recommending the short list of options to be taken forward for further WelTAG assessment. A summary of the future work that may be required to undertake further assessment is also provided.

2. Strategic Case

2.1 Overview

As detailed in WelTAG 2017, the strategic case:

- Presents an evidence-based description of the current situation and the issue that needs addressing, describes the likely future situation if no action is taken and presents the reasons why an intervention is required.
- Involves an analysis of the factors that are contributing to the identified problem, as this will assist in the development of possible solutions.
- Establishes objectives against which the proposed solutions will be judged.
- Sets out a narrative as to how each of the proposed solutions is intended to change the situation.

2.2 Consultation

The development of the Strategic Case has been informed by two WelTAG consultation events that took place in Penarth in January 2019. Firstly, a stakeholder workshop and secondly, a public consultation event. Both were used to identify the current problems and constraints within the study area and to identify potential solutions to these problems. The seven well-being goals of the Well-Being of Future Generations (Wales) Act 2015 were considered when identifying potential solutions at both workshops.

The WelTAG consultation report detailing the comments received at both consultation events is included in Appendix 3 of the IAR. The outputs from both the stakeholder and public consultation events helped to inform the Strategic Case, including the identification of problems, the development of study-specific objectives and the development of a list of potential options to address the problems. These are discussed further in Sections 2.5, 2.6 and 2.7.

2.3 Policy Context

A policy review has been undertaken to inform the development of this WelTAG Stage 1 report and is included in Appendix 4 of the IAR. The national, regional and local policy documents reviewed in relation to this study are as follows:

- National Policy
  - Prosperity for All: The National Strategy (2017)
  - Prosperity for All: Economic Action Plan (2018)
  - Emerging Wales Transport Strategy
  - One Wales: Connecting the Nation (Wales Transport Strategy, 2008)
  - National Development Framework (anticipated publication – 2020)
  - Wales Spatial Plan (2008)
  - National Transport Plan (2010, updated 2011)
  - National Transport Finance Plan (updated 2017)
  - Planning Policy Wales (Edition 10, 2018)
  - Active Travel (Wales) Act 2013
  - Well-being of Future Generations (Wales) Act 2015

- Regional Policy
  - Cardiff Capital Region Regeneration Plan 2018-2021

- Local Policy
  - Vale of Glamorgan Public Services Board Well-being Plan 2018-2023: Our Vale – Our Future
  - Vale of Glamorgan Council Well-being Objectives and Improvement Plan (2018)
  - Vale of Glamorgan Local Development Plan (2017)
  - Vale of Glamorgan Local Transport Plan
  - Penarth Town Place Plan

The policy review outlines the key themes and objectives of the above policy documents and details how these would be supported by sustainable transport improvements within the study area. For example, at the national level, sustainable transport interventions would support the economic objectives of the Prosperity for All: Economic Action Plan (2018), National Development Framework and the National Transport Finance Plan. Improvements to sustainable transport within the study area would support the sustainable transport objectives of the Wales Transport Strategy, the National Development Framework, the National Transport Plan and the Active Travel (Wales) Act 2013. At a regional level, improvements in sustainable and active travel provision within the study area will contribute towards the Cardiff Capital Region objectives and would more locally contribute towards the goals and objectives of key policy documents such as the Local Development Plan and Local Transport Plan. The objectives of a number of these national, regional and local policy documents are considered further as part of the Strategic Case assessment, as detailed in Section 2.8 of this report.

The policy review has considered both national and local well-being plans and objectives, through a review of the Well-being of Future Generations (Wales) Act 2015 and local well-being plans. The policy review includes a summary of how sustainable transport improvements in the Penarth Cardiff Barrage Corridor would support the five ways of working of the Act i.e. Long Term, Prevention, Integration, Collaboration and Involvement. The Well-being of Future Generations (Wales) Act 2015 has been fundamental throughout the development of the Strategic Case. The well-being goals and five ways of working have been integral to the identification of problems (as detailed in Section 2.5), the development of study-specific objectives (as detailed in Section 2.6) and the assessment of potential options (as detailed in Section 2.8).

2.4 The Case for Change

There is evidence of high levels of car use for everyday journeys along the Penarth to Cardiff Barrage corridor, which results in a range of negative impacts for local communities. High levels of car use results in problems of traffic congestion and delays, not only on key routes, but also on more local roads and within Penarth town centre.

A previous study by Arup (2018)[1] undertook a review of Census data in relation to journey to work patterns. (A summary of the background studies referred to in this section are included within Appendix 5 of the IAR). The study has shown that 63% travel to work by car or van which, although lower than the Wales average of 71%, is by far the dominant mode of travel to work. This is combined with the area having the highest rate of out-commuting in Wales, the majority of which is commuting into Cardiff. The proportion of car use for travel to work journeys, combined with the high levels of commuting to Cardiff, has a large impact on key highway junctions and corridors linking Penarth and Cardiff. The Vale of Glamorgan's LDP identifies the 'high levels of out commuting for work resulting in peak time congestion on the main distributor roads in the eastern Vale of Glamorgan'.

The study[1] found that 3.1% travel to work by bus, which is lower than the Wales average of 4.9%. The low level of travel by bus is in part due to the available travel options by bus not presenting an attractive alternative to travel by car for everyday journeys. For example, traffic congestion at

[1] Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup, October 2018

key junctions results in delays to both private vehicles and to public transport for those using the key routes between Penarth and Cardiff. The current route for buses travelling from Penarth to Cardiff is via heavily trafficked roads with no bus priority measures in place. Buses are subject to the same delays as private vehicles and journeys by bus take longer than the equivalent journey by car. The unreliability and slow journey times of bus services reduces the attractiveness of travel by bus as an alternative to the car, particularly for commuting journeys.

The study[1] found that levels of travel to work by train, walking and cycling are all higher than the Wales average. Travel to work by train is almost 12%, which is significantly higher than the Wales average of 2% and reflects the good accessibility to the rail network for Penarth residents. Travel to work by bike is 3.7%, which is more than double the Wales average of 1.5%, and 12.6% walk to work, which is higher than the Wales average of 11.2%. These figures present a promising baseline on which to further increase levels of sustainable and active travel. However, although these figures are currently higher than the Wales average, factors such as the proximity of Penarth to Cardiff and the high levels of out-commuting to Cardiff, offer the potential to further increase the proportion of journeys by sustainable modes. The provision of dedicated sustainable transport infrastructure along the Penarth Cardiff Barrage Corridor would increase the attractiveness of the options for travel by sustainable modes.

High traffic levels and congestion also impact upon emissions levels and air quality. The Vale of Glamorgan Public Services Board's Well-being Assessment 2017 provided evidence from the physical environment domain of the Welsh Index of Multiple Deprivation 2014. This used a '2012 Air Concentrations Indicator which on a scale of 1 to 100 (100 being more polluted) ranged from over 80 in some parts of Penarth and Llandough in the Eastern Vale to under 25 in parts of Llantwit Major and St. Bride's Major in the Western Vale.' In addition, there have been more concentrated problems of poor air quality with a defined area on Windsor Road, Cogan being previously designated as an Air Quality Management Area (AQMA) between, although the designation has since been lifted. Measures to reduce levels of car use and increase levels of sustainable and active travel will have a positive impact on emissions and air quality.

In addition to commuting journeys, there is the potential to increase travel by sustainable and active modes for other 'everyday journeys', such as to services and facilities within Penarth town centre. High traffic levels and problems of congestion within Penarth town centre have a negative impact on the town centre environment and reduce the attractiveness of the town centre to pedestrians and cyclists. The impact of traffic along with a lack of joined-up and good quality infrastructure for pedestrians and cyclists leads to safety concerns by more vulnerable users. As stated by the Vale of Glamorgan Public Services Board's Well-being Assessment 2017 'thriving Town Centres are an important part of promoting all aspects of well-being in the Vale.' The LDP contains an objective for Penarth to 'strengthen links between Penarth Marina, the Esplanade and the town centre' through e.g. effective traffic management schemes and appropriate infrastructure improvements.

Measures to improve connectivity and accessibility to key services and facilities would have economic, social and environmental benefits for Penarth town centre and its surrounding communities. This includes the potential benefits that improvements in connectivity and accessibility would have to the Penarth leisure and tourism market. Improvements to sustainable transport linkages along the Penarth Cardiff Barrage Corridor would enable Penarth to attract a greater number of the leisure and tourism visitors from which the Cardiff Barrage and Cardiff Bay currently benefit. A previous study by Arup (2015)[2] included a review of Cardiff Harbour Authority pedestrian survey data that was collected on Cardiff Barrage throughout 2014. During 2014, a total of 644,771 pedestrians were recorded using the barrage and the surveys recorded a Sunday footfall peak of around 400 pedestrians per hour. The implementation of sustainable transport improvements along the Penarth Cardiff Barrage Corridor have the potential to expand the popularity of the barrage, and its associated benefits, to the wider area. The pedestrian data also highlights the fluctuations in pedestrian numbers on the barrage throughout the year and that usage of the barrage increases during the Spring and Summer months. This reflects the impact that environmental and seasonal factors can have on levels of walking and cycling.

[2] Cardiff Bay Barrage Transport Link, Arup, October 2015

The full detail of the problems identified to support the case for change are detailed in Section 2.5 below. The identification of problems has been informed by the seven goals of the Well-being of Future Generations (Wales) Act 2015.

If no action is taken, levels of car use are likely to increase, and the associated negative economic, social and environmental impacts of traffic delays and congestion are likely to worsen. The negative impacts of traffic volumes on the attractiveness of existing sustainable travel options are likely to increase. Journey time delays for buses are likely to worsen and traffic volumes are likely to have an increasing negative impact on Penarth town centre and reduce its attractiveness as a destination for journeys by active travel modes.

2.5 Identification of Problems

The first step in the WelTAG Stage 1 process was the identification of the problems that need to be addressed along the Penarth Cardiff Barrage Corridor. The WelTAG stakeholder and public consultation events required those attending to consider and identify problems affecting the study area. The results of the consultation events, along with information gathered from previous studies and existing policy documents, such as the Vale of Glamorgan Local Development Plan, enabled a list of the key problems to be developed. The 14 problems that have been identified are detailed in Table 2.1, which is also included in Appendix 6 (Worksheet 1) of the IAR. A summary of the background studies referenced in the tables in this report are included within Appendix 5 of the IAR. The well-being goals and objectives of the Well-being of Future Generations (Wales) Act 2015 formed a key part of developing the strategic case and the table below shows how each identified problem impacts directly on achieving the well-being goals.

Table 2.1 – Identified Problems and Links to the Goals of the Wellbeing of Future Generations (Wales) Act 2015

Well-being Goal Being Hindered	Ref	Description	Evidence
A Prosperous Wales	1	Existing volumes of traffic and levels of congestion causes pollution and creates unreliable journey times and delays to private and business vehicles and bus services, particularly during peak periods. A study by Arup (2018) has highlighted that traffic congestion and delay is a significant issue along the B4267 Lavernock Road/ Redlands Road (between Cosmeston and Cogan), along the A4160 Windsor Road (between Penarth and Cogan) and on the A4055 around the Merrie Harrier junction. This is particularly the case during the AM peak when with average speeds are often 10mph or lower. The WelTAG consultation highlighted congestion problems on routes between Penarth and Cardiff, e.g. along Windsor Road, Windsor Road/ Plassey Street and in Penarth town centre. Reference was also made to congestion at Penarth Marina due to 'rat-running'.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); WelTAG consultation events (Jan 2019)
	4	Sustainable transport options available do not present an attractive alternative to car travel e.g. key destinations are not easily accessible by sustainable transport modes, bus accessibility and provision is viewed as poor, rail service viewed as unreliable, expensive and requiring more capacity, lack of reliable boat service throughout the year.	WelTAG consultation events (Jan 2019)
	6	A lack of park and ride facilities in the area limits the opportunities for interchange between car and public transport, which reduces the attractiveness of public transport travel options. Park and ride provision at rail stations in the study area (Penarth, Dingle Road and Cogan) is very limited with less than 25 parking spaces available at both Penarth and Cogan and no parking available at Dingle Road. There are no bus park and ride facilities available in the study area.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); WelTAG consultation events (Jan 2019)

Well-being Goal Being Hindered	Ref	Description	Evidence
 A Resilient Wales	3	High levels of car use and low levels of public transport usage and active travel, particularly for commuting journeys. The close proximity of Penarth to Cardiff results in high levels of commuting into Cardiff. Figures for the Vale of Glamorgan as a whole show that 52.2% of working residents commute out of the county borough to work with the majority of these (21,600) commuting to Cardiff. A study by Arup (2018) has highlighted that a significant proportion of those working in Cardiff commute to work by private car (66.7%) and only 12.5% commute by public transport (bus and rail). There are high levels of commuting by car transport into Cardiff due to a lack of convenient and attractive alternatives by sustainable modes and this puts pressure on the local highway network and routes into Cardiff.	StatsWales Commuting Patterns in Wales 2017; Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
 A More Equal Wales	5	Bus services linking Penarth and Cardiff have slow journey times and are unreliable due to congestion problems along the bus corridors. The available bus route options often require interchange at Cardiff Bay. A study by Arup (2018) has found that bus services take between 50% and 80% longer than travelling by car, with congestion problems in Cardiff being a key factor in the length of journey times. The significantly longer journey times reduce the attractiveness of bus travel, particularly for those commuting into Cardiff.	WelTAG consultation events (Jan 2019); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
 A Healthier Wales	7	There are currently low levels of active travel for everyday journeys, which needs to be increased if the long-term health benefits of active travel are to be realised. The WelTAG consultation noted that too many short distance trips are undertaken by car. A study by Arup (2018) found that 12.6% of Penarth residents walk to work and 3.7% commute by bike. Both figures are higher than the Wales average but have potential to be increased further due to the proximity of Penarth to Cardiff and the high levels of commuting into Cardiff.	WelTAG consultation events (Jan 2019); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
	11	Environmental factors reduce the attractiveness of walking and cycling e.g. the exposed nature of the most direct active travel route into Cardiff (across Cardiff Barrage) may discourage use of the route during bad weather, coastal erosion, risk of rockfall and bad weather conditions (storms/ high tides) along the coastline.	WelTAG consultation events (Jan 2019)

Well-being Goal Being Hindered	Ref	Description	Evidence
 A Wales of Cohesive Communities	8	Safety issues act as a barrier to walking and cycling and the constrained nature of the built environment e.g. narrow roads and congestion at junctions, creates conflicts between motor vehicles, pedestrians and cyclists. Specific locations highlighted during the WelTAG consultation include: - lack of safe cycle routes along Windsor Road and Penarth Road; - Arcot Street/ Windsor Road junction being dangerous for cyclists; - footways in Penarth being dangerous for those with disabilities; - the need for safe pedestrian crossing facilities at Plassey Street/ Windsor Road; - a lack of safe pedestrian crossing facilities at Cogan (Windsor Road/ A4160 adjacent to railway station); - the hill from Cardiff Barrage into Penarth being dangerous for cyclists and the footway being unsuitable for pedestrians.	WelTAG consultation events (Jan 2019)
	9	A lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes within Penarth and between Penarth and Cardiff creates a poor quality environment for walking and cycling and acts as a barrier to encouraging active travel. Specific issues highlighted during the WelTAG consultation include: - the existing route connecting Penarth seafront to Cardiff Barrage being challenging and unsuitable for pedestrians and those with mobility problems; - need a link to Cardiff Bay that avoids busy junctions; - need to improve pedestrian and cycling access to Cogan and Penarth stations; - no route from Cardiff Barrage to bottom of 'zig-zag' path; - poor connectivity from Llandough Hospital and Merrie Harrier to Penarth; - lack of lighting along existing active travel routes.	WelTAG consultation events (Jan 2019); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
	10	A lack of facilities for cyclists at trip origin and destination discourages the use of active travel e.g. no current opportunities to hire bikes, lack of showers and bike storage at employment sites.	WelTAG consultation events (Jan 2019)
	12	The topography of the area acts as a barrier to active travel and creates difficulties in providing active travel infrastructure e.g. gradient from Cardiff Barrage to Penarth town centre.	WelTAG consultation events (Jan 2019)

Well-being Goal Being Hindered	Ref	Description	Evidence
 A Wales of Vibrant Culture and Thriving Welsh Language	14	Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the Penarth economy e.g. there is a need for improved links to Cardiff Bay and the Penarth end of Cardiff Barrage lacks a 'destination'. The operational barrage also impacts on connectivity and creates conflict between pedestrians and cyclists using Cardiff Barrage and Pont y Werin.	WelTAG consultation events (Jan 2019)
 A Globally Responsible Wales	2	The high volume of traffic acts as a barrier to walking and cycling and to increasing levels of active travel. The WelTAG consultation highlighted the volume of traffic on Windsor Road and Hickman Road as being a barrier to walking and cycling, along with the speed of traffic along Windsor Road.	WelTAG consultation events (Jan 2019)
	13	Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	Vale of Glamorgan Council 2018 Air Quality Annual Progress Report (Aug 2018)

2.6 Objectives for the Study Area

The objectives for the WelTAG Stage 1 appraisal were developed through the WelTAG consultation events, a review of previous studies and consideration of the identified problems. The consultation events with stakeholders and the public were used to identify a potential long list of objectives, which is detailed in Appendix 6 (Worksheet 2) of the IAR. Each potential objective was assessed in terms of its ability to address the identified problems and to contribute to each of the well-being goals of the Well-being of Future Generations (Wales) Act 2015. This assessment enabled the long list of objectives to be refined and combined to produce a more succinct list of five SMART objectives.

The five objectives have been further assessed in terms of their potential to have a positive impact on each of the identified problems and their potential to work towards each of the national well-being goals. The assessment has also considered how each objective contributes to the five ways of working as set down in the Well-being of Future Generations (Wales) Act 2015. This assessment is included in Appendix 6 (Worksheet 3) of the IAR. The five objectives have been agreed with the Vale of Glamorgan Council and are the objectives against which each of the proposed options/ solutions have been appraised.

The five agreed objectives that will form the basis for this WelTAG are as follows:

1. Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel.
2. Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.
3. Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being.
4. Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.
5. Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.

2.7 Option Development

The WelTAG Stage 1 process requires the identification of options to address the identified problems and achieve the agreed objectives. The WelTAG stakeholder and public consultation events required those attending to consider solutions/ options to address the problems that had been identified. A list of 17 potential options for consideration was compiled through a review of the information gathered from the WelTAG consultation events and of previous studies relating to the study area. This list of 17 potential options is included within Appendix 6 (Worksheet 4a) of the IAR.

The potential list of options was discussed at a stakeholder meeting and packaged together into appropriate themes to produce a final long list of five options for assessment during the WelTAG Stage 1 process. The final long list of options assessed was agreed with the Vale of Glamorgan Council. Table 2.2 details the list of options that were assessed during the WelTAG Stage 1 appraisal and this information is also included in Appendix 6 (Worksheet 4b) of the IAR. A summary of the background studies referenced in the tabled below are included within Appendix 5 of the IAR.

Table 2.2 – Option Development – Agreed Long List of Options

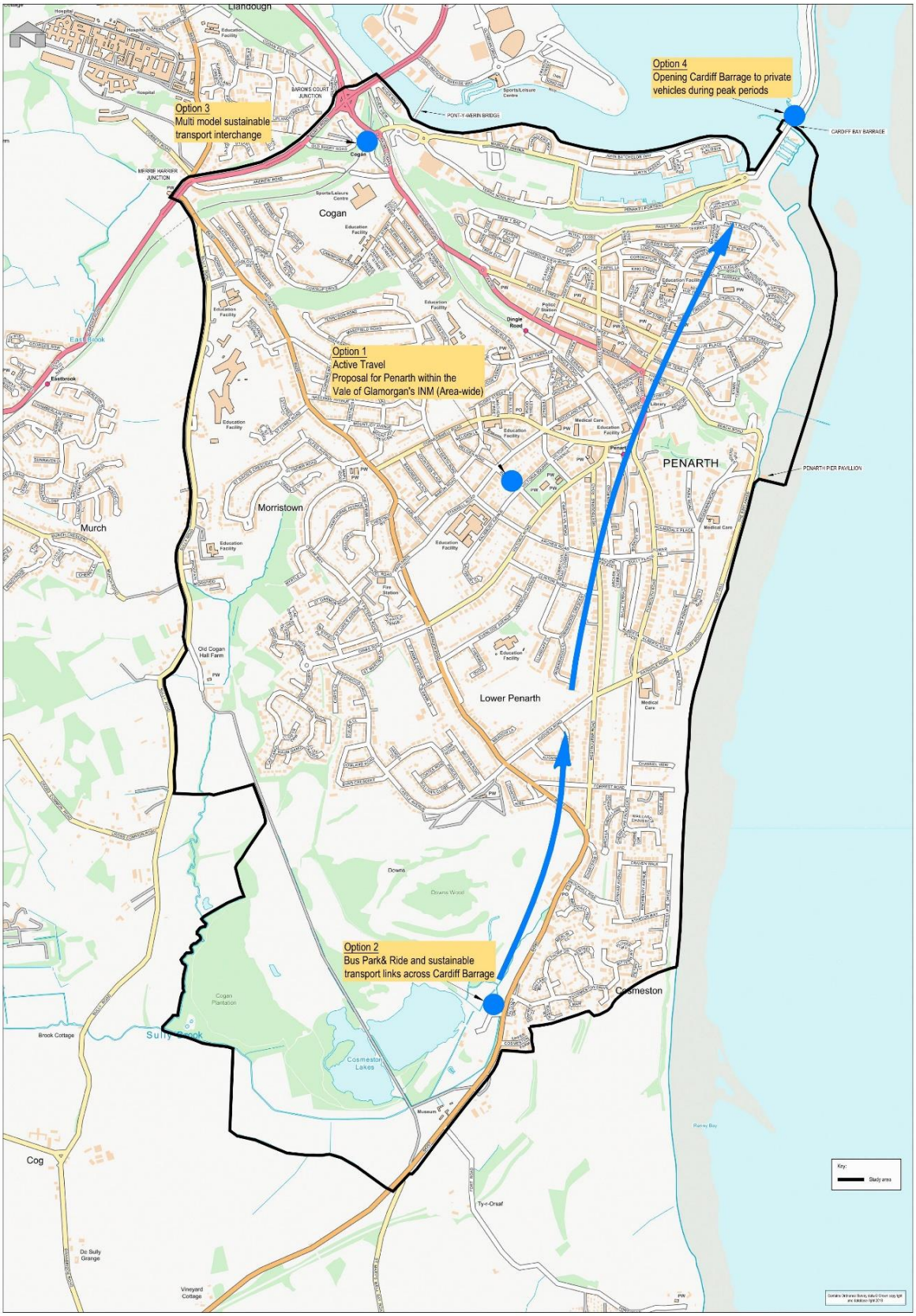
Ref	Option Title	Description
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	This option involves delivering the proposals within the Vale of Glamorgan's Active Travel Integrated Network Map (INM).The lack of a joined-up network of active travel links within Penarth and to the wider active travel network, e.g. to Cardiff, along with the congested nature of the highway network, limits the potential of active travel as an option for everyday journeys. The provision of new active travel infrastructure would encourage greater levels of walking and cycling and improve links between key services. The delivery of the active travel proposals within the Vale of Glamorgan's Active Travel INM would improve connectivity and the attractiveness of active travel between key origins and destinations within Penarth and to the wider area. The INM proposals in the Penarth area include a programme of schemes, which are highlighted as having a 'predictive delivery' timescale of 0-5 years (short term schemes), 5-10 years (medium terms schemes) and 10-15 years (long term schemes). The proposals include two active travel schemes that have been considered by previous feasibility studies: - Penarth Headland Link – Construction of a shared-use pedestrian and cycle route to improve connectivity between Penarth and Cardiff Bay. The 1.1km route would run from the western end of Cardiff Barrage to Penarth Pier and would extend the existing Wales Coastal Path. Identified in the INM as a long-term proposal. Previous studies that have considered the feasibility and economic case for the proposal include those by the Penarth Headland Link Group (2017), Sustrans (2018), Arup (Apr 2018) and Arup (Oct 2018). - Merrie Harrier to Pont y Werin and Penarth Road – Identified in the INM as a medium-term proposal. A previous feasibility study by Capita (2016) considered this route and proposed a number of cycle and pedestrian infrastructure measures. In addition to the delivery of the INM this option includes consideration of the following area-wide measures: - Measures to improve existing active travel and highway infrastructure for pedestrians and cyclists can encourage greater levels of active travel e.g. by improving the safety and security of routes for more vulnerable users. Such proposals include the lighting of active travel infrastructure to increase the attractiveness of routes at all times of the day/ year and speed reduction measures on the highway network, such as the introduction of 20mph zones or shared spaces, to create a more attractive active travel environment. - Improved facilities at employment sites and other destinations, e.g. the provision of secure bike storage, pool bikes and employer incentives, can also increase the attractiveness of active travel as a realistic everyday travel option. - The success of the 'Next Bike' bike hire scheme in Cardiff and the potential of expanding the scheme to Penarth also offers potential for increasing levels of active travel by removing constraints to travelling by bike for short journeys. - Softer measures such as the introduction of school travel plans and walking buses at schools can also encourage greater levels of active travel for school journeys. It should be noted that a number of these measures, e.g. the provision of facilities at employment sites, expanding the bike hire scheme and walking buses, are reliant on implementation by a third party. NB. The following additional improvements in Penarth were suggested through the WelTAG consultation that are not currently included in the Active Travel INM: Reopening the tunnel below the A4160 Windsor Road to Cogan Station; Pedestrian link between Tennyson Drive and Cowslip Drive; Pedestrian link between Fairfield Road and Gainsborough Road; Continuation of Railway Walk for walking and cycling. Suggestions for additional active travel improvements would initially need to be considered as part of any future review of the INM and will not be considered by this WelTAG study.

Ref	Option Title	Description
2	Bus park and ride and sustainable transport links across Cardiff Barrage	This option involves providing attractive and convenient sustainable transport options for the journey between Penarth and Cardiff through the implementation of a bus park and ride scheme, associated bus priority measures and sustainable transport provision across Cardiff Barrage into Cardiff. The current route for buses travelling from Penarth to Cardiff is via heavily trafficked roads with no bus priority measures in place. Buses are subject to the same delays as private vehicles and journeys by bus take longer than the equivalent journey by car. The unreliability and slow journey times of bus services due to traffic delays reduces the attractiveness of travel by bus as an alternative to the car, particularly for commuting journeys. There are currently no park and ride facilities available for those living within the Cosmeston/ Sully area and options for rail park and ride in Penarth area generally are limited. The provision of a bus park and ride facility at Cosmeston would aim to remove car trips from the highway network in and around Penarth, reduce congestion along key routes and increase sustainable travel options for commuting journeys into Cardiff. Land at Cosmeston has been identified within the Vale of Glamorgan's Local Development Plan as being suitable to accommodate a large surface car park. The site currently comprises a car park with a gravel surface and has good access to the adjacent B4267 with access to the car park via a priority junction. Delivery of the scheme would need to be supported by bus priority measures on the bus route to and from the park and ride facility to ensure the bus journey time for those using the park and ride presents an attractive alternative to the journey by private car. The bus priority measures between Cosmeston and Cardiff Barrage could include improvements at key junctions and optimisation of traffic signals to reduce bus journey times. Measures could include local widening, lane reallocation, junction upgrades at pinch points and would potentially require land acquisition. The scheme would also include improvements to bus stops along the route. The Vale of Glamorgan's Local Development Plan includes a policy to provide bus priority measures along Lavernock Road to Cardiff via Cardiff Barrage. More recently a study by Arup (2018) undertook a feasibility appraisal of four potential alignments for the bus priority scheme between Cosmeston and Cardiff Barrage. The 'emerging preferred sub-option' from the feasibility assessment involves a range of bus measures along Westbourne Road, the A4160 Stanwell Road, Clive Place and Paget Terrace/ Road which subsequently provides access to Cardiff Barrage. At Cardiff Barrage this option involves the introduction of sustainable transport options for travel into Cardiff via Cardiff Barrage, which would significantly improve access from Penarth and Penarth Marina. A number of innovative sustainable transport options for linking Penarth and Cardiff were suggested during the WelTAG consultation including water taxis, self-driving electric pods/ vehicles/ bikes, monorail or shuttle bus linking Penarth and Cardiff, powered uphill cycle lifts and a cable car. Consideration would need to be given to the infrastructure required to enable any sustainable transport option to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. The existing active travel route along the barrage may require widening and land acquisition, with potential issues of conflict between the sustainable transport option and those walking and cycling being a key issue. Consideration would also need to be given to the operational nature of the barrage and the impact that water traffic crossing the barrage would have on timetabling and delays to any sustainable transport option. Issues regarding the introduction of buses onto the barrage have previously been considered in a report by Arup (2015). Associated measures to be considered as part of this option include: - bus service improvements, and - measures to improve interchange and connectivity between public transport/sustainable transport modes to simplify the user experience e.g. improved timetabling, enhanced information provision etc.

Ref	Option Title	Description
3	Multi-modal sustainable transport interchange	This option involves upgrading the existing railway station at Cogan to create a new multimodal transport interchange facility serving the Penarth Marina and Cardiff Bay areas. The current provision for park and ride at Cogan Station is limited, the station has poor quality pedestrian links to the surrounding area and the highway network in the vicinity of the station experiences problems of congestion. The option would deliver a mixed-use development that combines station enhancements, including an additional platform on the Penarth branch line, with residential and retail facilities. The study by Arup (2018) considered a number of sub-options for the station upgrade and provision of an expanded park and ride facility. The recommended sub-option include the following elements: - A large park and ride facility (168 spaces) with improved facilities and road access located on a vacant site to the east of the study area; - Improvements to passenger facilities including a new station ticket hall, passenger waiting areas and customer toilets on the station platform; - Improved access on the A4160 Windsor Road and improvements to the road infrastructure including increased roundabout capacity; - Provision of bus and taxi interchange facilities to allow better links to Penarth Marina/ Cardiff Bay; - A new platform on the existing Penarth to Cardiff line; - A new 'access for all' footbridge to the main eastbound platform; - New residential development on the currently vacant site to the east. Suggestions were made during the WelTAG consultation for improvements to the highway network in the vicinity of Cogan Station e.g. replacement of Cogan roundabout with a traffic-signalled junction and provision of crossing facilities for pedestrians and cyclists. The WelTAG consultation also highlighted the need for improvements to the active travel environment and improved access for pedestrians and cyclists to Cogan Station. This option will also consider measures to improve interchange and connectivity between public transport/ sustainable transport modes to simplify the user experience e.g. improved timetabling, enhanced information provision, secure bike parking etc.
4	Opening Cardiff Barrage to private vehicles during peak periods	This option involves allowing Cardiff Barrage to be used by private vehicles during peak periods. The current route for all traffic travelling from Penarth to Cardiff is via heavily trafficked roads with high traffic volumes and problems of congestion. The route along Cardiff Barrage from Penarth to Cardiff Bay would be a significantly shorter and quicker route for those commuting from Penarth, especially for those working in and around Cardiff Bay. The scheme would allow private vehicles to travel the route of the Barrage during peak periods. As with Option 2, consideration would need to be given to the infrastructure required to enable vehicles to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. The existing active travel route along the barrage may require widening and land acquisition, with the segregation of vehicles and those walking and cycling being a key issue.
5	Do Minimum	This option involves undertaking no investment in new transport infrastructure and no dedicated sustainable transport improvements in the area except from routine maintenance as and when required to keep routes operational.

A schematic plan showing the indicative location of each of the long list of options is included as Figure 2.1.

Figure 2.1- Study Area Plan of Options



2.8 Option Appraisal

An appraisal of each of the options has been completed using information that is currently available about each option. At WelTAG Stage 1, each option is at an early stage of development and this is reflected in the high-level and qualitative nature of the appraisal that has been undertaken.

The appraisal has involved each option being assessed against a range of factors using the WelTAG seven-point assessment scale, as set out in Section 1.4. A full record of the Strategic Case appraisal is included in Appendix 7 (Worksheets 5-9 and 11) of the IAR.

One element of the appraisal involved each option being assessed against the objectives of the following strategies and plans:

- Wales Transport Strategy
- Well-being of Future Generations (Wales) Act 2015
- Local well-being plans
- Local Transport Plan
- Cardiff Capital Region

The detailed results of the above assessment are included within Appendix 7 (Worksheets 5, 6 and 7) of the IAR.

Each option has also been assessed against each of the agreed study objectives of this WelTAG appraisal as detailed in Section 2.6 and each of the identified problems as detailed in Section 2.5. An early stage appraisal has also been undertaken of the deliverability of each option, which considers potential technical constraints and risks to delivery. The details of each of these assessments are included within Appendix 7 of the IAR (Worksheets 8, 9 and 11 respectively).

The following tables (Tables 2.3 – 2.7) provide a summary of the Strategic Case appraisal of each of the options and summarises the more detailed assessment that is recorded in Appendix 7 (Worksheets 5-9 and 11) of the IAR. The tables provide a summary description of each option, with the full description of each option being included in Table 2.2.

Table 2.3 - Option 1 – Strategic Case Summary Table

Option 1 – Active Travel Proposals for Penarth within the Vale of Glamorgan's Active Travel INM		
Description	This option involves delivering the proposals within the Vale of Glamorgan's Active Travel Integrated Network Map (INM). The provision of new active travel infrastructure would encourage greater levels of walking and cycling and improve links between key services. The proposal would improve connectivity and the attractiveness of active travel between key origins and destinations within Penarth and to the wider area. The INM proposals in the Penarth area include the Penarth Headland Link and Merrie Harrier to Pont-y-Werin proposed routes (amongst others). The option includes consideration of area-wide active travel measures e.g. introduction of 20mph zones, improved facilities at employment sites, expansion of the Cardiff bike hire scheme to Penarth, school travel plans and walking buses.	
How does it tackle the problem?	Delivery of the INM proposals will increase the attractiveness of walking and cycling in the study area and help to achieve a modal shift away from the private car towards more active modes of travel. The INM programme has the potential to improve the health and wellbeing of those travelling by active modes due to an increase in exercise, as well as those who are currently exposed to pollution caused by road traffic congestion. The intervention, if successful in creating a modal shift, may reduce congestion and improve journey times by public transport that is reliant on the road network. The following identified problems may be tackled by this option: • Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution • Volume of traffic is barrier to walking and cycling • Sustainable transport options not attractive alternative to car travel • Unreliable and slow journey times of bus services • Low levels of Active Travel • Safety issues act as barrier to walking and cycling • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes • Lack of facilities for cyclists at trip origin and destination • Environmental factors reduce the attractiveness of walking and cycling • Topography of the area acts as a barrier to walking and cycling • Road traffic emissions and congestion contribute to reduced air quality and an AQMA has previously been in place on Windsor Road, Penarth • Poor connectivity to the wider area reduces potential of tourism and leisure visitors to the economy	
Objectives	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	+++
	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	+++
	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being	+++
	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	++
	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.	++
Adverse Impacts and Dependencies	• Impacts of individual schemes within the INM programme (e.g. environmental impacts) would need to be considered as the proposals are further developed. • Ongoing maintenance requirements following delivery of the INM proposals.	

	• Some of the area-wide measures included within this option, e.g. provision of facilities at employment sites, expanding the bike hire scheme and walking buses, are reliant on implementation by a third party.	
Constraints	• High level of capital investment required to deliver the whole INM programme. • Environmental considerations due to the location of some INM proposals e.g. INM routes proposed within Conservation Area (as outlined in LDP map), INM routes proposed within Severn Estuary Special Protection Area (Penarth Headland Link). • Potential land ownership issues in relation to some INM proposals.	
Key Risks	Feasibility	0
	Acceptability	++
	Timescales	+
	Risks	+
	Comments: The INM contains a range of active travel scheme proposals that vary in technical feasibility from relatively small-scale schemes to large infrastructure projects. The most technically complex of all scheme proposals within the INM is the Penarth Headland Link, which is a large-scale engineering project that has a 'predictive delivery time' within the INM of 10-15 years and is the only 'long-term' scheme within the programme. As this is part of a package of measures, higher risks may be associated with the largest-scale projects such as the Penarth Headland Link, though a number of localised improvements may be deliverable with far lower levels of risk. A greater assessment of the feasibility and risk associated with individual schemes will be developed at later stages of the WelTAG process if this option is recommended to be progressed. The full deliverability assessment of the long list of options is included in Appendix 7 (Worksheet 11) of the IAR.	

Table 2.4 - Option 2 – Strategic Case Summary Table

Option 2 - Bus Park and Ride and Sustainable Transport Links Across Cardiff Barrage		
Description	This option involves providing attractive and convenient sustainable transport options for the journey between Penarth and Cardiff through the implementation of a bus park and ride scheme, associated bus priority measures and sustainable transport provision across Cardiff Barrage into Cardiff. Bus priority measures could include local widening, lane reallocation, junction upgrades at pinch points and would potentially require land acquisition. The scheme would also include improvements to bus stops along the route. At Cardiff Barrage this option involves the introduction of sustainable transport options for travel into Cardiff via Cardiff Barrage, which would significantly improve access from Penarth and Penarth Marina. A number of innovative sustainable transport options for linking Penarth and Cardiff were suggested during the WelTAG consultation including water taxis, self-driving electric pods/ vehicles/ bikes, monorail or shuttle bus linking Penarth and Cardiff, powered uphill cycle lifts and a cable car. Associated measures to be considered as part of this option include: - bus service improvements, and - measures to improve interchange and connectivity between public transport/sustainable transport modes to simplify the user experience e.g. improved timetabling, enhanced information provision etc.	
How does it tackle the problem?	This option involves providing an attractive and convenient sustainable transport option for the journey between Penarth and Cardiff through the implementation of a bus park and ride scheme, associated bus priority measures and sustainable transport provision across Cardiff Barrage into Cardiff. The intervention would aim to reduce journey times by public transport that is reliant on the road network. The proposal would aim to remove car trips from the highway network in and around Penarth, reduce congestion along key routes and increase sustainable travel options for commuting journeys into Cardiff. The following identified problems may be tackled by this option: • Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution • Volume of traffic is a barrier to walking and cycling • High levels of car use and low levels of public transport usage • Sustainable transport options not attractive alternative to car travel • Unreliable and slow journey times of bus services • Lack of Park and Ride facilities limits opportunities for Public Transport interchange • Low levels of Active Travel • Lack of facilities for cyclists at trip origin and destination • Road traffic emissions and congestion contribute to reduced air quality in some areas and an AQMA has previously been in place on Windsor Road, Penarth • Poor connectivity to wider area reduces potential of tourism and leisure visitors to the economy	
Objectives	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	++
	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	++
	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being	++
	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	++

Option 2 - Bus Park and Ride and Sustainable Transport Links Across Cardiff Barrage		
	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.	+
Adverse Impacts and Dependencies	• Impacts of the individual scheme elements (e.g. environmental impacts) would need to be considered as the proposal is further developed. • The introduction of bus priority measures on the existing highway network could have a negative impact on the journey times of private vehicles. • Consideration would need to be given to the infrastructure required to enable any sustainable transport option to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. • The existing active travel route along the barrage may require widening and land acquisition, with potential issues of conflict between the sustainable transport option and those walking and cycling being a key issue. • Consideration would also need to be given to the operational nature of the barrage and the impact that water traffic crossing the barrage would have on timetabling and delays to any sustainable transport option. • Potential ongoing revenue/ operating costs following delivery of the proposal.	
Constraints	• Availability of capital funding required to deliver the proposal. • Environmental and heritage considerations due to the proposed location of the Park and Ride at Cosmeston Lakes Country Park. The area is designated as a Local Nature Reserve. • The proposed Park and Ride site is within Flood Zone B as outlined within the Vale of Glamorgan's LDP (via the Development Advice Map). • Provision of bus priority measures will be constrained by available highway space. • Technical and operational challenges relating to the introduction of a sustainable transport link across Cardiff Barrage. • Cardiff Barrage is under the control of Cardiff Council. • Potential land ownership issues e.g. the sustainable transport link across the Barrage may require crossing third party land.	
Key Risks	Feasibility	+
	Acceptability	0
	Timescales	+
	Risks	-
	Comments: Cardiff Barrage is under the control of Cardiff Council and the implementation of a scheme along Cardiff Barrage is reliant on the support and close cooperation of Cardiff Council. A feasibility study has previously been undertaken (commissioned by Cardiff Council) to evaluate the technical and operational viability of providing a bus-based public transport route via the Cardiff Barrage (Cardiff Bay Barrage Transport Link, Arup, 2015). Although the feasibility study focuses on the use of the barrage by buses, the issues considered will be of relevance to the introduction of any sustainable transport option along the barrage. It is considered that the nature of the sustainable transport option proposed will impact on the acceptability of the proposal e.g. the degree of impact that the sustainable transport option will have on the current use of the barrage by pedestrians and cyclists. A greater assessment of the feasibility and risk associated with individual elements of the proposal will be developed at later stages of the WelTAG process if this option is recommended to be progressed. The full deliverability assessment of the long list of options is included in Appendix 7 (Worksheet 11) of the IAR.	

Table 2.5 - Option 3 – Strategic Case Summary Table

Option 3 - Multi-Modal Sustainable Transport Interchange	
Description	This option involves upgrading the existing railway station at Cogan to create a new multimodal transport interchange facility serving the Penarth Marina and Cardiff Bay areas. The option would deliver a mixed-use development that combines station enhancements, including an additional platform on the Penarth branch line, with residential and retail facilities. A study by Arup (2018) considered a number of sub-options for the station upgrade and provision of an expanded park and ride facility. The recommended sub-option includes the following elements: - A large park and ride facility (168 spaces) with improved facilities and road access located on a vacant site to the east of the study area; - Improvements to passenger facilities including a new station ticket hall, passenger waiting areas and customer toilets on the station platform; - Improved access on the A4160 Windsor Road and improvements to the road infrastructure including increased roundabout capacity; - Provision of bus and taxi interchange facilities to allow better links to Penarth Marina/ Cardiff Bay; - A new platform on the existing Penarth to Cardiff line; - A new 'access for all' footbridge to the main eastbound platform; - New residential development on the currently vacant site to the east. This option will also consider measures to improve interchange and connectivity between public transport / sustainable transport modes to simplify the user experience e.g. improved timetabling, enhanced information provision, secure bike parking etc.
How does it tackle the problem?	The multi-modal sustainable transport interchange option will see Cogan station, as well as the surrounding area, redeveloped in a way that supports public transport interchange, as well as improving walking and cycling provision within the vicinity. A multi-modal sustainable transport interchange at Cogan would see an improved station with more travel options for users e.g. connections between the Vale of Glamorgan line and the Penarth Branch (currently users must travel to Grangetown to change), as well as improvements to park and ride and train - bus interchange. The proposal therefore has the potential to alleviate the following of the identified problems: • Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution • Volume of traffic is a barrier to walking and cycling • High levels of car use and low levels of Public Transport use • Sustainable transport options not attractive alternative to car usage • Unreliable and slow journey times of bus services • Lack of Park and Ride facilities limits opportunities for Public Transport interchange • Low levels of Active Travel • Safety issues act as a barrier to walking and cycling • Lack of safe, accessible and joined up and direct pedestrian and cycle routes • Lack of facilities for cyclists at trip origin and destination • Road traffic emissions and congestion contribute to reduced air quality in some areas and an AQMA has previously been in place on Windsor Road, Penarth • Poor connectivity to wider area reduces potential of tourism and leisure visitors to the economy

Option 3 - Multi-Modal Sustainable Transport Interchange		
Objectives	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	+
	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	++
	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being	+
	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	++
	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.	+
Adverse Impacts and Dependencies	• Impact of the park and ride proposal on traffic levels on the local highway network would need to be considered. • Dense nature of the urban environment would need to be considered and the impact of construction on local communities. • Ongoing revenue/ operating costs following delivery of the proposal.	
Constraints	• High capital investment needed to deliver the proposal. • Transport for Wales have responsibility for improvements to the rail network. • Potential land ownership issues in relation to the park and ride proposal. • Technical challenges in delivering improvements on operational rail land and at a constrained and congested location on the highway network. • Proposed site within Flood Zone B of the Vale of Glamorgan LDP (via Development Advice Map).	
Key Risks	Feasibility	+
	Acceptability	+
	Timescales	0
	Risks	0
	Comments: A key issue in relation to this option is the need for the scheme to be developed and delivered by Transport for Wales who have responsibility for improvements to the rail network. As such, the prioritisation and programming of the option to redevelop Cogan Station as a multi-modal transport interchange is not within the control of the local authority.	

Table 2.6 - Option 4 – Strategic Case Summary Table

Option 4 - Opening Cardiff Barrage to Private Vehicles During Peak Periods		
Description	This option involves allowing Cardiff Barrage to be used by private vehicles during peak periods.	
How does it tackle the problem?	The current route for all traffic travelling from Penarth to Cardiff is via heavily trafficked roads with high traffic volumes and problems of congestion. The route along Cardiff Barrage from Penarth to Cardiff Bay would be a significantly shorter and quicker route for those commuting from Penarth, especially for those working in and around Cardiff Bay. The proposal therefore has the potential to alleviate the following of the identified problems: • Volume of traffic and levels of congestion cause unreliable journey times, delay and pollution	
Objectives	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	---
	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	---
	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being	---
	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	0
	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.	-
Adverse Impacts and Dependencies	• Potential adverse impacts on the use of the barrage as an existing active travel route - concerns were raised at the WelTAG public consultation event. • Potential environmental impacts would need to be considered. • Consideration would need to be given to the infrastructure required to enable private vehicles to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. • The existing active travel route along the barrage may require widening and land acquisition, with potential issues of conflict between private vehicles and those walking and cycling being a key issue. • Consideration would also need to be given to the operational nature of the barrage and balancing the use of the barrage by vehicles with the operation of the barrage in relation to the passage of water vessels. • Impact of the proposal on traffic levels on the local highway network would need to be considered.	
Constraints	• Public acceptability and potential opposition to the introduction of private vehicles onto Cardiff Barrage. • Availability of capital funding required to deliver the proposal. • Technical and operational challenges relating to the introduction of private vehicles on Cardiff Barrage. • Cardiff Barrage is under the control of Cardiff Council. • Potential land ownership issues as the proposal may require crossing third party land.	
Key Risks	Feasibility	+
	Acceptability	---
	Timescales	-
	Risks	--

Option 4 - Opening Cardiff Barrage to Private Vehicles During Peak Periods	
	Comments: Cardiff Barrage is under the control of Cardiff Council and the implementation of a scheme along Cardiff Barrage is reliant on the support and close cooperation of Cardiff Council. As such, this option would be dependent on Cardiff Council to enable delivery. At present there is no evidence that Cardiff Council are considering opening the barrage to private vehicles. Public acceptability and potential opposition to the introduction of private vehicles onto Cardiff Barrage is considered a risk. The full deliverability assessment of the long list of options is included in Appendix 7 (Worksheet 11) of the IAR.

Table 2.7 - Option 5 – Strategic Case Summary Table

Option 5 - Do Minimum		
Description	This option involves undertaking no investment in new transport infrastructure and no dedicated sustainable transport improvements in the area, except from routine maintenance as and when required to keep routes operational.	
How does it tackle the problem?	The do minimum approach is likely to see existing problems become worse in the long term. It is not envisaged that this option would assist with tackling any of the identified problems.	
Objectives	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	--
	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	--
	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being	--
	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	--
	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.	-
Adverse Impacts and Dependencies	• A do minimum approach would likely see identified problems become worse, particularly due to the planned future developments within the Vale of Glamorgan, as well as predicted increase in the population of the Cardiff Capital Region.	
Constraints	• No constraints identified as the do minimum approach assumes that no sustainable transport improvements are delivered.	
Key Risks	Feasibility	0
	Acceptability	--
	Timescales	0
	Risks	0
	Comments: A do minimum approach assumes that no sustainable transport improvements are delivered and has therefore not been rated in terms of technical feasibility, timescales and risk. This option has a negative rating in terms of acceptability, as a do minimum approach and a subsequent worsening of identified problems is unlikely to be an acceptable long-term option.	

2.9 Summary of the Strategic Case

The strategic case has outlined the existing problems affecting the Penarth Cardiff Barrage Corridor, many of which are a result of the current transport options and choices of those travelling to, from and within the study area. Problems associated with high levels of car use and relatively low levels of travel by more sustainable modes are having a negative impact on e.g. journey times, accessibility and connectivity, air quality and the safety of more vulnerable road users. The problems identified each have a negative impact on one or more of the goals of the Well-being of Future Generations (Wales) Act 2015 and therefore measures are needed to address the problems to ensure the long-term negative impacts are minimised.

The strategic case involved the identification of five study objectives and five potential options to address the problems affecting the study area. The long list of five potential options has been appraised against a number of national, regional and local policy objectives to assess their suitability and strategic fit as potential solutions. Each option has also been assessed against the five study objectives and its ability to address the identified problems.

Table 2.8 provides a summary of the results of the various appraisals and this is also included within Appendix 7 (Table 12) of the IAR. The detailed record of the assessment is provided in Appendix 7 (Tables 5-9 and 11) of the IAR.

Three options all performed well against the higher-level appraisal criteria e.g. the objectives of the Wales Transport Strategy and the Well-being of Future Generation (Wales) Act 2015. The three options that performed well are those that are focused on sustainable transport improvements. These are:

- Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM;
- Option 2 - Bus park and ride and sustainable transport links across Cardiff Barrage;
- Option 3 - Multi-modal sustainable transport interchange.

The above three options were each assessed as likely to have a mostly positive impact on existing policy objectives at the national, regional and local level. Similarly, all three of the above options were assessed as having a positive impact on achieving each of the five study objectives and in addressing most of the identified problems within the study area. The option that was assessed as performing the best against the study objectives is Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM.

In general, Option 5 - Do Minimum did not perform well in the appraisal. A do minimum approach is likely to result in a worsening of existing problems and was assessed as having a negative impact on many policy objectives, in addition to the study objectives. The long-term impact of a do minimum option will adversely affect the goals of the Well-being of Future Generations (Wales) Act 2015.

The remaining option (Option 4 - Opening Cardiff Barrage to private vehicles during peak periods) also did not perform well in the appraisal. This option was assessed as having the greatest negative collective impact on the study objectives and an adverse impact on many of the identified problems.

The strategic case has identified three sustainable transport options that have the potential to have a positive impact on existing problems within the study area and on a range of national, regional and local policy objectives.

Table 2.8 - Summary of Option Appraisal

Option Ref	Option	Wales Transport Strategy Outcomes			WBOFGA Goals	Local Transport Plan Objectives	Cardiff Capital Region Strategic Objectives	Scheme Objectives					Tackling Problems	Appraisal Summary Table				Delivery
		Soc.	Econ.	Env.				1	2	3	4	5		Econ.	Env.	Soc. & Cul	Pub. Acc.	
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+ +	+ +	+ +	+ +	+ +	+ +	+ + +	+ + +	+ + +	+ +	+ +	+ +	+ +	+	+ +	NYA	+
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+ +	+ +	+	+	+ +	+	+ +	+ +	+ +	+ +	+	+	+	0	+ +	NYA	0
3	Multi-modal sustainable transport interchange	+ +	+ +	+	+	+ +	+	+	+ +	+	+ +	+	+	+ +	0	+ +	NYA	0
4	Opening Cardiff Barrage to private vehicles during peak periods	0	0	- -	- -	- -	-	- - -	- - -	- - -	0	-	- -	- -	- -	0	NYA	-
5	Do Minimum	-	- -	-	-	-	-	- -	- -	- -	- -	-	-	- -	-	-	NYA	0

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)
Not Yet Assessed (NYA)

Key:
Scheme Objectives
1 = Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel
2 = Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.
3 = Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being.
4 = Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.
5 = Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.

3. Transport Case

3.1 Overview

As detailed in WelTAG 2017, 'the transport case tells you what the expected impacts of the project are, how the project will contribute to the well-being goals and whether a project will provide value for public money. This is calculated by thinking about social, cultural, environmental and economic costs and benefits of each option.'

The transport case is an evidence-based assessment of:

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

WelTAG 2017 also identifies that 'at Stage 1, the assessments of the impacts are likely to be mainly qualitative with indications provided of the numbers of people affected. Much of the evidence used will come from existing data sources and evaluations of relevant previous projects elsewhere.'

3.2 Monetarised Benefits

At the current stage of development, no cost estimates are available for the list of options under consideration and therefore a value for money assessment cannot be undertaken as part of the WelTAG Stage 1 appraisal. The development of cost estimates and a value for money assessment will be progressed at a later stage of the WelTAG appraisal process.

3.3 Non - Monetarised Benefits – Assessment of Impacts

The Transport Case assessment has involved undertaking a qualitative appraisal of the list of options against Economic, Environmental, Social and Cultural criteria. The appraisal has involved each option being assessed using the WelTAG seven-point assessment scale, as set out in Section 1.4 above. The appraisal also considered when and where the impacts will occur and who and/or what will experience the impacts. A summary of the results of this appraisal are presented below in Table 3.1 and is also included within Appendix 7 (Worksheet 10) of the IAR. Further justification and detail to support each of the appraisal scores provided in the table can be found in Appendix 8 of the IAR.

At WelTAG Stage 1, each option is at an early stage of development and this is reflected in the high-level and qualitative nature of the appraisal that has been undertaken. Due to the current stage of development of each of the options, certain impacts have yet to be assessed and these are identified as NYA (Not Yet Assessed) within the table. The appraisal of each option will be reviewed at WelTAG Stage 2 (Outline Business Case), when further qualitative and quantitative information about impacts may become available.

An assessment of how each option under consideration contributes to each of the well-being goals was undertaken as part of the Strategic Case, as detailed in Section 2.8 of this report. The assessment considered the seven national well-being goals within the Well-being of Future Generations (Wales) Act 2015 and the more localised well-being objectives of the Vale of Glamorgan Council and Vale of Glamorgan's Public Service Board. The detailed results of this appraisal are included in Appendix 7 (Worksheet 6) of the IAR.

Table 3.1 - High Level Appraisal of Options (Appraisal Summary Table)

Criteria	Qualitative Assessment				
	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	**Bus park and ride and sustainable transport links across Cardiff Barrage**	**Multi-modal sustainable transport interchange**	**Opening Cardiff Barrage to private vehicles during peak periods**	**Do Minimum**
Economic					
Business Users & Reliability Impact	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Regeneration	**+ +**	**+**	**+ +**	**-**	**- -**
Wider Impacts	**+ +**	**+**	**+ +**	**- -**	**-**
Environment					
Noise	**+ +**	**+**	**0**	**- -**	**-**
Air Quality	**+ +**	**+**	**0**	**- -**	**-**
Greenhouse Gases	**+ +**	**+**	**0**	**- -**	**-**
Landscape	**0**	**-**	**+**	**- -**	**-**
Townscape	**+**	**0**	**+**	**-**	**-**
Historic Landscape	**0**	**0**	**0**	**0**	**0**
Cultural Heritage	**+**	**-**	**0**	**0**	**0**
Biodiversity	**0**	**-**	**0**	**-**	**-**
Water Environment	**0**	**0**	**0**	**-**	**0**
Social and Cultural					
Commuting and Other Users	**+**	**+ +**	**+ +**	**+**	**- -**
Reliability Impact on Commuting and Other Users	**+**	**+ +**	**+ +**	**+**	**- -**
Physical Activity	**+ + +**	**+**	**+**	**- - -**	**-**
Journey Quality	**+ + +**	**+ +**	**+ +**	**0**	**-**
Accidents	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Security	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Access to Services	**+ +**	**+ +**	**+ +**	**+**	**- -**
Affordability	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Severance	**+ + +**	**+ +**	**+ +**	**0**	**-**
Option Values	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Public Accounts					
Cost to Broad Transport Budget	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Indirect Tax Revenues	**NYA**	**NYA**	**NYA**	**NYA**	**NYA**
Occurance of Impacts					
When and where impacts will occur (positive and negative)	During the construction and operational stages, in the vicinity of the routes. Impacts to the wider area if car trips are removed from the highway network.	During the construction and operational stages, in the vicinity of the proposal. Impacts to local roads and junctions as traffic is removed from the highway network.	During the construction and operational stages, in the vicinity of the proposal. Impacts to local roads and junctions during construction and as traffic is removed from the highway network in the long term.	During the construction and operational stages, in the vicinity of the proposal i.e. along Cardiff Barrage. Impacts to local roads and junctions due to changes in traffic movements.	Across the Penarth Cardiff Barrage Corridor including local roads and junctions, Penarth town centre etc.
Who or what will experience the impacts	Users of the active travel network. Users of the local highway network. Residents, businesses and visitors to Penarth.	Users of the service. Users of the local highway network. Residents, commuters, businesses and visitors to Penarth. Visitors to Cosmeston Lakes Country Park.	Users of the service. Users of the local highway network. Residents, commuters businesses and visitors to Cogan, Penarth Marina and Penarth.	Users of Cardiff Barrage. Users of the local highway network. Residents, commuters, businesses and visitors to Penarth, Penarth Marina, Cardiff Bay and Cogan.	Users of the local highway network. Residents, commuters, businesses and visitors to the Penarth Cardiff Barrage Corridor.

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large Negative (- - -)
Not Yet Assessed (NYA)

3.4 Summary of Transport Case

At this stage of option development, much of the information required to produce a full transport case is not available. However, a qualitative assessment of the economic, environmental, social and cultural impacts of the long list of options has been undertaken with the results presented in Section 3.3.

As with the Strategic Case assessment, the three options that focus on sustainable transport improvements performed well against the Transport Case qualitative assessment. These are:

- Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM;
- Option 2 - Bus park and ride and sustainable transport links across Cardiff Barrage;
- Option 3 - Multi-modal sustainable transport interchange.

The above options were each assessed as likely to have a positive impact on each of the economic, social and cultural criteria and a positive or neutral impact on most of the environmental criteria. The option that was assessed as performing the best overall against the economic, environmental, social and cultural criteria is Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM.

In general, and as with the Strategic Case assessment, Option 5 - Do Minimum did not perform well in the appraisal and was assessed as likely to have a negative impact on many economic, environmental, social and cultural criteria. The long-term impact of a do minimum option will adversely affect the goals of the Well-being of Future Generations (Wales) Act 2015.

Option 4 (Opening Cardiff Barrage to private vehicles during peak periods) did not perform well in the appraisal overall and the option was assessed as likely to have a negative impact on many of the economic and environmental criteria.

The Transport Case assessment will be further developed in WelTAG Stage 2 for each of the recommended options.

4. Financial Case

4.1 Overview

As detailed in WelTAG 2017, '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.'

The following considerations should be made in outline at Stage 1:

- Lifetime costs of the project,
- Sources of funding, and
- Accounting implications.

4.2 Capital and Ongoing Costs and Source of Potential Funding

The financial case is not able to be considered in detail as part of WelTAG Stage 1, due to the current stage of development of each of the options under consideration. A greater understanding of the capital and lifetime costs of each of the options would be needed to enable a quantitative assessment of the financial case to be undertaken. This detail will be developed during later stages of the WelTAG process when progressing the recommended options.

At WelTAG Stage 1, a qualitative assessment of the financial case has been undertaken, which is detailed in Table 4.1 below. This considers factors affecting the lifetime costs of each option, potential sources of funding and accounting implications to public sector organisations. The assessment considers both the capital and revenue implications of each option.

Table 4.1 - Financial Case Assessment

Financial Case				
Option (Revenue/Capital)		***Lifetime Costs of the Project***	***Potential Source of Funding***	***Accounting Implications***
Option 1: Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	Capital	- Capital cost at the start of the project relating to the delivery of any new active travel infrastructure. - The Active Travel INM contains a programme of schemes, which will vary in delivery cost on a scheme by scheme basis. Although cost estimates have not been established at this stage, it is likely the INM programme includes a combination of relatively low cost and high cost schemes. The Penarth Headland Link proposal is the highest cost scheme within the INM. - In May 2018 the Welsh Government committed £60 million funding for active travel over the next three years.	- Local Transport Fund, Active Travel Fund and Safe Routes in Communities funding from Welsh Government - Potential for Section 106 contributions towards some active travel schemes depending on location - Potential for private sector investment in the provision of active travel facilities at employment sites e.g. bike storage, showers etc.	- Local authority in relation to any grant funding/S106 contributions for the delivery of active travel schemes
	Revenue	- Ongoing revenue costs to maintain any new active travel routes and associated infrastructure e.g. lighting, local authority owned bike storage/ parking. - The design of new infrastructure should seek to minimise ongoing maintenance requirements, which will need to be considered on a scheme by scheme basis.	- Local authority budgets for highway maintenance. - Potential for private sector investment to support the expansion of the bike hire scheme implemented in Cardiff i.e. Nextbike.	- Local authority in relation to the maintenance of active travel infrastructure

Financial Case				
Option (Revenue/Capital)		***Lifetime Costs of the Project***	***Potential Source of Funding***	***Accounting Implications***
Option 2: Bus park and ride and sustainable transport links across Cardiff Barrage	Capital	- Capital cost at the start of the project relating to the delivery of any new highway/ park and ride infrastructure. - Potential capital cost at the start of the project relating to the purchase of vehicles to support the bus park and ride and sustainable transport links across Cardiff Barrage. Option requires further development prior to determining capital cost implications linked to the purchase of vehicles.	- Local Transport Fund and Local transport Network Fund from Welsh Government - City Deal	- Local authority in relation to grant funding
	Revenue	- Ongoing revenue costs to maintain any new highway and associated infrastructure e.g. park and ride car park, CCTV at the park and ride, bus priority measures. - Consideration is needed of the model for the bus service that will serve the park and ride e.g. whether it will be a commercial or supported service and the cost of the service to the user. - Potential ongoing revenue costs in relation to the sustainable travel links across Cardiff Barrage. Option requires further development prior to determining revenue implications/ potential funding sources.	- Local authority budgets for highway/ CCTV maintenance.	- Local authority in relation to the maintenance of highway/ CCTV infrastructure

Financial Case				
Option (Revenue/Capital)		***Lifetime Costs of the Project***	***Potential Source of Funding***	***Accounting Implications***
Option 3: Multi-modal sustainable transport interchange	Capital	- Significant capital cost at the start of the project relating to the delivery of new rail/ highway/ park and ride/ active travel infrastructure. - Potential capital costs linked to the purchase of additional rolling stock if the option results in an additional platform on the Penarth branch line leading to increased frequency of rail services.	- Welsh Government/ City Deal/ Metro	- Transport for Wales is the lead delivery body for rail schemes/ works on operational rail land - Local authority likely to be the lead delivery body for works to the local highway network
	Revenue	- Ongoing revenue costs to maintain any new rail/ highway/ park and ride/ active travel infrastructure.	- Transport for Wales budgets for maintenance of rail infrastructure. - Local authority budgets for highway maintenance.	- Transport for Wales in relation to the maintenance of rail infrastructure/ rolling stock - Local authority in relation to the maintenance of highway infrastructure

Financial Case				
Option (Revenue/Capital)		***Lifetime Costs of the Project***	***Potential Source of Funding***	***Accounting Implications***
Option 4: Opening Cardiff Barrage to private vehicles during peak periods	Capital	- Capital cost at the start of the project relating to the delivery of new highway infrastructure required to enable private vehicles to travel the length of the barrage.	- Local Transport Fund and Local Transport Network Fund from Welsh Government	- Local authority in relation to grant funding (Cardiff Barrage lies within the Cardiff Council area)
	Revenue	- Ongoing revenue costs to maintain any new highway infrastructure. - Potential ongoing revenue costs in relation to the operational implications of allowing private vehicles to access the barrage at specific times e.g. the means of restricting access outside peak hours. Option requires further development prior to determining revenue implications/ potential funding sources.	- Local authority budgets for highway maintenance.	- Local authority in relation to the maintenance of highway infrastructure
Option 5: Do Minimum	Capital	- No capital cost implications as the do minimum option assumes no investment in new transport infrastructure.	- N/A	- N/A
	Revenue	- Ongoing revenue requirements to maintain existing highway infrastructure and to subsidise existing supported bus services.	- Local authority budgets for highway maintenance. - Local authority budgets and Welsh Government's Bus Services Support Grant (BSSG) to subsidise bus services.	- Local authority

5. Commercial Case

5.1 Overview

As detailed in WelTAG 2017, '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 in to the future. It focuses in particular on the level and type of involvement of the private sector in each option. This includes items that affect the delivery of the option and its on-going viability, for example, will there be an on-going need for revenue support, will there be any charges levied on users or non-users and the allocation of risk for the provision of the project and during its on-going operation.' Such considerations will be made in outline at Stage 1 of the WelTAG process.

5.2 Procurement Method

Each option under consideration (other than the do minimum) will require the procurement of capital works to deliver new infrastructure for the sustainable transport improvements. One issue affecting the procurement of the capital works will depend on the lead delivery body for each option. For example, due to the nature of the options currently being considered at WelTAG Stage 1, there may be different bodies that would lead on delivery. For example, the delivery of the Vale of Glamorgan's Active Travel INM is likely to be led and procured by the Vale of Glamorgan Council, whereas the multi-modal sustainable transport interchange option is likely to be led and potentially procured by Transport for Wales. Any option that involves the use of Cardiff Barrage will require involvement by Cardiff Council, in addition to the Vale of Glamorgan Council, and could result in elements of the options involving Cardiff Barrage being procured by different bodies.

Each recommended option will be procured in line with the lead body's financial regulations and standing orders for contracts to ensure best value. The method of procurement will also need to be in line with any grant funding requirements, depending on how the preferred option is financed.

The length of the contract relating to each of the options is unknown at this stage and will be further developed during later WelTAG stages. At this stage, with no chosen preferred option, it is not possible to provide an outline of the final procurement methodology that will be followed.

5.3 TUPE / HR Implications

It is difficult to confirm whether there will be any TUPE or HR implications until a final preferred option is known. The implications for existing/ additional staff requirements will need to be considered as the recommended options are further developed e.g. whether additional staff are required to support any new facilities and/or services that are delivered and who would be the employing organisation of any additional staff. This will be assessed at future stages of appraisal.

6. Management Case

6.1 Overview

As detailed in WelTAG 2017, '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.'

At this stage, as limited development work has been undertaken on each of the options, the management case has involved a high-level assessment of factors that may impact on the delivery of each option.

6.2 Scheme Development, Delivery Arrangements and Legal Powers

At present no formal design work has been undertaken on any of options included within the long list. Design work will need to be progressed at a later stage of the WelTAG appraisal process and development of the preferred option will need to be in line with the five ways of working of the Well-being of Future Generations (Wales) Act 2015. This will ensure that the preferred option is developed collaboratively and with the involvement of interested parties.

At this stage it is difficult to determine the statutory procedures that would need to be followed in the delivery of the preferred option. As such, consideration has been given to the potential statutory procedures that might need to be completed in the delivery of a sustainable transport scheme along the Penarth Cardiff Barrage corridor. These are as follows:

- Planning permission and associated processes e.g. Environmental Impact Assessment;
- Environmental and ecological processes;
- Compulsory Purchase Orders may be needed to acquire land to enable a desired route alignment;
- Large-scale interventions may be subject to a public inquiry;
- Liaison with statutory bodies and service providers e.g. Welsh Government, Transport for Wales, bus operators, Cardiff Harbour Authority and Cardiff Council (for options that impact upon Cardiff Barrage);
- Traffic Regulation Orders;
- Completion of GRIP process for options that impact upon the rail network.

This list is not exhaustive and will be developed further at future WelTAG stages as options are rationalised and a final preferred option chosen.

As detailed in Section 5.2 above, the lead body for the scheme could vary depending on the preferred option that is taken forward. Section 5.2 considered how the lead body could impact on procurement arrangements. The lead body will also impact on how scheme development progresses and the working arrangements that will be required to undertake the required statutory procedures and to deliver the preferred option on the ground. Similarly, the preferred option will impact upon roles and responsibilities for the ongoing management and operation of the option following its delivery. For example, the local authority would be responsible for the long-term management and operation of schemes on the local highway network whereas Transport for Wales would have responsibility for schemes on the rail network.

Issues such as these will be further considered in later stages of the WelTAG appraisal as the recommended options are developed in greater detail. This will include consideration of the arrangements and responsibilities for monitoring and evaluating scheme impacts. A Benefits Realisation and Monitoring and Evaluation Plan will be produced for a final preferred option at WelTAG Stage 3 (Final Business Case), which will set out the arrangements for monitoring and evaluation following scheme delivery. This will ensure the long-term impacts of the preferred

option are monitored and evaluated to ensure objectives are being achieved and benefits realised.

6.3 Governance, Project Management and Reporting

The WelTAG Stage 1 work has been project managed by Arcadis Consulting UK Ltd on behalf of the Vale of Glamorgan Council. As the project develops during the later WelTAG stages, further project governance structures will be put in place as required e.g. the setting up of a Project Board and project reporting arrangements. Vale of Glamorgan Council/ Arcadis Consulting UK Ltd are taking the lead on the communication and stakeholder management aspects related to the WelTAG Stage 1 study.

WelTAG 2017 states that, 'At Stage One, the management case should set out which organisation and groups will sit on the Review Group that meets at the end of each WelTAG Stage. This group will consider the contents of the Stage Report and decide on the actions to be taken at the end of each stage.' The review group was set up to review the contents of the WelTAG Stage 1 (Strategic Outline Case) study and includes representatives from the following:

To be completed following comments being received on the draft report

6.4 Consultation

As detailed in Section 2.2, the development of the WelTAG Stage 1 (Strategic Outline Case) has been informed by two consultation events with stakeholders and the public. The continued involvement of key stakeholders and interested parties will be important in taking forward the next stages of the WelTAG process and in the development of the preferred option.

6.5 Project Risks, Constraints and Deliverability

At this WelTAG Stage 1 (Strategic Outline Case), a high-level consideration of option deliverability has been undertaken as part of the appraisal process. The summary appraisal tables included in Section 2.8 of this report include an assessment of constraints and key risks that could affect delivery of each option e.g. in terms of feasibility, acceptability and timescales for delivery. A more detailed assessment of issues affecting the deliverability of each option is included in Appendix 7 (Worksheet 11) of the IAR.

The assessment has highlighted that all options being considered (other than the do minimum) have specific risks to delivery. One issue highlighted is that three of the options under consideration are reliant on third parties to enable delivery of key elements of the proposals. The issues affecting the three options are described below:

Option 2 - Bus park and ride and sustainable transport links across Cardiff Barrage – An element of this option is the implementation of a sustainable transport link across Cardiff Barrage. The barrage is under the control of Cardiff Council and implementation of a scheme along Cardiff Barrage is reliant on the support and close cooperation of Cardiff Council. A feasibility study has previously been undertaken, which was commissioned by Cardiff Council, to evaluate the technical and operational viability of providing a bus-based public transport route via the Cardiff Barrage (Cardiff Bay Barrage Transport Link, Arup, 2015). Cardiff Council have therefore previously investigated the feasibility of the introduction of a sustainable transport option onto the barrage and may be supportive of a future proposal. Should this option be recommended as progressing to WelTAG Stage 2, then a dialogue will be needed with Cardiff Council to establish the current position regarding the proposal. Other identified risks affecting delivery of this option include:

- The need to carefully manage potential issues arising from the siting of the park and ride car park at Cosmeston Lakes Country Park;

- Technical challenges in implementing bus priority measures due to the constraints of the existing highway network and in implementing a sustainable transport option across the barrage;
- The need to manage potential conflict with more vulnerable users of Cardiff Barrage i.e. those walking and cycling;
- Potential need to acquire land to implement a sustainable transport option across the barrage.

Option 3 - Multi-modal sustainable transport interchange - A key issue and risk in relation to the option to provide a multi-modal transport interchange at Cogan Station is the need for the scheme to be developed and delivered by Transport for Wales who have responsibility for improvements to the rail network. The timescales for developing, designing and implementing the scheme will be wholly dependent on Transport for Wales. As such, the prioritisation and programming of the option to redevelop Cogan Station as a multi-modal transport interchange is not within the control of the local authority. Other identified risks affecting delivery of this option include:

- Potential need to acquire land to enable delivery of the park and ride facility;
- Technical challenges in delivering improvements at a constrained and congested location on the highway network and due to the dense nature of the urban built environment.

Option 4 - Opening Cardiff Barrage to private vehicles during peak periods – As described in relation to Option 2 above, the barrage is under the control of Cardiff Council and implementation of a scheme to open Cardiff Barrage to private vehicles is reliant on the support and close cooperation of Cardiff Council. As such, this option would be dependent on Cardiff Council to enable delivery. At present there is no evidence that Cardiff Council are considering opening the barrage to private vehicles. Other identified risks affecting delivery of this option include:

- Public acceptability and potential opposition to the introduction of private vehicles onto Cardiff Barrage;
- Technical challenges in opening the barrage to private vehicles;
- The need to manage potential conflict with more vulnerable users of Cardiff Barrage i.e. those walking and cycling;
- Potential need to acquire land to implement a route for vehicles across the barrage.

The only option that is not reliant on third parties to enable delivery of key elements is **Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM**. The delivery of most elements of this option are within the control of the local authority in terms of the prioritisation, programming and subsequent delivery of active travel schemes. This option includes a range of Active Travel scheme proposals that vary in technical feasibility from relatively small-scale schemes to large infrastructure projects. As such the risks associated with delivery of this option will vary from scheme to scheme within the INM programme. The most technically complex of all scheme proposals within the INM is the Penarth Headland Link, which is a large-scale engineering project that has a 'predictive delivery time' within the INM of 10-15 years and is the only 'long-term' scheme within the programme. As this is part of a package of measures, higher risks may be associated with the largest-scale projects such as the Penarth Headland Link, though a number of localised improvements may be deliverable with far lower levels of risk. Should this option be recommended to progress to WelTAG Stage 2, a greater assessment of the feasibility and risk associated with individual active travel schemes within the programme will be developed.

In addition to the specific risks associated with each option, there will also more general risks that will need consideration and will be applicable to all options, such as the reliance on external funding to enable delivery and engineering project risks.

Due to the early stage of development of each of the options, all potential risks to delivery cannot be identified and quantified at this stage of the WelTAG process. Therefore, the risk and

deliverability issues highlighted represent those that are known from the existing information that is available. Further feasibility work would be required to identify all risks before any option was implemented. As further development work is undertaken on the recommended options, a better understanding will be developed of constraints and potential risks that may impact upon project delivery.

7. Conclusion and Recommendations

7.1 Summary

This WelTAG Stage 1 (Strategic Outline Case) has identified existing problems affecting the Penarth Cardiff Barrage Corridor. A summary of the problems identified are:

- Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution;
- Volume of traffic is a barrier to walking and cycling;
- High levels of car use and low levels of public transport use;
- Sustainable transport options not an attractive alternative to car travel;
- Unreliable and slow journey times of bus services;
- Lack of park and ride facilities limits opportunities for public transport interchange;
- Low levels of Active Travel;
- Safety issues act as a barrier to walking and cycling;
- Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes;
- Lack of facilities for cyclists at trip origin and destination;
- Environmental factors reduce the attractiveness of walking and cycling;
- Topography of the area acts as a barrier to walking and cycling;
- Road traffic emissions and congestion contribute to reduced air quality in some areas and an AQMA has previously been in place on Windsor Road, Penarth; and
- Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.

The problems identified are associated with high level of car use and relatively low levels of travel by more sustainable modes, which are having a negative impact on e.g. journey times, accessibility and connectivity, air quality and the safety of more vulnerable road users. The problems identified each have a negative impact on one or more of the goals of the Well-being of Future Generations (Wales) Act 2015 and therefore measures are needed to address the problems to ensure the long-term negative impacts are minimised.

The WelTAG Stage 1 process has involved the identification of five study objectives and a long list of five potential options to address the problems affecting the study area. These were developed through a process of consultation with officers, wider stakeholder organisations and the public. The long list of options is as follows:

- Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM;
- Option 2 - Bus park and ride and sustainable transport links across Cardiff Barrage;
- Option 3 - Multi-modal sustainable transport interchange;
- Option 4 - Opening Cardiff Barrage to private vehicles during peak periods; and
- Option 5 - Do minimum.

The long list of five potential options has been appraised against national, regional and local policy objectives to assess their suitability and strategic fit as potential solutions. Each option has also been assessed against the five study objectives, its ability to address identified problems and a qualitative assessment has been undertaken of the options against economic, environmental, social and cultural criteria.

The WelTAG Stage 1 report also includes a consideration of issues affecting scheme development and delivery for each option within the long list. This includes issues such as statutory procedures, funding requirements and procurement options. An early stage assessment has also been undertaken of potential risk and deliverability issues affecting each option. Issues such as these will be further considered in later stages of the WelTAG appraisal process, as the recommended options are developed in greater detail.

7.2 Recommendations

The initial high-level appraisal has highlighted two options that are viewed as less favourable due to their likely negative impact on many policy objectives, the study objectives and on many economic, environmental, social and cultural criteria. These are:

Option 4 - Opening Cardiff Barrage to private vehicles during peak periods – This option did not perform well in the appraisal. It was assessed as having the greatest negative collective impact on the study objectives, an adverse impact on many of the identified problems and likely to have a negative impact on many of the economic and environmental criteria. In terms of deliverability, public acceptability and potential opposition to the introduction of private vehicles on Cardiff Barrage is considered a risk. However, it should be noted that there was evidence of support for this option during the WelTAG consultation. In addition, as the barrage is under the control of Cardiff Council, the option is reliant on Cardiff Council for delivery. **It is not recommended that this option be progressed for further appraisal to WelTAG Stage 2.**

Option 5 - Do Minimum – This option did not perform well in the appraisal. A do minimum approach is likely to result in a worsening of existing problems and was assessed as having a negative impact on many policy objectives, in addition to the study objectives. It was assessed as likely to have a negative impact on many economic, environmental, social and cultural criteria. The long-term impact of a do minimum option will adversely affect the goals of the Well-being of Future Generations (Wales) Act 2015. Although this option did not perform well in the appraisal, **the do minimum option will be progressed to WelTAG Stage 2** to provide the baseline against which the recommended options will be assessed.

Three of the options within the long list performed well in the appraisal and are those options that are focused on sustainable transport improvements. These are:

- Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM;
- Option 2 - Bus park and ride and sustainable transport links across Cardiff Barrage;
- Option 3 - Multi-modal sustainable transport interchange.

The above three options were each assessed as likely to have:

- A mostly positive impact on existing policy objectives at the national, regional and local level.
- A positive or neutral impact on each of the goals of the Well-being of Future Generations (Wales) Act 2015;
- A positive impact on achieving each of the five study objectives and in addressing most of the identified problems within the study area;
- A positive impact on each of the economic, social and cultural criteria and a positive or neutral impact on most of the environmental criteria.

The option that was assessed as performing the best against the study objectives and against the economic, environmental, social and cultural criteria is **Option 1 - Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM**. **It is recommended that this option be progressed for further appraisal at WelTAG Stage 2.**

In terms of the remaining two options (Options 2 and 3), the assessment of scheme deliverability has highlighted a key issue that presents a risk to the delivery of each option. This is the reliance on third parties to enable delivery of key elements of the two options.

In relation to **Option 2 - Bus park and ride and sustainable transport links across Cardiff Barrage**, this element of risk is limited to the Cardiff Barrage section of the scheme proposal, due to the barrage being in the control of Cardiff Council. It is considered that Cardiff Council may be supportive of a proposal to provide a sustainable transport link across the barrage, as Cardiff Council has previously commissioned feasibility studies into such a proposal. The remaining elements of the scheme proposal to provide a park and ride facility and bus priority measures are within the control of Vale of Glamorgan Council. **It is recommended that this option be progressed for further appraisal at WelTAG Stage 2.**

In relation to **Option 3 - Multi-modal sustainable transport interchange**, all elements of the scheme are dependent on Transport for Wales developing and delivering the proposal, as Transport for Wales has responsibility for improvements to the rail network. The timescales for implementing the proposal are therefore dependent on Transport for Wales and are not within the control of the local authority. At the current time there is no evidence that a multi-modal sustainable transport interchange at Cogan is being progressed by Transport for Wales or within any current Transport for Wales programme for delivery. **It is not recommended that this option be progressed for further appraisal at WelTAG Stage 2** due to the scheme lying outside of the responsibility of the local authority and the consequent risks surrounding delivery of the proposal. It is recommended that the local authority be supportive of the proposal and work with Transport for Wales in the development of the proposal should the opportunity arise. It is also recommended that the results of this WelTAG Stage 1 assessment, which have highlighted the potential positive impacts of a multi-modal sustainable transport interchange at Cogan, be shared with Transport for Wales.

7.3 Review Group

In line with WelTAG 2017, an independent Review Group has overseen and reviewed the WelTAG Stage 1 appraisal output.

To be completed following comments from Review Group.

7.4 Further Work

In order to complete the WelTAG Stage 2 (Outline Business Case) on the recommended shortlist of options detailed in Section 7.2, the following further work may need to be undertaken. Development of the short list of options will need to be in line with the five ways of working of the Well-being of Future Generations (Wales) Act 2015. The following list is not exhaustive and further information or tasks may need to be undertaken as appraisal work develops. This further work will improve the evidence base:

- **Option development work** – Further investigative work would be required into each of the recommended options to enable a more detailed understanding of the issues, constraints and risks associated with delivery. In terms of Option 1 (Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM), results from the Welsh Government Active Travel Audit Tool assessment will be interrogated to identify quick win opportunities. In terms of Option 2 (Bus park and ride and sustainable transport links across Cardiff Barrage) further work is needed to determine the route and the scope and nature of the sustainable transport link across Cardiff Barrage.

- **Value for Money assessment** – A Value for Money assessment would be required through the production of a Benefit Cost Ratio (BCR) for each of the recommended options. It is assumed that the data required to produce the value for money assessment

can be provided by the Client via existing survey data and transport models such as the South East Wales Transport Model.

- **Development of the Five Cases** – The Five Cases for each of the recommended options would need to be developed further. The Strategic Case would need to be checked and updated for each option and further information provided in the Transport, Financial, Commercial and Management cases.

- **Further consultation and engagement** – During the WelTAG Stage 2 (Outline Business Case) appraisal process, further stakeholder engagement will be important to gather views and more detailed information on each of the recommended short list of options. For example, a dialogue will be needed with Cardiff Council in relation to the introduction of a sustainable transport link on Cardiff Barrage.

- **Consideration of future monitoring** – Although a monitoring plan cannot be produced in detail until WelTAG Stage 3 (Full Business Case), it would be beneficial to give some consideration to the types of data and areas that will need monitoring. This should include the data that would require collection for each of the short list of options. This can then be detailed in the Stage 2 Management Case.

We | Listen Create Deliver

www.capita.co.uk/infrastructure

St David's House, Pascal Close, St Mellons, Cardiff, CF3 0LW T: 02920 803500

CAPITA

Penarth Cardiff Barrage Sustainable Transport Corridor Study

WelTAG Stage 1 Draft Impact Assessment Report

March 2019

We | Listen Create Deliver

CAPITA

Project No: CS/096888 Doc Ref: CS/096888/01 Rev: P01

Client: Vale of Glamorgan Council
Issue Date: March 2019

Penarth Cardiff Barrage Sustainable Transport Corridor Study
WelTAG Stage 1 Draft Impact Assessment Report

	Name	Signature	Date
Author	Gemma Thomas		21/03/2019
Checker	Martin Dolan		21/03/2019
Approver	Dave James		21/03/2019

Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:
01	21/03/19	Draft Report for Issue	Gemma Thomas	Dave James

CAPITA

GENERAL DISCLAIMER:

This report has been prepared by Capita Property and Infrastructure Limited (Capita) in favour of the Vale of Glamorgan Council ("the Client") and is for the sole use and benefit of the Client in accordance with the agreement between the Client and Capita dated 7th November 2018 under which Capita's services were performed. Capita accepts no liability to any other party in respect of the contents of this report. This report is confidential and may not be disclosed by the Client or relied on by any other party without the express prior written consent of Capita.

Whilst care has been taken in the construction of this report, the conclusions and recommendations which it contains are based upon information provided by third parties ("Third Party Information"). Capita has for the purposes of this report relied upon and assumed that the Third Party Information is accurate and complete and has not independently verified such information for the purposes of this report. Capita makes no representation, warranty or undertaking (express or implied) in the context of the Third Party Information and no responsibility is taken or accepted by Capita for the adequacy, completeness or accuracy of the report in the context of the Third Party Information on which it is based.

FREEDOM OF INFORMATION:

Capita understands and acknowledges the Authority's legal obligations and responsibilities under the Freedom of Information Act 2000 (the "Act") and fully appreciates that the Authority may be required under the terms of the Act to disclose any information which it holds. Capita maintains that the report contains commercially sensitive information that could be prejudicial to the commercial interests of the parties. On this basis Capita believes that the report should attract exemption from disclosure, at least in the first instance, under Sections 41 and/or 43 of the Act. Capita accepts that the damage which it would suffer in the event of disclosure of certain of the confidential information would, to some extent, reduce with the passage of time and therefore proposes that any disclosure (pursuant to the Act) of the confidential information contained in the report should be restricted until after the expiry of 24 months from the date of the report.

Contents

Appendices

1. Introduction

In line with WelTAG 2017, detailed evidence, data and analysis underlying the statements made in the WelTAG Stage Reports, are presented in a separate document known as the WelTAG Impacts Assessment Report (IAR).

This IAR for the Penarth Cardiff Barrage Sustainable Transport Corridor Study WelTAG Stage 1 – Draft Report gathers together all the evidence that has been used to determine and support the appraisal undertaken to recommend a short list of options for further appraisal.

As future stages of the WelTAG process are undertaken, more evidence will be produced, and additional sections will be added to this IAR.

The contents of this IAR are described in the following chapter of this report.

2. Strategic Outline Case

This Impacts Assessment Report (IAR) contains the following information to support the appraisal undertaken at Stage 1 of the WelTAG process (Strategic Outline Case), to determine a recommended short-list of options for further appraisal.

This information is presented in the following Appendices:

- Appendix 1 – Current Sustainable Transport Provision
  This provides an outline of the current sustainable transport provision within the study area.

- Appendix 2 – Appraisal Methodology Note
  This outlines the methodology used to appraise the options at WelTAG Stage 1 (Strategic Outline Case).

- Appendix 3 – Consultation Report
  This provides a summary of the outputs from stakeholder and public consultation events held in January 2019.

- Appendix 4 – Policy Review
  This includes a review of national, regional and local policy relevant to the study.

- Appendix 5 – Background Studies
  This provides details of the background studies from which information has been retrieved for the study. Executive summaries have been included for some reports.

- Appendix 6 – Worksheets 1 – 4
  These worksheets provide details of the identification of problems, development of objectives and the development of a long list of options to be assessed.

- Appendix 7 – Worksheets 5 – 12
  These worksheets provide detail of the appraisal undertaken on the long list of options.

- Appendix 8 – Impacts Assessment Tables
  These provide additional information to support the transport case assessment undertaken on the long list of options.

- Appendix 9 – Review Group Comments
  This provides details of the comments received from the Review Group on the draft WelTAG Stage 1 report.

Appendix 1 Current Sustainable Transport Provision

The following summary provides details of the current sustainable options within the Penarth Cardiff Barrage Corridor, as of March 2019.

Bus

Both New Adventure Travel (NAT) and Cardiff Bus run public bus services within the study corridor (as well as Capital Links via Cardiff Bus). A summary of services and frequencies can be seen below.

Bus Service	Route	Frequency Weekday Daytime	Frequency Weekday Evening	Frequency Saturday Daytime	Frequency Sunday Daytime
89A*	Cardiff – Penarth – Dinas Powys	5 per day	No service	5 per day	No service
89B	Llandough – Penarth - Cardiff	5 per day	No service	5 per day	No service
91	Cardiff Bay – Penarth	No service	No service	Summer only (2 per hour)	Summer only (2 per hour)
92	Cardiff – Penarth (St Lukes Avenue)	3 per hour	1 per hour	3 per hour	1 per hour
93	Cardiff – Barry via Penarth and Dinas Powys	1 per hour	No service	1 per hour	No service
94	Cardiff – Barry via Penarth and Sully	2 per hour	1 per hour	2 per hour	1 per hour
95 (serves Merrie Harrier)	Heath Hospital – Barry Island	2 per hour	Limited service	2 per hour	1 per hour
95A**	Cardiff – Penarth	1 per hour	No service	1 per hour	No service
95B**	Cardiff - Penarth	1 per hour	No service	1 per hour	No service
304 (serves Merrie Harrier)	Cardiff – Barry	1 per hour	1 every 2 hours	1 per hour	No service

*Temporary timetable until March 29th 2019 due to closure of Station Road
**Will cease operating from March 31st 2019

Rail

Transport for Wales (TfW) operate rail services along both the Penarth branch line and Vale of Glamorgan line within the study area. Those on the Penarth branch run between Penarth and Dingle Road, before joining the Vale of Glamorgan line just north of Cogan (bypassing the

station). A summary of services can be seen in the Table below. A ticket office is available at Penarth, and automatic ticketing machines at Dingle Road and Cogan stations.

Route	Frequency Weekday (Daytime)	Frequency Weekday (Evening)	Frequency Saturday	Frequency Sunday
Penarth – Cardiff (and onwards to Rhymney/Bargoed)	4 per hour	2 per hour	4 per hour	Once every 2 hours
Cardiff – Cogan - Bridgend	1 per hour	1 per hour	1 per hour	Once every 2 hours
Barry Island – Cogan - Cardiff Central (onwards to Merthyr Tydfil/Aberdare)	3 per hour	1 per hour	3 per hour	1 or 2 per hour

Active Travel

A number of active travel provisions already exist within the study area. Current infrastructure that supports journeys made by active modes include:

- The Pont-y-Werin Active Travel bridge, linking the study area across the River Ely to the International Sports Village.
- The Cardiff Bay Barrage is open to walkers and cyclists to cross between the study area and Cardiff Bay. It is currently only open to vehicles for access to Associated British Ports land. A cycle maintenance shop has also recently opened near the Barrage gates.
- A shared-use path is in operation between Penarth Marina and Penarth Heights, known locally as 'Zig-Zag path' (opened in 2013).
- A shared walking and cycling path connects Penarth Town Centre (with access just south of the station) to Cosmeston, known locally as the Railway Path.
- A shared walking and cycling path runs adjacent to the B4267 Lavernock Road between the Harvester restaurant and to the south of the study area (on to Sully).
- A Next Bike cycle hire docking station is located at the Penarth end of the Barrage.

The above list is not extensive of pedestrian and cycling infrastructure in the study area. A number of existing and identified useful future active travel routes were identified as part of extensive consultations surrounding the Integrated Network Mapping exercise(s).

Other Sustainable Transport Modes

A seasonal and weather dependent Aquabus service operates between Cardiff Castle and Cardiff Bay and serves a stop at the Barrage (at Penarth Marina) on request. Passengers for this stop must call a number for the boat to stop and may only pay via cash. Service frequency can be seen below.

Route	**Frequency Weekday (Daytime)**	**Frequency Weekday (Evening)**	**Frequency Saturday (Daytime)**	**Frequency Sunday (Daytime)**
Cardiff Bay – Cardiff Castle (via Barrage) & return	1 per hour	No service	1 per hour	1 per hour

Appendix 2 Appraisal Methodology Note

This note outlines the methodology that has been used for the appraisal of options at WelTAG Stage 1 to ensure consistency at later stages of WelTAG appraisal.

Appraisal of Options – National, Regional and Local level

In line with WelTAG 2017, the appraisal process has included the assessment of the long list of options against national, regional and local policy objectives. Each option has been assessed against the objectives of the following strategies and plans:

- One Wales: Connecting the Nation (Wales Transport Strategy, 2008)
- Well-being of Future Generations (Wales) Act 2015
- Vale of Glamorgan Council Well-being Objectives and Improvement Plan (2018)
- Vale of Glamorgan Public Services Board Well-being Plan 2018-2023: Our Vale – Our Future
- Vale of Glamorgan Local Transport Plan 2015-2030
- Cardiff Capital Region City Deal Regeneration/ Strategic Business Plan

In addition to this detailed, high-level assessment of the long list of options, a wider policy review has also been undertaken. This considered the strategic fit and the contribution that improvements to sustainable transport along the Penarth Cardiff Barrage corridor can make towards the goals and objectives of the following policy documents:

- Prosperity for All: The National Strategy (2017)
- Prosperity for All: Economic Action Plan 2018
- One Wales: Connecting the Nation (Wales Transport Strategy, 2008) and the emerging Wales Transport Strategy
- National Development Framework (anticipated publication 2020)
- Wales Spatial Plan (2008)
- National Transport Plan (2010, updated 2011)
- National Transport Finance Plan (updated 2017)
- Planning Policy Wales (edition 10, 2018)
- Active Travel (Wales) Act 2013
- Well-being of Future Generations (Wales) Act 2015
- Cardiff Capital Regional City Deal Regeneration Plan
- Vale of Glamorgan Public Services Board Well-being Plan 2018-2023: Our Vale – Our Future
- Vale of Glamorgan Council Well-being Objectives and Improvement Plan (2018)
- Vale of Glamorgan Local Development Plan
- Vale of Glamorgan Local Transport Plan 2015-2030

- Penarth Town Place Plan

Appraisal of Options – Identified Problems and Study Objectives

This WelTAG Stage 1 (Strategic Outline Case) has identified existing problems affecting the Penarth Cardiff Barrage Corridor. These were developed through a process of stakeholder and public consultation, along with information gathered from previous studies and existing policy documents. A summary of the problems identified are:

- Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution.
- Volume of traffic is a barrier to walking and cycling.
- High levels of car use and low levels of public transport use.
- Sustainable transport options not an attractive alternative to car travel.
- Unreliable and slow journey times of bus services.
- Lack of park and ride facilities limits opportunities for public transport interchange.
- Low levels of active travel.
- Safety issues act as a barrier to walking and cycling.
- Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes.
- Lack of facilities for cyclists at trip origin and destination.
- Environmental factors reduce the attractiveness of walking and cycling.
- Topography of the area acts as a barrier to walking and cycling.
- Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.
- Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.

Study specific objectives have also been developed through a process of consultation with officers, wider stakeholder organisations and the public. Objectives have been assessed in terms of their potential to address the identified problems and to contribute to each of well-being goals and five ways of working of the Well-being of Future Generations (Wales) Act 2015.
The objectives are as follows:

1. Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel.
2. Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.

3. Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being.

4. Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.

5. Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.

The appraisal process has included the assessment of the long list of options against each of the above identified problems and each of the above study objectives.

Appraisal of Options – Assessing the Transport Case

The Transport Case assessment has involved undertaking a qualitative appraisal of the long list of options against a range of economic, environmental, social and cultural criteria. The impacts of each option, the scale of the impacts, where and when they will occur and who will experience them has also been considered when appraising the Transport Case elements.

Appraisal of Options – Deliverability and Risk

An early stage appraisal has also been undertaken of the deliverability of each option, which considers potential technical constraints and risks to delivery. Deliverability and risks have been identified at a very high level for each of the options proposed, based on existing or known data at the time of the Stage 1 appraisal. Deliverability was assessed in terms of:

- Technical deliverability – This considered aspects affecting the feasibility and technical complexity of the options proposed, with consideration given to elements such as land constraints.
- Acceptability – This considered the acceptability of each option to the public and politically.
- Timescales – This involved a high-level consideration of the potential timescales for implementation of the proposal.
- Risks – This considered known potential risks to the development and delivery of each option.

Evidence Base

An appraisal of each of the options has been completed using information that is currently available about each option. At WelTAG Stage 1, each option is at an early stage of development and this is reflected in the high-level and qualitative nature of the appraisal that has been undertaken. At WelTAG Stage 1, quantitative data is only utilised where it currently existing within reports, previous surveys or publicly available data sets.

Assessment Scale

A seven-point likert scale was adopted for the appraisal of options (as detailed in WelTAG Guidance 2017). This assessment scale is as follows:

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large Negative (- - -)

As most of the appraisal undertaken at this stage is qualitative, bandings for each assessment criteria have not been developed. At WelTAG Stage 2 when quantitative data is available, if required and appropriate, scales for each of the seven assessment ranges for individual assessment criteria could be developed.

Weighting

No weighting has been applied to any of the assessment criteria. The ability of each option to address the identified problems, achieve the study-specific objectives and issues in relation to deliverability have played an important role in differentiating options. However, all appraisal criteria have been considered in making the overall recommendation for those schemes to be taken forward for further appraisal work at WelTAG Stage 2.

Validation Process

The assessment of each option against the appraisal criteria has been undertaken by a Senior Transport Planning professional with WelTAG appraisal experience alongside engineering professionals.

The results of the appraisal have then been checked and approved by a second Senior Transport Planning professional and engineering professional with relevant WelTAG experience.

Appraisal results were lastly checked and approved by Arcadis Consulting UK Ltd on behalf of the Vale of Glamorgan Council officers before being presented to the independent review group for comment.

Appendix 3 Consultation Report

CAPITA

Penarth Cardiff Barrage Sustainable Transport Corridor

Stage 1 Consultation Report

February 2019

We | Listen Create Deliver

CAPITA

Project No: CS/096888 Doc Ref: cs/096888 Rev: P02

Client: Vale of Glamorgan Council
Issue Date: February 2019

Penarth Cardiff Barrage Sustainable Transport Corridor: Stage 1 Consultation Report

	Name	Signature	Date
Author	Luke Tizzard		11/02/2019
Checker	Martin Dolan		11/02/2019
Approver	Dave James		11/02/2019

Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:
P01	11/02/19	Issued to Client	L.Tizzard	D.James
P02	22/02/19	Minor amendments	L.Tizzard	D.James

CAPITA

GENERAL DISCLAIMER:

This report has been prepared by Capita Property and Infrastructure Limited (Capita) in favour of Vale of Glamorgan Council ("the Client") and is for the sole use and benefit of the Client in accordance with the agreement between the Client and Capita dated 8th November 2018 under which Capita's services were performed. Capita accepts no liability to any other party in respect of the contents of this report. This report is confidential and may not be disclosed by the Client or relied on by any other party without the express prior written consent of Capita.

Whilst care has been taken in the construction of this report, the conclusions and recommendations which it contains are based upon information provided by third parties ("Third Party Information"). Capita has for the purposes of this report relied upon and assumed that the Third Party Information is accurate and complete and has not independently verified such information for the purposes of this report. Capita makes no representation, warranty or undertaking (express or implied) in the context of the Third Party Information and no responsibility is taken or accepted by Capita for the adequacy, completeness or accuracy of the report in the context of the Third Party Information on which it is based.

FREEDOM OF INFORMATION:

Capita understands and acknowledges the Authority's legal obligations and responsibilities under the Freedom of Information Act 2000 (the "Act") and fully appreciates that the Authority may be required under the terms of the Act to disclose any information which it holds. Capita maintains that the report contains commercially sensitive information that could be prejudicial to the commercial interests of the parties. On this basis Capita believes that the report should attract exemption from disclosure, at least in the first instance, under Sections 41 and/or 43 of the Act. Capita accepts that the damage which it would suffer in the event of disclosure of certain of the confidential information would, to some extent, reduce with the passage of time and therefore proposes that any disclosure (pursuant to the Act) of the confidential information contained in the report should be restricted until after the expiry of 24 months from the date of the report.

Front Cover Photograph Acknowledgements

Active Travel Image – Source: Vale of Glamorgan https://www.valeofglamorgan.gov.uk/en/our_council/consultation/previous-consultations/Active-Travel.aspx

Cardiff Barrage Image – Source: Cardiff Bay https://www.cardiffbay.co.uk/listings/the-barrage-car-park/

Penarth Image – Source: Steve McKay

Stakeholder Workshop Image – Source: Capita

Penarth Headland Link Image – Source: Penarth News https://penarthnews.wordpress.com/2017/02/19/pro-bike-body-sustrans-pedals-into-the-penarth-headland-link-project/

Contents

Appendices

Glossary of Terms

GPG	Gwyrddio Penarth Greening
GVA	Gross Value Added
MPH	Miles per Hour
SUDs	Sustainable Urban Drainage Systems
WBOFGA	Well-Being of Future Generations Act
WelTAG	Welsh Transport Appraisal Guidance

1. Introduction

1.1 Context

Capita Real Estate and Infrastructure has been commissioned to undertake a Stage One: Strategic Outline Case to develop and appraise potential options for improving sustainable transport within and between Penarth and Cardiff barrage. The study area can be seen in Figure 1.1.

Figure 1.1 Study Area Map

(Shown on next page)

Two events relating to the Stage One: Strategic Outline Case were held at the Paget Rooms, Penarth Town Centre in January 2019, details as follows:

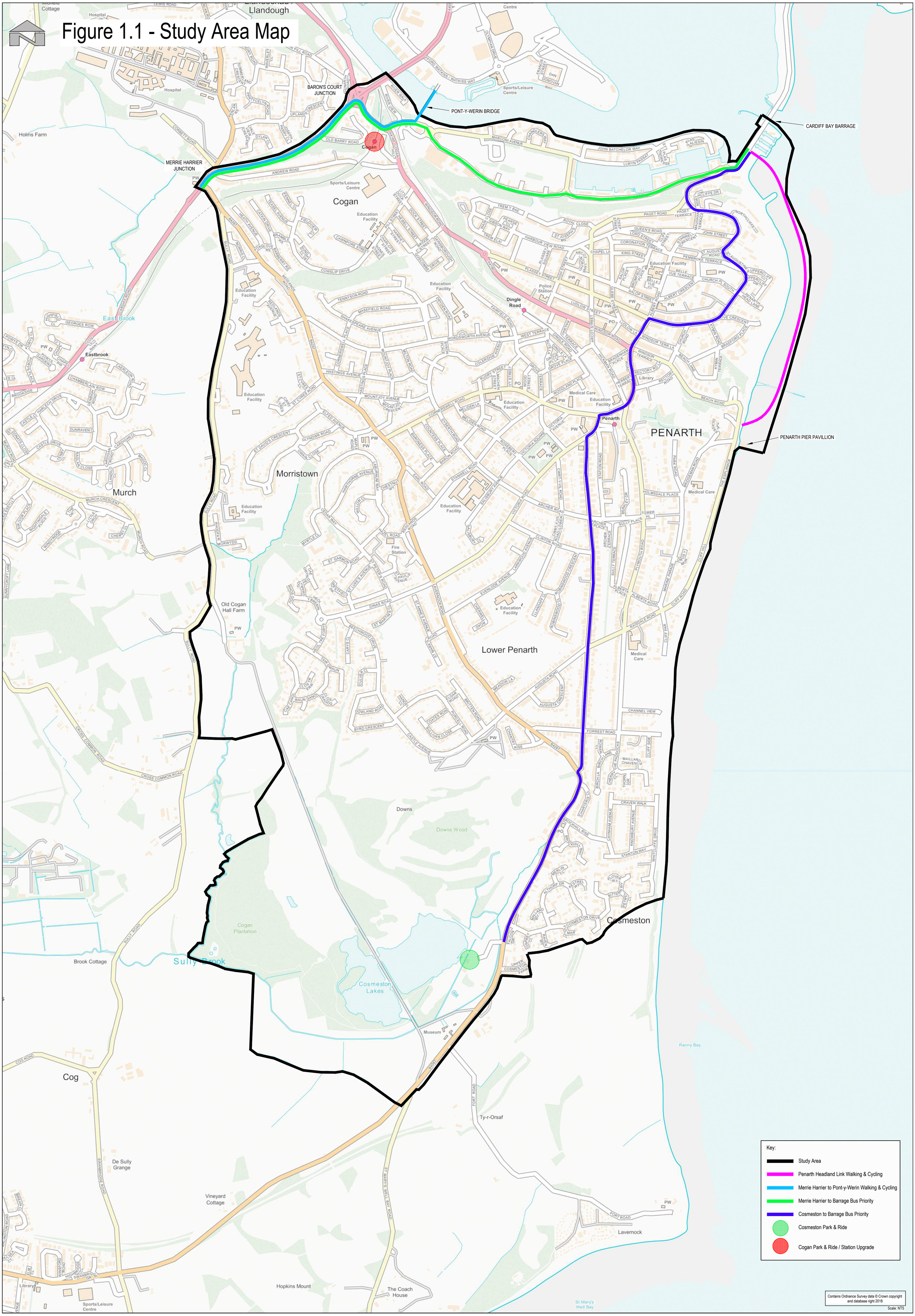
- **17th January 2019, 10:00 – 12:30: Stakeholder Workshop**
- **24th January 2019, 13:00 – 19:00: Public Consultation Event**

Across the two events representatives from the Vale of Glamorgan Council and Capita Real Estate and Infrastructure were on hand to deliver tasks that aimed to gather comments, views and suggestions on matters relating to transport issues within the study area.

Parties were invited to the Stakeholder Workshop via Arcadis Consulting UK Ltd on behalf of Vale of Glamorgan Council who contacted stakeholders directly by email with an invitation.

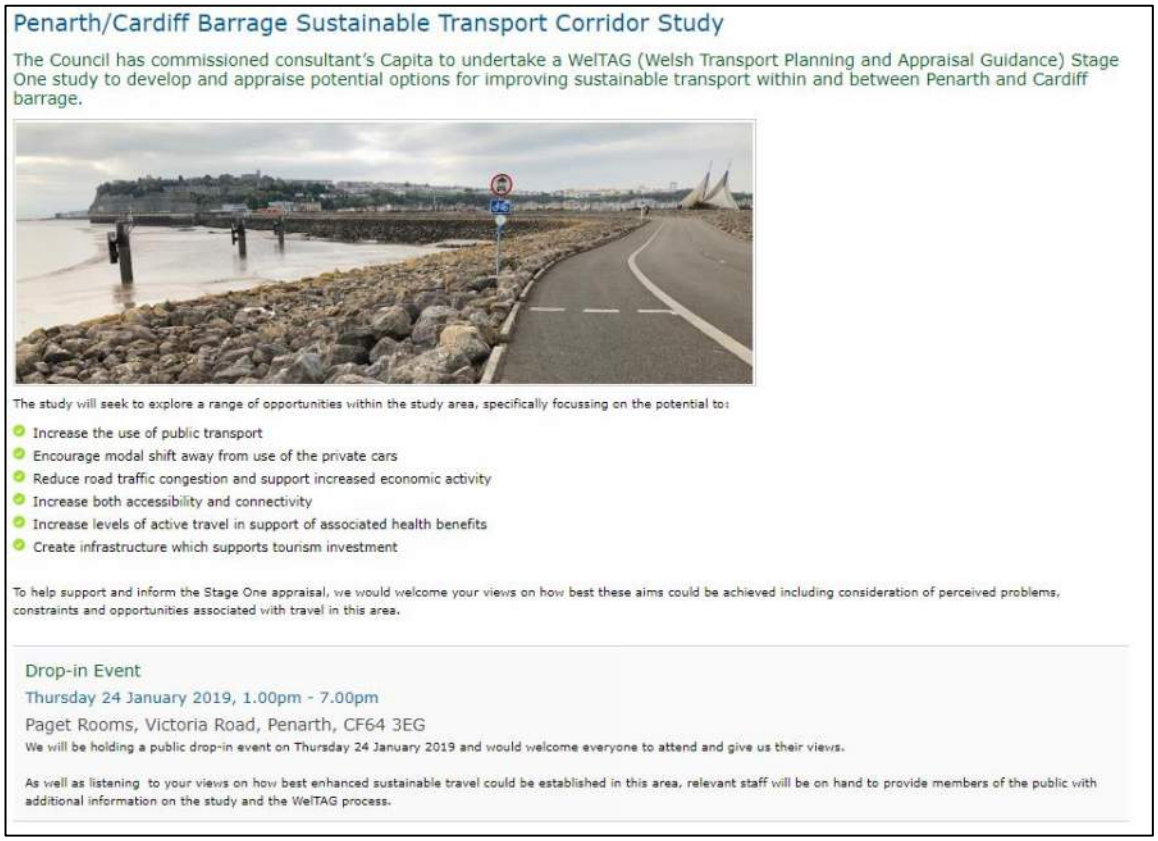
The Public Consultation Event was advertised on the Vale of Glamorgan Council's website, as the screenshot in Figure 1.2 shows.

Figure 1.1 - Study Area Map



Scale: NTS

Figure 1.2 Advert for the Public Consultation Event



An advertisement about the public consultation event was shown in the Penarth Times. Online news platform Penarth Daily News also previewed the event.

This document aims to act as a record, and summary, of the comments received at both events. Capita has not edited or amended any of the comments received in either the Stakeholder Workshop or the Public Consultation Event.

2. Stakeholder Workshop

2.1 Attendees

On 17th January 2019, a Stakeholder Workshop event was held at the Paget Rooms, Victoria Road, Penarth. Attendees included representatives from both local, regional and national government, transport operators, campaign groups as well as the local harbour authority, health team and utility company.

A full list of organisations represented at the workshop can be seen in Table 2.1. The workshop was also attended and managed by representatives of Capita Real Estate and Infrastructure and Arcadis Consulting UK Ltd on behalf of Vale of Glamorgan Council.

Table 2.1 Full list of attendees to Stakeholder Workshop

Organisation
Associated British Ports
Welsh Government
Vale of Glamorgan Council
GPG Management Committee
Cardiff Capital Region City Deal
Vale of Glamorgan Council
Cardiff Harbour Authority
Cardiff Bus
Cardiff Council
Councillor (Plymouth Ward, Penarth)
Vale of Glamorgan Council
Sully Town Council
Vale of Glamorgan Council
Penarth Town Council
Cardiff Harbour Authority
Councillor (St Augustine's Ward, Penarth)
Cardiff Bus
Vale of Glamorgan Council
Welsh Water
Councillor (St Augustine's Ward, Penarth)
Sustrans
Cardiff and Vale Local Health Team
South Wales Police
GPG Management Committee
Welsh Government
Councillor (Stanwell Ward, Penarth)

Attendees were given a short presentation which included a background to previous schemes discussed within the area, an introduction to the Welsh Government WelTAG process and an outline of tasks that were aimed to be completed as part of the workshop.

Attendees were split into five groups (Photographs 1 and 2) in order to complete the following workshop tasks.

Photographs 1 and 2: Stakeholder Workshop groups


2.2 Task Outline

2.2.1 Task One

Attendees were asked to discuss the opportunities that the study area presented with regards to sustainable and active travel interventions. Attendees were provided with a list of pre-identified opportunities on which they were encouraged to discuss, comment and critique.

Table 2.2 shows the pre-identified opportunities and the attendees' comments on them.

Table 2.2 Pre-identified opportunities and associated comments.

Identified Opportunity	Comments
Well-placed interventions may convert private vehicle trips into active and sustainable modes, thus reducing traffic congestion on existing routes	• Should replace 'well placed interventions' with 'opportunities.'; • Overarching; • Aspirational; and • Would love to get across Barrage in car on peak. If job requires travel often need personal travel options such as a car (e.g. 7am – 9am and 4pm – 6pm).
Buses between Cardiff and Penarth to run via the Barrage, which would significantly improve access to Cardiff/Cardiff Bay from Penarth and Penarth Marina	• Barrage for other uses? Will pedestrians use it in the peak hours? • Will running buses impinge on space for other pedestrians/cyclists? detracting from a safe environment for active travel; and • Suggestion that this should be electric buses only.
Opportunity to improve lighting provision across active travel routes as part of intervention	• Have to have lights to access Active Travel funding.
Opportunity to include proposals as part of wider Capital Region Metro project	• Funding opportunities? • Links from Metro/future phases/City Deal/Linking with existing routes/Active.
Improvements to existing/development of new active travel routes and sustainable transport infrastructure could improve disabled accessibility to/from/within the study area.	• Interventions could enable exclusive design; • Agreed, parents with buggies would benefit; • Need to build with desire lines, not just what looks good on a map; and • Electric buses/greener hub.

Identified Opportunity	Comments	
To provide economic benefits to Penarth and Cardiff	• Aspirational and long term.	
To provide economic benefits to the NHS via uptake of active travel modes, and thus reduce healthcare costs	• Aspirational and long term.	
Headland Link would create an easy, flat, walking and cycling link between Cardiff Bay and Penarth via Barrage	• Query as to how this would be quantified.	These are one aspect
Headland Link would create an exciting yet easy start/end to the Vale of Glamorgan section of the Wales Coast Path	• Query as to how this would be quantified.	
Headland Link has potential to increase levels of walking and cycling within/to/from Penarth, via providing commuters with a shorter and safe route to employers in the Bay	• Query as to how this would be quantified.	
Headland Link connection may bring Penarth Pier into the leisure offer of Cardiff Bay	• Query as to how this would be quantified.	

Attendees were also encouraged to add any further opportunities that they believe should be included as part of the study. A summary of suggestions are included within Table 2.3. A full list of suggestions for task one is included within Appendix A of this report.

Table 2.3 Summary of additional opportunities suggested by attendees.

• Expansion of walking buses project to more schools within study area. • To use right materials in interventions to reflect coastal location(s). • Expansion of NextBike/cycle hire scheme to Penarth. • Self-driving electric pods. • Monorail. • Reduce car usage and create modal shift to Active Travel. • Development opportunity left of the Custom House (Cardiff end of Headland Link). • Improve Active Travel links between Penarth and Cardiff Bay. • Improve Active Travel in Penarth. • Improve Public Transport provision into and out of Penarth. • Improve overall Health and Wellbeing of residents. • Include proposals as part of wider plan to increase rail provision in Study Area. • Reduction in vehicle ownership to create more space (freed up by parking). • Introduce shared spaces. • Link Cardiff and Vale tourism strategies. • Align with industrial strategy. • Maximise accessibility on-foot and cycle between Cogan and Penarth. • Improve priority for pedestrians and cycles at Cogan station using TfW improvements. • Expansion of 20mph limit zones. • Extend public transport links south of Penarth towards Sully/Barry. • Utilise advancements in technology to use electric buses across the Barrage. • Include SUDs legislation as part of designs. • Encourage high levels of footfall currently using Barrage to visit Penarth. • Prioritise bus movements into and out of Penarth. • Create a unified payment system for bus and rail; and • Increase of parking at Penarth outer Harbour (Park and Ride with Headland Project).

2.2.2 Task Two

After the identification of opportunities within the area, task two required attendees to review and comment on pre-identified problems and constraints in the study area. The results of this task are shown in Table 2.4.

Table 2.4 Pre-identified problems and associated comments.

Pre-identified Problem	Comment
Traffic congestion between Penarth and Cardiff (via Cogan)	*No comments made*
Lack of attractive Active Travel Routes between Penarth Esplanade and Cardiff	• Suggestion to also include 'Town Centre'
Currently challenging walking terrain (around Headland) between Cardiff Barrage and Penarth Promenade	*No comments made*
Unsuitable route between Penarth Esplanade and Cardiff Barrage (around Headland) for those with wheelchairs/pushchairs	*No comments made*
Missing commuter link between study area and Cardiff Bay.	• Replace 'missing' with 'poor' • Include bus journey problem as part of this identified problem; and • Needs clarity on transport mode
Current lack of destination at the end of Cardiff Barrage (Penarth end)	*No comments made*
Unreliable and slow bus journeys between Penarth and Cardiff (often requiring a change to travel to Cardiff Bay)	• Include this identified problem as part of 'Missing commuter link between study area and Cardiff Bay'
Lack of car parking at Penarth Esplanade	• Should be in brackets, may not be a problem if replaced by other modes
Lack of lighting along existing active travel routes	*No comments made*

The second part of this task required attendees to write any problems they felt should be added to the list of pre-identified problems and constraints. A list of responses can be found in Table 2.5.

Table 2.5 Additional problems suggested by attendees.

- Fear/protection of health and safety preventing people from leaving their car at home.
- Employer provisions for showers/storage/safe bike storage.
- Not enough shelter on Barrage.
- No current opportunities to hire bikes.
- Only so much space – potential conflicts between motorised vehicles and pedestrians.
- Opertaional barrage – water traffic given priority?
- LDP shows Park and Ride at wrong end of Penarth – benefit for outside of study area.
- Windsor Road/Plassey Street Congestion.
- Narrow Roads.
- Too many short distance trips undertaken by car users.
- Key destinations not accessible by sustainable transport modes.
- Low demand for communiting to Cardiff Bay via bus – bus across the Barrage may lack demand (need to check census data).
- Barriers to walking and cycling across Penarth due to volume of traffic on Windsor Road and Hickman Road.
- Speed of traffic from Cogan and Penarth along Windsor Road.
- No cycle infrastructure provision from Barrage to bottom of Zig-Zag path.
- Improve pedestrian and cycling access and priority to Cogan and Penarth stations.
- Sustainable transport (e.g. regular EV bus shuttle from centre to Cogan (Health/Leisure bus) and free shuttle bus).
- Air quality issues in Cogan.
- Gradient up to Penarth from Barrage.
- Decrease private motor traffic along Windsor Road/Penarth town centre – replace with walking/cycling/shuttle bus.
- Bad weather conditions (storms/high tides) – Headland Link.

- Debris washed up and cliff falls – Headland Link.
- Fair weather cyclists may limit usage of barrage to summer only.
- Topography of Penarth Esplanade.
- Parking costs at the Barrage; and
- Readily avaliable bicycle hire.

Attendees were also asked to discuss, comment and critique a number of pre-identified constraints that they felt are experienced within the study area, these are represented in Table 2.6.

Table 2.6 Pre-identified constraints and associated comments.

Pre-Identified Constraint	Comment
Tide dependent walking route around Headland	*No comments made*
Risk of rockfall (around Headland)	*No comments made*
Unsuitable route for those with wheelchairs/pushchairs (around Headland)	*No comments made*
Topography of study area restricting likelihood of active travel uptake (particularly between Penarth Esplanade and Cardiff Bay Barrage)	*No comments made*
Lack of sustainable transport alternatives	• Suggestion that the sustainable transport alternatives were unattractive rather than lacking.
Buses are reliant on road network and often do not have priority	*No comments made*
Potential for buses to cross Barrage may require crossing of third-party land	*No comments made*
Buses running across Barrage may detract from existing safe cycling and walking environment	*No comments made*
Interventions to increase vehicle parking at Penarth Esplanade may encourage private vehicle usage	*No comments made*
Third party apparatus and access requirements may affect potential routings of interventions	*No comments made*
Increases in provision of lighting may conflict with ecological concerns and shipping movements	*No comments made*
Construction of any large-scale interventions may impact upon residents of study area (during and post construction)	*No comments made*
Section of study area is included as part of the Severn Estuary European Marine Site	*No comments made*

Attendees were then asked to include any constraints they felt should be added to the list. These responses can be found in Table 2.7

Table 2.7 Additional constraints suggested by attendees.

- Uncontrollable weather/coastal erosion.
- Weathering of anything.
- Climate change.
- "Need to think differently".
- Crossing on the other side of the Barrage limited with routing options.
- Public transport timings influenced by boat movements into Barrage.
- Insufficient space in places for bus as well as cycle/walking.
- Autonomous pods/electric bikes/cargo bikes.
- Existing services and infrastructure – constraints if these are affected in practical and financial terms.
- Conflict between boat/bridge uses at Barrage and Pont-y-Werin.
- Bike lock up at place of work/destination.
- Shower facilities at place at place of employment.
- Park and Ride (in Sully or Cosmeston); and
- Interchangeable travel tickets to also cover bike usage.

2.2.3 Task Three

For the third task, participants were asked to discuss, comment and critique on a number of suggested scheme specific objectives. The suggested objectives and the comments concerning them are shown in Table 2.8.

Table 2.8 Suggested scheme specific objectives and their associated comments.

Suggested Scheme Specific Objective	Comment
Increase the usage of public transport	• This should be an outcome; • Improve bus priority.
Encourage modal shift away from the private car	• Particularly for short journeys to improve health and wellbeing • This should be prioritised
Reduce road traffic congestion and support increased economic activity	• This should be an outcome • This should be prioritised • Increased economic activity should be supported with better paid jobs (GVA)
Increase both accessibility and connectivity	• This is an outcome • These need to be separated between accessibility and connectivity
Increase levels of active travel in support of associated health benefits	• This is an outcome • Via expansion of the Next Bike? • Should replace 'increase levels' with 'Reduce barriers to uptake'
Create infrastructure which supports tourism investment	• Should support all investment, not just tourism • Should include that this investment should be sustainable

Attendees were also asked to also include any scheme specific objectives that they felt needed to be included. Their suggestions are presented in Table 2.9.

Table 2.9 Additional scheme specific objectives identified by attendees.

- Use inclusive design to increase tourism.
- Brexit-proof.
- Shorter journey opportunities for school journeys.
- Future proof use of latest technology (including renewable).
- Cleaner and greener.
- Ministerial priorities.
- Need to have long term vision.
- Improve infrastructure for sustainable modes of transport.
- Improve sustainable connectivity between Penarth and Cardiff Bay/Centre of Cardiff and vice-versa.
- Enhance Penarth and other areas of the Vale's economy by increasing visitor numbers.
- Improve access to employment.
- Electric vehicles (later query as to whether this will have any impact upon congestion).
- Wider fit to strategic agendas.
- Study area map needs to be widened to be more strategic.
- 'Carrots and Sticks' improve infrastructure and introduce car parking charges.
- Link to industrial strategy objectives – cleaner, greener, ageing population, mobility, artificial intelligence/data.
- Improve air quality especially around Cogan.
- Shuttle links – Penarth to Cogan (especially for the new Health Centre).
- Maximise SUDs features in accordance with recent legislation, which can encourage green infrastructure and therefore improve public health.
- Satifaction with walking/cycling facilities.
- Integrated ticketing – trains/buses/Next Bike.
- Miles of segregated cycle paths.
- Footfall and cycles on Barrage.
- Extending the NextBike.
- Oyster card across all travel options across Cardiff and the Vale.
- Opportunity to increase Park and Ride adjacent to Barrage car park and Sully and Cosmeston.
- Shuttle bus across the Barrage (should be electric).
- Water taxis (ideally electric).
- Better connections between trains and buses.
- More bus lanes (though appreciative of cost and constraints associated with this); and
- Section 106 funding – can this be used?

2.2.4 Task Four

Attendees were asked to develop a long list of solutions that aim to address the problems and constraints identified in Task Two. Firstly, attendees were asked to comment on existing potential identified solutions identifying the constraints/risks to each solution as well as stating the problems each solution addressed. They were also required to score each solution against the Five Ways of Working of the Well Being of Future Generations Act (Wales) (WBoFGA). Table 2.10 below shows results of Task Four.

Table 2.10 Existing potential identified solutions, comments and appraisal against WBoFGA.

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBoFGA?
Penarth Headland Link Walking and Cycling	• Weather • Maintenance of walkways	• Extension of Coastal Path • Continuation of Barrage route, with over 1 million barrage footfall potential to continue around to Penarth Esplanade	*No comments made*
Merrie Harrier to Pont-y-Werin Walking and Cycling	• Traffic crossings/busy roads/land availability • Pont-y-Werin bridge delay	• Lack of Active Travel links	*No comments made*
Cosmeston – Barrage Bus Priority	*No comments made*	• Improves attractiveness of using bus services	*No comments made*
Cosmeston Park and Ride	• Land availability/water with other transport/parking issues and resilience.	*No comments made*	*No comments made*
Cogan Park and Ride/Station Upgrade	*No comments made*	*No comments made*	*No comments made*
Vale Wide Parking Strategy	*No comments made*	*No comments made*	*No comments made*

Secondly, attendees were asked to identify other potential solutions and again state the constraints/risks these addressed and the problems each solution addressed. Then, as before, attendees were required to score each of their own solutions against the Five Ways of Working of the WBoFGA (Wales). These solutions are shown in Table 2.11 below.

Table 2.11 Additional potential solutions identified by attendees.

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
Creation of Multi-storey Parking on land adjacent to Cogan station	• Land earmarked for sheltered housing	• Parking/vehicle storage and lack of use at Cogan Station	• *Long Term* • *Integration*
Wellbeing hub and access to Cogan station. Improved through Active Travel Act inclusive design guidance.	• Design/Architecture would need to be in keeping with landscape.	• Lack of residential links to Cogan Station.	• *Collaboration* • *Involvement*

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
New car park on south west end of Barrage	• Design/Architecture would need to be in keeping with landscape.	• Lack of vehicle storage at barrage discourages non-car use.	• *Long Term* • *Integration*
Park and ride stops from Cosmeston	• Road width negates bus priority lane. Where are key travel points?	• High use of personal cars.	• *Prevention* • *Integration* • *Collaboration*
One-way systems. Employer incentives. Pool bikes/Next bikes	• Effective use of road space. • Commuters encouraged to make use of scheme (financial benefits).	• Perceptions of danger if using roads for walking/cycling.	• *Long Term* • *Integration* • *Collaboration* • *Involvement*
Company bikes/E-bikes for annual rent	• Short journeys/deliveries need early identification and opportunities need promotion.	• High use of car for short trips. • Reduction of short delivery journeys.	• *Prevention* • *Long Term* • *Integration* • *Collaboration* • *Involvement*
Speed limit at 20mph	• Spatial design. • Reduction of signage. Increase of road-based public spaces. • Public owned spaces	• Quality of air. • Quality of public spaces. • Perception of safety.	• *Prevention* • *Long Term* • *Integration* • *Collaboration* • *Involvement*
Bike Scheme	*No comments made*	• Give people the opportunities to use Active Travel easily.	• *Prevention* • *Collaboration*
Implement Active Travel links from the INM	*No comments made*	*No comments made*	*No comments made*
Improve bus shelters – RTI accessibility	*No comments made*	• More inclusive for passengers.	*No comments made*
Alternative solutions to short journeys	*No comments made*	*No comments made*	*No comments made*
Program to encourage Active Travel	*No comments made*	*No comments made*	*No comments made*
Demand responsive (e.g. Uber) & green expansion links.	*No comments made*	*No comments made*	• *Prevention* • *Integration* • *Collaboration* • *Involvement*
Light rail to Penarth and Cosmeston	• Financial	• Encourage people from cars onto train	• *Prevention* • *Long Term* • *Collaboration* • *Involvement*
Dedicated bus service to Llandough hospital	• Lack of usage	• Encourage employees/visitors out of cars and onto bus.	• *Prevention* • *Long Term* • *Collaboration* • *Involvement*

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
Regular circular bus from Dinas Powys to Penarth and Bay (every 15 – 20 mins)	• Usage (would need promotion).	• Inclusivity	• *Prevention* • *Long Term* • *Collaboration* • *Involvement*
More direct bus services to Cardiff city centre and Heath Hospital	*No comments made*	*No comments made*	• *Prevention* • *Long Term* • *Integration* • *Involvement*
Walking buses to schools in Penarth	*No comments made*	*No comments made*	• *Prevention* • *Long Term* • *Integration* • *Collaboration* • *Involvement*
Increase evening and weekend public transport services (particularly Sundays).	*No comments made*	*No comments made*	• *Prevention* • *Integration* • *Collaboration* • *Involvement*
Reduce congestion and traffic speed into town centre to increase walking and cycling (shared spaces).	*No comments made*	*No comments made*	• *Prevention* • *Integration* • *Collaboration* • *Involvement*
Improve cycle routes from Penarth residential areas to Barrage to encourage novice cyclists.	*No comments made*	*No comments made*	• *Prevention* • *Collaboration* • *Involvement*
Real time public transport information	*No comments made*	*No comments made*	*No comments made*
Integrated ticketing and introduction	*No comments made*	*No comments made*	*No comments made*
Car parking charges	*No comments made*	*No comments made*	*No comments made*
Congestion charge zone	*No comments made*	*No comments made*	*No comments made*
Kill the commute	*No comments made*	*No comments made*	*No comments made*
Tunnel between Cogan and Sports Centre	*No comments made*	*No comments made*	*No comments made*
Next bike scheme	*No comments made*	*No comments made*	*No comments made*
Infrastructure elements	*No comments made*	*No comments made*	*No comments made*
Bus route – widen Windsor Road	• Single lane traffic	• Reduce number of private vehicle use	• *Long Term*
Extended car park at Penarth Barrage	• Cost of infrastructure. • Availability of the Barrage (able to cross).	*No comments made*	*No comments made*
Park and Ride scheme.	• Initial investment cost (roughly £6m).	*No comments made*	• *Prevention* • *Long Term*

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
Integrated ticket for water bus/land bus/bike hire			• *Integration* • *Collaboration*
Increased tourism into Penarth Marina and Esplanade	• Opening hours. • Cost to small/private businesses.	• Increased tourism and improved local economy. • Increased job opportunities. • Reduced lengthy travel, i.e. not having to travel to Cardiff Bay	• *Long Term* • *Integration* • *Collaboration* • *Involvement*

3. Public Consultation Event

3.1 Background

A public consultation event was held on the 24th January between the hours of 13:00 and 19:00 in the Paget Rooms, Victoria Road, Penarth. Between these hours a total of 116 people attended the consultation. Table 3.1 presents a breakdown of attendees recorded by hour.

Table 3.1 Number of attendees to the Public Consultation Event

Time	Attendees
13:00 – 14:00	17
14:00 – 15:00	12
15:00 – 16:00	30
16:00 – 17:00	8
17:00 – 18:00	19
18:00 – 19:00	30
Total (13:00 – 19:00)	**116**

Attendees were encouraged to attend the following four workstations (Photographs 3 and 4). These are listed in Table 3.2.

Table 3.2 Format of the Public Consultation Event

Workstation	Activity
1	Penarth INM Maps (for reference)
2	Identification of Problems and Proposals ideas of Solutions (Flipcharts)
3	Comments on proposals and identification of alternatives/constraints (Study Area Maps)
4	Identification of whether the scheme proposals comply with the goals of the Well-Being of Future Generations Act (Wales)

Photographs 3 and 4: Public Consultation workstations.

3.2 Problems Identified

A number of problems in relation to uptake of sustainable and active modes, as well as other traffic issues within and surrounding the study area were captured by attendees of the consultation.

Problems identified were captured into common themes and are presented as follows in Table 3.3. A full list of comments can be found in Appendix B.

Table 3.3 Problems identified at the Public Consultation Event

Problems Identified at Public Consultation Event
Safety • Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station) • Lack of safe cycle routes (Penarth Road, Windsor Road, safe cycling route) • Arcot Street/Windsor Road junction dangerous for cyclists • Pavements in Penarth are dangerous for users, in particular, disabled users. • Hill from Custom House to Penarth – pavement is not suitable for pedestrians, is dangerous for cyclists. Need to address the number of cars and their speed.
Public Transport • Poor bus accessibility and provision. • Problems with train service: unreliable, expensive, capacity needs increasing • Park & Ride – “old fashioned” • Need to get people out of cars and using public transport / active travel. (Modal Shift) • Lack of reliable water boat service throughout the year.
Traffic/Congestion • Plassey Street/Windsor Road junction – building a bigger roundabout won’t help traffic and pedestrians. Putting in pedestrian traffic lights will help people cross the road. • Grid-locked roads at the Marina - used as a “rat-run”. • On street parking in the immediate vicinity of Penarth Station leads to single lane traffic. • We need to reduce vehicles. Traffic everywhere (pollution).
Active Travel • Barrage should be traffic free – against buses along the barrage • Need to get people out of cars and using public transport / active travel. (Modal Shift) • We need to reduce vehicles. Traffic everywhere (pollution).
Other • Long journeys – look at whether people actually need to travel • Sully should be included in study area and transport plans.

Additionally, attendees annotated the printed study area maps at to highlight with any problems that concerned a specific location within the study area. This feedback is shown in Appendix C.

3.3 Suggested Solutions

A number of solutions to tackle the problems identified were also made by attendees of the Public Consultation Event. These are presented below (Table 3.4) along with a list of identified problems that they may help to address. Initial constraints and considerations for each of the proposals are also included in preparation for the WelTAG Stage 1 appraisal of options.

Table 3.4 Proposed solutions identified during the Public Consultation Event

Proposed Solution	Problems that may be addressed	Constraints/Considerations
Re-opening of tunnel below A4160 Windsor Road to Cogan Station	• Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station)	Would require investigation into suitability of tunnel for reopening (e.g. structural)
Replacement of Cogan roundabout with traffic signalled junction (with associated active travel crossings)	• Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station) • Rat-running via Marina • Modal shift to public transport / active travel. •	May require timings to be phased with Baron's Court Junction.
Left hand filter lane toward Penarth at Cogan	• Reduce traffic congestion.	Re-design of current road layout.
Improve bus services and pedestrian links towards Cogan	• Need to get people out of cars and using public transport / active travel. (Modal Shift) • Poor bus accessibility and provision. • Pavements in Penarth are dangerous for users, in particular, disabled users	Cost of additional buses. Allocation of space for buses and pedestrians.
Traffic lights needed at A1460 Cogan Hill to stop the marina being used as a rat-run.	• Grid-locked roads at the Marina - used as a "rat-run". • Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station)	Could slow traffic down. Cost of installation of traffic lights.
Penarth Headland Link	• Lack of safe cycle routes. • Gridlocked roads at the Marina. • Hill from Custom House to Penarth. • Modal shift to public transport / active travel.	Subject to weather/storms and rockfall. High spring tide.
Next bikes brought to Penarth/ Vale of Glamorgan.	• Lack of safe cycle routes. • Barrage should be traffic free. • Reduce vehicles.	Would require investment in additional bikes and bike stations across Penarth.
Train services in the evening	• Problems with train service – capacity needs increasing	Cost of running and staffing additional trains.
Make Penarth Marina area 20mph speed limit.	• Rat-running via Marina • Hill from Custom House to Penarth • Lack of safe cycle routes. •	Slowing traffic down could lead to increased congestion.
Restricting parking to one side of each road	• On street parking in the immediate vicinity of Penarth Station leads to single lane traffic. • Lack of safe cycle routes.	Involves re-design of road layouts – moving white lines and parking bays.
Cable Car near Headland Link	• Rat-running at the Marina	Construction and cost of infrastructure required.

Proposed Solution	Problems that may be addressed	Constraints/Considerations
Pedestrian link between Tennyson Road and Cowslip Drive	• Pavements in Penarth are dangerous for users, in particular, disabled users. • Lack of safe cycle routes.	Construction of pathway between two locations. Current land ownership.
Pedestrian link between Fairfield Road and Gainsborough Road	• Pavements in Penarth are dangerous for users, in particular, disabled users. • Lack of safe cycle routes.	Construction of pathway between two locations. Current land ownership.
Sustainable transport route along the Esplanade and Cliff Road/Hill.	• Modal shift from cars to public transport / active travel.	Facilities for the route – bus stops, cycle bays/stations.
Continue Railway Walk for walking/cycling.	• Pavements in Penarth are dangerous for users, in particular, disabled users. • Lack of safe cycle routes. • Sully should be included. • Modal shift to public transport / active travel.	Maintenance/repair work for used/derelict parts of the Railway Walk.
Powered cycle lifts up the hill	• Need to get people out of cars and using public transport / active travel. (Modal Shift) • Lack of safe cycle routes (Penarth Road, Windsor Road, safe cycling route)	Installation costs. Maintenance – subject of weather.
More bus stops downhill on Pill Street	• Poor bus accessibility and provision. • Need to get people out of cars and using public transport / active travel. (Modal Shift)	Parked cars along Pill Street could limit opportunity for additional bus stops.
Light railway	• Need to get people out of cars and using public transport / active travel. (Modal Shift) • Problems with train service: unreliable, expensive, capacity needs increasing	Potential opposition to new rail tracks being built. Cost of construction.

Appendix D shows the solutions that were annotated onto the study area maps as they concern a specific location within the study area.

Additionally, attendees also commented on printed maps of the study area at workstation 3 to highlight solutions to tackle the problems identified. These are displayed in Appendix D.

Appendix A

Full List of Responses to Task One

Opportunities added by Stakeholders
• Other schools to be included as part of the Walking Buses project and cycling hubs
• Opportunity to use the right materials in interventions to reflect coastal location(s)
• Expansion of Next Bike scheme to Penarth
• Self-driving electric pods
• Monorail (Expensive, but sponsorship opportunities may exist)
• Shift away from cars to more active travel
• Development opportunity building next to Custom House (to the left) for car park
• Opportunity for multi-storey on current Barrage Car Park
• Improve Active Travel links between Penarth and Cardiff Bay
• Improve Active Travel in Penarth
• Improve Public Transport Provision in and out of Penarth
• Improve overall health and wellbeing of residents
• Include proposals as part of wider plan to increase rail provision within and south of study area
• Reduce vehicle ownership to create more space (freed up by parking)
• Expand bicycle hire to Penarth (including electric bicycle hire)
• Reduce congestion and traffic speed in Penarth Town Centre via introduction of shared spaces
• Link Cardiff with Vale tourism strategies to enhance opportunities
• Need to align with industrial strategy and focus on the 4 priorities (Mobility/Artificial Intelligence/Growing ageing population/Greener and carbon agenda)
• Maximise accessibility by foot and cycle to from Cogan/Penarth. Improve priority for pedestrians and cyclists at Cogan Station using TfW improvements to stations/visions in Metro area
• 20mph expansion (20's plenty)
• Air quality impact and social cohesion
• Extend public transport links south of Penarth towards Sully/Barry
• Headland Link
• Shuttle (Electric) across Barrage
• SUDs legislation
• High footfall across Barrage – opportunity to get footfall into Penarth
• Potential for modal shift – reduced travel time
• Increased parking at Penarth outer Harbour (Park and Ride would work with Headland Project)
• Use of electric buses across Barrage – huge costs against diesel engines and tourism into Penarth
• 20 mph limit expansion
• Prioritise bus movements in and out of Penarth
• Unified payment system for bus and rail

Appendix B

Full List of Problems Identified at Public Consultation Event

Problems Identified at Public Consultation Event
Regional transport links – mass transport, cycle network
Poor bus accessibility
Traffic congestion at Windsor Road, Cogan and the Merrie Harrier. Also, Dinas Powys congestion and Redland Heights congestion.
Lack of easy access into Cardiff by pedestrians/cyclists from/to Penarth.
Need to increase visitors from Cardiff Bay to Penarth front to improve economy and improve access for pedestrians/cyclists.
Hill down to Custom House, pavement not suitable for pedestrians, dangerous for cyclists, need to address number of cars, and the speed.
Absolutely no buses over the barrage. We have to do everything we can to preserve the traffic/car free parks of the city. Too many cars.
Lack of connected safe cycle routes e.g. dangerous junction and cycling on Windsor Road.
Train is regular but unreliable. Should be cheaper.
Penarth Headland link missing.
Safe cycling route
Prioritise traffic reduction through more accessible public transport. No point having more buses/routes if no one can afford them.
Ensure Park & Ride has additional stops, and any infrastructure needed doesn't ruin Cosmeston as an attraction.
Problem with old railway route where bikes and pedestrians both use whole width and cyclists too often don't have bells!
Lack of safe cycle route along Penarth Road.
Lack of reliable water boat service throughout year. Hear, hear!
Footpaths – incompletely represented on main maps. Old railway line path should continue to Sully area WITHOUT returning to the road. No reference on maps to paths through Kymin to Bradford Place to the Pier. Important it be retained.
Proposed headland link – Esplanade – Cardiff Barrage should be constructed. Public transport to Barrage across to Cardiff needed.
Pavements in Penarth. Hazardous to the disabled – and all!
There are two elements to the train problem 1. The capacity of the trains needs to be increased. 2. Provision must be made to accommodate parking in the vicinity of the station
There are two major constructions to road traffic in Penarth 1. The Baron's Court Junction – ideally this needs to be a fly-over, although this would be difficult to achieve. 2. There are only two bridges carrying road traffic over the railway.
At present all the streets in the immediate vicinity of Penarth station are parked solid every working day, leaving single lane traffic to operate in many streets. Consideration should be given to: 1. Creating several one-way systems to channelize traffic or 2. Restricting parking to one side of each road only.
Headland Link is big waste of money – only brings visitors to seafront – better to spend money on cycling links from town and improved train services.
Bus Park and Ride to be sited in Barry, to relieve traffic coming through Penarth and Dinas Powys.
Strong 'no' to opening barrage to motorised traffic – critical to protect it as a quiet, leisure facility.
Barrage should be traffic free. More cycle routes in Penarth. Stop parking on existing cycle routes. E.g. Castle Avenue, Beechwood Drive
Headland link car park. (On site of previous car park)
Obstacles to Cycling or Walking Enormous potential will be created for community to Penarth/Barry from Cardiff, and from the Vale/Penarth to Cardiff, by creating a flat, pleasant route to the Barrage via Penarth Headland Link.

Problems Identified at Public Consultation Event
• Will be capable of coping with both on the Link and recreational use. • And will create a visitor/tourist loop Cardiff → Barrage → Link → Esplanade → Alexandra Park → Town → Cardiff → Barrage, of international quality. • Will fill the embarrassing gap in the Wales coast path so close to the Capital City. Makes transport sense but coast paths, like other long-distance paths, create income as well as benefitting local people.
Walking from Llandough Hospital to Penarth via M4 junction.
Penarth R/B trees and shrubs – more greenery/shrubs.
1. At traffic lights it is very helpful to have box for cyclists. I am now 60 years and have started cycling for my new job. To have a slightly higher step so I can push off would be very helpful at traffic lights. 2. To encourage cycling, need more secure places for bikes. I have a £1,000 bike so would be reluctant to leave in a place which was not monitored. 3. In planning, consider older generation cycling as not so flexible.
Better access to take cycles on trains. Often the platforms are very low, and I could not easily lift my heavy bike off. Also, there are few carriages so no room. Trains discourage cycle and ride.
Streets are clogged with private parked cars and rat-run traffic making cycling in Penarth unpleasant and scary.
Allowing private transport across the barrage is not the answer for congestion – need to get people out of cars and using public transport/cycling/walking i.e. “Active Travel”.
Need to improve bus routes
Bus routes can’t start/finish at barrage as this would lead to a Park and Ride system, causing problems for residents of the Marina, as parking on roads would increase significantly.
Buses no longer come to Penarth Heights.
Emergency vehicle access between Royal Close and Trem Y Bae is compromised by key operated bollards.
Cycling and walking around Penarth doesn’t feel safe because of illegal parking and priority given to vehicles.
Unsafe cycle routes – needs to be safe for children.
Not enough capacity on the trains.
Long journeys – look at whether people actually need to travel - agile working/co-working in the community – would boost local economy too.
Grid locked roads – Marina used as a rat-run.
Building a bigger roundabout at the Plassey Street/Windsor Road junction will not increase traffic flow and help pedestrians. (NB Railway bridge in a fixed space). Putting in pedestrian traffic lights will help people cross the road.
Need link between Cardiff Bay and Penarth Waterfront avoiding busy junctions, enabling walking, cycling and a short route for sustainable vehicles.
Motor vehicles are to me the largest problem. • We need to reduce vehicles. • More designated zone free walkways. • Reduce congestion. • Encourage people to cycle by putting in place cycleways. • Stop large vehicles using road that are obviously inappropriate. • Traffic everywhere (pollution). • Penarth some roads not fit for purpose.

Appendix C

Annotated Study Area Map with Additional Problems Identified at The Public Consultation Event

Appendix C - Problems Identified at Penarth Public Consultation Event

BARON'S COURT JUNCTION

PONT-Y-WERIN BRIDGE

CARDIFF BAY BARRAGE

MERRIE HARRIER JUNCTION

PENARTH PIER PAVILLION

6

5

3

2

9

8

1

11

4

10

7

Problems

1. Currently roads around Grove Place/Grove Terrace/Dingle Rd are narrow due to parked cars on either side and “rat-run” traffic.
2. Issue with roundabout, cyclists & drivers coming along the wrong side of roundabout (near barrage).
3. Pavements on hill is unsafe/too narrow for pedestrians. Something to address traffic on this road.
4. Lots of roads converge in one place (Windsor Rd/Cornerswell Rd junction). Can be tricky to cross multiple roads as a pedestrian and cars shoot out when on a bike.
5. Disagree with the plans to make this (Windsor Rd) one way, would still be too dangerous to cycle & it appears to be a traffic flow exercise rather than improving sustainable transport.
6. Really hard to cross the road from the marina to access Cogan train station.
7. Pinch point for cyclists when cars are waiting at the lights going into town. Hard to get past in a safe place ahead of traffic.
8. Arcot St/Windsor Rd difficult to get across as pedestrian and cyclist when going along Arcot St and crossing Windsor Rd, suggest a zebra crossing with cycle lane.
9. One-way road with cycle lane in other direction - hasn't been implemented well. There isn't enough space for vehicles and as a result, they drive in the cycle lane which makes it quite dangerous.
10. There is a lane that runs parallel to Cornerswell Rd, to the rear of the houses on the southern side. Lots of children go this way to school. It could be made safer by raising the road when it hits the cross roads could also introduce filtered permeability to make it safe.
11. Street outside Victoria School could be made safer. Could widen the pavement, add street trees etc. to slow down cars and give priority to pedestrians.

Key:

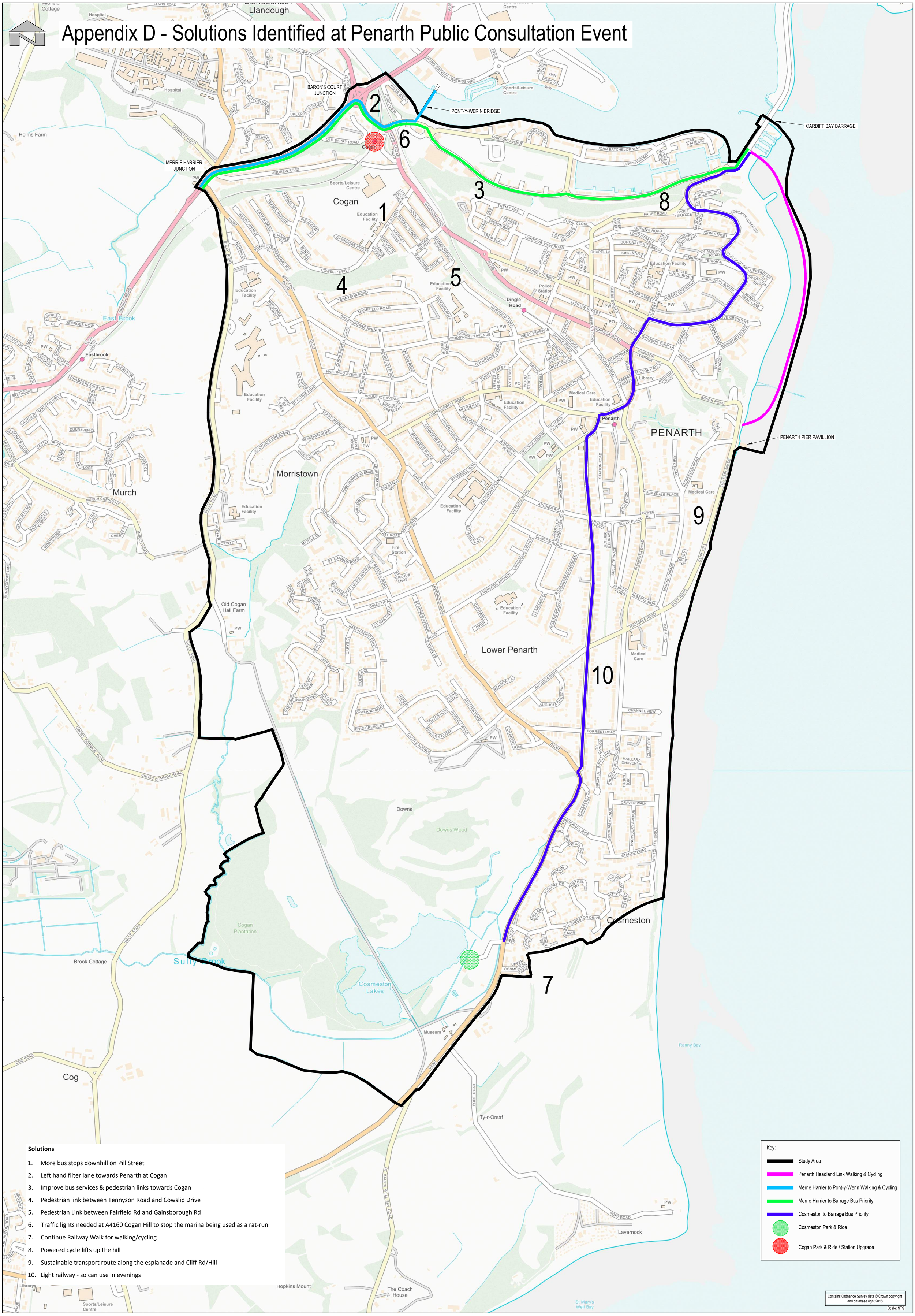
- Study Area
- Penarth Headland Link Walking & Cycling
- Merrie Harrier to Pont-y-Werin Walking & Cycling
- Merrie Harrier to Barrage Bus Priority
- Cosmeston to Barrage Bus Priority
- Cosmeston Park & Ride
- Cogan Park & Ride / Station Upgrade

Scale: NTS

Appendix D

Annotated Study Area Map with Additional Solutions Identified at The Public Consultation Event

Appendix D - Solutions Identified at Penarth Public Consultation Event



Solutions

1. More bus stops downhill on Pill Street
2. Left hand filter lane towards Penarth at Cogan
3. Improve bus services & pedestrian links towards Cogan
4. Pedestrian link between Tennyson Road and Cowslip Drive
5. Pedestrian Link between Fairfield Rd and Gainsborough Rd
6. Traffic lights needed at A4160 Cogan Hill to stop the marina being used as a rat-run
7. Continue Railway Walk for walking/cycling
8. Powered cycle lifts up the hill
9. Sustainable transport route along the esplanade and Cliff Rd/Hill
10. Light railway - so can use in evenings

Key:

- Study Area
- Penarth Headland Link Walking & Cycling
- Merrie Harrier to Pont-y-Werin Walking & Cycling
- Merrie Harrier to Barrage Bus Priority
- Cosmeston to Barrage Bus Priority
- Cosmeston Park & Ride
- Cogan Park & Ride / Station Upgrade

Scale: NTS

We | Listen Create Deliver

www.capita.co.uk/infrastructure

St David's House, Pascal Close, St Mellons, Cardiff, CF3 0LW T: 02920 803500

Appendix 4 Policy Review

Prosperity for All: The National Strategy, 2017:

Prosperity for All – The National Strategy sets out four key themes, which are the same as those in Taking Wales Forward to deliver by 2021.

Key Themes and Well-Being Objectives	
Key Themes	Objectives
Prosperous and Secure	• Support people and businesses to drive prosperity; • Tackle regional inequality and promote fair work; and • Drive sustainable growth and combat climate change.
Healthy and Active	• Deliver quality health and care services fit for the future; • Promote good health and well-being for everyone; and • Build healthier communities and better environments.
Ambitious and Learning	• Support young people to make the most of their potential; • Build ambition and encourage learning for life; and • Equip everyone with the right skills for a changing world.
United and Connected	• Build resilient communities, culture, and language; • Deliver modern and connected infrastructure; and • Promote and protect Wales' place in the world

Improvements to encourage and promote sustainable transport within the study corridor would enable modern and connected infrastructure to be implemented which will contribute to the four key themes and list of objectives.

Through improving the sustainable transport connections within the corridor there could be a reduction in air pollution caused by private motor vehicle usage. Improvements to sustainable transport infrastructure within the corridor will also increase transport options for those travelling who do not have access to, or do not wish to use, private motor vehicles.

The National Strategy is underpinned by an Economic Action Plan (2017), discussed below.

Prosperity for All: Economic Action Plan: 2018

This document produced by the Welsh Government seeks to grow economy inclusively, spread opportunity and promote well-being within Wales. It contains actions that will work to grow the economy and reduce inequality. The vision of the plan is 'inclusive growth, built on strong foundations, supercharged industries of the future and productive regions'.

The plan is focused around the following areas:

- Support people and businesses to drive prosperity;
- Tackle regional inequality and promote fair work;
- Drive sustainable growth and combat climate change;

- Build ambition and encourage learning for life;
- Equip everyone with the right skills for a changing world;
- Deliver modern and connected infrastructure;
- Promote and protect Wales' place in the world.

Any intervention implemented within the study area would be supportive of the Economic Action Plan, through providing better access to existing developments and potentially open up new development opportunities through increased access (especially for those without access to a car).

Via improving sustainable transport provision through the study corridor access to employment and education opportunities may be strengthened, thus helping to grow economic activity in the area and surrounds.

Emerging Wales Transport Strategy

A two-tier approach to the replacement Wales Transport Strategy is proposed, comprising an overarching policy statement supported by a number of thematic policy statements.

The overarching policy statement will set out how transport will work to deliver the four key themes in Taking Wales Forward and deliver against the Priority areas set out in Prosperity for All.

The overarching policy statement is underpinned by a suite of thematic policy statements which together form a new Wales Transport Strategy. This would in turn, sit under the Economic Action Plan and the National Strategy.

This WelTAG study for improving sustainable transport within the study corridor considers impacts against the existing Wales Transport Strategy. However, the study acknowledges that there is an emerging Wales Transport Strategy being developed and will likely be of consideration for WelTAG Stage 2 (if the new strategy has been published).

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

The aim of One Wales: Connecting the Nation is to "promote sustainable transport networks that safeguard the environment while strengthening the country's economic and social life".

The Wales Transport Strategy (WTS) identifies a range of outcomes that should be achieved over the longer term, including the need for improved connectivity and reliability across networks. The following high-level outcomes are identified as critical to the future transport policy agenda:

- Achieving a more effective and efficient transport system;
- Achieving greater use of the more sustainable and healthy forms of travel;
- Minimising demands on the transport system; and
- Reducing the impact of transport on greenhouse gas emissions.

An intervention into improving sustainable transport provision along the study corridor will consider the economic, environmental, social and cultural benefits that may be achieved for which any improvement will likely provide benefits.

Worksheet 5 in Appendix 6 of the Impacts Assessment Report also shows the impact of the long list of options against the outcomes of the Wales Transport Strategy.

National Development Framework (Anticipated Publication – 2020)

The Planning Directorate is working on the production of a National Development Framework which will set out a 20-year land use framework for Wales and will replace the current Wales Spatial Plan.

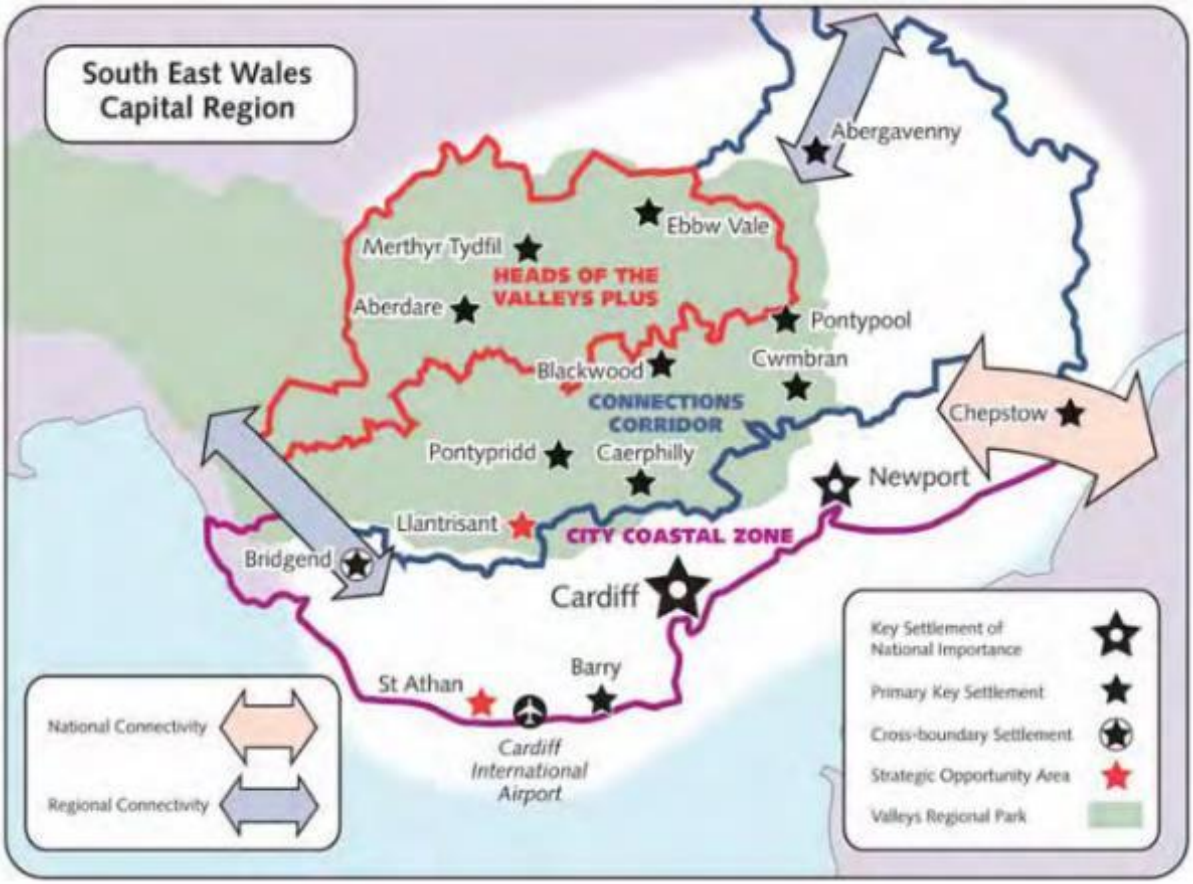
The National Development Framework will:

- Set out where nationally important growth and infrastructure is needed and how the planning system - nationally, regionally and locally - can deliver it;
- Provide direction for Strategic and Local Development Plans and support the determination of Developments of National Significance;
- Sit alongside Planning Policy Wales, which sets out the Welsh Government's planning policies and will continue to provide the context for land use planning; and
- Support national economic, transport, environmental, housing, energy and cultural strategies and ensure they can be delivered through the planning system.

While at the draft stage, the improvement in provision of sustainable and active transport modes within the study corridor is likely to be supportive of aims and objectives of the emerging document.

Wales Spatial Plan, 2008

The Wales Spatial Plan (2008) sets out improvements and strategic priorities for the National Transport Plan (2010). The high level objective of the Wales Spatial Plan is to provide strategic transport links and infrastructure that improve well-being and the quality of life by integrating social, economic and environmental objectives. The study corridor sits within the Coastal Zone of the plan, which is seen illustrated below.



The study corridor sits within the City Coastal Zone. The Spatial Plan document describes the City Coastal Zone as "an area including the two mains cities of Cardiff and Newport as well as smaller district communities offering a high quality of life located in rural, coastal communities". Better sustainable transport connections would support maintaining this quality of life and ensuring this continues to be the case for future generations within the study corridor.

National Transport Plan (2010, updated 2011)

The National Transport Plan (NTP) sits alongside the Local Transport Plan to deliver the aims and outcomes of the Wales Transport Strategy. The NTP sets out Welsh Government interventions to deliver the aspects of transport policy for which it is responsible. It sets out proposals to deliver a transport system as integrated as possible and to ensure the transport system is used efficiently and sustainably. The NTP reflects a balanced approach to the development of the transport network, recognising that it must continue to support economic growth and promote social inclusion, whilst playing its full part in tackling climate change. Any improvements to sustainable transport provision within the study area would support the National Transport Plan through enabling economic growth and social inclusion for the communities surrounding and travelling along/within the corridor. Inclusion of Active Travel improvements along with public transport provision in any solution implemented within the corridor would assist in tackling climate change through promoting sustainable forms of transport.

National Transport Finance Plan, Updated 2017

The Plan sets out the investment for transport infrastructure and services for 2015 to 2020 and beyond. It recognises that Transport has a critical role to play in improving Wales' economic competitiveness and access to jobs and services. However, it does state that it is not a policy document, nor does it seek to prioritise schemes to be taken forward.

The Plan acknowledges that the maximum benefits from transport will be experienced if excellent national/international connections exist, enabling access to markets, employment, education and services. It is envisaged that interventions to improve sustainable transport provision along and within the study corridor will increase the opportunities for people without access to a private vehicle to connect at key destinations within and outside of the study corridor.

Planning Policy Wales (Edition 10, 2018)

Planning Policy Wales Edition 10 (2018) has been developed considering the Well-being of Future Generations (Wales) Act 2015. The objectives of which are the central thread running through the document.

To support the delivery of the Well-being of Future Generation (Wales) Act 2015 goals, Planning Policy Wales Edition 10 focuses on the new, multi-faceted concept of Placemaking. The four key themes that contribute to Placemaking are shown below.

Key Themes and Deliverables	
Key Theme	Deliverables
Strategic & Spatial Choices	• Good Design • Promoting Healthier Places • The Welsh Language • Sustainable Management of Natural Resources • Strategic Planning • Placemaking in Rural Areas • Managing Settlement Form
Active & Social Places	• Transport • Housing • Retail & Commercial Centres • Community Facilities • Recreational Spaces
Productive & Enterprising Places	• Economic Development • Tourism • The Rural Economy • Transport Infrastructure • Telecommunications • Energy • Minerals • Waste

Distinctive & Natural Places	• Landscape • Coastal Areas • Historic Environment • Green Infrastructure • Biodiversity • Water, Air, Soundscape and Light • Flooding • De-risking

The following five outcomes provide a framework for proposals:

- Creating and Sustaining Communities;
- Growing Our Economy in a Sustainable Manner;
- Making Best Use of Resources;
- Maximising Environmental Protection and Limiting Environmental Impact; and
- Facilitating Accessible and Healthy Environments.

These outcomes, whilst highlighting the sustainable features should be the starting point for plan makers and decision takers and be considered at the earliest possible opportunity. In accordance with Planning Policy Wales Edition 10, this WelTAG Stage 1 study considers improvements to sustainable transport provision within the Penarth to Cardiff study corridor that will enable the key themes and objectives to be achieved.

Active Travel (Wales) Act (2013)

The Active Travel (Wales) Act was passed by the National Assembly of Wales and seeks to secure new and enhanced active travel routes and facilities, improving provision for walkers and cyclists across Wales. The Act requires Local Authorities to map existing active travel routes and regularly monitor active travel facilities / routes to review where improvements and/or new routes are required. Part of this process requires Local Authorities to record annual reports regarding how route usage.

The Vale of Glamorgan Council's Integrated Network Map (INM) and existing route map have been approved by Welsh Government. Investment in delivering developments to the proposed INM routes within the study corridor would allow for implementation of the Act. This may facilitate increases in the uptake of Active Travel modes, particularly to places of employment across the county border into/from Cardiff.

Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations (Wales) Act (WBOFGA) is about improving the social, economic, environmental and cultural well-being of Wales. The Act puts in place seven well-being goals:

- A globally responsible Wales;
- A Wales of vibrant culture and thriving Welsh Language;
- A Wales of cohesive Communities;
- A more equal Wales;
- A healthier Wales;
- A resilient Wales; and
- A prosperous Wales.

A summary table of appraisal results against the Well-Being of Future Generations Act Goals is included as Appendix 7 (Worksheet 6) of the Impacts Assessment Report.

The Well-being of Future Generations (Wales) Act also details five ways of working to enable the act. An intervention within the study corridor would help to address these as follows:

- Long Term – any intervention chosen as a preferred option would address long term aims through appraisal of options against future trends and wider issues. For example, consideration of more sustainable modes including public transport and active travel. These will look towards helping to address long term trends of increasing congestion and help to reduce carbon, as will options to adopt future technologies such as electric bikes and vehicles.
- Prevention – any intervention chosen would aim to address problems getting worse or occurring. Problems for the study area have been defined and objectives and interventions formed are specifically related to addressing these problems. Options look to address issues of congestion, which if addressed would aid in carbon reduction, preventing emissions and worsening air quality.
- Integration – At this stage, the wider issues have been considered and how interventions may impact upon this. Wellbeing objectives of the Vale of Glamorgan Council as well as the local health board's objectives have been considered in developing options.
- Collaboration – Stakeholders from a range of organisations operating within the Vale of Glamorgan and surrounding areas along with the public have been engaged as part of this Stage 1 WelTAG (Strategic Outline Case) process. This will ensure a collaborative approach to addressing the identified problems is achieved and any intervention addresses a range of problems identified for the study area.
- Involvement – Both local and national government representatives and the public have been engaged at an early stage in identifying problems within the study area, formulating objectives and identifying potential solutions.

In addition to the Well-being of Future Generations (Wales) Act 2015, the Vale of Glamorgan Public Services Board has its own Well-being objectives, which are detailed in the local policy section.

Regional Policy

Cardiff Capital Region City Deal (CCRCD) Regeneration Plan

The Cardiff Capital Region City Deal (CCRCD) is a £1.28 billion programme which will achieve a 5 per cent uplift in the region's GVA by delivering a range of programmes which will increase connectivity, improve physical and digital infrastructure, as well as regional business governance[1]. It covers the 10 local authorities within south east Wales including the Vale of Glamorgan.

Some of the key aspects of the deal include improvements to connectivity within the region and supporting new infrastructure. There is a commitment to spend £1.2 billion on the Capital City Region infrastructure including delivery of the South East Wales Metro. A Regional Transport Authority has been set up to manage the implementation of this infrastructure.

Any improvement to sustainable transport provision along the study corridor would help to achieve the objectives of the CCRCD, through improving access and thus opportunities for local communities to key strategic routes.

Each of the long list of options has been assessed in terms of impact against the CCRCD Regeneration Plan objectives. Results of this are shown in Appendix 7 (Worksheet 7) in the Impacts Assessment Report.

[1] http://www.cardiffcapitalregioncitydeal.wales/ date accessed 31st October 2018

Local Policy

Penarth Town Place Plan

The Penarth Town Place Plan aims to be a flexible town plan that adapts to the wider local, regional and national policy. The plan has been created in close collaboration with the Vale of Glamorgan Council, and the public.

The plan outlines 12 themes of focus, which include those specifically related to the sustainable transport corridor:

- **Improved Links** – A town that is positively connected to its surroundings through a range of transport modes, and which attracts visitors from Cardiff and the wider Vale. Seek to connect the Pier to the Barrage.
- **Better Transport Choices** – A town where there are a range of ways to safely and conveniently access the town centre and the wider area – on foot, by public transport and by bike.

Vale of Glamorgan Local Development Plan

The Vale of Glamorgan Local Development Plan outlines the development priorities and designations for the study area, the document also outlines a number of objectives:

- **Objective 1:** To sustain and further the development of sustainable communities within the Vale of Glamorgan, providing opportunities for living, learning, working and socialising for all
- **Objective 2:** To ensure that development within the Vale of Glamorgan makes a positive contribution towards reducing the impact of and mitigating the adverse effects of climate change
- **Objective 3:** To reduce the need for Vale of Glamorgan residents to travel to meet their daily needs and enabling them greater access to sustainable forms of transport
- **Objective 4:** To protect and enhance the Vale of Glamorgan's historic, built, and natural environment
- **Objective 5:** To maintain, enhance and promote community facilities and services in the Vale of Glamorgan
- **Objective 6:** To reinforce the vitality, viability and attractiveness of the Vale of Glamorgan's town district, local and neighbourhood shopping centres
- **Objective 7:** To provide the opportunity for people in the Vale of Glamorgan to meet their housing needs
- **Objective 8:** To foster the development of a diverse and sustainable local economy that meets the needs of the Vale of Glamorgan and that of the wider South East Wales Region
- **Objective 9:** To create an attractive tourism destination with a positive image for the Vale of Glamorgan, encouraging sustainable development and quality facilities to enrich the experience for visitors and residents

In developing the list of options, the Local Development Plan has been considered. Objectives that an improvement in Sustainable Transport provision are most likely to address includes both Objective 1, to sustain and further the development of sustainable communities within the Vale of Glamorgan, providing opportunities for living, learning working and socialising for all, and Objective 3, to reduce the need for Vale of Glamorgan residents to travel to meet their daily needs and enabling them greater access to sustainable forms of transport.

Local Transport Plan

The Vale of Glamorgan also have a Local Transport Plan (2015 – 2030), states that it seeks to "secure better connections for pedestrians, cyclists and public transport users and to encourage a change in travel choices away from single occupancy car. The LTP also seeks to tackle traffic congestion by securing improvements to the strategic highway corridors for commuters who may need to travel by car as well as providing better infrastructure for freight. It also addresses the key road safety priorities for the Vale."

The plan at various points links back to the importance of promoting and encouraging sustainable modes of transportation and links in to the Vale of Glamorgan's Local Development Plan as well as Welsh Government Priorities.

Within the document, the scheme 'Localised Road Improvement Actions' specifically relates to the study area, as seen illustrated below:

Scheme	Description	Priority
Localised Road Improvement Actions	Implement local road improvement actions at Cardiff Road corridor, Barry, the A4231/A4055/B4267 Biglis roundabout; the Merrie Harrier Junction; Penarth; Windsor Road corridor – Cogan, Penarth, Barry Island Causeway/Harbour Road	High
Safe Routes in Communities	To implement safe routes in communities. Walking and cycling infrastructure interventions that assist the public accessing schools and services by using sustainable travel options	High
Road Safety Highway Engineering Schemes	To implement road safety highway engineering schemes that address the current risk of accident on the highway, using the current KSIs identified in Stats 19 records, to help meet the targets identified in the Road Safety Framework for Wales up to 2020.	High
Bus Park and Ride at Cosmeston	To provide a 500 space regional Bus Park and Ride/Park and Share facility at Cosmeston, Penarth	Medium

Vale of Glamorgan Well-Being Objectives

The Vale of Glamorgan Public Services Board has created a Well-being plan with an aim to achieve 4 Well-being objectives of:

- To enable people to get involved, participate in their local communities and shape local services
- To give children the best start in life
- To protect, enhance and value the environment
- To reduce poverty and tackle inequalities linked to deprivation.

The document states how by achieving the above objectives, a "positive difference can be made to the social, economic, environmental and cultural well-being of residents and visitors" and has therefore been included as part of the appraisal process for this study.

Vale of Glamorgan Well-Being and Improvement Plan Part 1: Improvement Objectives 2018 – 2019

The Vale of Glamorgan Council aims to pursue service excellence, improvement and efficiency. As part of this aim, there are a number of Well-being outcomes (in addition to those outlined within the section above), which include:

- Well-being Outcome 1: Citizens of the Vale of Glamorgan have a good quality of life and feel part of the local community
- Well-being Outcome 2: The Vale of Glamorgan has a strong and sustainable economy and the local environment is safeguarded for present and future generations
- Well-being Outcome 3: All Vale of Glamorgan citizens have opportunities to achieve their full potential
- Well-being Outcome 4: Residents of the Vale of Glamorgan lead healthy lives and vulnerable people are protected and supported.

Within these, specific references are made to the potential that a promotion of sustainable travel may have upon the study area. For example, as part of Well-being Objective 2 "Implement Integrated Network and Active Travel Maps to provide residents and visitors with a comprehensive information resource to travel efficiently and safely" and Well-being Objective 4 "Seek S106 and other funding to deliver improved walking and cycling access to parks and other leisure facilities" – amongst other examples of how the proposed options may link into the policy document, therefore the Well-being objectives outlined within the Vale of Glamorgan Well-Being and Improvement Plan Objectives have been considered as part of the appraisal process.

Appendix 5 Background Studies

CAPITA

Barry to Dinas Powys Cycleway/Footway Review

March 2016

We | Listen Create Deliver

CAPITA

Project No: CS/085419 Doc Ref: CS/085419 Rev:

Client: Vale of Glamorgan County Borough Council
Issue Date: March 2016

Barry to Dinas Powys Cycleway/Footway Review

	Name	Signature	Date
Author	Alan Wooldridge		23/03/2016
Checker	Lee Morgan		23/03/2016
Approver	Leigh Collier		23/03/2016

Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:

Contents

Appendices

1. Introduction

1.1.1 This report follows the Vale of Glamorgan Report entitled Barry to Dinas Powys Cycle Route Feasibility Report 2011, which contained the feasibility study for providing a combined footway / cycleway from Barry to Dinas Powys.

1.1.2 The proposed cycleway is considered to be an important link in the National Cycle Network's (NCN) overall cycleway strategy for the Vale of Glamorgan. The proposed route is intended to link Cae'r Odyn at the southern extent of Dynas Powys with the A4055 / A4231 Biglis Roundabout at the eastern end of Barry. Two main options were considered:

(i) Option 1 – for most of its length passing on or close to the line of Public Footpath ROW14 through recreational land and agricultural land on the north western side of the A4055 Cardiff Road.

(ii) Option 2 – is the same as Option 1 at the Dinas Powys end over about 30% of the total length but then crosses the A4055 Cardiff Road and then passes through mainly agricultural land on the south eastern side of that road.

1.1.3 The feasibility report also considered alternative alignments over parts of both options. The proposed cycleway standards and planning were based on the recommendations of Sustrans Connect2 and Greenway Design Guide. The proposed route is in line with the subsequently introduced Active Travel (Wales) Act 2013.

1.1.4 This report considers the route previously called Option 2. In particular, the report examines the feasibility of providing an on-line route on the south eastern side of the A4055 Cardiff Road between Green Lane and Biglis Roundabout. For ease of reference, this report will refer to the Option 2 from the previous report as Option 2A and the on-line variation of it as Option 2B. On the north western side of the A4055 Cardiff Road between Dinas Powys and Green Lane, Option 2B coincides with Option 2A.

1.1.5 For reference, typical cross-sections of these two options are given in Appendix D. The cross sections are based on criteria in LTN 1/12 "Shared Use Routes for Pedestrians and Cyclists" This requires that the preferred minimum width of an unsegregated route should be 3 metres but if there is an adjacent vertical feature above 600 mm high, an additional width of 500 mm should be provided to maintain effective width of cycle track. It also requires that for shared use non-motorised user (NMU) routes alongside high speed roads, a buffer zone must be provided between the route and the carriageway. The Design Manual for Roads and Bridges (DMRB), "TA 90/05 The Geometric Design of Pedestrian, Cycle and Equestrian Routes" recommends that the buffer zone should be at least 0.5 metres rising to 1.5 metres, where possible, on roads with speed limits over 40mph. In this report, a buffer zone of 0.5 metres (minimum) has been used but this will increase as necessary to accommodate larger road signs and at accommodation accesses.

2. Feasibility of Proposed Route 2B

2.1.1 The length of the proposed footway / cycleway route is approximately 1.9km. In the Vale of Glamorgan Report entitled Barry to Dinas Powys Cycle Route Feasibility Report 2011, the route length is given as 1.85km on the drawings due to Ch. 600 occurring twice. Attention has been drawn to this error in case the Feasibility Report costs were based on the incorrect route length.

2.1.2 The average gradient is less than 2% falling from Dinas Powys to Barry. Allowing for minor variations, this makes all options of the route suitable with regard to vertical alignment in accordance with the requirements of DMRB "TA 90/05 The Geometric Design of Pedestrian, Cycle and Equestrian Routes", which states a preferred maximum gradient of 3% and an acceptable maximum gradient of 5%.

2.1.3 Part of the proposed route for Options 2A and 2B, on the north western side of the A4055 Cardiff Road, passes through land that is considered to be a potential ransom strip (see Section 5 Review and discussion of land implications and processes for explanation and Appendix B Schematic Layout Plan for location). This could potentially lead to delays and increased costs for the project and mitigation measures, which are discussed in Section 5.

2.1.4 Provision of a Toucan Crossing of the A4055 Cardiff Road near the existing junction with Green Lane will provide the safest location for such a facility, as discussed in Section 3.

2.1.5 The southern end of the proposed route at the A4055 Cardiff Road near Biglis Roundabout currently presents a number of issues, many of which have yet to be determined and this is also discussed in in Section 3.

2.1.6 The section of the route on the south eastern side of the A4055 Cardiff Road could be located, subject to land acquisition, within existing fields and adjacent to their boundary with Cardiff Road. This would allow mainly at grade construction, except through the flood risk area, where the cycleway / footway would have to be raised on embankment. However, this off-line route may be unpopular during hours of darkness and it may be necessary to provide lighting for the route due to its remoteness. Sustrans (2012) Lighting of Cycle Paths - Technical Information Note No. 29 states:

"Lighting should generally be provided on all routes where cycling can be expected after dark. Lighting will be particularly important on commuter routes and routes forming part of a safe routes to school network, where usage is sustained throughout the longer periods of darkness associated with the winter months."

Any such lighting would have to be discreet and will be subject to planning constraints. For the purposes of this report, a lighting scheme has been proposed for each route that is sensitive to environmental constraints (e.g. bats and other light pollution considerations).

2.1.7 An on-line provision of the route would be on embankment throughout most of its length. The considerable clearance of trees and informal hedgerow, subject to environmental consents, would require environmental enhancement through provision of mitigation in the form of planting of new boundary hedgerow and associated planting.

3. Advantages / Disadvantages of Proposed Route 2B

3.1 Advantages

3.1.1 Through most of its length route Option 2B as Option 2A will follow a straight or gently curved alignment. This will ensure that pedestrians and particularly cyclists have good visibility in order to minimise the risk of collisions.

3.1.2 Option 2B generally is further separated from the river than Option 2A, reducing environmental impacts and improving safety for users.

3.1.3 Locating the Toucan Crossing of the A4055 Cardiff Road near the existing junction with Green Lane will provide cost savings and safety improvements for the scheme when compared to a crossing at any other location along the route.

(a) within an existing 30mph restricted zone;

(b) there is a substantial central island;

(c) there is existing road lighting for the junction, which should also be available to provide power for the crossing signals;

(d) Desirable Minimum Stopping Sight Distance in accordance with DMRB "TD 9/93 Highway Link Design" can be achieved with the trimming back of overgrown vegetation in the verge.

3.1.4 Option 2B will be more visible to drivers than Option 2A, making them more alert to the prospect of a non-motorised user (NMU) road crossing.

3.1.5 On the south eastern side of the A4055 Cardiff Road, Option 2B will be closer to the highway and at a higher level than Option 2A and that will assist in reducing the risk of flooding to the route. Both options will have to be raised on embankment through the flood risk area but as Option 2B will be next to the road, the impact on the floodplain and associated land take requirement will be significantly reduced.

3.1.6 As alluded to in the previous point, the on-line route, Option 2B, would have potentially less impact on adjacent land than an off-line route would and reduced land related costs.

3.1.7 Option 2B may be perceived by its users as a safer route, especially during hours of darkness as Option 2A is more remote. Cyclists and pedestrians who currently travel along Cardiff Road, particularly at night, may be more likely to use a Cycleway / footway that is adjoining the road especially if these non-motorised users are travelling for reasons other than leisure (e.g. commuting).

3.1.8 The Biglis Tip landfill site poses a particular problem, due to the unknown constraints of the site. Option 2A has two alternative routes in that area and given as points N to O or N to P in the original report and reproduced on the schematic layout plan in Appendix B.

3.1.9 For route N to O, Option 2A will require a bridged crossing of the existing field drainage ditch to access the existing southern verge / footway of the A4055 Cardiff Road. Option 2B will not need the bridge. Both options will require modification or replacement of an existing large map type

advance direction sign, tree clearance adjacent to the main road and construction in the highway verge on the approach to the roundabout.

3.1.10 For route N to P Option 2A will require significant tree clearance and earthworks in an area that is potentially subject to environmental constraints.

3.1.11 Works in and adjacent to the highway at a busy junction will impose additional safety considerations and cost on the project.

3.2 Disadvantages

3.2.1 Option 2B would inevitable increase design and construction costs as compared to the off-line route and require significantly more temporary traffic management measures during construction.

3.2.2 There are several environmental constraints currently known and it is suspected that others may be determined by more a more comprehensive range of environmental studies. These are discussed in detail elsewhere in this report as follows:

(a) Section 4 Ecology Issues

(b) Section 6 Flooding

3.2.3 The uncertainty of these constraints have prevented a complete evaluation of the on-line route, (Option 2B) and consequently reduce confidence in the accuracy of the project cost estimate and project programming.

3.2.4 On the approach to Biglis Roundabout, Option 2B will be aligned between the A4055 Cardiff Road and the drainage ditch running near the edge of the adjacent field for about 150 metres. This may require the ditch to be realigned to accommodate the cycleway / footway. Whilst there is potential to steepen the embankment supporting the route, the presence of an existing large map type advance direction sign and road lighting will require that the width of the buffer zone between the route and the carriageway is significantly increased from the standard 0.5 metres.

3.2.5 The nature of the land through which the proposed route will pass will present maintenance issues that cannot be completely designed out. These issues generally relate to the retained trees and hedgerow along the route which will require regular trimming to prevent encroaching onto the route:

(a) restricting the width of the cycleway / footway and reducing safety for users;

(b) restricting visibility on the A4055 Cardiff Road verge, particularly at the proposed Toucan Crossing, where visibility criteria will be particularly important.

On the south eastern side of the A4055 Cardiff Road, the first point will be a concern for both options but probably more onerous for the on-line route as moving the line of the route to the highway boundary will require more vegetation clearance and potentially more maintenance of the residual hedgerow.

3.2.6 For both Options 2A and 2B, the route will generally pass through or adjacent to grazing land which will require considerable lengths of stock proof fencing.

4. Review and Discussion of Ecology Issues

4.1 Recommendations from Environmental Study

4.1.1 The Environmental Study contained in the Feasibility Study Report outlined the following recommendations by a Vale of Glamorgan Council Ecologist:

(a) Retain all trees if possible.

(b) The cycleway / footway should be kept 1m clear of the top of the river bank to retain the trees and shrubs on the river bank that are likely to be used by birds for nesting. This line of vegetation also provides a corridor that could be used by many small mammals, reptiles and invertebrates, and provides screening between the Right of Way (ROW) and the river making it less likely that people will disturb any otters that may use the river.

(c) The river corridor could be improved by planting native hedgerow species in any gaps.

(d) The streams and river are poached by cattle in some places; fencing off the river would improve the biodiversity of the river.

(e) At Parc Bryn-Y-Don there is a population of great crested newts, need to discuss with LA ecologist to ensure avoidance of impacts.

(f) Each side of the entrance to Parc Bryn-Y-Don there is a wooded area adjacent to the river and the mature trees in this area should be maintained. The cycleway / footway should deviate to the west of ROW 14 and the trees through this area with a fence between the cycleway / footway and the trees to establish a wildlife haven for birds and small mammals.

(g) Use existing gaps in hedge lines between fields to minimise impacts.

(h) Consult the Environment Agency before planning any work to rivers and streams.

(i) Consult the LA ecologist if lighting is to be proposed.

4.1.2 With regard to point (a), it will be advantageous to retain mature trees where possible to reduce environmental impact and project cost. Minor local deviations to the route to avoid mature trees should be considered, where that will not impact on the safety of the cyclists or pedestrians.

4.1.3 The off-line route on the north western side of Cardiff Road, at Dinas Powys end, coincides generally with the recommendations in points (b) and (f). Points (c) or (d) or a combination of both, if implemented would also improve safety for users of the cycleway / footway in eliminating the risk of users falling into the river.

4.1.4 It is probable that environmental mitigation measures will be necessary with regard to any effect on the great crested newts mentioned in Point (e).

4.1.5 For the off-line section of the route on the north western side of Cardiff Road, several of the existing gaps in the field boundaries are close enough to the proposed route to be considered for use as recommended in point (g). On the south eastern side of Cardiff Road, there are fewer opportunities to use existing gaps for Option 2A and none for Option 2B.

4.1.6 With regard to the work in or near the Cadoxton, River as recommended in point (h), and any effect on the existing flood risk areas, it will be essential that the designer consults with Natural Resources Wales, which has now taken over the Environment Agency Wales. Natural Resources

Wales and the Vale of Glamorgan Council Ecologist will also have to be consulted regarding ecological licencing requirements.

4.1.7 With regard to point (i), there is existing road lighting on Cardiff Road at its junction with Green Lane and on the approach to Biglis Roundabout. This lighting will be beneficial for the cycleway / footway as the proposed route will have a road crossing near Green Lane and a tie in at the roundabout.

4.2 Further Work Prior to Detailed Design

4.2.1 The following actions will be essential prior to submitting a planning application for the scheme:

(a) Arboricultural survey;

(b) Phase 1 Habitat Survey with potential for recommendation for more detailed surveys where appropriate pertaining to Great Crested Newts, amphibians, invertebrates, breeding birds, badgers, bats, dormice and plants, including invasive weeds.

(c) Consult Natural Resources Wales and the Vale of Glamorgan Council regarding Biglis Tip landfill sites.

4.2.2 The need for the various ecological surveys, as outlined in the Environmental Study, will have to be discussed with the Vale of Glamorgan Council Ecologist in order to ensure that the necessary work is undertaken to determine a comprehensive list of environmental constraints for the designer to incorporate into the proposed scheme and allow development of appropriate licences to obtain necessary consents.

4.2.3 The Biglis Tip landfill sites represent several unknowns which currently prevent any decision regarding the selection of an alignment for the southern (Barry) end of the proposed cycleway / footway. Natural Resources Wales and the Vale of Glamorgan will have to be consulted at an early stage so that any ground investigation proposals can be adapted to allow for any constraints on this site. An on-line route would obviously have less effect on the Biglis Tip landfill site as it would require less tree clearance and considerable less excavation in that vicinity.

4.2.4 On the eastern approach to Biglis Roundabout, there is a drainage ditch running for about 150 metres near the edge of the road which will be affected by Option 2B. The Vale of Glamorgan Council will have to be consulted regarding the extent of surveys required for this ditch.

4.2.5 The potential for providing an environmentally sensitive lighting scheme for the cycleway / footway will have to be developed sufficiently and discussed with the Planning Authority and relevant environmental bodies to determine whether it is viable.

5. Review and Discussion of Land Implications and Processes

5.1 Land Types

5.1.1 There are three main types of land which will be affected by the proposed footway / cycleway over its full length:

(a) Public recreation land known as Parc Bryn y Don and owned by the Vale of Glamorgan Council.

(b) Arable land, which relates exclusively to Field Number 3171 (refer to Appendix B – Schematic Layout Plan for location).

(c) Grazing land in fields used by horses and cattle.

5.1.2 The recreation land is on the north western side of Cardiff Road, at the Dinas Powys end and will be traversed by an off-line cycleway / footway. The arable land is on the south eastern side of Cardiff Road and will be largely unaffected by an on-line route except for accommodation works to a field access from Cardiff Road. Grazing land makes up the bulk of the land to be affected by the route but this will be least affected by an on-line solution.

5.2 Statutory Processes

5.2.1 Where the footway / cycleway is proposed on the north western side of the A4055 Cardiff Road on or near the line of Public Footpath ROW14, proposals to divert and improve part of the Public Footpath such that it forms the new footway / cycleway where required, can be determined by the planning application process.

5.2.2 Where the footway / cycleway is proposed to run alongside Cardiff Road, the highway corridor could be widened to include the footway / cycleway under Section 65 of the Highways Act 1980.

5.2.3 However, as the proposal will require stock-proof fencing through the grazing land and land acquisition from a number of owners throughout, it may be more appropriate to manage the statutory process for the whole of the route through a planning application process.

5.2.4 Acquisition of the land by agreement may be possible and it will be necessary to demonstrate that attempts have been made for purchase by agreement. However, there appears to be at least one landowner that may not be amenable to this and it is likely that this process will need to be provided by a Compulsory Purchase Order (CPO). The CPO should include for temporary access arrangements for servicing maintenance requirements where necessary. The CPO may also need to include a provision for any adverse effect on the retained land due to the proposed footway / cycleway being partially built in a flood plain.

5.2.5 Accommodation Works will be necessary, where any accesses to land are affected by the proposed works. This will include accesses to and from the highway and most likely the continuation of suitable access for livestock which currently pass between fields by walking in the Cadoxton River passing beneath the Cardiff Road Bridge deck. The new bridge, referenced BR03 in the Feasibility Report will have to be provided with sufficient headroom above the river to maintain this practice.

5.2.6 Prior to the main construction works, it will be necessary for agreements to be made with the landowners for access to carry out topographical surveys and ground investigation. The highways authority have powers of entry under the Highways Act 1980 to carry out such work and will provide the landowners with suitable compensation for such rights and any associated damage to the property.

5.3 Land Option Issues

5.3.1 For the off-line route, Option 2A, the width of verge between the cycleway / footway and the carriageway will vary for several reasons:

(a) The varying level difference between Cardiff Road and the adjoining land;

(b) The width of the vegetated area between Cardiff Road and the adjoining land;

(c) If the land adjoining Cardiff Road is part of a floodplain, an embankment of 500mm minimum will be necessary to keep the cycleway / footway above maximum flood level.

(d) Potential for deviation of the cycleway / footway away from Cardiff Road to accommodate existing field accesses, river crossings, etc.

5.3.2 For the both options, the stock proof fencing between the cycleway / footway and the adjoining land has been shown a nominal distance away from the bottom of the embankment. This distance will vary in order to prevent excessive bends in the fence line. To reduce land take requirements and provide protection from falling from the cycleway / footway, consideration should be given to locating the fence at the top of the embankment.

5.3.3 The area of land described as a potential ransom strip is on the north western side of Cardiff Road, just north of Green Lane (see Appendix B Schematic Layout Plan for location). The Vale of Glamorgan Council consider that the owner of this narrow strip of wooded grazing land is unlikely to be co-operative in negotiations for amending and improving the line of Public Footpath ROW14 over his land to the status of cycleway / footway. Reasons for this belief are as follows:

(a) The landowner believes that this scheme will render his land unsuitable as a grazing area for his horses.

(b) The landowner considers that this scheme will adversely affect any future plans for his land to be utilised as strategic access for development on adjacent land.

(c) The landowner is aggrieved with the Vale of Glamorgan Council Planning Department for denying him planning permission for development on another of his land holdings.

As this potential ransom strip presents a risk to the progress of this scheme, it is proposed that the route for Options 2A and 2B be diverted to the west of his land boundary, connecting to Public Footpath ROW14 to the north and south of his land.

6. Review of Areas Prone To Flooding and the Recommendations Made in the 2011 Feasibility Report

6.1.1 Referring to the Natural Resources Wales Flood Risk Map in Appendix E, it can be seen that the entire section of proposed cycleway / footway on the north western side of the A4055 Cardiff Road will be at risk of flooding to varying degrees.

6.1.2 On the section of proposed cycleway / footway on the south eastern side of the A4055 Cardiff Road, just over half will be at risk of flooding to varying degrees. The only area where the proposal will be outside of the flood risk zones is the central section extending from the road crossing near Green Lane and into Field Number 0950 (refer to Appendix B – Schematic Layout Plan for location).

6.1.3 In order to reduce the risk of flooding to the cycleway / footway, it will be necessary to raise the cycleway / footway on embankment about 300mm to 500mm above the floodplain. The additional embankment and run-off from the hardened surface of the cycleway / footway will inevitably have an adverse effect on the remainder of the floodplain. A flood consequence assessment will be necessary to quantify that effect and determine whether compensatory excavation will be required in the residual floodplain. However, moving the cycleway / footway as close as possible in line and level to Cardiff Road (and away from the floodplain) will reduce this effect on the residual floodplain. This will depend on the environmental acceptability of cutting back some of the dense vegetation in the highway verge and adjoining field.

6.1.4 The detailed design will need to anticipate climate change in the choice of materials and techniques in order to minimise the whole life cost of the proposal. Similarly, the design of new bridges for the river crossings will need to include appropriate allowance for climate change.

6.1.5 Another aspect of land drainage relates to the existing drainage measures on Cardiff Road. These consist of kerb-drainage at the junction with Green Lane and a short length of positive drainage (kerbs and gullies) on the approach to Biglis Roundabout. Elsewhere there appears to be no evidence of formal drainage and run-off is generally prevented from draining readily into the verges as they are silted up and overgrown. In several locations, small channels have been cleared into the verges to improve run-off. Measures will have to be incorporated within the design of the proposed works to prevent excess run-off from Cardiff Road flowing onto the cycleway / footway. This could include cleaning of any existing filter drain in the highway verge or installation of a new filter drain in the verge between the road and the proposed on-line route.

Cardiff Council
Arup Feasibility Report | Oct 2015

Cardiff Bay Barrage Transport Link

ARUP

Cardiff Council

Cardiff Bay Barrage Transport Link

Feasibility Report

REP/001

Issue | 1 October 2015

Job number 240535-00

Ove Arup & Partners Ltd
4 Pierhead Street
Capital Waterside
Cardiff CF10 4QP
United Kingdom
www.arup.com

ARUP

Document Verification

ARUP

Job title		Cardiff Bay Barrage Transport Link			**Job number** 240535-00
Document title		Feasibility Report			**File reference** 4-05
Document ref		REP/001			
Revision	**Date**	**Filename**	Cardiff Barrage Transport Link Report Final Issue 30.06.2015.docx		
Draft 1	30 Jun 2015	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Issue	1 Oct 2015	**Filename**	Cardiff Barrage Transport Link Report Final Issue 01.10.2015.docx		
		Description	Final Issue		
			Prepared by	Checked by	Approved by
		Name	Chris Birkett	Gwyn Ephraim	Gwyn Ephraim
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

1 Introduction

1.1 The Commission

Ove Arup & Partners ("Arup") have been commissioned by Cardiff Council to undertake a feasibility study to evaluate the technical and operational viability of providing a bus-based public transport route via the Cardiff Bay Barrage. The proposed bus route consists of a western section over the existing Cardiff Bay Barrage lock bridges and embankment infrastructure, and an eastern section connecting the end of the Barrage to Heol Porth Teigr in Cardiff Bay; this eastern section has a number of route options.

The background to the study is that bus services between Cardiff city centre and Penarth via the Merry Harrier junction (on the western end of the Cogan Spur) frequently experience severe congestion, particularly at peak times. As a result, bus services between Central Cardiff and Penarth can be unreliable, suffering extensive delays at times, and there is little scope to provide sufficient bus priority measures on the existing route. The objective of the study is to examine issues associated with implementing a bus service via the Barrage, looking in particular at the following:

- The feasibility of providing an alternative transport route via the Cardiff Bay Barrage, with up to 48 buses per day using the route;
- Operational interaction between the barrage and bus schedules;
- The structural integrity of the bascule bridge; and
- Estimation of costs for any proposed structural upgrade and bus route infrastructure requirements.

The bus service proposal will be considered by Cardiff Council in the context of ongoing development of a Cardiff Bay Masterplan.

The commission included consultation with key stakeholders including a project workshop to inform the development of infrastructure and operational proposals. This report has therefore been compiled with input from the following organisations:

- Cardiff Council;
- Vale of Glamorgan Council;
- Cardiff Harbour Authority;
- Bus operators; and
- Welsh Government.

The meeting notes and workshop outputs have been included in Appendix B.

1.2 Project Objectives

Project Objectives set out in the Brief are as follows:

- Investigate whether the existing barrage infrastructure facilities can safely accommodate a new bus link, taking account of road construction, current road widths, street lighting, cyclists & pedestrian links and the open space recreational parks;
- Identify if there are any planning, environmental or health and safety requirements to implement the options;
- Determine possible implications for the structure after 5 years of bus service over the bascule bridge;
- Investigate management/controls systems which will need to be in place to allow buses, cycles, pedestrians and boats to navigate safely over and through the lock gates and/or harbour authority land during operational hours;
- Determine whether existing bascule bridge can accommodate buses driving over the structure (48 buses per day), taking account of pedestrian and cycle movement;
- Investigate operational arrangements that will need to be put in place for bus services, when barrage/bascule bridge is closed for maintenance work, poor weather and events etc.
- Provide outline design options with indicative costs for how buses can safely travel on to and stop at the barrage from Paget Road/Penarth Marina end including any infrastructure works necessary to improve the route(s) to the Barrage at the Penarth end;
- Provide road alignment options and indicative costs for connecting the bus link from Queen Alexandra House to Discovery Quay;
- Quantify operational and management risks for introducing a bus link over the barrage;
- Identify any costs for upgrading or improving the bascule bridge/structure to accommodate buses;
- Provide details including any associated costs to bring up the carriageway over the barrage to an acceptable standard for a bus link; and
- Liaise with Cardiff Council's Economic Development, ABP and Harbour Authority to investigate and agree the specification for the design and to understand the constraints and issues in the area as well as statutory undertakings;
- Liaise with the Vale of Glamorgan to identify appropriate routes and bus priority and/or bus stop improvements.

The findings and recommendations in respect of each of the above objectives are summarised in Section 9.

1.3 Study Content

The remainder of the report will cover the following:

- **Section 2 - Existing Conditions** will review the current constraints and existing operations for the local public transport provisions;
- **Section 3 - Existing Policies and Plans** describes the applicable local planning policies together with a review of the key points in the Cardiff Barrage Act 1993;
- **Section 4 - Bridge Structure Investigation** provides a summary of the desk study review and consultation undertaken with regard to the bridge structure;

- **Section 5 - Existing Barrage Operations** is based on discussions with the Harbour Authority, who also provided CCTV footage of the Barrage Lock and Bridge operations which give a perspective of the lifting sequence and timings;
- **Section 6 – Bus Operations Options** considers the findings of the baseline investigation which reviews and describes the various option for bus timetabling, interaction with the boat movements in and out of the bay together with highway routing options.
- **Section 7 – Infrastructure and Operations Options Development** describes and discussed the infrastructure and operations arrangements for carrying a scheduled bus service across the Barrage, including a risk assessment for delivery, and outline cost estimations
- **Section 8 – Risk Assessment and Costs** provides a list of risks in respect of deliverability of the bus service proposal, and also an outline cost estimate for infrastructure elements
- **Section 9 - Summary and Next Steps** provides a conclusion in respect of the infrastructure and operations arrangements, together with recommendations for the next steps.

Project Objectives	Summary of Findings / Recommendations
	the bridges to carry bus traffic to be firmly established. This would include detailed inspections of all bridges to record their condition and identify the deck details.
Investigate management/controls systems which will need to be in place to allow buses, cycles, pedestrians and boats to navigate safely over and through the lock gates and/or Harbour Authority land during operational hours	The proposed arrangement for bus movements at the lock section is to operate the buses on a 30 minute schedule such that their arrival matches the opening/closing schedule of the bascule bridges. The lock/bridge schedule (which has an Out vessel movement at 00 and 30 minutes past the hour, and an In movement at 15 and 45 minutes past the hour) provides a theoretical 'window' of 10—15 minutes every 30 minutes for passage of vehicles.
Determine whether existing bascule bridge can accommodate buses driving over the structure (48 buses per day), taking account of pedestrian and cycle movement	Operating a bus service will require improved management of bus, car, pedestrian and cycle movements across barrage roadway – and in the vicinity of the lock / sluice roadway in particular. It is proposed to: • Establish the roadway as a Shared Space area (for pedestrians, cyclists and vehicles) with appropriate signage and road markings • Install rising bollards at both ends of the lock/sluice section, to control vehicle movement into the bascule bridge area; this will allow greater control of vehicle access and interaction with bridge raising/lowering operations. Usage of the bascule bridge area by pedestrians and cyclists would be similar to the present situation – but with improved signage and management of the roadspace. In particular, the bunching of pedestrians and waiting vehicles at the bascule bridge barriers will be avoided – as the control centre will be able to block vehicle access to the bridges for a period before the barriers are raised. It will be important that buses are driven slowly through this area.
Investigate operational arrangements that will need to be put in place for bus services, when barrage/bascule bridge is	It is recommended that an alternative bus service route is operated (and included on the published bus service timetable) at periods of busy pedestrian activity, likely to be during the 10am – 4pm period on Sundays.

Project Objectives	Summary of Findings / Recommendations
closed for maintenance work, poor weather and events etc.	For events, when the locks are closed for periods or vehicle access is restricted, the alternative bus service would operate for an appropriate period. The service would be routed such that it would be routed close to both ends of the barrage in both directions (and could thus would provide a service to the barrage during events). Instigating the alternative service will require appropriate publicity to ensure passengers are aware of the arrangement.
Provide outline design options with indicative costs for how buses can safely travel on to and stop at the barrage from Paget Road/Penarth Marina end including any infrastructure works necessary to improve the route(s) to the Barrage at the Penarth end	Infrastructure design options have been devised for the Barrage roadway and bridge sections, as set out above. For the prospective bus route to Penarth, the current '89' service (operated by Watts Coaches) travels via Paget Road and through Penarth Marina. This indicates that the relatively steep incline of Paget Road is able to be negotiated by buses. It can thus be concluded that it is feasible for buses to travel from Penarth to the western end of the barrage – with no new infrastructure needed.
Provide road alignment options and indicative costs for connecting the bus link from Queen Alexandra House to Discovery Quay	An infrastructure assessment was made for the highway section from the Barrage through to the existing highway network at Heol Porth Teigr. There have been two separate options investigated which are as follows: • Route Option A via Cargo Road, with a short new section of road linking the Heol Porth Teigr / Harbour Road roundabout with Cargo Road (with an approximate £1.9M cost), and • Route Option B, via a new busway (of approximate £3.2M cost) through land currently owned by Welsh Government but subject to future development plans. On review of both scheme options, including indicative costs, Option B would have the greater project capital cost but Option A's deliverability is subject to agreement with ABP and the land acquisition requirement and financial arrangements are unknown. Whilst the Option A route through ABP land would appear to provide the least cost option,

Project Objectives	Summary of Findings / Recommendations
	there are several high-level Cardiff Bay masterplanning decisions and agreements to be undertaken which would affect the programme deliverability. In respect of deliverability, Option B is the preferred option. However, as part of the early phasing of a new bus route, it could be agreed with ABP to use part of Cargo Road as temporary route while awaiting construction of the new bus route carriageway. Option B's precise alignment would be subject to detailed design considerations, and the location would ideally be situated close to the ABP land boundary to ensure as much developable land is available close to the Cardiff Bay water edge.
Quantify operational and management risks for introducing a bus link over the barrage	The preliminary risk assessment above indicates that the most significant risks can be addressed as follows: • Minimising operational risk will require that bus traffic management is included within the barrage operational duties. Installation of an upgraded vehicle access control system (with automatic bollards on both ends of the Bascule Bridge / Sluice roadway) will ensure that the barrage operation can manage boat and vehicle movements efficiently. • Risks associated with pedestrians and cyclists using the barrage can be minimised by instituting a 'shared space' roadway, and by installing automated vehicle access control bollards at both ends of the Bascule Bridge / Sluice roadway to enable vehicles to be held back from the Bascule Bridge area prior to raising the bridges • The risks to the reliability of the bus service being affected by busy pedestrian activity or events in Cardiff Bay can be addressed by re-routing the bus service (on a planned basis) to an alternative route which avoids the Barrage e.g. on Sundays between 10am and 4pm.
Identify any costs for upgrading or improving the bascule	In respect of the ability for the Bascule Bridge structure to carry additional bus traffic, further fatigue bridge analysis is recommended to provide

Project Objectives	Summary of Findings / Recommendations
bridge/structure to accommodate buses	quantitative evidence to confirm the bridges' structural capacity.
Provide details including any associated costs to bring up the carriageway over the barrage to an acceptable standard for a bus link	The existing road over the embankment section is considered likely to be able to accommodate bus traffic since it already carries traffic including heavy vehicles. At the detailed design stage we would recommend highway cores be undertaken to establish roadbase thicknesses which will confirm any need for overlay or not. It is recommended that monitoring of the barrage roadway is increased in frequency from every 6 months to every 3 months. This will ensure that any problems with the road surface or the emergence of additional voids in the road construction are addressed quickly. Additional high-level street lighting on the bridge/sluice/embankment is not proposed, however, low level lighting alongside the on-road cycleway on the embankment section is recommended to be installed to increase general visibility of cyclists. This will require new cabling for power supply.
Liaise with Cardiff Council's Economic Development, ABP and Harbour Authority to investigate and agree the specification for the design and to understand the constraints and issues in the area as well as statutory undertakings	Consultation with stakeholders has been undertaken throughout the course of the Study – and meeting notes are presented in Appendix B.
Liaise with the Vale of Glamorgan to identify appropriate routes and bus priority and/or bus stop improvements	Liaison has been undertaken with Vale of Glamorgan Council staff – and established that the Council is supportive of the bus proposal (see Appendix B). It has been established that buses are able to travel between Penarth Centre and the barrage without the need for new bus infrastructure.

9.2 Operations and Management Summary

The key aspects of operational control and management to accommodate a bus service are set out in Table 9.2.

Table 9.2: Operations and Management Recommendations

Element	Recommendation
Bascule Bridge and Bus Service Scheduling	The sequencing of a scheduled bus service will need full co-ordination with barrage operations – which who control the timing of vessels entering and exiting Cardiff Bay. A review of the existing bascule bridge operation, relevant for a scheduled bus service, has identified that the 'maximum' practical bus service that could theoretically be operated robustly is a 30 minute frequency service, with a 'window' of opportunity' for vehicle movement across the lock/bridges structure of around 15-20 minutes every 30 minutes. For this schedule the roadway would be closed to traffic in line with the 'fixed' schedule for boat movement. It is clear however that there are likely to be occasions when vehicular access across the bascule bridges would be subject to delay due to unscheduled occurrences such as higher than normal boat movement, slow movement of boats through the locks, and reduced capacity of the locks during maintenance periods. It is therefore essential that the barrage operation includes for pro-active management of the movement of buses – although the schedule for boat movements will continue to take precedence. A revised operational H&S Plan will be required for the bridge / sluice operation.
Bus Service	A bus service operating twice every hour is considered to be the maximum feasible service. Maximising its usage and commercial viability would require the service to connect Penarth town centre and Cardiff City Centre. The provision of this service may require some re-organisation or revision to existing services e.g. bus services to Penarth and Cardiff Bay. The bus services timetable should be arranged such that buses in both directions reach the bascule bridges at approximately the same time. This should be feasible to arrange but may have an impact on the number of buses needed. It is recommended that the bus service schedule includes an alternative service route which avoids the barrage at periods when the barrage area is typically

Element	Recommendation
	very busy with pedestrians. This service would be operated on a pre-planned basis such that passengers are aware of the route to be taken prior to planning their journey (and would be shown on printed timetables). A suggested arrangement is that the alternative service diverts from the normal route at the Penarth end of the barrage, and then travels via Penarth Marina and the A4232 to Cardiff Bay, re-joining the normal route in the vicinity of Heol Porth Teigr. It may be necessary to operate this service on an hourly basis to allow the service to be operated with the same number of buses and drivers. It is noted that this alternative service route would provide a public transport link from Penarth and Cardiff for visitors to the barrage (even though it would not cross the barrage). It is recommended that the feasibility of operating a 4-bus / hour frequency is considered in future after a period of operating a 2-bus/hour service, at which time the operational interactions between the lock operations and bus services will be clearly understood. However, based on current lock operations, it is considered unlikely that a reliable 15 minute service would be feasible.
Barrage Operational Control Systems	The introduction of a scheduled bus service over the barrage provides an impetus to upgrade the control systems at the bascule bridges in particular, which could improve general operational capability as well as providing the means to manage movement of buses across the barrage. The control system upgrade would include incorporating automated access control bollards on the approaches to the bascule bridges – which provides an ability to hold all vehicles away from the bascule bridges prior to raising the bridges. A review of the current control systems should be undertaken to identify any shortfalls or upgrades required in their current systems, such as pedestrian warning devices, communication systems, vehicle identification systems etc. Undertaking an upgrade of the barrage control systems at the same time as introduction of the bus service is considered an essential component of de-risking the barrage bus proposal.

9.3 Key Next Steps

There are a number of recommended key next steps to enable the viability of a bus service over Cardiff Bay barrage to be further established.

9.3.1 Bridge and Embankment Structure Investigation

Structural investigations of the bascule bridges are necessary to confirm feasibility of the bus proposal. This would involve detailed inspections of the bridges to record their condition and identify the deck details. Strain gauges could then be installed at the critical locations, and the results from the strain gauges would be used to assess for both the fatigue and ULS capacity of the bridge decks.

It is also recommended that further efforts are made to locate the Health and Safety File for the bridge design, as this would provide information on the designed loads and design life of the structures, as well as a record of the inspections undertaken and a full set of as-built drawings. This could involve seeking to interview design staff involved in the original design work to gain background information which could assist in a risk assessment process.

In respect of the roadbase structure, it is possible that the road construction is not suitable for the level of use by heavy traffic which a bus service would entail. Hence, at the detailed design stage it will be is likely to be necessary to undertake some targeted roadbase cores to establish road construction thicknesses which will confirm any need for reconstruction or overlay or not.

At detailed design stage it will be necessary to review the embankment cross-section and the implications for vehicle containment in more detail (including undertaking a topographical survey of the embankment).

9.3.2 Bus and Lock Operation Virtual Test

It is recommended that a ‘virtual test’ is undertaken at the next stage in the development phase of the barrage bus project. For the test, pro-active management of the movement of ‘virtual’ buses would be undertaken while adhering to the normal lock opening schedule (that is, the test should not be based on a laissez-faire approach). The test should be undertaken for a whole day (or part of day) – ensuring that the boat movement on the day (or days) chosen is sufficient to enable conclusions to be drawn. This test could be based on either:

- Opening and closing the bridges to allow boats to pass through according to the standard lock schedule, and at the same time seeking to ensure that ‘virtual’ buses can pass through the bascule bridge section every half-hour according to a notional timetable.
- Operating a bus (without passengers) over the barrage according to a fixed notional timetable, while opening and closing the bridges to allow boats to pass through according to the standard lock schedule.

The test should be recorded in respect of timings and any delays, and a short report produced. A pre-cursor to on-site tests could be to produce a micro-simulation (using VISSIM software or similar) to simulate the current and future bascule bridge roadway operations (with buses and automated bollards).

Penarth Headland Link

Feasibility Report and

Value of the Work Done

February 2017

Penarth Headland Link

Feasibility Report and the Value of the Work Done

1.0 Introduction

Penarth Headland Link (PHL) is a wonderful opportunity to produce an exciting yet easy start to the Wales Coast Path as it heads westward around the headland from the Barrage in Cardiff Bay to the Promenade at Penarth.

The PHL has been has been sought by residents and visitors to Penarth and Cardiff Bay for many years. It is the missing link between the Capital and its seaside. A previous scheme, which took the form of an iconic architectural viaduct, was abandoned in 2007 due to its high cost.

A new initiative was started in 2014 by a voluntary group with a range of relevant expertise. Some had previously been involved in the initiative and eventual delivery of the very successful Penarth Pier Pavilion renovation and re-development; others were invited to join the group due to their specific expertise and extensive experience of the construction industry.

This document records the work undertaken by the expert in house team and its external consultants, to demonstrate that the PHL can be delivered to an appropriate design and specification at around half the cost of the previously proposed scheme. It records work in hand and further work planned to complete this study.

The early work is under the heading of 'Pre-feasibility' described in Section 2. This was a conceptual assessment of the primary issues, to determine whether there was sufficient confidence in the project to justify the substantially greater effort required to retest all the key components of the project in more detail. In essence, it is the work required in Stages 0 and Stage 1 of HMT The Green Book

The more detailed work is described under the heading 'Feasibility Study' in Section 3. This is the work required in Stage 2 of the Green Book.

This report also values the work done to date at 26th February 2017. It gives a value, item by item, for the Pre-feasibility and Feasibility work. All the figure quoted are excluding VAT.

In concluding this introduction we would like to thank formally the consultant firms and individuals who so generously contributed with pro bono advice, which has been valued at approximately a quarter of the total value of the worth done, and without which this report could not have been produced, Our thanks go to :-

Arup Aecon BAM/Nuttall Bates Wells & Braithwaite Broomfield & Alexander Chris Lloyn (Architects) Cosslett Geldards Hugh James (Solicitors) Professor Max Mundy (Cardiff University) PwC Soltys Brewster

Appendix 1 contains a list of the people within our group who that have produced this Feasibility Study, together with thumb nail CV's,

This document supersedes an earlier version issued in December 2016

2.0 Pre-feasibility -- £24k

2.1 Scope of work

Activities included:

- Contacts with the leadership in the Vale of Glamorgan (Vale) Council enabled us to explore the possible reaction of to our ideas. This involved a number of meetings during 2015 as a result of which we were given access to all the files from the previous Council project
- Informal meetings with residents of Penarth to help gauge the likely public reaction to the proposal
- Archive searches and preliminary assessments of reports on the previous PHL scheme, the old Penarth Promenade Car Park and the Cardiff Bay Barrage.
- Initial review of Vale of Glamorgan Council's files on land ownership and related issues.
- Visual site surveys including beach, cliff, end transitions (slipway & outer harbour), tides etc
- Discussion with Environmental interest groups and bodies to help determine constraints and priorities**.**

Perhaps the crucial activity at this time was scrutiny of the information provided to us by the Vale and this proved to be enormously helpful.

With the information collected the team considered various design solutions and concluded that a simple rock causeway would represent a feasible, attractive, and affordable solution, using standard maritime construction methods, without significantly adverse environmental impact.

2.2 Topics Considered & Preliminary Conclusions

2.2.1 Public Support -£2k

Comments received demonstrated;

- universal disappointment that the Link which had been planned as part of the Cardiff Bay Barrage Project had not been delivered,
- there would be strong local support for a Link of the type proposed,
- that the Project would benefit greatly from a car park at its Penarth End.

If a car park is regarded as essential – and that was the general view at both public meetings in Penarth – we have worked out how best to meet this requirement and tested the workability of our suggestions with Arup's experts and with the Vale Council's engineers. We will continue to develop thinking on the parking issues with Penarth Town Council and the Vale Council. However, as a group, we have made it clear that this is in addition to our main purpose, which is simply to provide the Causeway at a much lower cost than previously projected, and we are confident that our plans will bring that about.

2.2.3 Planning Consent --£3k (incl. Soltys Brewster £1k)

The previous scheme had received Planning Permission under the Town and Country Act and all of the documents submitted in support that successful application were studied.

Meetings were held with Soltys Brewster (planning & environmental consultants for the previous scheme) (£1k) and the Vale of Glamorgan's project engineer to explore requirements and constraints that need to be taken into account.

It was concluded that, based on these documents and discussions there were no major issues that should prevent the current proposal being granted an equivalent permission to build.

2.2.4 Land Ownership --£2K

Provisional information was obtained on the ownership of the land required for the Link.

It was concluded that the issue was not straight forward, none the less there was confidence that all the necessary land could be acquired

2.2.5 Third Party Interests --£2K

Provisional information was obtained on Dwr Cymru Welsh Water apparatus, which are present at both ends.

Provisional information was also obtained on constraints imposed by users of the slipway at the Penarth End.

It was concluded that both these sets of constraints could be accommodated.

2.2.6 Environmental Interests -- £2K

Meeting were held with RSPB Cymru, Ramblers Cymru, and the South and South West Wales Wildlife Trust

It was concluded that all concerns could be reasonably addressed

2.2.7 Alignment --£3K (incl. Soltys Brewster £0.5k)

A provisional alignment was chosen for the Link, after taking account of the instability of the cliff and the objective of minimising the fill required to build the causeway.

A preliminary plan for the Link was drawn up by Soltys Brewster(£0.5k).

2.2.8 Fill Material --£3k

Consideration was given to the volumes required, that the Link would be exposed to extremes of wind and tide and that the site had limited road access.

The use of robust cemented blocks purpose built from recycled waste was considered, as was a construction made of large tubes filled with pumped sand (one of the options being favoured for proposed tidal lagoons.

It was provisionally concluded that the most practical, flexible, and cost effective material to use would be to rock fill.

2.2.9 Illustration --£2k (incl. Chris Lloyn £1k and £1k for the drone pictures)

The route was photographed from the beach, sea and air, by drone photography (£1k).

Artist's illustrations of the scheme were produced by Chris Lloyn (£1k), which proved to be extremely helpful when explaining the concept to others.

2.2.10 Cost Estimates --£2k

Accepting that at a Pre–feasibility Stage there are inevitably large unknowns, a concept stage assessment concluded that the total costs of all items up to the completion of the PHL would be less than half of the £21m and rising, predicted for the previous scheme when that scheme was abandoned.

2.2.11 Car Parking—£3K

It was provisionally concluded that a multi-storey car park, combined with commercial elements, could be provided in an elegant building at the southern end of the Link and could be self-financing.

2.2.12 Conclusions

Following the above assessments, provisional conclusions were;

- a causeway type solution could be the basis for a successful PHL scheme;
- this concept should be taken forward, developed, and tested in greater depth in a Feasibility . Study
- the group had the enthusiasm, the in house expertise and could draw on sufficient third party support to progress a Feasibility assessment.

3.1 Feasibility Study –£224.5k

3.2 Scope of Work

This stage of work was to test the feasibility of a Link comprising a causeway from the arm of the Outer Harbour at the Barrage end to the sea outfall at the Penarth end , together with connections to the Barrage Car Park and to the North Promenade. This work started in August 2015.

All parts of the Feasibility work were progressed, and can be summarised as;
- Client Body established as a Corporate Entity;
- Route studied and confirmed, taking account of cliff condition;
- Design parameters established, taking account of usage, beach topography and tides;
- Information required to obtain all the permissions needed, was determined;
- Good progress made in defining the environmental issues and the measures needed;
- Aesthetic studies;
- Construction logistics studies are well advanced;
- Impact of Dwr Cymru Welsh Water's equipment & routes considered;
- Preliminary economic impact studies undertaken;
- Project funding options considered;
- Tax advice received;
- Land and ownership issues are well advanced and approaching conclusion;
- Substantial public, commercial and political engagement undertaken to establish support;
- Related building concept studies, including car parking and potential for tourist and commercial development at both ends.

Activities have included site visits, design workshops, studies, and meetings with a variety of third parties.

In the following sections of this report there is a summary of the topics progressed, each with a value ascribed to it.

3.2 Management --£30k

Tasks were allocated to 4 teams, namely

- **Central Team** under the leadership of Roget Thomas for tasks including Management, Procurement, Fund Raising & Business Plan;
- **Legal Team** under the leadership of Roger Thomas for tasks including Constitution, Property, Commercial, Finance & Planning;
- **Communications Team** under the leadership of Alun Michael for tasks including Communications and Engagement;
- **Design Team** under the leadership of Gabe Treharne and John Lovell for task including Design, Environmental Impact,, Planning Permissions, Construction, Costs and Development Opportunities.

It was also agreed that monthly progress meetings would be formalised under the Chairmanship, initially of Brendan Sadka and then of Roger Thomas , with substantial matters being brought by the each of the teams for discussion and agreement as appropriate by the Client Body.

Each month reports were received, discussed, item agreed and action to be taken forward recorded. Typically, 6 to 8 members attended the meetings, which lasted between 1 and 2 hours.

To take account of the time preparing papers,£1k, and the meetings themselves (£1k), it is estimated that each meeting was worth £ 2k, so for the period August 2015 to November 2016 2x15 =£30k (there was no meeting in of September 2016).

3.3 **Central Team--£28.5** k **(incl. Geldards £6k, Broomfield &Alexander £1k, Max Munday £5.5k ,Arup £6k)**

3.3.1 Formalising The Client Body --£10k (incl. Geldards £6k, Broomfield &Alexander £1k)

Our in house legal and chartered accountant members considered the options, and after taking further advice from Geldards (£2.5) and Broomfield &Alexander (£1), recommended that to enable it to be the vehicle for the feasibility work, the Client Body should become a Corporate Entity and a Registered Charity. This recommendation was accepted.

The Client Body became a company limited by guarantee, namely Penarth Headland Link No 9897285 and was entered on the Register of Charities on 19th May 2016 with the registration No 1167209

Advice was then obtained from Geldards (£3.5k) on charity law and its implications on the procurement of help from third parties.

3.3.2 Funding the Project --£5k—Ongoing

Exploratory approaches were made with the following results;

- The head of the Wales Office of the Big Lottery advised that the days of big grants for capital projects were gone, but if we had a core funder then they would consider a contribution;
- A former Chairman of the Heritage Lottery Fund advised that we would not qualify for HLF money;
- A substantial local charity gave similar advise, namely that if we had core funder they would consider making a contribution

These approaches quickly led us to realise that securing core funding was the key and that without this key further approaches to similar organisations would be a waste of resources.

This confirmed the provisional view that we had reached during the Pre –feasibility, that we would have to progress the Feasibility work on a pro bono basis.

It was anticipated that the large majority of the pro bono work would be done by members of PHL in their respective areas of specialisms and that this was practical, as collectively they had a broad experience of the planning processes, environmental issues, the civil engineering and the buildings works that would be need to be considered as part of the feasibility work. It was recognised however that it might be necessary at some stage to increase the membership, as the project moved forward.

It was always recognised that some pro bono advice from third party firms wishing to support the project would be required and PHL considered that its Registered Charity status would help attract such advice.

3.3.3 Economic Assessments —£ 13.5k (incl. Max Munday £5.5k and Arup £6k)

Initially the project was seen as a " Penarth " project and consequently the Socio-Economic appraisal produced by Professor Max Munday (£5.5k) of the Welsh Economic Research Unit at Cardiff University Business School , was briefed to " examine the expected impacts of the PHL development on the local economy of Penarth"

This report focused on economic effects and activities in the tourist sector but suggested also a wide range of social , community and welfare effects which are difficult to quantify, but none the less important.

Perhaps the most significant outcome from this report is that it helped us realise that the PHL was much more than a " Penarth " project , and that it had the potential for a much bigger impact when thought of as a " Cardiff and Penarth " project.

Picking up from this early work Arup (£6k) undertook an Outline Economic Impact Assessment of the PHL, looking at it in this wider context.

Arup concluded that the PHL has the potential to bring substantial economic benefits both to Cardiff and to Penarth; in particular its investigation demonstrated qualitatively that;

- The expected increase in tourist expenditure from the arrival of the PHL would more than cover its costs in the long term. An enhanced retail offering at both ends would maximise these benefits.
- Increased cycling activity will come from providing Penarth commuters with a shorter safer route to the Bay, with substantial health benefits.
- Increased pedestrian and cycling leisure activity around the Cardiff Bay would occur by providing access to the Taff Trail and the Wales Coastal Path with a spectacular, easy to use link.
- Cycle and walking trips can be enhanced by supporting interventions such as Cardiff's incoming cycle hire scheme to Penarth and a tourist train.

Arup also concluded that while the potential economic benefits are large, these are difficult to monetise using a conventional transport appraisal framework.

3.4 Legal Team -- £ 42k (incl. Hugh James (Solicitors) £8k, Geldards £6k , PwC £2k Bates Wells Braithwaite £1k, land purchase £11k and insurances £1k)

3.4.1 Property --£25k (incl. Hugh James Solicitors £8k ; £11k for the purchase of the Whannell Land)

Hugh James Solicitors (£2k) investigated the land tiles and advised that they were held mainly by four Parties, namely:

--The Whannell Estate
--The Plymouth Estate
--Vale of Glamorgan Council
--Cardiff City Council

It also advised that Dwr Cymru Welsh Walter (DCWW) had assets at both ends and that the Penarth (Wales) Water Ski Club had an interest at the Penarth end.

Hugh James Solicitors then agreed to assist us secure an appropriate position; including if appropriate, the drafting and agreeing a form of transfer.

We chose to start with the two main private title holders and excellent progress has been with both, see below for details. Our next target is to secure arrangements in respect of the land owned by the two local authorities.

Whannell land : At the public meeting at the Pier a member of the Whannell Family announced that it did not want did not want to stand in the way of the project. This offer was taken up and following negotiations agreement was eventually reached that we would pay £10,000 (plus costs of £250 + VAT) to them for the beach part of their land in the knowledge that they planned to pass that on to the Sidmouth Donkey Sanctuary.

Negotiations became entangled in an overage agreement and were delayed following the death of Mr Whannell.
Hugh James Solicitors (£3k) guided us through this process and we secured the land in November 2016

Plymouth Estates land
Starting at a site meeting with its agents Cooke & Arkwright and following up with negotiations, agreement has been reached with the Plymouth Estates on the terms of an option over its land on the beach. The agreement for the land required for the Link is in the process of being documented.

Hugh James solicitors (£3k) helped us through this process and in the negotiation of legal expenses that we were obliged to pay.

We have now secured an appropriate option for this land

3.4.2 Insurances --£4k (incl. the premium for the 1st year)

Considerable efforts was required to obtain public liability insurance for the project and trustees' liability insurance because the unusual nature of the risks proved a deterrent.

It involved numerous discussions and exchanges with brokers in the general and Lloyds insurance markets.

Eventually with the help of Marsh Ltd this matter was resolved and the following cover is now in place --
£5m --Public Liability
£1m --Trustee/Director Liability

3.4.3 Permissions—£8k (incl. Geldards £6k pro bono)

Geldards(£5k) advised on the legal and regulatory matters to be resolved including--

--the possibility of seeking compulsory purchase or an Order under the Transport & Works Act 1992,
--the implications of works in tidal waters,
--local government implications of any transfer of land to the project
--generally on the statutory consents needed and the process needed to obtain them.
--noting that insurance might be the best solution to uncertainties in respect of old restrictive covenants.

It did not identify any issues which would stop the project. It agreed to clarify –

--what title or licence DCWW had in respect of its control building, sewers and sewage outfalls,

--the present status of the interest of the Penarth (Wales)Water Ski Club.(PWSC)

--Penarth Leisure Centre Limited (PLCL) lease for 42 years from 1970. PLCL was a limited company ; there is no company of that name currently shown on the Companies registry register

Geldards (£1k) also advised that –

--as the walkway would be constructed in tidal, navigable waters. Statutory Authority was needed to obstruct navigation rights (however theoretical).

--that there is now a new system of marine licensing under the Marine and Coastal Access Act 2009 which regulates operations in tidal waters including land reclamation

-- that as a consequence there were two courses of action that would require formal legal advice and study in order to inform a decision on how best to proceed in authorising the scheme.

For the purpose of this Feasibility it was decided that we would proceed on the basis that it would be necessary to --

--Seek an Order under the Transport and Works Act 1992 for the walkway. The Order could be applied for to the Welsh Ministers by the promoters. It could contain authority to develop in tidal waters and also any CPO powers needed over the land.

--Seek planning permission from the Vale as such the application could also cover any commercial development

--Seek a marine licence from the Welsh Government.

3.4.4 Tax —£5k incl. PwC £2k and Bates Wells Braithwaite £1k)

Informal advice was obtained from VAT experts at Price Waterhouse Coopers (PwC) and from a partner in a London firm specialising in charity law, Bates Wells Braithwaite.

We considered the implications of a judgement of the ECJ (European Court of Justice) on an appeal from Lithuania – Sveda v Lithuania – on when VAT can be reclaimed; also consideration of the benefit of charging (however little) to use the Link in leading to recoverability of VAT.

We have made some enquiries with regard our position on business rates. This matter is ongoing

3.5 Communications and Engagement Team--£32k (incl. Chris Lloyn £1k,Designdough £2k)

3.5.1 Preparation of Display Material --£5 k (incl. Chris Lloyn £1k and Designdough £2k)

Display panels were prepared by Chris Lloyn. (£1k) These were to help us demonstrate the features of the Link at the various meetings described below

Designdough (£2) worked with us to design a brochure, partly for the same purpose but also for general circulation to the public. A total of 1500 were purchased and of these some 1000 copies were distributed in due course at events, to shops, pubs and clubs, Town Hall, the library and the church hall.

3.5.2 Meeting with local Leaders 29th October 2015 and 8th December 2016--- £4k

This meeting at Penarth Town Council Offices was with the Leader and interested Members of the Town Council and interested Penarth Ward Members on the Vale Council). The PHL proposal was presented and we were encouraged to develop it further. This meeting helped us gauge the likely public reaction to the proposal.

The meeting of 8th December 2016 was with Officers and some members. Progress was discussed and plans made to take the project forward.

3.5.3 Public Meeting at the Pier 24th November 2015- £3k

This Public meeting was arranged by us and held at Penarth Pier. It was well attended and we had the opportunity to present the PHL proposal to range of local people.

120 people attended and it was obvious from the questions and the comments from the floor that there was almost unanimous support for the Link

We received 67 completed response sheets, a number being submitted as a single combined response from a couple. The results were —

--66 approving and 57 strongly approving, with only 1 disagreed because of a concern that it would attract litter and drug addicts.

--Key benefits anticipated were 44 for increased tourism, 36 economic benefits for community, 34 completion of the coastal path, 25 for health, 24 for commuting, 22 closer connection to Cardiff.

--64 asked for further information , 59 left their e mail addresses and 67 wanted a progress meeting in 2016.

--10 were from people who lived in Cardiff, Dinas Powis and Barry.

3.5.4 Meetings with the Cardiff City Council 11th January and October 7th 2016 - £4k

The first meeting was with the Leader, the Chief Executive and a Senior Officer of Cardiff City Council. We presented our proposals and Senior Officer was designated to take forward our proposals with us

The October meeting was with the designated officers. Progress was discussed,m we were encouraged to proceed and further meeting were planned

3.5.5 Meetings with the Vale 18th January and 4th April 2016, and 23th February 2017- **£6k**

Following informal discussions in 2015 with the Leader of the Council and the Managing Director in 2015, we were provided with access to all the files from the design work and planning documents from the project that was discontinued in 2007. Members of our group with legal, technical and planning experience drew on these files to inform and test our work. On the 18th January this year we met with the Leader, Cabinet Members, the Managing Drector and and Senior Officers to formally present our proposal to the Vale. The proposal was well received and the Leader agreed that officers should meet with us to help to take it forward.

On 4th April we met with Marcus Goldsworthy, Head of Regeneration and Planning, together with Mike Clogg (highways), Lorna Cross(estates), Joselyn Ham(legal) and Steve Butler (planning) and were invited to liaise directly with this team, as appropriate .

The meeting of 23rd February 2017 was with officers. Progress was discussed and plans made to take the project forward.

3.5.6 Public Meeting Arranged by the Penarth Society 15th April 2016 - £1k

This public meeting was held at Penarth Pier. We were afforded an opportunity to up-date the public on progress. It was very well attended and there was almost unanimous support for the Link.

3.5.7 Meetings with ABP --£2K

There were two meetings to seek approval to bring rock to the site through the Port land, and so avoid bringing in this bulk material through busy local highways.

3.5.8 Meetings with Cardiff Harbour Authority 22nd April and 25th November 2016 --£3K

This was to try and obtain permission to bring rock to the site across the barrage, and to reclaim a strip on the western side of the Outer Harbour for a site compound

Good progress appeared to have been made.

3.5.9 Meeting with Run 4 Wales 15th November ---£1k

Our proposal was greeted very enthusiastically and we were encouraged to proceed.

3.5.10 Meeting with Welsh Government 14th December 2016 --£3k

Our meeting was with members of Ken Skate's office

The December version of this Feasibility Report had been circulated beforehand and formed part of the agenda.

Our progress to date was noted, we were given advice and we were encouraged to proceed.

3.6 –Design Team —£92k--(incl. Arup £15k, BAM/Nuttall £8k, Cosslett £4k Aecom £3k, Chris Lloyn £2 and Soltys Brewster £1k)

3.6.1 Cliff stability -- £4k

The geotechnical reports prepared for the previous scheme have been studied and site visits have been made to look closely at the rock face and the deposits on the beach.

These sources of information enabled our expert to gain a thorough understanding of the geology of the cliff and the ground conditions beneath the beach.

Our constraints studies concluded that parts of cliff, and certain lengths in the upper part of the cliff were very unstable, with the potential for boulders to become detached at almost any time due to natural weathering processes. There were some unstable areas in the lower parts of the cliff but these there not material in this discussion process.

Boulders from the top of the cliff found on the beach suggested that occasional rock falls involving 100mm x 400mm x 500mm boulders should reasonably be expected; also their locations on the beach demonstrated the scale of the energy that such falling boulders would have; i.e. they would have the potential to roll and bounce off the lower part of the cliff, so creating unsafe conditions in a wide strip at the base of the cliff.

Consideration was given to options to stabilising the high unstable areas. But our expert advised that the scale of such work was impossible to predict in advance, the amount of work required would only become apparent during the work itself and experience suggests costs and work usually escalate. Also the need for monitoring and the future need for stability works are big areas of uncertainty.

There is also the issue of difficult access at the bottom from the beach and access, if permissible, at the top across private land.

3.6.2 Alignment alternatives—£4K

An alignment high on the beach, say 6m from the toe of the cliff, would require the least amount of fill and so potentially could provide the lowest cost causeway.

However, the cliff studies, described above, demonstrated that although potentially the lowest cost causeway option this carried too many risks which were difficult to quantify. Consequently, it was concluded that the Link should follow an alignment up to 30m from the toe of the cliff. At this distance, users of the Link would be safe from falling boulders and also there would be sufficient capacity between the base of the cliff and the structure of the Link to safely capture larger rock falls similar to those that have occurred in the recent past from the lower parts of the cliff and which were evident during our site visits

3.6.3 Deck height—£6k (incl. Arup £1k)

The assessment of the deck height started with an examination of the publicly available information, stored at the Glamorgan Archives. Unfortunately this found that a key modelling report was missing,

This led to a meeting with the former Director of Engineering of Cardiff Bay Development Corporation who in turn arranged for us to contact directly and to obtain a copy on the original model testing by Wallingford of various barrage heights.

The Wallingford report discussed the probability and frequency of exceptional tides coinciding with strong wind speed and unfavourable wind direction at the barrage, i.e.at the northern end of the Link.

Consequently our expert was able to use the Wallingford information to conclude that at a deck height of 8m AOD it would be reasonable to expect that the Link would only need to be closed, due to the threat of overtopping, once or twice a year; also that a drop in the deck level by say 1m would significantly increase the frequency of when closure would be needed, while raising the deck by say 1m would have little benefit in terms of closure frequency. This conclusion has been reviewed and confirmed by Arup.

3.6.4 Deck width— £2k

The other key dimension is the width of the surface for walkers and cyclists. We visited to experience what is being used and what is working elsewhere; e.g. the promenade between Swansea and Mumbles and the Taff Trail..

We concluded a width of 6m allows walkers to walk in small groups yet give reasonably safe segregation of walkers and cyclists. It would also be possible for a “fun land train” to operate within this width using the cycle lane.

This conclusion was welcomed by the Vale when the project was presented to it.

3.6.5 Causeway cross section –£9k (incl. Arup £3k)

It was decided that the most practical and flexible solution, bearing in mind the scale and volume, is likely to be a rock fill causeway protected by very large rock facing on the seaward face, similar in style to those in New Plymouth, New Zealand and Vancouver, Canada.

It was also decided that the causeway would have a slope and rock size to match those of the existing embankment at the Outer Harbour of the Barrage and at the rock protection at the northern end of Penarth Promenade. Over time these existing embankments have demonstrated their capacity to withstand the forces of tides and waves at this site.

Initially, it was assumed that the seaward and that the landward of inner slope would both be 1 on 2.

To try and reduce costs various options were considered on a technical and cost basis before deciding on the most economical to be taken forward. A sketch of the chosen cross section is available.

Arup have advised throughout this design development and not raised any concerns with regard the final cross section.

3.6.6 Rock supplies and logistics -£6 (incl. Cosslett £2k, BAM/Nuttall £2k)

We have had discussed on rock supplies, logistics and costs with Cosslett, a local earth moving contractor and with BAM/Nuttall, a major contractor with experience of building maritime structure on the Welsh coast.

Cosslett advised that suitable supplies were available locally and that they could be brought to site by standard road vehicles. They advised that we should consider a supply from more than one source, to try and get a more secure supply and a more competitive rate. Cosslett initially advised against delivery by sea directly onto the beach because of the perceived increased costs of this method and its weather dependency.

Key to the delivery of rock to site by road vehicles will be the acceptability of the transport route by the public

Discussions have been held with Associated British Ports and we have received a provisional agreement in principle for the rock to be brought though ABP port land to the eastern side of the Barrage, and for the use of an area there for stockpiling, to smooth out the interface between the construction progress and delivery rates.

The agreement with ABP needs to be concluded

Discussions have also been held with Cardiff Harbour Authority and it has been agreed in principle that rock can be brought from the APB land across the Barrage to the construction site at the eastern end of the Link. These discussions covered typical arrangement for site traffic to cross the Barrage and for the reclamation of land for a site compound along the western side of the Outer Harbour. The agreement with Cardiff Harbour Authority needs to be concluded

On the other hand, BAM/Nuttall favours the transport of the large rock armouring by sea and delivery directly onto the beach. It was accepted that delivery of rock directly onto the beach could introduce wider environmental concerns, but it was concluded that such concerns were unlikely to rule out that this option.

In conclusion, it was decide to keep both options open, so as to have a more competitive environment at the time of tender.

3.6.7 Rock causeway, construction method --£5k (incl. Cosslett £1k and BAM/Nuttall £2k)

The discussions with Cosslett concluded on a similar construction method to that used by BAM/Nuttall for the construction at Borth , see photographs

The proposal is that the construction would start with filling to about mid height, progressing from the Barrage End towards Penarth. At the promenade at Penarth the embankment would be completed to full height working in the reverse direction. With this method all of the construction would take place from the one end; i.e. from the Barrage end.

The proposal is that the rock will be end tipped and spread, without compaction by rolling. Compaction will be achieved by the flow of tidal water through the porous structure. It is estimated that a period, say of 6 months, will be required for wave action to have the desired compaction on the embankment, before the road surface and others finishing items are built

3.6.8 Alternatives-- Viaduct Construction Studies-- £5k

As for all significant infrastructure projects of this nature it is appropriate that alternatives are consider before deciding on the optimum solution

We have therefore studied alternative suspended viaduct forms with various spans and materials to compare with the rock fill causeway design.

The rock underlying the beach is just below the pebble (or cliff fall rubble) surface for most of the Link route, therefore economical, shallow foundations supporting a small span well braced structural form would be suitable for most of the route. The favoured viaduct design used continuous ground beam foundations, anchored into the rock (and infilled with a temporary construction road) supporting a column grid of 6m x 5m with cross bracing.

A deck width similar to the rock causeway design was assumed. Deck height was increased to a minimum of 9m AOD (level with Penarth Pier deck) since increasing the height would be relatively economical and a higher deck level would moderate wave uplift forces, when high spring tides combine with storm conditions. Another factor affecting deck height is beach topography. As it may be desirable to use pre-fabricated columns with a constant height, in this comparative study it was assumed that the deck level would vary above the 9m AOD, with beach level.

As the link approaches the Outer Harbour at the Cardiff end, the bedrock dips to a lower level. A different structural design would be applied in this area, utilising small caissons or short piles and perhaps a longer span structure for a short distance.

The need to plan for shuttle working between high tides suggests quick build pre-fabricated forms in pre-cast concrete or steel. Salt water corrosion protection or resistance could be delivered by either dense, precast concrete elements with stainless steel fixings, or coated steel frames, or use of cathodic protection methods.

Comparative studies of the viaduct and causeway options concluded that --

-- the construction cost of such a viaduct would be similar or less than that of the rock causeway

-- the rock causeway could be modified much more easily for increased or new uses in future. In response to increased use it could be made wider by steepening slopes or widening its footprint on the beach; also its pavement could be made stronger for vehicle loads eg vehicles bringing deliveries for events. In response to climate change the level of the pavement could easily be raised.

-- both would attract similar operation

---both would attract similar normal annual inspection and maintenance costs

-- the viaduct was more likely to attract long term higher cost maintenance issues.

---both could be made aesthetically pleasing

--both were acceptable on ecological grounds

3.6.9 Architecture & visual appearance--£2k (incl. Chris Lloyn £2k)

The natural appearance of a rock filled causeway, matching that of the existing rock faced embankments at both ends, may be preferred from an aesthetic viewpoint; also from an environmental view point because of its potential for colonisation by marine organisms.

An illustration of the Link was produced by our architect. This has been shown at all consultation meetings and it has always been well received

Nonetheless, it is appreciated that during the detailed design phase, alternative forms will need to be studied further.

3.6.10 Environmental impacts -£6k (incl. Arup £2k)

A provisional list of issues and an outlines of the work ahead was developed from studying the planning documents submitted in support of the previous scheme, and after taking views from Arup (£1k).

This provisional list was sent to the Vale Council for the attention of its Ecologist and to Natural Resources Wales; and was followed up by meetings.

Constructive response were received from both and neither raised a significant concern .These responses were reviewed by Arup (£0.5k), who concurred with the advice given.

A helpful joint meeting was then held with Natural Resources Wales and the Vale of Glamorgan. This enabled us to produce a list of the species for our current research and which in due we will need to be addressed in the Environmental Assessment. That we will produce in the detailed design stage. It was agreed that only species of birds needed to be on the list.

Using this list we made an enquiry to the South East Wales Biodiversity Research Centre (SEWBRcC) for records of these species being at our site during the last 10 years. SEWBReC is recognised by NRW and the Vale Ecologist as the appropriate organisation to consult for such records,; and in due course the records were provided to us.

We have examined the records and have concluded that they support the view that we already had , namely that the area of our site is not particularly attractive to birds on the list, and that consequently there were no exceptional bird issues to hinder the project going forward.

3.6.11 Statutory permissions processes—£5k (incl. Arup £2k , Soltys Brewster £1k

The studies and reports submitted in support of the previous scheme is a large source of publicly available relevant information.

Our experts have studied these documents and scheduled what we judge we could reuse, what we can adjust and what we will need to do new in support of our submissions.

We have discussed the scope and budget for this work with Arup (£2k) and Soltys Brewster(£1k), who were the planning consultants for the previous scheme.

3.6.12 Impact on Dwr Cymru Welsh Water's Apparatus --£4k (incl. Arup £2k)

There are DCWW apparatus at both ends of the Link. There is a 300mm ductile iron sewer which runs for some 500m from the barrage car park along the footprint of the Link to join an brick sea outfall which crosses the beach. At the Penarth end there is a major pumping station. The overflow from this also runs along the line of the Link before joining a sea

We have met DCWW at a site visit and at its offices and have followed up with technical discussions to confirm what is in place and what we will need to do to protect the apparatus and to maintain DCWW's access to these.

We have developed options for both ends with help from Arup. At the Barrage end it should be possible leave the 300mm sewer in place and to extend the manholes to the pavement on the Link. However at the detailed design stage, investigations show that this is not practical and that this sewer will

need to be replaced at shallow depth beneath the pavement.. The old sea outfall can be protected and left in place

Where there is an issue with the DCWW sewer and outfall at the at the Penarth end , it is proposed that the structure of the Link will change to a " Pier Structure " and that this will have 4.5m of clearance above , the normal clearance requirement by DCWW in such circumstances.

Our proposals to protect the DCWW Apparatus have not yet been submitted to DCWW for its comments

3.6.13 Car Parking and Traffic Movements at the Penarth End---£ 7k (incl. Arup £5k)

The Penarth waterfront has suffered from a shortage of parking during busy periods since the old multi-story car park was demolished. The success of the re-developed Pier has increased demand and the Link will attract further visitors to the Promenade at Penarth.

Our local meetings and consultations have yielded a clear demand for more parking.

The previous Link scheme, aborted in 2007, included parking spaces accessed off the link around the pump house. This was an imperfect arrangement with a blind entrance involving conflict between cars and pedestrians. We have therefore studied alternative configurations and concluded that a car park accessed higher up Beach Road would improve visibility of the car park entrance; junction site lines; and provide safer grade separation of cars, pedestrian and cyclists.

We have drawn up various car park access proposals. The junction with Beach road could either be a restricted movement T junction; or a full movement T junction; or a mini-roundabout.

We have met on site with the VOG Highway Engineer to explain our logic. We received no adverse reaction to the principle but VOG have reserved their position until formal preliminary engineering design can be produced and reviewed.

Arup (£5k) reviewed our junction proposals on site and undertook a preliminary analysis. They confirmed that all of our solutions could be made to work, subject to taking some of the adjacent landscaped land, owned by the VOG.

We have discussed our proposed access arrangements with the Penarth Council and have been encouraged to look at combining this junction with improved arrangements for access and egress from the Kymin, taking account of possible future use.

3.6.14 Car Park Design Proposals at Penarth End—£3k

Sketches illustrating various car park design proposals have been produced. Our favoured designs are accessed at roof level from our preferred junction arrangement discussed above. A 2 or 3 level car park may be provided. We have assumed that a car park with the same or greater capacity than the previous multi-storey car park, perhaps for around 200 cars, should be provided..

We have examined 2 families of design options; one based on the footprint of the previous car park, the other adopting a linear form under the cliff.

3.6.15 Funding Car Parking at the Penarth End--- £3k

It is assumed that parking in any new facility should be charged for at a rate that will enable self-funding without subsidy. However, this building will not be self-funding without either the introduction of a charging regime for on street parking nearby, or having some commercial element to cross subsidise it.

Such a proposal would require a parking and transport impact study, including consideration of an on-street parking regime in the general area of the new car park.

Arup have scoped this work and estimated that a budget of some £35k is required for such a study..

3.6.16 Retail, Leisure & Tourism opportunities – -£3k

We have produced sketch designs illustrating how retail, leisure and tourism facilities may be included at link level under the car park decks at the Penarth end of the Link, facing the sea. At this point the link could become a tourist piazza passing beach-side of food and drink outlets with alfresco seating during fine weather. Such an arrangement would suggest a linear car park and building form. Our architect has produced sketches with façade treatments related to cliff aesthetics.

At the barrage end, we have planned for the site compound to be on land reclaimed along the western edge of the Outer Harbour. After it has served its purpose as a construction site, this reclaimed land and the adjacent surface car park will form a site with a potential for leisure and commercial use.

In addition, the old dilapidated Maritime building needs to be brought back into beneficial use. We have met with the owner and received details of the planning consent, which is currently considered unviable due to conservation requirements and a lack of critical mass. Incorporation into a larger development would enable viability.

The outer harbour area is located at the mid-point between the Eastern end of the barrage and Penarth Pier and is an ideal additional destination. We have produced sketches illustrating a master plan of this area, aimed at enhancing the bay, the barrage and the link to Penarth as a tourist destination and increasing economic benefit. Commercial development would enable subsidy of tourist facilities via profits made.

We plan to explore these ideas further at our next meeting with Cardiff City.

3.6.17 Programme--£4k (incl. BAM/Nuttall £1k)

Since the December version of this document we have given further thought to the programme and by overlapping activities, and assuming no delay between the Stages, have reduced the overall time required from the release of funding to the completion of construction from 36 months to 32 months

The revised programme, with reference to the Green Book Stages, can be summarised —

Stage 3 –17 months
Procure consultants , obtain permission, select a Design and Build Contractor , complete the Full Business Case and Pass through Gate 3

Stage 4 –15 months
Complete the detailed design and build the Works

3.6.18 Capital Cost ---£10k (incl. Aecom £3k, Cosslett £1k, BAM/Nuttall £3k)

Cost estimates were initially produced by Aecom and then modified as the design has progressed.

BAM/Nuttall contributed their own independent cost estimate for the whole of the Works and Cosslett has provided independent advice on the cost of the supply of the rock armouring.

We compared the information from BAM/Nuttal with that from Cosslett and Aecon; and decided that because of BAM/Nuttall's general experience of maritime work and because of its particular experience of building a similar structure off the West Coast of Wales, that we would use the

BAM/Nuttall estimates as the most reliable basis for our estimate. In reaching this decision we took comfort that there was much similarity between the estimates from the three sources and that the main difference was in the allowance made for maritime work.

Bam/Nuttall made an in initial estimate that caused us to modify the design to reduce cost. Consequently this assessment starts with BAM/Nuttall 2nd estimate of £9.6m and we made the following adjustments --

--.that estimate is for an 850m long Causeway. The length of the causeway, from the arm of the Outer Harbour to the outfall at Penarth is 775m —-We therefore assumed a 10% reduction bringing the estimate to £8.7m.

--some filling will be required at the Barrage end to create the site compound, say a narrow strip for cabins near the existing footpath at 8.5mAOD with the main storage area at 6.5mAOD. This would require some 10k m3 of general filling. We decided to allow £0.1m for this work, assuming that part of this work would be already be covered. -- This brought the estimate to £8.8m

--to form the site compound at the Barrage end will require the agreement of DCWW for this to be built above its 300mm ductile iron sewer heading to the outfall at Penarth Head. In our opinion, and that of Arup, this should be acceptable to DCWW without the requirement to strengthen the sewer; also as the site compound is temporary without the need to extend the manholes, subject to an undertaking that the fill would be removed when the site compound is decommissioned or should the site compound becomes a permanent feature, then the manholes would be extended and that this done as part of that future proposal. – We decided not to increase the estimate, but record this as a risk to close out with DCWW.

--to form the site compound there will need to be protection measures added for the Harbour Authority navigation aids cable and manholes. – We decided no significant extra measures will be required and recorded this as a risk to be closed out with the Harbour Authority.

--- an old cast iron 300mm sewer follows the line of the causeway to Penarth Head to a brick sea outfall that crosses the beach. We believe that it is practical, and Arup agree, that we can deal with this sewer by extending the manholes to the give access to it from the pavement and by providing protection to the outfall, if needed. We made an allowance of £0.1m for this work. Should DCWW insist that the 300mm sewer is replaced, this could involve a length of some 500m from the barrage car park to Penarth Head, then this wold be a significant additional cost, say £0.5m.—We decided to increase the estimate to £8.9m and record the possibility of needing to replace the sewer as a risk to close out with DCWW.

—At the Penarth end there will need to be a short connection from the causeway to the northern end of North Promenade and at the other end, across the decommissioned site compound to the Barrage Car park.--We increased the estimate by £0.1m to £9.0 to allow for this.

—Fees /expenses may be payable to Associated British Ports and to the harbour Authority for bringing bulk materials to the site compound through the port land and across the barrage.-- We made an allowance of £0.2m for this item , bringing the estimate to £9.2m, and record it as a risk to close out with Associated Ports and the Harbour Authority.

—During the detailed design process it is likely that some changes will be found necessary e.g. the design will need to adjusted at the barrage end where the rock surface is lower and it is covered by soils On the other hand it is likely that challenge during the detailed design process will find savings. --We agreed that one affect could act to counteracting the other and so made no change to the estimate.

-- the recent information gathered from the South East Wales Biodiversity Research Centre that the area of our site is not attractive to the bird species that require our special attention which meant we could reduce the allowances made in our earlier estimate for the duties required to deal with this topic.

The revised estimate for the selection of consultants and obtaining permissions is revised to £0.5m made up as follows-

--£0.025 for the selection of Consultants

- £0.1m, engineering and modelling

--£0.25m, other studies and planning documents

- £0.05m, legal costs

- £0.05m for Client or external management

- £0.025m for Client Contingency

A second adjustment to the December document, to accord with The Green Book Stages, is that the estimates for the selection of the Design and Build Contractor , the completion of the Full Business Case and the passage of the project through Gate 3 have been brought forward from Stage 4 and into Stage 3, so bringing the revised total for Stage 3 to £0.6m. These transfers being, £0.05m for selecting the design and build Contractor and £0.05m for completing the Full Business case and taking it through Gate 3

These considerations bring the total estimate to £9.8m

—Finally we considered that as a minimum there should be an allowance of say £0.1m to cover Client, or external Project Management Costs and Expenses and £0.0.1m as a Client Contingency. These figures show a reduction on those in the December document, recognising the £ 0.1m transferred forward into Stage 3

The estimate total cost of all of the activities of The Green Book Stage 3 and Stage 4 is £10m.

In summary, we believe that a budget of £10.0m is reasonable to cover all costs, from now to the completion of the Link. It contains some contingencies that may prove not to be needed, but it also contains risk that could add significantly to costs.

The key to providing confidence in this budget, will be to close out the big risks items referred to above.

To ensure no misunderstanding, we repeat the comment in the introduction, that all figure in this report do not include VAT.

3.6.19 Operation and Maintenance Costs--£2k

Cardiff Harbour Authority are ideally placed and ideally equipped to operate and maintain the Link.

Following our meetings with them we believe that they are supportive of the project and have an interest in taking on these duties.

The Link will provide opportunities for commercial activities and we anticipate that these can be developed to provide funding to cover the ongoing operation and maintenance costs.

3.6.20 Drafting of the Outline Business Case--£5 k

On the advice received at the Wels Government meeting in December, we have been working on an Outline Business Case .

4. Conclusions

This study has shown that the PHL:

- will enable substantial economic, social and wellbeing benefits to the residents of Cardiff and Penarth;
- delivers a long awaited missing ingredient linking the waterfront of the Capital to a beach and an Edwardian Promenade
- enhances the national and international reputation of our Capital City increasing its attraction to tourists and businesses;
- has strong public support;
- will not cause significant environmental adverse impacts;
- is good value for money;
- can be delivered for £10m (plus VAT if payable);
- and that now it is the right time to return to fund raising.

We have taken the project as far as we reasonably can on a pro bono basis, to go forward from here and to trigger the next phase we need funding commitments……

- to provide £0.6k so that we can take project forward , starting with the selection of consultants, through the detailed design stage, securing the necessary permissions to build, selecting the design and Build Contractor , preparing the Full Business case and taking the project through Gate 3 of the Green Book processes.
- to provide a further £9.4m so that the Design and Build Contractor can be appointed to proceed to complete the detailed design and to construction the Link.

Vale of Glamorgan Council

Penarth Headland Link

Stage 1 Maritime and Geotechnical Review

Issue | 25 April 2018

Job number 260490-00

Ove Arup & Partners Ltd
4 Pierhead Street
Capital Waterside
Cardiff CF10 4QP
United Kingdom
www.arup.com

ARUP

1 Executive summary

For the maritime assessment of the proposed structure (earth causeway with rock revetment) the alignment considered assumes approximately 20m offset from the cliff.

The design has been assessed to determine rock sizes required for the revetment and viable crest levels (based on overtopping criteria) compared to an initial outline proposal prepared by the Penarth Headland Group.

The initial proposed level of +8m OD is considered too low to provide safety to pedestrians from wave overtopping. Based on the existing data, an adequate level is estimated to be indicatively +9m OD. The exact level is to be decided after further studies considering risks and options and sensitivity to climate change.

By comparison this level is below the +9.7m OD 'as built' level at Cardiff Bay Barrage outer harbour breakwater, but higher than the +8.0m OD on the Parliamentary plans for the (unbuilt) Penarth Headland Link.

As another benchmark, the predicted 1:100 year flood level allowing for sea level rise but with no allowance for wave action is +8.5m OD.

The wave data available for this stage 1 study isn't sufficient to permit an assessment of the frequency that the causeway would have to be closed off as unsafe.

The rock armour on the causeway outer face appears reasonable for preliminary design, except that a toe of armour will be required.

Some issues that will require consideration in the next stage:

- Assess gaps and inconsistencies in the wave and water level data which is available for this stage 1 assessment.
- Operational restrictions: prevent access during storms.
- Potential for a parapet wall along the seaward edge of path to reduce wave overtopping.
- Allowance for sensitivity to increased storminess and sea level rise scenarios.
- Need for culverts through the causeway to prevent 'leaky dam'.
- Area between causeway and cliff likely to become silty, collecting rubbish and possibly becoming smelly.
- Need to consider escape options if overtopping or security concerns.
- Environmental and landscape impacts.

YMUNWCH Â'R MUDIAD

sustrans

JOIN THE MOVEMENT

Penarth Headland Economic Impact Study

April 2018

Circulation status:	Final draft – updated to address Sustrans Cymru feedback
Date issued:	13 April 2018
Authors:	Emma Lindsay with support from Elisabeth Muller and direction from Anjali Badloe and Ryland Jones
Quality assurance	Anjali Badloe 13 March 2018 and 13 April 2018
Sign-off	Louann Sugden (15.03.2018) Ryland Jones (16.03.2018)

About Sustrans

Sustrans yw'r elusen sy'n ei gwneud yn haws i bobl gerdded a beicio. Rydym yn cysylltu pobl a llefydd, yn creu cymunedau byw, yn trawsnewid y daith i'r ysgol ac yn hwyluso taith hapusach ac iachach i'r gwaith.

Ymunwch â ni ar ein siwrne. www.sustrans.org.uk

Sustrans is the charity making it easier for people to walk and cycle. We connect people and places, create liveable neighbourhoods, transform the school run and deliver a happier, healthier commute. Join us on our journey. www.sustrans.org.uk

Sustrans Cymru
123 Bute Street
Cardiff Bay
Cardiff
CF10 5AE

Head Office
Sustrans
2 Cathedral Square
College Green
Bristol
BS1 5DD

Front cover image credit: ©Sustrans Credit: J Bewley/Sustrans

Penarth Headland – Business Case

The following document provides an assessment of the economic benefits of developing a new walking and cycling route along the Penarth Headland in the Vale of Glamorgan, Wales.

The proposed route would run along the base of the cliffs at Penarth. The cliffs are crumbling, posing a considerable engineering challenge in stabilising them so that the route can be constructed on the shore below.
This document will inform the business case alongside a feasibility study of the proposed development that has been undertaken by the Vale of Glamorgan County Council.

1 Executive Summary

1.1 Economic benefits of the Penarth Headland Route

The economic benefits of the Penarth headland route have been appraised based on expected annual cyclist and pedestrian usage on the proposed shared use path after construction is completed. The economic benefits of this annual usage have been appraised as if observed for the next 20 years (i.e. a 20-year appraisal period has been used).

This analysis calculates baseline annual cycling and walking usage by local users before estimating usage on the constructed route based on uplift seen in previous infrastructure projects. The post-construction usage estimates have been developed using evidence from the Infrastructure Impact Tool (IIT), local data from past schemes in the surrounding area and other comparable sites. The post-construction usage scenarios include an estimated annual number of trips and are presented as low, middle and high scenarios.

Under the middle scenario, where the shared use route sees a 122% increase in cycling and 65% increase in walking trips above baseline:

- It is estimated that 759,156 cycling trips and 1,025,848 pedestrian trips could be occurring annually on the route.
- The economic benefits of the route development over a 20 year period are valued at £25,730,335, inclusive of £23,091,498 health-related economic benefits.
- The estimated tourism-related economic benefits of developing the route from pedestrian usage are valued at £8,063,365 per year with 178 FTE jobs directly and indirectly supported through this tourism.
- The Benefit-Cost Ratio (BCR) was calculated for the three usage scenarios. With total costs of the route estimated at £12,114,074 (including maintenance), all showed the route to have a positive economic impact: The Benefit-Cost Ratio (BCR) for the middle usage scenario was 2.12[1], where the economic benefits of constructing the route estimated to outweigh the costs. For comparison, the low usage scenario has an estimated BCR of 0.89 (where economic costs outweigh the benefits) and the high usage scenario BCR of 3.36.

[1] The average BCR of all schemes in the Connect2 active travel infrastructure programme is 6.3:1 The BCRs of individual schemes range greatly from 3:1 to 32.8:1.

Respondents of the Route User Intercept Surveys show overwhelming support for new route. When shown the proposed route on a map, 64% of respondents said they would always use the new route and 35% responded they would use it sometimes.

Vale of Glamorgan Council

Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts

Scheme Impacts Assessment Report – Final (version 1.0)

Final (v1.0) | 11 October 2018

Job number 260490-00

Ove Arup & Partners Ltd
4 Pierhead Street
Cardiff
CF10 4QP
United Kingdom
www.arup.com

ARUP

Important notice

This report has been prepared specifically for and under the instructions and requirements of the Vale of Glamorgan Council ("our client") in connection with the appraisal of transport and economic impacts associated with a number of proposed sustainable transport schemes.

This report is prepared for use and reliance by our client only. No third party is entitled to rely on any of the figures contained within this report unless and until they and we sign a reliance letter in a form agreed by us. We do not in any circumstances accept any duty, responsibility or liability to any third party whatsoever (including retail investors whether by bond issue or otherwise) who has relied on this report in circumstances where they and we have not signed a reliance letter in a form agreed by us. Accordingly, we disclaim all liability of whatever nature (including in negligence) to any third party other than to our client or to any third party with who we have agreed a reliance letter (and such liability is subject always to the terms of our agreement with our client and the reliance letter with the third party).

In preparing this report we have relied on information provided by others and we do not accept responsibility for the content, including the accuracy and completeness, of such information. In no circumstances do we accept liability in relation to information used by us which has been provided by others.

We emphasise that the forward-looking projections, forecasts, or estimates are based upon interpretations or assessments of available information at the time of writing. The realisation of the prospective financial information is dependent upon the continued validity of the assumptions on which it is based. Actual events frequently do not occur as expected, and the differences may be material. For this reason, we accept no responsibility for the realisation of any projection, forecast, opinion or estimate.

Findings are time-sensitive and relevant only to current conditions at the time of writing. We will not be under any obligation to update the report to address changes in facts or circumstances that occur after the date of our report that might materially affect the contents of the report or any of the conclusions set forth therein.

No person other than our client and any party to who reliance has been expressly permitted by us pursuant to a reliance letter may copy (in whole or in part), use or rely on the contents of this report without our prior written permission. Any copying or use of this report (in whole or in part) by any party whatsoever shall be accompanied by or incorporate this notice at all times.

We accept no responsibility for, and have not authorised, the contents of any report, prospectus, supplementary prospectus, listing particulars, supplementary listing particulars, presentation or other document or communication in respect of the sale, acquisition, offering or transfer of any shares or securities or interest in them, whether on the primary or secondary market or otherwise, which uses, includes or incorporates any report, deliverable or information, or any element thereof, prepared by us under or in connection with this agreement.

Arup, 11 October 2018

0 Executive summary

0.1 Introduction

The Vale of Glamorgan Council has commissioned Arup to undertake an appraisal of a series of sustainable transport interventions along the Vale of Glamorgan to Cardiff coastal corridor. The term "coastal corridor" refers to the area of the Vale of Glamorgan stretching from Barry in the west to Cardiff Bay in the east, which includes Dinas Powys, Sully and Penarth.

This appraisal encompasses the following seven potential schemes:

- Cycling and pedestrian routes:
  - Penarth Headland Link
  - Biglis Roundabout to Dinas Powys
  - Merrie Harrier to Pont-Y-Werin and Penarth Road
- Bus priority schemes:
  - Merrie Harrier to Cardiff Barrage (and onwards to Cardiff city centre)
  - Cosmeston to Cardiff Barrage (and onwards to Cardiff city centre)
  - Park & ride facility at Cosmeston Park
- Cogan rail station upgrade

The appraisal aims to identify the strategic, economic and transport benefits that could be realised due to the implementation of the schemes. This is intended to provide analytical content that can be used to support future WelTAG Stage 1 and Stage 2 appraisals for any scheme that is progressed for further analysis.

0.2 Strategic context

Transport conditions along the corridor

Analysis of journey to work patterns indicates that levels of both public transport usage and active travel (walking or cycling) are generally low – each accounting for around 10 – 15% of journeys along the corridor. Driving a car or van remains the dominant mode (around two thirds of total journeys).

Results from analysis of Trafficmaster data indicate that traffic congestion is a significant issue in peak periods. Investing in alternative / sustainable modes would help reduce traffic, ease congestion and reduce emissions.

Cycling infrastructure between Barry, Dinas Powys and Penarth

There are differences in levels of cycling within the corridor area. Levels of cycling are significantly higher for journeys to / from Penarth than for journeys to/from Dinas Powys or Barry. Low levels of cycling for Dinas Powys and Barry are likely to be due in part to the limited cycling infrastructure beyond Penarth – with particularly limited provision between Dinas Powys and Barry.

There is a strong case for improving cycling facilities, as this would link Barry and Dinas Powys to established cycle routes into Cardiff via the Barrage.

Bus journey times along the corridor

Analysis of census data suggests that bus usage accounts for between 2% and 4% of total journeys – below the Wales average. Journey times are also slow compared to car or rail journeys. This is partly to congestion along key routes (principally the A4055) as well as within Cardiff (the principal destination for commuters).

These factors support the case for bus priority measures along the corridor, coupled with a faster link into Cardiff (potentially via Cardiff barrage).

0.3 The Case for Change

Combining the assessment of transport issues along the corridor with the specific scheme proposals, the following six Strategic Objectives have been defined:

1. Reduce journey times and improve journey quality for sustainable transport modes (bus and rail services, pedestrian and cycling links) along the Vale of Glamorgan coastal corridor.
2. Increase the levels of active travel through provision of high quality pedestrian and cycling infrastructure along key routes.
3. Improve accessibility and connectivity between key destinations by all modes, in turn reducing the reliability on the car.
4. Enhance development opportunities by improving access to strategic development sites.
5. Encourage economic activity, leisure and tourism by reducing barriers to shoppers, tourists and other visitors.
6. Contribute towards reduced road traffic congestion, reduced emissions and improved air quality.

A comparative evaluation of the potential scheme options has been undertaken, to assess the extent to which each scheme option delivers against the above Strategic Objectives. A scoring mechanism has been applied, based on the WelTAG scoring matrix (see section 3.3.2). The results are summarised in Table 1.

Table 1: Appraisal of scheme options alignment with strategic objectives

Scheme option	Indicative score	Summary
Penarth Headland Link (ped & cycle)	**+10**	Strong strategic alignment due to encouragement of active travel, journey quality, and significant leisure and tourism benefits.
Biglis Roundabout to Dinas Powys (ped & cycle)	**+12**	Strong strategic alignment due to active travel benefits, journey quality, connectivity and congestion reduction.

Scheme option	Indicative score	Summary
Merrie Harrier to Pont-y-Werin and Penarth Road (ped & cycle)	**+12**	Strong strategic alignment due to active travel benefits, journey quality, connectivity and congestion reduction.
Merrie Harrier to Cardiff Barrage (bus)	**+10**	Strong strategic alignment due to journey quality, connectivity and congestion reduction.
Cosmeston to Cardiff Barrage (bus)	**+10**	Strong strategic alignment due to journey quality, connectivity and congestion reduction.
Park & Ride at Cosmeston (or alternative locations) (bus / rail)	**+7**	Positive strategic alignment due to journey quality, connectivity and congestion reduction.
Cogan Station upgrade (rail)	**+10**	Strong strategic alignment due to journey quality, connectivity, congestion reduction and facilitation of wider development.

0.4 Options feasibility assessment

An assessment of the overall technical feasibility and deliverability of each scheme option has also been completed. For three of the proposed schemes (Cosmeston P&R / Cosmeston Bus Priority / Cogan Interchange), Arup has carried out its own feasibility analysis and appraisal of different sub-options, (see Appendix B). For the other schemes, the feasibility assessment draws upon other pre-existing feasibility reports.

The assessment includes a summary appraisal to compare the performance of each potential scheme option relative to three key criteria: technical feasibility and deliverability; potential cost; and dependencies and risks. A scoring mechanism has been applied to capture the results which is based on the WelTAG scoring matrix (see section 4.4).

We note that technical proposals for each of the scheme options are at an early stage. As a result, there is a significant degree of uncertainty associated with the cost estimations provided. To reflect this, all costs provided are inclusive optimism bias. A figure of 44% has been applied to the capital costs for all scheme options, with the exception of Penarth Headland Link for which 66% optimism bias has been applied due to the project's scale and complexity, and Biglis to Dinas Powys pedestrian and cycle link, for which a 40% optimism bias has been applied as per Capita's original feasibility study.[1]

The results of the initial options feasibility appraisal are summarised in Table 2.

[1] Merrie Harrier to Barons Court Strategic Cycle Routes (Capita), March 2016

Table 2: Comparative appraisal of scheme options feasibility

Scheme option	Indicative cost (2018 prices)	Indicative score	Summary
Penarth Headland Link (pedestrian & cycle)	£16.6m	**-5**	A significant engineering undertaking, and the most technically complex of all the scheme options with highest cost. Requires consultation / stakeholder engagement.
Biglis Roundabout to Dinas Powys (pedestrian & cycle)	£1.5m	**-1**	Project unlikely to pose significant technical or delivery challenges. Lower cost than other schemes. Potential risk associated with land acquisition / CPO.
Merrie Harrier to P//ont-y-Werin and Penarth Road (pedestrian & cycle)	£4.9m	**-1**	Project unlikely to pose significant technical or delivery challenges, although works will require traffic management measures. Significant costs.
Merrie Harrier to Cardiff Barrage (bus)	£6.3m	**-4**	Technical challenges, significant costs and operational risks relating to implementation of buses over the barrage.
Cosmeston to Cardiff Barrage (bus)	£4.9m	**-4**	Technical challenges, significant costs and operational risks relating to implementation of buses over the barrage.
Park & Ride at Cosmeston (or alternative locations) (bus / rail)	Sub-options: A: £1.0m B: £1.0m C: £2.6m	**0**	Low technical complexity. Lower cost than other schemes. Preferred option (C) dependent on land acquisition.
Cogan Station upgrade (rail)	£5.2m	**-3**	Upgrade unlikely to pose significant technical or delivery challenges. Preferred sub-option (B) requires civils works to accommodate new platform and pedestrian linkage, potentially significant costs. Land acquisition required.

0.5 Transport impacts appraisal

Overview

An estimation has been made of the potential impact of each scheme option on transport usage, modal share and journey times. The key focus is on the increased usage of sustainable modes (walking / cycling / bus usage) that will arise.

We note that the estimation of current and future demand associated with the different scheme options has required a number of input data sources to be combined, with various assumptions applied (see chapter 5). As a result, there is a significant degree of uncertainty with regard to the results shown. It is recommended for any scheme option taken forward for WelTAG Stage 1&2 development that a more in-depth analysis is undertaken that includes detailed surveys of current travel patterns (see section 0.8).

We also note that projected usage of the scheme options in the years following their implementation is assumed to grow over time in line with general population

trends (see Section 5.2.4). This is a conservative approach, which does not take into consideration any potential increases in underlying demand for sustainable transport modes associated with other factors, e.g. policies to incentivise active / sustainable travel or increases in the real costs of car usage. It is recommended that the potential "upside" impacts of more positive trends in underlying usage of sustainable modes are factored into the value for money appraisal for any scheme options taken forward for WelTAG Stage 1&2 development (see section 0.8).

Results

Results from the initial appraisal of transport impacts are summarised in Table 3.

Table 3: Sustainable transport scheme options – summary of transport impacts

Scheme	Estimated current demand (2018)	Estimated future demand – 2021 (post-option implementation)*
Pedestrian & cycling schemes		
Penarth Headland Link Walking & Cycling	Pedestrians: 118k Cyclists: 155k[2]	Pedestrians: 271k (+ 130%) Cyclists: 288k (+ 86%)
Biglis-Dinas Powys Walking & Cycling	Pedestrians: 0 Cyclists: 21k	Pedestrians: 85k *(all new users)* Cyclists: 32k (+ 52%)
Merrie Harrier - Pont y Werin Walking & Cycling	Pedestrians: 0 Cyclists: 41k	Pedestrians: 41k *(all new users)* Cyclists: 62k (+ 51%)
Bus priority schemes		
Merrie Harrier - Barrage Bus Priority	Bus: 208k	Bus: 230k (+ 11%)
Cosmeston - Barrage Bus Priority	Bus: 285k	Bus: 300k (+ 5%)
Park & Ride schemes		
Cosmeston Park & Ride (plus potential alternatives)	n/a	Sub-option 1 (Cosmeston): (bus trips) 18k p.a. Sub-option 2 (Sully): (bus trips) 19k p.a. Sub-option 3 (Eastbrook): (train trips) 37k p.a.
Cogan Park & Ride	n/a	Train trips: 34k p.a.
* We note 2021 demand figures also incorporate underlying year-on-year demand growth – see Section 5.2.4		

Summary – walking & cycling schemes

Comparing the percentage uplifts in levels of usage for sustainable modes, the Penarth Headland Link shows the biggest impact of all the scheme options. This is mainly because the link would connect with the already heavily used Cardiff Bay barrage, from which much of the new demand is expected to arise.

The Biglis to Dinas Powys and Merrie Harrier - Pont y Werin schemes are also expected to drive increased levels of walking and cycling, albeit to a lower level. Current provision along the two routes is limited, therefore providing safe, segregated walking and cycling links will have a significant impact.

[2] Note: there is no current route around Penarth Headland; these demand figures relate to cycle / walking journeys between Lower Penarth and Cardiff Bay (which currently involves travelling through Penarth town centre).

Summary – bus priority schemes

The two bus priority schemes – Merrie Harrier to Cardiff Barrage and Cosmeston to Cardiff Barrage – would each deliver journey time improvements that would give rise to increased demand. In both cases, bus demand is expected to increase from current levels, with around 15,000 – 22,000 additional bus trips per annum by 2021, and a related reduction in car trips.

Summary – park & ride schemes

The uplift in levels of public transport demand arising from the Park & Ride options / sub-options varies. Analysis of two potential locations for a bus P&R facility – at Cosmeston, or Sully – suggests either option would generate approximately 18 – 19,000 additional bus trips per annum. In contrast, expanding existing park & ride provision at Eastbrook rail would be expected to deliver roughly double the users – with around 37,000 additional (rail) trips per annum.

The expansion and upgrading of Cogan rail station P&R is expected to result in a similar growth in demand, with an additional 34,000 rail trips per annum forecast.

0.6 Economic impacts appraisal

Overview

The focus of the economic impacts appraisal is on the specific benefits each of the scheme options will deliver, compared to the status quo (or "do nothing" scenario). The benefits are compared against the costs of implementation and operation (net of any direct revenues), in order for a net economic benefit to be calculated alongside a benefit-to-cost ratio.

Economic benefits and costs for each scheme option have been quantified as far as practicable based on the high-level approach adopted for this study, and the available data. It is important to note that there are a number of additional economic benefits across the schemes that have not been quantified in detail as part of this study (discussed further below).

Results obtained

Noting the limitations outlined above, the results obtained for each scheme option are summarised in the table below.

Table 4: Economic impacts – scheme options (60-year totals, discounted), 2010 prices

Scheme option	Economic benefits	Economic costs	Total net benefit	Benefit-Cost Ratio
Pedestrian & cycling scheme options				
Penarth Headland Link Walking & Cycling	£7.07m	£12.38m	**-£5.31m**	**0.57**
Biglis-Dinas Powys Walking & Cycling	£2.83m	£1.16m	**£1.67m**	**2.44**
Merrie Harrier - Pont y Werin Walking & Cycling	£1.70m	£3.66m	**-£1.96m**	**0.46**
Bus priority scheme options				
Merrie Harrier - Barrage Bus Priority	£7.27m	£21.95m	**-£14.68m**	**0.33**

Scheme option	Economic benefits	Economic costs	Total net benefit	Benefit-Cost Ratio
Cosmeston - Barrage Bus Priority	£4.58m	£6.41m	**-£1.83m**	**0.71**
Park & ride scheme options				
Cosmeston Park & Ride - Sub-option A: Cosmeston	£0.56m	£0.80m	**-£0.25m**	**0.69**
Cosmeston Park & Ride - Sub-option B: Sully	£0.60m	£0.80m	**-£0.20m**	**0.75**
Cosmeston Park & Ride - Sub-option C: Eastbrook (rail)	£1.16m	£2.14m	**-£0.98m**	**0.54**
Cogan Park & Ride	£1.22m	£2.23m	**-£1.01m**	**0.55**

Based on the economic impacts quantified within this appraisal, the results indicate that for most of the scheme options the benefits will be exceeded by the costs for delivery:

- Only one scheme option – the Biglis to Dinas Powys walking & cycling route – shows a positive economic net benefit of £1.7m (60-year NPV) with a benefit-cost ratio of 2.44 representing "high" value for money. For the remaining seven schemes the net economic benefit calculations show negative values ranging from -£0.2m (Cosmeston Park & Ride – sub-option B: Sully) to -£14.7m (Merrie Harrier to Barrage bus priority).

- Two of the three walking & cycling schemes (Penarth Headland Link and Merrie Harrier – Pont y Werin) and both bus priority schemes would require major capital works. Initial estimates range (in NPV terms) from £3.2m (Merrie Harrier – Pont y Werin) to £10.9m (Penarth Headland Link). Furthermore, the two bus schemes will also involve additional operating costs to run the enhanced services (in excess of additional revenues gained). In all four cases, initial results show the total costs incurred are in excess of the benefits delivered.

- Although the park & ride scheme options involve lower costs for delivery, benefits quantified within this evaluation do not fully cover the costs incurred, mainly due to lower levels of usages compared to other schemes.

Programme-level results including potential synergies

As well as considering each scheme option in its own right (see above), a corridor-level assessment has also been made of the scheme options as a combined programme of measures. This also takes into account potential synergies associated with two of the pedestrian & cycle schemes and the two bus priority schemes – see section 6.4.2. Results are shown in the table below.

Table 5: Economic impacts – corridor-level (60-year totals, discounted), 2010 prices

Scheme option	Economic benefits	Economic costs	Total net benefit	Benefit-Cost Ratio
Pedestrian & cycling scheme options				
Penarth Headland Link Walking & Cycling	£7.07m	£12.38m	**-£5.31m**	**0.57**
Two-option synergy (with dem. uplift): - Biglis-Dinas Powys - Merrie Harrier - Pont y Werin	£4.98m	£4.81m	**£0.16m**	**1.03**

Scheme option	Economic benefits	Economic costs	Total net benefit	Benefit-Cost Ratio
Bus priority scheme options				
Two-option synergy (with reduction in combined cost): - Merrie Harrier - Barrage - Cosmeston - Barrage	£11.85m	£20.26m	**-£8.41m**	**0.58**
Park & ride scheme options				
Cosmeston Park & Ride (recommended sub-option): - Sub-option C: Eastbrook (rail)	£1.16m	£2.14m	**-£0.98m**	**0.54**
Cogan Park & Ride	£1.22m	£2.23m	**-£1.01m**	**0.55**
Programme-level total				
Total (all scheme options incl. synergies)	£26.28m	£41.83m	**-£15.55**	**0.63**

Taking into account the limitations of the economic impacts appraisal as outlined previously, the initial evaluation of potential project synergies indicates the following:

- Combining the two walking & cycling schemes along the Barry – Dinas – Cardiff Bay corridor (Biglis to Dinas Powys, plus Merrie Harrier to Pont y Werin), the joint economic benefit is slightly higher than the economic cost, although the resulting benefit-cost ratio of 1.03 represents "low" value for money according to HM Treasury standards.

- Combining the two bus priority schemes enables costs to be substantially reduced. However, costs still remain significantly higher than benefits quantified thus far, such that the net economic benefit (60-year NPV) shows a negative figure of -£8.4m.

- Combining all seven scheme options, the total economic benefits identified within this appraisal remain significantly lower than the combined cost. As a result, the programme level economic net benefit shows a negative total of -£15.5m (in 60-year NPV terms), and a programme level benefit-cost ratio of 0.63.

Benefits not quantified within this appraisal

It is important to note that a number of benefits associated with the scheme options have not been quantified as part of this economic impacts appraisal. These include:

- Health benefits of walking/cycling schemes;

- Benefits associated with increased leisure and tourism activity, in particular for Penarth Headland Link;

- Direct user benefits for the Park & Ride schemes; and

- Benefits associated with the release of land for housing development at Cogan and associated financial benefits.

Inclusion of such impacts could result in a significant improvement in overall value for money for the schemes.

One of the key recommendations from this study is for a full quantitative appraisal of the above impacts to be undertaken, building on the initial qualitative appraisal presented in this report (see section 0.8).

0.7 Conclusions

Arup's key conclusions from this appraisal are as follows:

- The seven proposed scheme options would help to improve the quality and attractiveness of walking, cycling and bus usage as transport options along key sections of the Vale of Glamorgan to Cardiff coastal corridor. There is a strong justification for delivering the schemes from the context of local, regional and national policy.
- There is a clear rationale for increasing the levels of sustainable transport usage along the corridor. Current provision for walking and cycling is limited, and bus journey times are slow compared to other modes.
- With regard to the schemes' feasibility, constructing the Penarth Headland Link would be a major engineering undertaking, involving significant cost. The remaining scheme options are not considered particularly challenging from a technical or delivery perspective, however in most cases significant costs would still be involved in constructing and/or operating the schemes.
- The analysis of transport impacts suggests that the scheme options would lead to demonstrable increases in the usage of sustainable transport modes. Users will experience improved amenity, journey quality and reduced travel times. (It is important to note that there is a significant degree of uncertainty in relation to the initial estimations of current and future demand associated with the different scheme options presented within this appraisal).
- The results of the economic appraisal indicate that for most of the scheme options, costs for delivery will exceed the economic benefits calculated in this appraisal. However, there are a number of additional economic impacts that have not been quantified which could significantly improve value for money identified for the projects. In particular, for the three walking and cycling scheme options, additional benefits relating to public health improvements and increased leisure activity (particularly for Penarth Headland Link).
- For the bus priority schemes, the difference between benefits and costs is significant. It is also noted that, whilst operating buses over Cardiff Barrage would deliver significant benefits, similar improvements in connectivity and journey time savings may be achieved by routing additional services over the existing Cardiff Bay Link Road bridge (for which no capital investment would be required).

0.8 Recommendations

Quantitative analysis of additional economic impacts

Building on the analysis presented in this study, it is recommended that a full quantitative appraisal is undertaken of additional economic impacts on a scheme-specific basis, as outlined in the table below.

Table 6: Economic benefits recommended for further quantitative appraisal

Scheme option	Economic benefits
Pedestrian & cycling scheme options	
Penarth Headland Link Walking & Cycling	• Public health benefits from increased physical activity • Leisure and tourism benefits • Financial benefits associated with increased commercial activity (Penarth seafront)
Biglis-Dinas Powys Walking & Cycling	
Merrie Harrier - Pont y Werin Walking & Cycling	
Bus priority scheme options	
Merrie Harrier - Barrage Bus Priority	• Leisure and tourism benefits
Cosmeston - Barrage Bus Priority	
Park & ride scheme options	
Cosmeston Park & Ride - Sub-option A: Cosmeston	• Direct user benefits for P&R users (time savings, quality improvement) • Financial benefits and wider economic benefits associated with release of land for housing development (Cogan)
Cosmeston Park & Ride - Sub-option B: Sully	
Cosmeston Park & Ride - Sub-option C: Eastbrook (rail)	
Cogan Park & Ride	

Improved growth scenarios

It is recommended that additional demand scenarios are tested, which factor-in higher growth "upside" scenarios to reflect stronger growth in sustainable mode usage over time. This should include an investigation of the potential effect on the appraisal results from the following:

- National or local policies to encourage underlying increases in walking and cycling.
- National or local policies to discourage private car usage, e.g. limitations in parking provision, higher taxes, congestion charging.
- Improvements in wider bus transport service quality or network connectivity, e.g. smartcard ticketing, enhanced modal connectivity resulting from the SW Metro programme.

Capital costs appraisal

It is recommended that a more enhanced and detailed appraisal of the likely capital investment costs for the delivery of the respective scheme options is undertaken, including evaluation of potential scope modifications to enable cost reductions.

Bus service operations and costs appraisal

It is recommended that the Vale of Glamorgan council examines the potential demand impact and associated economic benefits from an increase in bus service quality and frequency over the existing Cardiff Bay Link Road bridge (as a potential alternative to routing services over Cardiff Barrage).

Detailed commuting patterns in Wales by Welsh local authority

Business, economy and labour market > People and work > Employment > Commuting > Detailed commuting patterns in Wales by Welsh local authority

	Isle of Anglesey	Gwynedd	Conwy	Denbighshire	Flintshire	Wrexham	Powys	Ceredigion	Pembrokeshire	Carmarthenshire	Swansea	Neath Port Talbot	Bridgend	Vale of Glamorgan	Cardiff	Rhondda Cynon Taf	Merthyr Tydfil	Caerphilly	Blaenau Gwent	Torfaen	Monmouthshire	Newport	Liverpool	Wirral	Cheshire East	Warrington	Cheshire West and Chester	Herefordshire, County of	Shropshire	Bristol, City of	South Gloucestershire	Aberdeenshire	Scottish Borders, The	North Devon	Forest of Dean	Other (1)	Other outside Wales
Isle of Anglesey	22,400	7,000	(!!) 700	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 500	(!!) 900
Gwynedd	(!!) 1,700	50,400	(!) 2,700	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!) 2,700	*
Conwy	*	3,400	37,200	4,700	(!!) 900	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,200	(!) 2,800
Denbighshire	*	*	3,100	30,700	(!) 2,600	(!) 2,400	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,300	*	*	*	*	*	*	*	*	(!) 2,300
Flintshire	*	*	*	(!) 3,200	37,400	7,700	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,200	(!!) 1,000	*	*	15,700	*	*	*	*	(!) 3,600	*	*	*	*	(!) 2,600
Wrexham	*	*	*	(!!) 1,700	(!) 3,000	50,000	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,000	*	*	*	5,500	*	(!) 2,700	*	*	*	*	*	*	*	(!) 2,900
Powys	*	*	*	*	*	*	50,000	*	*	*	(!!) 1,500	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,900	4,400	*	*	*	*	*	*	4,300	(!!) 2,400
Ceredigion	*	*	*	*	*	*	*	28,400	*	2,100	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,100	(!!) 700
Pembrokeshire	*	*	*	*	*	*	*	(!!) 1,000	49,500	(!!) 1,700	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,100
Carmarthenshire	*	*	*	*	*	*	*	(!!) 2,200	(!!) 2,500	65,600	8,300	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	5,200	(!!) 1,900
Swansea	*	*	*	*	*	*	*	*	*	6,800	86,000	(!) 4,200	*	*	(!!) 2,500	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 3,000	(!!) 2,700
Neath Port Talbot	*	*	*	*	*	*	*	*	*	(!!) 1,800	15,800	31,800	(!) 3,600	*	(!!) 2,500	(!!) 1,100	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,800	(!!) 1,100
Bridgend	*	*	*	*	*	*	*	*	*	*	(!!) 2,700	(!) 3,100	40,900	(!!) 1,100	7,100	(!!) 2,100	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 2,600	(!!) 2,100
Vale of Glamorgan	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 2,500	28,400	21,600	(!!) 1,000	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!) 3,600	(!!) 2,400
Cardiff	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 3,400	(!!) 4,000	139,600	(!!) 5,800	*	(!!) 5,000	*	*	*	(!!) 4,400	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 5,600	(!!) 4,400
Rhondda Cynon Taf	*	*	*	*	*	*	*	*	*	*	(!!) 1,600	*	(!) 4,600	*	18,900	60,700	(!!) 2,700	(!!) 3,700	*	*	*	(!!) 3,400	*	*	*	*	*	*	*	*	*	*	*	*	*	(!) 6,200	(!!) 2,600
Merthyr Tydfil	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2,900	(!) 2,100	15,900	(!) 1,800	(!!) 600	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!) 2,600	(!!) 800
Caerphilly	*	*	*	*	*	*	*	*	*	*	*	*	*	*	11,600	(!) 3,900	(!!) 2,400	41,600	(!!) 1,900	(!!) 2,100	(!!) 1,200	10,000	*	*	*	*	*	*	(!!) 1,200	*	*	*	*	*	*	(!!) 1,800	(!!) 2,300
Blaenau Gwent	*	*	*	*	*	*	*	*	*	*	*	*	*	*	(!!) 1,100	*	(!!) 700	2,800	14,700	(!) 2,300	3,400	(!) 1,800	*	*	*	*	*	*	*	*	*	*	*	*	*	(!) 2,100	(!!) 1,300
Torfaen	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3,500	*	*	(!!) 1,400	(!!) 1,000	23,500	2,800	7,500	*	*	*	*	*	*	(!!) 1,100	*	*	*	*	*	*	(!!) 1,200	(!!) 1,600
Monmouthshire	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2,800	*	*	(!!) 800	*	(!) 2,100	25,700	3,200	*	*	*	*	*	(!!) 700	*	4,300	*	*	*	*	*	(!!) 1,500	3,200
Newport	*	*	*	*	*	*	*	*	*	*	*	*	*	*	7,200	*	*	(!!) 1,400	*	(!) 3,200	(!) 3,400	46,400	*	*	*	*	*	*	*	(!) 3,200	*	*	*	*	*	(!!) 3,100	(!!) 2,600
Liverpool	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Wirral	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cheshire East	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Warrington	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cheshire West and Chester	*	*	*	*	(!!) 4,900	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Herefordshire, County of	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Shropshire	*	*	*	*	*	(!!) 3,200	(!!) 3,600	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bristol, City of	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
South Gloucestershire	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aberdeenshire	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Scottish Borders, The	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
North Devon	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Forest of Dean	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other (1)	(!!) 1,400	(!!) 2,700	(!!) 1,500	(!!) 1,800	*	(!!) 1,500	4,300	(!!) 1,500	(!!) 2,000	(!) 2,900	(!!) 2,700	6,100	6,000	(!) 4,700	(!!) 2,000	(!!) 2,400	(!) 3,000	(!!) 2,100	(!!) 2,000	(!) 4,200	(!) 3,500	5,000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Other outside Wales	*	*	*	*	(!!) 2,900	(!!) 4,600	(!!) 3,200	*	*	*	*	*	*	*	(!!) 5,100	*	*	*	*	*	(!!) 2,800	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Filters

Year: 2017

Footnotes

1 This contains the sum of the suppressed values in the table (*) - i.e. those which are below publication threshold.

!! The data item is based on between approximately 10 and 25 responses to the survey, and is categorised as being of low quality. Only estimates based on 40 responses or more are categorised as robust, whilst data items based on between 25 and 40 responses are categorised as being of limited quality. Data items based on less than 10 responses are considered unacceptable for use and suppressed.

! The data item is based on between approximately 25 and 40 responses to the survey, and is categorised as being of limited quality. Only estimates based on 40 responses or more are categorised as robust, whilst data items based on between 10 and 25 responses are categorised as being of low quality. Data items based on less than 10 responses are considered unacceptable for use and suppressed.

* The data item is disclosive or not sufficiently robust for publication

. The data item is not applicable

Metadata

Title	Detailed commuting patterns by Welsh local authority
Last update	29 March 2018
Next update	March 2019
Publishing organisation	Welsh Government
Source 1	Annual Population Survey, Office for National Statistics
Source 2	No drop down value selected
Source 3	No drop down value selected
Contact email	economic.stats@gov.wales
Designation	National Statistics
Lowest level of geographical disaggregation	Local authorities
Geographical coverage	Wales
Languages covered	English only
Data licensing	You may use and re-use this data free of charge in any format or medium, under the terms of the Open Government License - see http://www.nationalarchives.gov.uk/doc/open-government-licence
General description	This dataset provides information on commuting patterns by local authority in Wales and flows between Wales and the rest of the UK.
Data collection and calculation	ONS have reweighted the APS to take account of population data from the 2011 Census. Therefore, all estimates from quarter 4 of 2004 to quarter 3 of 2014 have been revised. The Annual Population Survey, which includes the WLLFS, is an annual sample survey of households living at private addresses in the UK. The annual survey uses results from those sampled for the main quarterly Labour Force Survey and since 2001 additional persons have been sampled on an annual basis to provide a more robust (boosted) annual dataset across the UK, with estimates subject to much lower sampling variability. For Wales, the data are now based on an enhanced sample (around 350 per cent larger) compared to earlier years.

	The additional persons sampled in the APS are based on four waves, over four years of the survey. For the first wave, the response rate in Wales is around 60%, with around 75% of these remaining by the fourth wave. In total, approaching 20,000 households are sampled each year for the APS in Wales. The APS relates to calendar years, whereas the WLLFS used the year ending in February. Therefore values for 2001 to 2003 relate to the years ending February 2002, February 2003 and February 2004. Subsequent values relate to calendar years.
Frequency of publication	Annual
Data reference periods	2001 to 2017
Users, uses and context	We believe the key users of commuting in Wales statistics are: Ministers and the Members Research Service in the National Assembly for Wales; Other areas of the Welsh Government; Welsh Local Authorities Other government departments; Students, academics and universities; Individual citizens and private companies. The statistics are used in a variety of ways. Some examples of the uses include: Advice to Ministers; Research and general background material; To inform debate in the National Assembly for Wales and beyond.
Rounding applied	
Revisions information	
Statistical quality	As the LFS/APS is a sample survey all estimates are subject to sampling variability. This is because the sample selected is one of only a very large number of possible samples that could have been drawn from the population. Standard errors (SEs) are commonly used as indicators of the extent to which the estimate based on a sample differs from the true population value. The larger the standard error, the less precise the estimate is. Coefficients of variation (CV) give the standard error as a proportion of the estimate itself.
Weblinks	
Keywords	Commuting

Appendix 6 Worksheets 1-4

Worksheet 1: Problems and Issues

Well-being Goal being hindered	Ref	Description	Evidence
A Prosperous Wales	1	Existing volumes of traffic and levels of congestion causes pollution and creates unreliable journey times and delays to private and business vehicles and bus services, particularly during peak periods. A study by Arup (2018) has highlighted that traffic congestion and delay is a significant issue along the B4267 Lavernock Road/ Redlands Road (between Cosmeston and Cogan), along the A4160 Windsor Road (between Penarth and Cogan) and on the A4055 around the Merrie Harrier junction. This is particularly the case during the AM peak when with average speeds are often 10mph or lower. The WelTAG consultation highlighted congestion problems on routes between Penarth and Cardiff, e.g. along Windsor Road, Windsor Road/ Plassey Street and in Penarth town centre. Reference was also made to congestion at Penarth Marina due to 'rat-running'.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); WelTAG consultation events (Jan 2019)
	4	Sustainable transport options available do not present an attractive alternative to car travel e.g. key destinations are not easily accessible by sustainable transport modes, bus accessibility and provision is viewed as poor, rail service viewed as unreliable, expensive and requiring more capacity, lack of reliable boat service throughout the year.	WelTAG consultation events (Jan 2019)
	6	A lack of park and ride facilities in the area limits the opportunities for interchange between car and public transport, which reduces the attractiveness of public transport travel options. Park and ride provision at rail stations in the study area (Penarth, Dingle Road and Cogan) is very limited with less than 25 parking spaces available at both Penarth and Cogan and no parking available at Dingle Road. There are no bus park and ride facilities available in the study area.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); WelTAG consultation events (Jan 2019)
 A Resilient Wales	3	High levels of car use and low levels of public transport usage and active travel, particularly for commuting journeys. The close proximity of Penarth to Cardiff results in high levels of commuting into Cardiff. Figures for the Vale of Glamorgan as a whole show that 52.2% of working residents commute out of the county borough to work with the majority of these (21,600) commuting to Cardiff. A study by Arup (2018) has highlighted that a significant proportion of those working in Cardiff commute to work by private car (66.7%) and only 12.5% commute by public transport (bus and rail). There are high levels of commuting by car transport into Cardiff due to a lack of convenient and attractive alternatives by sustainable modes and this puts pressure on the local highway network and routes into Cardiff.	StatsWales Commuting Patterns in Wales 2017; Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
 A More Equal Wales	5	Bus services linking Penarth and Cardiff have slow journey times and are unreliable due to congestion problems along the bus corridors. The available bus route options often require interchange at Cardiff Bay. A study by Arup (2018) has found that bus services take between 50% and 80% longer than travelling by car, with congestion problems in Cardiff being a key factor in the length of journey times. The significantly longer journey times reduce the attractiveness of bus travel, particularly for those commuting into Cardiff.	WelTAG consultation events (Jan 2019); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
 A Healthier Wales	7	There are currently low levels of active travel for everyday journeys, which needs to be increased if the long term health benefits of active travel are to be realised. The WelTAG consultation noted that too many short distance trips are undertaken by car. A study by Arup (2018) found that 12.6% of Penarth residents walk to work and 3.7% commute by bike. Both figures are higher than the Wales average but have potential to be increased further due to the proximity of Penarth to Cardiff and the high levels of commuting into Cardiff.	WelTAG consultation events (Jan 2019); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
	11	Environmental factors reduce the attractiveness of walking and cycling e.g. the exposed nature of the most direct active travel route into Cardiff (across Cardiff Barrage) may discourage use of the route during bad weather, coastal erosion, risk of rockfall and bad weather conditions (storms/ high tides) along the coastline.	WelTAG consultation events (Jan 2019)
	8	Safety issues act as a barrier to walking and cycling and the constrained nature of the built environment e.g. narrow roads and congestion at junctions, creates conflicts between motor vehicles, pedestrians and cyclists. Specific locations highlighted during the WelTAG consultation include: - lack of safe cycle routes along Windsor Road and Penarth Road; - Arcot Street/ Windsor Road junction being dangerous for cyclists; - footways in Penarth being dangerous for those with disabilities; - the need for safe pedestrian crossing facilities at Plassey Street/ Windsor Road; - a lack of safe pedestrian crossing facilities at Cogan (Windsor Road/ A4160 adjacent to railway station); - the hill from Cardiff Barrage into Penarth being dangerous for cyclists and the footway being unsuitable for pedestrians.	WelTAG consultation events (Jan 2019)

Worksheet 1: Problems and Issues

Well-being Goal being hindered	Ref	Description	Evidence
A Wales of Cohesive Communities	9	A lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes within Penarth and between Penarth and Cardiff creates a poor quality environment for walking and cycling and acts as a barrier to encouraging active travel. Specific issues highlighted during the WelTAG consultation include: - the existing route connecting Penarth seafront to Cardiff Barrage being challenging and unsuitable for pedestrians and those with mobility problems; - need a link to Cardiff Bay that avoids busy junctions; - need to improve pedestrian and cycling access to Cogan and Penarth stations; - no route from Cardiff Barrage to bottom of 'zig-zag' path; - poor connectivity from Llandough Hospital and Merrie Harrier to Penarth; - lack of lighting along existing active travel routes.	WelTAG consultation events (Jan 2019); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)
	10	A lack of facilities for cyclists at trip origin and destination discourages the use of active travel e.g. no current opportunities to hire bikes, lack of showers and bike storage at employment sites.	WelTAG consultation events (Jan 2019)
	12	The topography of the area acts as a barrier to active travel and creates difficulties in providing active travel infrastructure e.g. gradient from Cardiff Barrage to Penarth town centre.	WelTAG consultation events (Jan 2019)
 A Wales of Vibrant Culture and Thriving Welsh Language	14	Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the Penarth economy e.g. there is a need for improved links to Cardiff Bay and the Penarth end of Cardiff Barrage lacks a 'destination'. The operational barrage also impacts on connectivity and creates conflict between pedestrians and cyclists using Cardiff Barrage and Pont y Werin.	WelTAG consultation events (Jan 2019)
 A Globally Responsible Wales	2	The high volume of traffic acts as a barrier to walking and cycling and to increasing levels of active travel. The WelTAG consultation highlighted the volume of traffic on Windsor Road and Hickman Road as being a barrier to walking and cycling, along with the speed of traffic along Windsor Road.	WelTAG consultation events (Jan 2019)
	13	Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	Vale of Glamorgan Council 2018 Air Quality Annual Progress Report (Aug 2018)

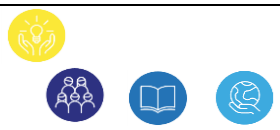
Worksheet 2: Objective Development - Long List of Objectives

Objective	Measurability of Objective	Evidenced Problem Objective Potentially Addresses (Refer to Worksheet 1)	Well-being Goals being progressed
To increase the use of public transport	• Bus and rail operator data	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Unreliable and slow journey times of bus services. • Lack of park and ride facilities limits opportunities for public transport interchange.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Globally Responsible
To encourage a modal shift away from the private car towards public transport and active travel, particularly for short journeys	• Office for National Statistics data, • Bus and rail operator data, • Active travel route counts/data.	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • Volume of traffic is a barrier to walking and cycling. • High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Unreliable and slow journey times of bus services. • Lack of park and ride facilities limits opportunities for public transport interchange. • Low levels of active travel. • Safety issues act as a barrier to walking and cycling. • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. • Lack of facilities for cyclists at trip origin and destination. • Environmental factors reduce the attractiveness of walking and cycling.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible
To reduce journey times and improve journey quality for sustainable transport modes	• Bus operator data, • Bus journey time data	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Unreliable and slow journey times of bus services. • Lack of park and ride facilities limits opportunities for public transport interchange.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Globally Responsible
To reduce car usage	• Office for National Statistics data	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • Volume of traffic is a barrier to walking and cycling. • High levels of car use and low levels of public transport use. • Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, More Equal, Healthier, Cohesive Communities, Globally Responsible
To reduce road traffic congestion	• Traffic survey data, • Bus journey time data	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • Volume of traffic is a barrier to walking and cycling. • Unreliable and slow journey times of bus services. • High levels of car use and low levels of public transport use. • Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, More Equal, Healthier, Cohesive Communities, Globally Responsible
To reduce the number of vehicles	• Traffic survey data	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • Volume of traffic is a barrier to walking and cycling. • Unreliable and slow journey times of bus services. • High levels of car use and low levels of public transport use. • Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, Resilient, More Equal, Healthier, Globally Responsible
To support increased economic activity	• Office for National Statistics data	• Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy. • Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution.	 Prosperous, More Equal, Cohesive Communities, Vibrant Culture, Globally Responsible
To improve accessibility	• Traffic/transport survey data, • Local Authority data, • Footfall data	• High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Low levels of active travel. • Safety issues act as a barrier to walking and cycling. • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Globally Responsible

Worksheet 2: Objective Development - Long List of Objectives

To improve access to employment	• Traffic/transport survey data, • Local Authority data	• Lack of facilities for cyclists at trip origin and destination. • Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, More Equal, Cohesive Communities, Vibrant Culture, Globally Responsible
To improve connectivity	• Bus and rail operator data - services, routes • Passenger/footfall counts	• Lack of park and ride facilities limits opportunities for public transport interchange. • Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, More Equal, Cohesive Communities, Vibrant Culture, Globally Responsible
To improve connectivity between buses and trains	• Bus and rail operator data	• High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Lack of park and ride facilities limits opportunities for public transport interchange. • Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, More Equal, Cohesive Communities, Vibrant Culture, Globally Responsible
To improve sustainable connectivity between Penarth and Cardiff	• Bus and rail operator data, • Active travel counts	• High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Low levels of active travel. • Safety issues act as a barrier to walking and cycling. • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible
To increase levels of active travel	• Active travel counts/data on routes	• Sustainable transport options not an attractive alternative to car travel. • Low levels of active travel. • Safety issues act as a barrier to walking and cycling. • Lack of facilities for cyclists at trip origin and destination. • Topography of the area acts as a barrier to walking and cycling	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Globally Responsible
To reduce barriers to active travel in support of associated health benefits	• Active travel counts/data on routes, • Footfall counts	• Volume of traffic is a barrier to walking and cycling. • Sustainable transport options not an attractive alternative to car travel. • Low levels of active travel. • Safety issues act as a barrier to walking and cycling. • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. • Lack of facilities for cyclists at trip origin and destination. • Environmental factors reduce attractiveness of walking and cycling. • Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible
To improve the overall health and wellbeing of residents	• Air quality monitoring data	• Low levels of active travel. • Environmental factors reduce the attractiveness of walking and cycling. • Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible
To ensure infrastructure created supports sustainable investment	• Office for National Statistics data	• Sustainable transport options not an attractive alternative to car travel. • Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy. • Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution.	 Prosperous, Resilient, More Equal, Cohesive Communities, Vibrant Culture, Globally Responsible
To improve infrastructure for sustainable modes of transport	• Bus and rail operator data, • Local Authority data	• High levels of car use and low levels of public transport use. • Sustainable transport options not an attractive alternative to car travel. • Unreliable and slow journey times of bus services. • Lack of park and ride facilities limits opportunities for public transport interchange. • Low levels of active travel. • Safety issues act as a barrier to walking and cycling. • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible

Worksheet 2: Objective Development - Long List of Objectives

To increase tourism	• Office for National Statistics data • Footfall data • Visitor attraction figures	• Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, Cohesive Communities, Vibrant Culture, Globally Responsible
To enhance Penarth's economy by increasing visitor numbers	• Office for National Statistics data • Bus and rail operator data	• Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy. • Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes.	 Prosperous, More Equal, Cohesive Communities, Vibrant Culture, Globally Responsible
To become environmentally 'cleaner and greener'	• Air quality monitoring data	• Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. • Environmental factors reduce the attractiveness of walking and cycling. • Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, Resilient, Healthier, Cohesive Communities, Globally Responsible
To improve air quality, especially around Cogan	• Air quality monitoring data	• Environmental factors reduce the attractiveness of walking and cycling. • Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Globally Responsible

Worksheet 3: Objective Development - Short-List of Objectives

Ref	Statement/Objective	Comments and relationship to Problems and Issues (Worksheet 1)	Well-being Goals being progressed	Ways of Working					Comments
				Collaboration	Integration	Involvement	Long Term	Prevention	
1	Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	1. Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. 2. Volume of traffic is a barrier to walking and cycling. 3. High levels of car use and low levels of public transport use. 4. Sustainable transport options not an attractive alternative to car travel. 5. Unreliable and slow journey times of bus services. 6. Lack of park and ride facilities limits opportunities for public transport interchange. 7. Low levels of active travel. 8. Safety issues act as a barrier to walking and cycling. 9. Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. 10. Lack of facilities for cyclists at trip origin and destination. 11. Environmental factors reduce the attractiveness of walking and cycling. 12. Topography of the area acts as a barrier to walking and cycling. 13. Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth. 14. Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible	✓	✓	✓	✓	✓	Meeting this objective would: • Provide **long term** economic, social, environmental, health and wellbeing benefits. • **Prevent** existing problems of traffic congestion and its associated negative economic and environmental impacts from worsening. **Prevent** health and wellbeing problems within local communities that are caused by sedentary lifestyles. • **Integrate** with the Vale of Glamorgan's Wellbeing Plan, Active Travel INM and Local Transport Plan. • Require **collaboration** between different parts of the local authority, neighbouring local authorities, local businesses and local communities. • Require **involvement** between key stakeholders within the Vale of Glamorgan, Transport for Wales and the Welsh Government.
2	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	1. Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. 2. Volume of traffic is a barrier to walking and cycling. 3. High levels of car use and low levels of public transport use. 4. Sustainable transport options not an attractive alternative to car travel. 5. Unreliable and slow journey times of bus services. 6. Lack of park and ride facilities limits opportunities for public transport interchange. 7. Low levels of active travel. 8. Safety issues act as a barrier to walking and cycling. 9. Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. 10. Lack of facilities for cyclists at trip origin and destination. 11. Environmental factors reduce the attractiveness of walking and cycling. 12. Topography of the area acts as a barrier to walking and cycling. 13. Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth. 14. Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible	✓	✓	✓	✓	✓	Meeting this objective would: • Provide **long term** economic, social, environmental, health and wellbeing benefits. • **Prevent** existing problems of traffic congestion and its associated negative economic and environmental impacts from worsening. **Prevent** health and wellbeing problems within local communities that are caused by sedentary lifestyles. • **Integrate** with the Vale of Glamorgan's Wellbeing Plan, Active Travel INM and Local Transport Plan. • Require **collaboration** between different parts of the local authority, neighbouring local authorities, local businesses and local communities. • Require **involvement** between key stakeholders within the Vale of Glamorgan, Transport for Wales and the Welsh Government.

3	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being.	1. Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. 2. Volume of traffic is a barrier to walking and cycling. 3. High levels of car use and low levels of public transport use. 4. Sustainable transport options not an attractive alternative to car travel. 5. Unreliable and slow journey times of bus services. 6. Lack of park and ride facilities limits opportunities for public transport interchange. 7. Low levels of active travel. 8. Safety issues act as a barrier to walking and cycling. 9. Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. 10. Lack of facilities for cyclists at trip origin and destination. 11. Environmental factors reduce the attractiveness of walking and cycling. 12. Topography of the area acts as a barrier to walking and cycling. 13. Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth. 14. Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible	✓	✓	✓	✓	✓	Meeting this objective would: • Provide **long term** economic, social, environmental, health and wellbeing benefits. • **Prevent** problems associated with poor accessibility by sustainable modes e.g. inequality of access to opportunities, poor access to employment, key services and facilities, traffic congestion. **Prevent** health and wellbeing problems within local communities that are caused by sedentary lifestyles. • **Integrate** with the Vale of Glamorgan's Wellbeing Plan, Active Travel INM and Local Transport Plan. • Require **collaboration** between different parts of the local authority, neighbouring local authorities, local businesses and local communities. • Require **involvement** between key stakeholders within the Vale of Glamorgan, Transport for Wales and the Welsh Government.
4	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	1. Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. 2. Volume of traffic is a barrier to walking and cycling. 3. High levels of car use and low levels of public transport use. 4. Sustainable transport options not an attractive alternative to car travel. 5. Unreliable and slow journey times of bus services. 6. Lack of park and ride facilities limits opportunities for public transport interchange. 7. Low levels of active travel. 8. Safety issues act as a barrier to walking and cycling. 9. Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. 10. Lack of facilities for cyclists at trip origin and destination. 11. Environmental factors reduce the attractiveness of walking and cycling. 12. Topography of the area acts as a barrier to walking and cycling. 14. Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, Resilient, More Equal, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible	✓	✓	✓	✓	✓	Meeting this objective would: • Provide **long term** economic, social, environmental, health and wellbeing benefits. • **Prevent** existing problems of traffic congestion and its associated negative economic and environmental impacts from worsening. **Prevent** a lack of efficient sustainable transport options acting as a barrier to future economic growth and investment. • **Integrate** with the Vale of Glamorgan's Wellbeing Plan, Active Travel INM and Local Transport Plan. • Require **collaboration** between different parts of the local authority, neighbouring local authorities, local businesses and local communities. • Require **involvement** between key stakeholders within the Vale of Glamorgan, Transport for Wales and the Welsh Government .
5	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.	1. Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution. 2. Volume of traffic is a barrier to walking and cycling. 7. Low levels of active travel. 9. Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes. 11. Environmental factors reduce the attractiveness of walking and cycling. 13. Road traffic emissions and congestion contribute to reduced air quality and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth. 14. Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy.	 Prosperous, Resilient, Healthier, Cohesive Communities, Vibrant Culture, Globally Responsible	✓	✓	✓	✓	✓	Meeting this objective would: • Provide **long term** economic, social, environmental, health and wellbeing benefits. • **Prevent** existing problems of traffic congestion and its associated negative economic and environmental impacts from worsening. **Prevent** sustainable transport having a negative impact upon the historic, built and natural environment. • **Integrate** with the Vale of Glamorgan's Wellbeing Plan, Active Travel INM and Local Transport Plan. • Require **collaboration** between different parts of the local authority, neighbouring local authorities, local businesses and local communities. • Require **involvement** between key stakeholders within the Vale of Glamorgan, Transport for Wales and the Welsh Government.

Worksheet 4a: Option Development - Potential Options

Ref	Option Title	Description	Source	Theme	Comment
1	Penarth Headland Link	The lack of walking and cycling links between Penarth seafront and Cardiff Barrage reduces the potential for encouraging walking and cycling journeys between the two areas. The topography of routes from Cardiff Barrage into Penarth acts as a constraint to encouraging walking and cycling from the Barrage into Penarth and vice versa. This limits the leisure and tourism potential offered by users of the Barrage to the economy of Penarth. The Penarth Headland Link proposal involves the construction of a shared-use pedestrian and cycle route to improve connectivity between Penarth and Cardiff Bay. The 1.1km route would run from the western end of Cardiff Barrage to Penarth Pier and would extend the existing Wales Coastal Path. The route would improve accessibility and remove the barrier of topography, which would be particularly beneficial to those with mobility problems. The Penarth Headland Link is included as an active travel route proposal in the Vale of Glamorgan's Active Travel INM and is shown as having a likely delivery timescale of 10-15 years.	Vale of Glamorgan Active Travel INM; Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); Penarth Headland Link Feasibility Report and Value of Work Done, Penarth Headland Link Group (Feb 2017); WelTAG consultation events (Jan 2019)	Active Travel	To be considered as part of the Active Travel INM option (refer to worksheet 4b, option 1).
2	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	The lack of a joined-up network of active travel links within Penarth and to the wider active travel network, e.g. to Cardiff, along with the congested nature of the highway network, limits the potential of active travel as an option for everyday journeys. The provision of new active travel infrastructure would encourage greater levels of walking and cycling and improve links between key services. The delivery of the active travel proposals within the Vale of Glamorgan's Active Travel INM would improve connectivity and the attractiveness of active travel between key origins and destinations within Penarth and to the wider area. Additional information is available about the active travel route from the Merrie Harrier to Pont y Werin and Penarth Road as a previous feasibility study considered the route and proposed a number of cycle and pedestrian infrastructure measures (Capita 2016). The proposed scheme involves a number of shared-use facilities for pedestrians and cyclists along key sections of route in the northern Penarth and Llandough area, including along the north side of the A4055 Barry Road from Merrier Harrier junction to Barons Court junction. The scheme also proposes cycle infrastructure measures along the route including advanced stop lines and cycle symbols on the carriageway to raise awareness. It should be noted that the following additional improvements in Penarth were suggested through the WelTAG consultation that are not currently included in the Active Travel INM: Reopening the tunnel below the A4160 Windsor Road to Cogan Station; Pedestrian link between Tennyson Drive and Cowslip Drive; Pedestrian link between Fairfield Road and Gainsborough Road; Continuation of Railway Walk for walking and cycling. Suggestions for additional active travel improvements would initially need to be considered as part of any future review of the INM and will not be considered by this WelTAG study.	Vale of Glamorgan Active Travel INM; Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); Merrie Harrier to Barons Court Strategic Cycle Routes, Capita (Mar 2016); WelTAG consultation events (Jan 2019)	Active Travel	Option retained (refer to worksheet 4b, option 1).
3	Area wide active travel infrastructure and softer measures e.g. lighting of routes, expansion of 20mph zones, introduction of shared spaces, provision of facilities at employment sites, bike hire, walking buses.	Measures to improve existing active travel and highway infrastructure for pedestrians and cyclists can encourage greater levels of active travel e.g. by improving the safety and security of routes for more vulnerable users. Such proposals include the lighting of active travel infrastructure to increase the attractiveness of routes at all times of the day/ year and speed reduction measures on the highway network, such as the introduction of 20mph zones, to create a more attractive active travel environment. The introduction of a 20mph limit in Penarth Marina was suggested during the WelTAG consultation. Improved facilities at employment sites and other destinations, e.g. the provision of secure bike storage, pool bikes and employer incentives, can also increase the attractiveness of active travel as a realistic everyday travel option. The success of the 'Next Bike' bike hire scheme in Cardiff and the potential of expanding the scheme to Penarth also offers potential for increasing levels of active travel by removing constraints to travelling by bike for short journeys. Softer measures such as the introduction of walking buses at schools can also encourage greater levels of active travel for school journeys. It should be noted that a number of these measures, e.g. the provision of facilities at employment sites, expanding the bike hire scheme and walking buses, are reliant on implementation by a third party.	WelTAG consultation events (Jan 2019)	Active Travel	To be considered as part of the Active Travel INM option (refer to worksheet 4b, option 1).
4	Cogan Station Upgrade	The current provision for park and ride at Cogan Station is limited, the station has poor quality pedestrian links to the surrounding area and highway network in the vicinity of the station experiences problems of congestion. The Cogan Station scheme involves upgrading the existing railway station to create a new multimodal transport facility serving the Penarth Marina and Cardiff Bay areas. The proposed upgrade aims to deliver a mixed-use development that combines station enhancements, including an additional platform on the Penarth branch line, with residential and retail facilities. The Arup 2018 study considered a number of sub-options for the station upgrade and provision of an expanded park and ride facility. The recommended sub-option include the following elements: A large park and ride facility (168 spaces) with improved facilities and road access located on a vacant site to the east of the study area; Improvements to passenger facilities including a new station ticket hall, passenger waiting areas and customer toilets on the station platform; Improved access on the A4160 Windsor Road and improvements to the road infrastructure including increased roundabout capacity; Provision of bus and taxi interchange facilities to allow better links to Penarth Marina/ Cardiff Bay; A new platform on the existing Penarth to Cardiff line; A new 'access for all' footbridge to the main eastbound platform; New residential development on the currently vacant site to the east. Suggestions were made during the WelTAG consultation for improvements to the highway network in the vicinity of Cogan Station e.g. replacement of Cogan roundabout with a traffic-signalled junction and provision of crossing facilities for pedestrians and cyclists. The WelTAG consultation also highlighted the need for improvements to the active travel environment and improved access for pedestrians and cyclists to Cogan Station.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); WelTAG consultation events (Jan 2019)	Public transport improvements (rail, interchange)	To be considered as part of a multi-modal transport interchange option (refer to worksheet 4b, option 3).
5	Cosmeston Bus P&R	There are currently no park and ride facilities available for those living within the Cosmeston/ Sully area and options for rail park and ride in Penarth area generally are limited. The provision of a bus park and ride facility (150 spaces) at Cosmeston would aim to remove car trips from the highway network in and around Penarth, reduce congestion along the B4267 Lavernock Road and increase sustainable travel options for commuting journeys into Cardiff. Land at Cosmeston has been identified within the Vale of Glamorgan's Local Development Plan as being suitable to accommodate a large surface car park. The site currently comprises a car park with a gravel surface and has good access to the adjacent B4267 with access to the car park via a priority junction. Delivery of the scheme would need to be supported by bus priority measures on the bus route to and from the park and ride facility to ensure the bus journey time for those using the park and ride presents an attractive alternative to the journey by private car (refer to option 8). It should be noted that the Arup 2018 study considered three potential sub-options for the location of a park and ride and the preferred sub-option recommended was to expand existing rail park and ride facilities at Eastbrook Rail Station. This current study has not assessed Eastbrook park and ride as an option as the station is outside the study area.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); Vale of Glamorgan Local Development Plan (2017); WelTAG consultation events (Jan 2019)	Bus Park and Ride	To be considered as part of an option that combines bus park and ride and sustainable transport links across Cardiff Barrage (refer to worksheet 4b, option 2). NB. The description makes reference to the Eastbrook rail park and ride proposal. This scheme is not being considered as part of this study as it is outside the study area.
6	Area wide interchange measures e.g. improved connections between buses, trains and active travel, improvements to bus stops and real time information	Measures to improve interchange and connectivity between public transport modes, as well as between public transport and active travel, would improve and simplify the user experience and increase the attractiveness of public transport options. Such measures could include; improved timetabling to enhance connectivity between buses and trains; improved interchange infrastructure for buses at or in the vicinity of rail stations; enhanced information/ timetable provision at bus stops and rail stations to enable easy interchange between modes; improved pedestrian and cycle links into rail stations, along with the provision of secure bike parking at stations.	WelTAG consultation events (Jan 2019)	Public transport improvements (interchange)	Interchange measures to be considered as part of two options i.e. the multi-modal transport interchange option and the bus park and ride and sustainable transport links across Cardiff Barrage option (refer worksheet 4b, options 2 and 3).

7	Integrated ticketing	The ability to transfer from one mode of public transport to another in South Wales is rarely seamless. There is often no complementary timetabling between bus and rail, whilst many rail stations do not have regular bus services calling at stops within a close distance. Transferring between bus and rail services or between bus services run by different operators requires separate tickets to be purchased to allow travel. The lack of simple-to-use, integrated ticketing acts as a barrier to encouraging travel by public transport. Integrated ticketing would enable a single ticket to be purchased to cover both bus and rail travel. This would improve the accessibility, convenience and attractiveness of travel by public transport and remove some of the hindrance of interchanging between services. It should be noted that due to the nature of everyday travel, integrated ticketing cannot be introduced on a single local authority basis and would need to be implemented at a Wales-wide level.	WelTAG consultation events (Jan 2019)	Public transport improvements (interchange)	Option not being considered as part of this study. Any integrated ticketing initiative would need to be taken forward by Transport for Wales and is outside of the remit of this study.
8	Cosmeston to Cardiff Barrage Bus Priority	Traffic levels and congestion on the route from Cosmeston to Cardiff Barrage results in buses experiencing delays along the B4267 Lavernock Road and within Penarth town centre. The unreliability and slow journey times of bus services due to traffic delays reduces the attractiveness of bus as a mode of travel. The scheme would put in place bus priority measures between Cosmeston and Cardiff Barrage, to improve journey times for buses. This would include improvements at key junctions and optimisation of traffic signals to reduce bus journey times. Measures could include local widening, lane reallocation, junction upgrades at pinch points and would potentially require land acquisition. The scheme would also include improvements to bus stops along the route. The Arup 2018 study undertook a feasibility appraisal of four potential alignments for the bus priority scheme between Cosmeston and Cardiff Barrage. The 'emerging preferred sub-option' from the feasibility assessment involves a range of bus measures along Westbourne Road, the A4160 Stanwell Road, Clive Place and Paget Terrace/ Road which subsequently provides access to Cardiff Barrage. It should be noted that the success of the scheme as assessed by Arup is subject to the implementation of bus services across Cardiff Barrage.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018)	Public transport improvements (bus priority)	To be considered as part of an option that combines bus park and ride and sustainable transport links across Cardiff Barrage (refer to worksheet 4b, option 2).
9	Merrie Harrier to Cardiff Barrage Bus Priority	Traffic levels and congestion on the route from the Merrie Harrier junction to Cardiff Barrage results in buses experiencing delays in the vicinity of Merrie Harrier junction and Cogan Hill roundabout. The unreliability and slow journey times of bus services due to traffic delays reduces the attractiveness of bus as a mode of travel. The scheme would put in place bus priority measures between the Merrie Harrier junction and Cardiff Barrage, to improve journey times for buses. The proposed scheme would help improve the capacity of junctions along the route through local widening, lane reallocation and junction upgrades at pinch points. A 2015 feasibility study by Capita recommended a package of measures along the route including road configuration improvements at the Merrie Harrier junction; separation of straight and right-turning movements from the Barons Court junction; road configuration improvements at the Cogan Roundabout junction to reduce delay; bus stop improvements along the route to improve the public transport user experience. It should be noted that the success of the scheme as assessed by Arup is subject to the implementation of bus services across Cardiff Barrage.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); Dinas Powys to Cardiff Corridor Bus Priority Measures, Capita (May 2015)	Public transport improvements (bus priority)	Option not being considered as part of this study. Scheme is being consideredd as part of the WelTAG Stage 2 for Dinas Powys.
10	Introduction of buses on Cardiff Barrage	The current route for buses travelling from Penarth to Cardiff is via heavily trafficked roads with no bus priority measures in place. Buses are subject to the same delays as private vehicles and journeys by bus take longer than the equivalent journey by car. The unreliability and slow journey times of bus services reduces the attractiveness of travel by bus as an alternative to the car, particularly for commuting journeys. The introduction of a bus route via Cardiff Barrage would significantly improve access from Penarth and Penarth Marina. The proposal links closely to options 8 and 9 considered above. The scheme would put in place a bus route along the length of Cardiff Barrage linking in to Cardiff Bay. Consideration would need to be given to the infrastructure required to enable buses to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. The existing active travel route along the barrage may require widening and land acquisition, with the segregation of buses and those walking and cycling being a key issue. Consideration would also need to be given to the operational nature of the barrage and the impact that water traffic crossing the barrage would have on bus timetabling and delays. Issues regarding the introduction of buses onto the barrage have previously been considered in a report by Arup (2015).	WelTAG consultation events (Jan 2019); Cardiff Bay Barrage Transport Link, Arup (Oct 2015)	Public transport improvements (bus priority)	Sustainable transport across Cardiff Barrage be considered as part of an option that combines bus park and ride and sustainable transport links across Cardiff Barrage (refer to worksheet 4b, option 2).
11	Opening Cardiff Barrage to private vehicles during peak periods	The current route for all traffic travelling from Penarth to Cardiff is via heavily trafficked roads with high traffic volumes and problems of congestion. The route along Cardiff Barrage from Penarth to Cardiff Bay would be a significantly shorter and quicker route for those commuting from Penarth, especially for those working in and around Cardiff Bay. The scheme would allow all traffic to travel the route of the Barrage during peak periods. The proposal is closely linked to option 10 above and would be dependent upon the implementation of the scheme to introduce buses on to the Barrage.	WelTAG consultation events (Jan 2019)	Highway network improvements	Option retained (refer to worksheet 4b, option 4).
12	Improvements to public transport services	A number of improvements to public transport services were suggested during the WelTAG consultation e.g. provision of a shuttle bus linking Penarth to the new health centre in Cogan, dedicated bus service to Llandough hospital, regular circular bus from Dinas Powys to Penarth, more direct bus services to Cardiff city centre and the Heath hospital, increase evening and weekend public transport services (particularly Sundays), more bus stops in certain areas.	WelTAG consultation events (Jan 2019)	Public transport improvements (bus, rail)	To be considered as part of an option that combines bus park and ride and sustainable transport links across Cardiff Barrage (refer to worksheet 4b, option 2).
13	Alternative transport proposals e.g. water taxis, self-driving electric pods/ vehicles/ bikes, monorail or shuttle bus linking Penarth and Cardiff, light rail to Penarth and Cosmeston, powered uphill cycle lifts, cable car	A range of alternative transport options were highlighted during the WelTAG consultation. These include alternative means of linking Penarth and Cardiff including water taxis, electric vehicles or bikes, a monorail or shuttle bus. As with option 10 above, the introduction of any form of vehicle on Cardiff Barrage would need consideration of the infrastructure required to enable a route for vehicles to be implemented along the length of the barrage and would need to address the potential issues of conflict with pedestrians and cyclists using the barrage. Other large-scale schemes suggested included the introduction of light rail linking Penarth and Cosmeston, a cable car in the vicinity of the proposed Penarth Headland Link and the introduction of powered uphill cycle lifts.	WelTAG consultation events (Jan 2019)	Innovative transport solutions	Majority of elements to be considered as part of an option that combines bus park and ride and sustainable transport links across Cardiff Barrage (refer to worksheet 4, option 2). NB. The description makes reference to the introduction of light rail linking Penarth and Cosmeston. This proposal would need to be progressed by Transport for Wales and the scheme has not been considered as part of this study.
14	Technological advancements e.g. infrastructure to support electric vehicles	Technological advancements in transport have the potential to improve transport connectivity and sustainability e.g. autonomous vehicles, alternative fuels, use of electric vehicles, provision of infrastructure required to support electric vehicles. The utilisation of transportation technologies could be delivered on an area-wide basis.	WelTAG consultation events (Jan 2019)	Innovative transport solutions	Technological advancements and the need to 'future proof' to be considered as part of all options (refer to worksheet 4b, options 1, 2, 3 and 4)
15	Reducing the demand for travel e.g. travel plans, homeworking, planning of future developments	Measures that reduce the demand for travel aim to reduce the number, frequency and length of journeys undertaken, particularly by private car, thereby removing traffic from the highway network. Long term factors that can reduce the demand for travel include the planning of future developments to ensure convenient and easily accessible services that minimise the need to travel for everyday journeys. Softer measures such as the use of travel plans and employer policies in relation to flexible working, homeworking and teleconferencing can also reduce the need to travel and subsequently reduce the volume of traffic, particularly during peak periods.	WelTAG consultation events (Jan 2019)	Reducing travel demand	Measures to reduce the demand for travel will be progressed alongside all options and are not being specifically considered as part of this study.
16	Implementation of Vale of Glamorgan's Parking Strategy and provision of additional parking	The availability and cost of car parking can impact upon how people choose to travel and influences whether travel by car is viewed as a more attractive option than the journey by more sustainable modes. The Vale of Glamorgan has recently developed a Parking Strategy and the implementation of this will introduce parking charges in Penarth. Options relating to parking provision were also suggested during the WelTAG consultation including the potential of extending parking at the Penarth end of Cardiff Barrage (potentially to provide a park and ride) and restricting parking to one side of the road in Penarth to improve traffic flow.	WelTAG consultation events (Jan 2019)	Car parking	The Vale of Glamorgan's Parking Strategy is being delivered separately and is not being considered as part of this study.
17	Do Minimum	Undertake no dedicated further improvements in the area except from routine maintenance as and when required to keep routes operational.	WelTAG requirement	Maintenance	Option retained (refer worksheet 4b, option 5).

Worksheet 4b: Option Development - Agreed Long List of Options

Ref	Option Title	Description	Source	Theme
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	This option involves delivering the proposals within the Vale of Glamorgan's Active Travel Integrated Network Map (INM).The lack of a joined-up network of active travel links within Penarth and to the wider active travel network, e.g. to Cardiff, along with the congested nature of the highway network, limits the potential of active travel as an option for everyday journeys. The provision of new active travel infrastructure would encourage greater levels of walking and cycling and improve links between key services. The delivery of the active travel proposals within the Vale of Glamorgan's Active Travel INM would improve connectivity and the attractiveness of active travel between key origins and destinations within Penarth and to the wider area. The INM proposals in the Penarth area include a programme of schemes, which are highlighted as having a 'predictive delivery' timescale of 0-5 years (short term schemes), 5-10 years (medium terms schemes) and 10-15 years (long term schemes). The proposals include two active travel schemes that have been considered by previous feasibility studies: - Penarth Headland Link – Construction of a shared-use pedestrian and cycle route to improve connectivity between Penarth and Cardiff Bay. The 1.1km route would run from the western end of Cardiff Barrage to Penarth Pier and would extend the existing Wales Coastal Path. Identified in the INM as a long term proposal. Previous studies that have considered the feasibility and economic case for the proposal include those by the Penarth Headland Link Group (2017), Sustrans (2018), Arup (Apr 2018) and Arup (Oct 2018). - Merrie Harrier to Pont y Werin and Penarth Road – Identified in the INM as a medium term proposal. A previous feasibility study by Capita (2016) considered this route and proposed a number of cycle and pedestrian infrastructure measures. In addition to the delivery of the INM this option includes consideration of the following area-wide measures: - Measures to improve existing active travel and highway infrastructure for pedestrians and cyclists can encourage greater levels of active travel e.g. by improving the safety and security of routes for more vulnerable users. Such proposals include the lighting of active travel infrastructure to increase the attractiveness of routes at all times of the day/ year and speed reduction measures on the highway network, such as the introduction of 20mph zones or shared spaces, to create a more attractive active travel environment. - Improved facilities at employment sites and other destinations, e.g. the provision of secure bike storage, pool bikes and employer incentives, can also increase the attractiveness of active travel as a realistic everyday travel option. - The success of the 'Next Bike' bike hire scheme in Cardiff and the potential of expanding the scheme to Penarth also offers potential for increasing levels of active travel by removing constraints to travelling by bike for short journeys. - Softer measures such as the introduction of school travel plans and walking buses at schools can also encourage greater levels of active travel for school journeys. It should be noted that a number of these measures, e.g. the provision of facilities at employment sites, expanding the bike hire scheme and walking buses, are reliant on implementation by a third party. NB. The following additional improvements in Penarth were suggested through the WelTAG consultation that are not currently included in the Active Travel INM: Reopening the tunnel below the A4160 Windsor Road to Cogan Station; Pedestrian link between Tennyson Drive and Cowslip Drive; Pedestrian link between Fairfield Road and Gainsborough Road; Continuation of Railway Walk for walking and cycling. Suggestions for additional active travel improvements would initially need to be considered as part of any future review of the INM and will not be considered by this WelTAG study.	Vale of Glamorgan Active Travel Intergrated Network Map; Penarth Headland Link Feasibility Report and Value of Work Done, Penarth Headland Link Group (Feb 2017); Penarth Headland Economic Impact Study, Sustrans (April 2018); Penarth Headland Link: Stage 1 Maritime and Geotechnical Review, Arup (Apr 2018); Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); Merrie Harrier to Barons Court Strategic Cycle Routes, Capita (Mar 2016; WelTAG consultation events (Jan 2019)	Active Travel
2	Bus park and ride and sustainable transport links across Cardiff Barrage	This option involves providing attractive and convenient sustainable transport options for the journey between Penarth and Cardiff through the implementation of a bus park and ride scheme, associated bus priority measures and sustainable transport provision across Cardiff Barrage into Cardiff. The current route for buses travelling from Penarth to Cardiff is via heavily trafficked roads with no bus priority measures in place. Buses are subject to the same delays as private vehicles and journeys by bus take longer than the equivalent journey by car. The unreliability and slow journey times of bus services due to traffic delays reduces the attractiveness of travel by bus as an alternative to the car, particularly for commuting journeys. There are currently no park and ride facilities available for those living within the Cosmeston/ Sully area and options for rail park and ride in Penarth area generally are limited. The provision of a bus park and ride facility at Cosmeston would aim to remove car trips from the highway network in and around Penarth, reduce congestion along key routes and increase sustainable travel options for commuting journeys into Cardiff. Land at Cosmeston has been identified within the Vale of Glamorgan's Local Development Plan as being suitable to accommodate a large surface car park. The site currently comprises a car park with a gravel surface and has good access to the adjacent B4267 with access to the car park via a priority junction. Delivery of the scheme would need to be supported by bus priority measures on the bus route to and from the park and ride facility to ensure the bus journey time for those using the park and ride presents an attractive alternative to the journey by private car. The bus priority measures between Cosmeston and Cardiff Barrage could include improvements at key junctions and optimisation of traffic signals to reduce bus journey times. Measures could include local widening, lane reallocation, junction upgrades at pinch points and would potentially require land acquisition. The scheme would also include improvements to bus stops along the route. The Vale of Glamorgan's Local Development Plan includes a policy to provide bus priority measures along Lavernock Road to Cardiff via Cardiff Barrage. More recently a study by Arup (2018) undertook a feasibility appraisal of four potential alignments for the bus priority scheme between Cosmeston and Cardiff Barrage. The 'emerging preferred sub-option' from the feasibility assessment involves a range of bus measures along Westbourne Road, the A4160 Stanwell Road, Clive Place and Paget Terrace/ Road which subsequently provides access to Cardiff Barrage. At Cardiff Barrage this option involves the introduction of sustainable transport options for travel into Cardiff via Cardiff Barrage, which would significantly improve access from Penarth and Penarth Marina. A number of innovative sustainable transport options for linking Penarth and Cardiff were suggested during the WelTAG consultation including water taxis, self-driving electric pods/ vehicles/ bikes, monorail or shuttle bus linking Penarth and Cardiff, powered uphill cycle lifts and a cable car. Consideration would need to be given to the infrastructure required to enable any sustainable transport option to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. The existing active travel route along the barrage may require widening and land acquisition, with potential issues of conflict between the sustainable transport option and those walking and cycling being a key issue. Consideration would also need to be given to the operational nature of the barrage and the impact that water traffic crossing the barrage would have on timetabling and delays to any sustainable transport option. Issues regarding the introduction of buses onto the barrage have previously been considered in a report by Arup (2015). Associated measures to be considered as part of this option include: - bus service improvements, and - measures to improve interchange and connectivity between public transport/sustainable transport modes to simplify the user experience e.g. improved timetabling, enhanced information provision etc.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); Vale of Glamorgan Local Development Plan; WelTAG consultation events (Jan 2019); Cardiff Bay Barrage Transport Link, Arup, October 2015	Bus, Interchange, Sustainable Transport
3	Multi-modal sustainable transport interchange	This option involves upgrading the existing railway station at Cogan to create a new multimodal transport interchange facility serving the Penarth Marina and Cardiff Bay areas. The current provision for park and ride at Cogan Station is limited, the station has poor quality pedestrian links to the surrounding area and the highway network in the vicinity of the station experiences problems of congestion. The option would deliver a mixed-use development that combines station enhancements, including an additional platform on the Penarth branch line, with residential and retail facilities. The study by Arup (2018) considered a number of sub-options for the station upgrade and provision of an expanded park and ride facility. The recommended sub-option include the following elements: - A large park and ride facility (168 spaces) with improved facilities and road access located on a vacant site to the east of the study area; - Improvements to passenger facilities including a new station ticket hall, passenger waiting areas and customer toilets on the station platform; - Improved access on the A4160 Windsor Road and improvements to the road infrastructure including increased roundabout capacity; - Provision of bus and taxi interchange facilities to allow better links to Penarth Marina/ Cardiff Bay; - A new platform on the existing Penarth to Cardiff line; - A new 'access for all' footbridge to the main eastbound platform; - New residential development on the currently vacant site to the east. Suggestions were made during the WelTAG consultation for improvements to the highway network in the vicinity of Cogan Station e.g. replacement of Cogan roundabout with a traffic-signalled junction and provision of crossing facilities for pedestrians and cyclists. The WelTAG consultation also highlighted the need for improvements to the active travel environment and improved access for pedestrians and cyclists to Cogan Station. This option will also consider measures to improve interchange and connectivity between public transport/ sustainable transport modes to simplify the user experience e.g. improved timetabling, enhanced information provision, secure bike parking etc.	Vale of Glamorgan Coastal Corridor – Sustainable Transport Impacts: Scheme Impacts Assessment Report – Final (version 1.0), Arup (Oct 2018); WelTAG consultation events (Jan 2019)	Rail, Bus, Interchange, Active Travel
4	Opening Cardiff Barrage to private vehicles during peak periods	This option involves allowing Cardiff Barrage to be used by private vehicles during peak periods. The current route for all traffic travelling from Penarth to Cardiff is via heavily trafficked roads with high traffic volumes and problems of congestion. The route along Cardiff Barrage from Penarth to Cardiff Bay would be a significantly shorter and quicker route for those commuting from Penarth, especially for those working in and around Cardiff Bay. The scheme would allow private vehicles to travel the route of the Barrage during peak periods. As with Option 2, consideration would need to be given to the infrastructure required to enable vehicles to travel the length of the barrage, as currently a significant section of the barrage is only accessible by pedestrians and cyclists. The existing active travel route along the barrage may require widening and land acquisition, with the segregation of vehicles and those walking and cycling being a key issue.	WelTAG consultation events (Jan 2019)	Highway network improvements
5	Do Minimum	This option involves undertaking no investment in new transport infrastructure and no dedicated sustainable transport improvements in the area except from routine maintenance as and when required to keep routes operational.	WelTAG requirement	Maintenance

NB. Option 1-4 to consider opportunities offered by technological advancements in transport (such as electric vehicles) and the need to 'future proof' for such opportunities.

Appendix 7 Worksheets 5-12

Worksheet 5: Appraisal of Options against the Wales Transport Strategy Outcomes

Option No.	Option	Wales Transport Strategy Outcomes																
		Social					Economy					Environment						
		Improve access to healthcare	Improve access to education, training and lifelong learning	Improve access to shopping and leisure facilities	Encourage healthy lifestyles	Improve the actual and perceived safety of travel	Improve access to employment opportunities	Improve connectivity within Wales and internationally	Improve the efficient, reliable and sustainable movement of people	Improve the efficient, reliable and sustainable movement of freight	Improve access to visitor attractions	Increase the use of more sustainable materials	Reduce the contribution of transport to greenhouse gas emissions	Adapt to the impacts of climate change	Reduce the contribution of transport to air pollution and other harmful emissions	Improve the impact of transport on the local Environment	Improve the impact of transport on our heritage	improve the impact of transport on biodiversity
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+ +	+ +	+ +	+ + +	+ +	+ +	+	+ + +	0	+ +	0	+ + +	+ + +	+ + +	+ + +	+	0
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+ +	+ +	+ +	+	0	+ +	+ +	+ +	0	+ +	0	+ +	+ +	+	+	-	-
3	Multi-modal sustainable transport interchange	+ +	+ +	+ +	+	+	+ +	+ +	+ +	0	+	0	+ +	+ +	+	+	0	0
4	Opening Cardiff Barrage to private vehicles during peak periods	+	+	+	- - -	- -	+	+	- -	0	+	0	- - -	- - -	- - -	- - -	-	- -
5	Do Minimum	-	-	-	- -	-	-	- -	- -	-	- -	0	-	- -	- -	-	-	-

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 6: Appraisal of Options against the Well-being of Future Generations (Wales) Act 2015 Goals

		Well-being of Future Generations Act Objectives							Vale of Glamorgan Council Well-being Objectives				Vale of Glamorgan's Public Service Board's Well-being Plan			
Option No.	Option	A globally responsible Wales	A Wales of vibrant culture and thriving Welsh language	A Wales of cohesive communities	A more equal Wales	A healthier Wales	A resilient Wales	A prosperous Wales	Wellbeing outcome 1: Citizens of the Vale of Glamorgan have a good quality of life and feel part of their local community 1) Reduce poverty and social exclusion 2) Providing decent homes and safe communities	Wellbeing outcome 2: The Vale of Glamorgan has a strong and sustainable economy and the local environment is safeguarded for present and future generations 3) Promoting regeneration, economic growth and employment 4) Promoting sustainable development and protecting our environment	Wellbeing outcome 3: All Vale of Glamorgan citizens have opportunities to achieve their full potential 5) Raising overall standards of achievement 6) Valuing culture and diversity	Wellbeing outcome 4: Residents of the Vale of Glamorgan lead healthy lives and vulnerable people are protected and supported 7) Encouraging and promoting active and healthy lifestyles 8) Safeguarding those who are vulnerable and promoting independent living	To enable people to get involved, participate in their local communities and shape local services	To reduce poverty and tackle inequalities linked to deprivation	To give children the best start in life	To protect, enhance and value the environment
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+ + +	+	+ +	+ +	+ + +	+ +	+ +	+ +	+ + +	+	+ +	0	+ +	+	+ + +
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+ +	0	+	+	+	+	+	+	+ +	+	0	0	+	0	0
3	Multi-modal sustainable transport interchange	+ +	0	+ +	+	+	+	+	+	+ +	+	0	0	+	0	+
4	Opening Cardiff Barrage to private vehicles during peak periods	- - -	0	-	-	- - -	-	0	-	- -	0	- - -	0	-	0	- -
5	Do Minimum	- -	0	-	-	-	- -	-	-	- -	-	-	0	-	0	- -

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 7 - Local & Regional Policy Appraisal

Option Ref.	Option	Vale of Glamorgan Local Transport Plan: Active Travel: Increase the number of cycle trips	Active Travel: Increase the number of children cycling to school	Active Travel: Increase off road cycle route provision	Active Travel: Increase on road cycle route provision	Active Travel: Increase Active Travel infrastructure and facilities	Active Travel: Increase the number of cycle stands at public transport interchanges	Park and Ride: Increase the number of park and ride spaces	Park and Ride: Increase the number of park and ride users	Park and Ride: Increase the number of park and ride locations	Park and Ride: Increase the number of people using rail park and ride facilities and the rail network	Highway Improvement: To reduce the number and severity of road traffic casualties	Highway Improvement: To improve journey times and journey reliability	Highway Improvement: To reduce congestion at key strategic junctions	Highway Improvement: To improve air quality at key strategic junctions or areas	Highway Improvement: To improve the efficient movement of traffic and freight through strategic junctions	Bus Infrastructure: To increase passenger numbers	Bus Infrastructure: To improve accessibility to bus services for all users	Bus Infrastructure: To improve reliability and punctuality	Bus Infrastructure: To enhance waiting facilities	Bus Infrastructure: To improve opportunities for interchange	Bus Infrastructure: To improve information provision	Bus Infrastructure: To improve safety and security	Cardiff Capital Region Strategic Objectives: Prosperity & Opportunity: Building the capacity of individuals, households, public sector & businesses to meet the challenges & grasp opportunity creating a more productive economy	Prosperity & Opportunity: Providing the right infrastructure including connectivity by means of good transport links and highspeed broadband	Prosperity & Opportunity: Encouraging a culture of innovation and entrepreneurship by providing the right skills, opportunities and support to engender a confidence to be creative	Prosperity & Opportunity: Ensuring that the city-regions labour market is equipped with the skills that businesses need	Prosperity & Opportunity: Improving public sector efficiency and effectiveness by new ways of working	Prosperity & Opportunity: Supporting all businesses to become more productive, from small retail to large advanced manufacturers	Prosperity & Opportunity: Enhancing the business climate for emerging sectors, enterprises and innovation	Prosperity & Opportunity: Encourage and promote research and development and entrepreneurial enterprise	Inclusion & Equality: A vibrant and sustainable economy which contributes to the well-being and quality of life of people and communities now and in the future	Inclusion & Equality: Access to employment and economic opportunities	Inclusion & Equality: Participation in the labour market for all members of society	Inclusion & Equality: Access to a range of housing, including affordable	Inclusion & Equality: Access to education and training to develop skills	Inclusion & Equality: Access to social and recreational opportunities	Culture, Community & Sustainability: Forging a clear identity and strong reputation as a City-Region for trade, innovation, and quality of life	Culture, Community & Sustainability: Ensure our urban centres are vibrant and vital with unique identities which all of the regions residents can use and be proud of	Culture, Community & Sustainability: Respect, protect and support our rural and natural environment and use it to promote economic and social outcomes	Culture, Community & Sustainability: Develop and promote our world-class cultural and recreational opportunities utilising the regions natural beauty and historic areas	Culture, Community & Sustainability: Provide a quality environment across the whole region including existing and new development that attracts businesses and talented people	Culture, Community & Sustainability: Demonstrate our commitment to a sustainable future and acknowledge our global responsibility	Work with political and commercial partners, at a national, regional and local level to coordinate the promotion of the region
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+ + +	+ + +	+ + +	+ + +	+ + +	+ +	0	0	0	+	+	+	+	+	0	0	+	0	0	+ +	0	0	0	+ + +	0	0	0	+	0	0	+ + +	+ +	+ +	+	+ +	+ +	+	+ +	+ +	+ + +	0
2	Bus park and ride and sustainable transport links across Cardiff Barrage	0	0	0	0	0	+	+ + +	+ + +	+ + +	0	0	+ +	+	+	0	+ +	+ +	+ +	+	0	+ +	+	+	0	0	+ +	0	0	0	+	0	0	+	+ +	+ +	+	0	+ +	+ +	+	+ +	+	0
3	Multi-modal sustainable transport interchange	+ +	0	0	+	+ +	+ +	+ + +	+ + +	+ + +	+ +	+	+ +	+	0	+	+	+	+	+	+ + +	+ + +	+ +	+ +	0	+ +	0	0	0	+	0	0	+	+ +	+	0	+ +	+ +	+	+	+	+	0
4	Opening Cardiff Barrage to private vehicles during peak periods	- - -	- -	- - -	- - -	- - -	0	0	-	0	- -	-	+	+	- - -	+	- -	0	+	0	0	0	0	0	0	0	0	0	0	-	+	0	0	+	-	0	-	-	- -	-	- - -	0
5	Do Minimum	0	0	0	0	0	0	0	0	0	0	-	- -	- -	-	-	0	0	-	0	0	0	0	0	0	- -	-	-	0	-	0	-	-	-	-	-	-	- - -	0

Notes

To avoid double counting in appraisal process only those objectives which are not covered in the AST assessment or WTS assessment are included.

Key

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 8: Appraisal of Scheme Options against Scheme Objectives

Option No.	Option	Objectives				
		Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel	Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.	Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being	Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.	Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+ + +	+ + +	+ + +	+ +	+ +
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+ +	+ +	+ +	+ +	+
3	Multi-modal sustainable transport interchange	+	+ +	+	+ +	+
4	Opening Cardiff Barrage to private vehicles during peak periods	- - -	- - -	- - -	0	-
5	Do Minimum	- -	- -	- -	- -	-

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 9A: Options against Identified Problems

Identified Problems

Option No.	Option	Volume of traffic and levels of congestion cause unreliable journey times, delay and pollution	Volume of traffic is a barrier to walking and cycling	High levels of car use and low levels of public transport use	Sustainable transport options not an attractive alternative to car travel	Unreliable and slow journey times of bus services	Lack of Park and Ride facilities limits opportunities for public transport interchange	Low levels of Active Travel	Safety issues act as a barrier to walking and cycling	Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes	Lack of facilities for cyclists at trip origin and destination	Environmental factors reduce attractiveness of walking and cycling	Topography of the area acts as a barrier to walking and cycling	Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth	Poor connectivity to the wider area reduces the potential of tourism and leisure visitors to the economy
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+	+ + +	0	+ +	+	0	+ + +	+ + +	+ + +	+ +	+	+	+ + +	+ + +
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+ +	+	+ +	+ +	+ + +	+ + +	+	0	0	+	0	0	+ +	+ +
3	Multi-modal sustainable transport interchange	+ +	+	+ +	+ +	+	+ + +	+	+	+	+	0	0	+	+ +
4	Opening Cardiff Barrage to private vehicles during peak periods	+	- - -	- - -	- - -	-	0	- - -	- - -	- - -	0	-	0	-	0
5	Do Minimum	-	-	- -	- -	- -	-	- -	- -	- -	-	0	0	- - -	- -

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 9b: How the Long List Options will Tackle the Identified Problems, and Other Relevant Issues

How the Options Tackles the Problem				
Long List Option No.	**Option**	**How the Option will Tackle the Identified Problems**	**Other Relevant Issues**	**Overall rating**
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	Delivery of INM Proposals and area-wide measures aim to increase the attractiveness of walking and cycling in the study area, thus helping to achieve a modal shift from the private car to active modes. This has the potential to improve the health of those travelling by active modes due to an increase in exercise, but also those who are currently exposed to pollution caused by other unsustainable modes. The intervention, if successful in creating a modal shift, may reduce congestion and thus improve journey times by public transportation that is reliant on the road network, therefore this intervention has the potential to tackle the following of the identified problems: - Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution - Volume of traffic is barrier to walking and cycling - Sustainable transport options not attractive alternative to car travel - Unreliable and slow journey times of bus services - Low levels of Active Travel - Safety issues act as barrier to walking and cycling - Lack of safe, accessible, attractive, joined up and direct pedestrian and cycle routes - Lack of facilities for cyclists at trip origin and destination - Environmental factors reduce the attractivness of walking and cycling - Topography of the area acts as a barrier to walking and cycling - Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth - Poor connectivity to the wider area reduces potential of tourism and leisure visitors to the economy	The proposal includes area-wide initiatives raised at the consultation events in addition to those proposed within the INM, including reduced speed limits, improved facilities at key destinations, potential for expanding cycle hire to Penarth and softer measures such as travel plans and walking buses. Many localised active travel proposals were also received at a consultation event, many of these are covered by the INM proposals, however a number fall outside and would be required to be considered as part of the next INM review (due every 3 years).	+ +
2	Bus park and ride and sustainable transport links across Cardiff Barrage	A bus park and ride, as well as sustainable transport links across Cardiff Barrage aims to improve the attractivness and accessibility of public transport within the study corridor. The following problems may be tackled by this proposal: - Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution - Volume of traffic is a barrier to walking and cycling - High levels of car use and low levels of public transport usage - Sustainable transport options not attractive alternative to car travel - Unreliable and slow journey times of bus services - Lack of Park and Ride facilities limits opportunities for Public Transport interchange - Low levels of Active Travel - Lack of facilties for cyclists at trip origin and destination - Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth - Poor connectivity to wider area reduces potential of tourism and leisure visitors to the economy	Concerns were raised at a public stakeholder event that the addition of through vehicles across the Barrage would negatively impact upon an attractive walking and cycling link between Cardiff Bay and Penarth Marina.	+
3	Multi-modal sustainable transport interchange	The multi-modal sustainable transport interchange option will see Cogan station, as well as the surrounding area, redeveloped in a way that supports public transport interchange, as well as improves walking and cycling provision within the vicinity of the area. A multi modal sustainable transport interchange at Cogan would see an improved station with connections between the Vale of Glamorgan line and the Penarth Branch (currently users must travel to Grangetown to change), as well as improvements to train - bus interchange. The proposal therefore has the potential to alleviate the following of the identified problems: - Volume of traffic and levels of congestion cause unreliable journey times, delays and pollution - Volume of traffic is a barrier to walking and cycling - High levels of car use and low levels of Public Transport use - Sustainable transport options not attractive alternative to car usage - Unreliable and slow journey times of bus services - Lack of P&R facilities limits opportunities for Public Transport interchange - Low levels of Active Travel - Safety issues act as a barrier to walking and cycling - Lack of safe, accessible and joined up and direct pedestrian and cycle routes - Lack of facilities for cyclists at trip origin and destination - Road traffic emissions and congestion contribute to reduced air quality in some areas and an Air Quality Management Area (AQMA) has previously been in place on Windsor Road, Penarth - Poor connectivity to wider area reduces potential of tourism and leisure visitors to the economy	Scheme may encourage additional traffic to use the A4160 link between Baron's Court and a new Cogan Park and Ride site. The crossing of the A4160 at the Cogan/Penarth Marina roundabout highlighted as a particular problem at the public consultation event.	+
4	Opening Cardiff Barrage to private vehicles during peak periods	Opening the Barrage to private vehicles would allow cars to traverse the Barrage, thus providing a more direct link between Penarth and Cardiff Bay, and an alternative route to the City Centre. This option would aim to relieve pressure on key strategic junctions, particularly the Baron's Court junction and along the A4160 Windsor Road, however more long term concerns are that such an intervention may lead to an increase in private vehicle usage generally within the study area. It is expected that in the long-term this option would have a negative impact on the majority of identified problems. It may make a positive contribution to the following identified problem: - Volume of traffic and levels of congestion cause unreliable journey times, delay and pollution	Concerns were raised at a public stakeholder event that the addition of private vehicles across the Barrage would negatively impact upon an attractive walking and cycling link between Cardiff Bay and Penarth Marina. There is also potential that this option could increase the attractiveness of car usage in the study area whilst reducing the attractivness of walking and cycling. Other potential problems relate to how the scheme will be managed, as there would be potential for vehicles to queue before the peak time opening, and speed on surrounding routes towards the end of the opening phase(s). Traffic within Cardiff Bay and along Penarth Marina/Paget Road would also likely increase. Traffic modelling would be required to fully whether allowing private vehicles to use the barrage would ease congestion at key junctions and to understand the impacts on wider highway network.	- -
5	Do Minimum	A do minimum approach is likely to see current problems become worse in the long term. The do minimum option is not likely to have a positive impact on any of the identified problems and it is expected that the majority of problems would worsen if this approach was adopted.		-

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 10: High Level Appraisal of Options (Appraisal Summary Table)

Criteria	Qualitative Assessment				
	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	Bus park and ride and sustainable transport links across Cardiff Barrage	Multi-modal sustainable transport interchange	Opening Cardiff Barrage to private vehicles during peak periods	Do Minimum
Economic					
Business Users & Reliability Impact	NYA	NYA	NYA	NYA	NYA
Regeneration	+ +	+	+ +	-	- -
Wider Impacts	+ +	+	+ +	- -	-
Environment					
Noise	+ +	+	0	- -	-
Air Quality	+ +	+	0	- -	-
Greenhouse Gases	+ +	+	0	- -	-
Landscape	0	-	+	- -	-
Townscape	+	0	+	-	-
Historic Landscape	0	0	0	0	0
Cultural Heritage	+	-	0	0	0
Biodiversity	0	-	0	-	-
Water Environment	0	0	0	-	0
Social and Cultural					
Commuting and Other Users	+	+ +	+ +	+	- -
Reliability Impact on Commuting and Other Users	+	+ +	+ +	+	- -
Physical Activity	+ + +	+	+	- - -	-
Journey Quality	+ + +	+ +	+ +	0	-
Accidents	NYA	NYA	NYA	NYA	NYA
Security	NYA	NYA	NYA	NYA	NYA
Access to Services	+ +	+ +	+ +	+	- -
Affordability	NYA	NYA	NYA	NYA	NYA
Severance	+ + +	+ +	+ +	0	-
Option Values	NYA	NYA	NYA	NYA	NYA
Public Accounts					
Cost to Broad Transport Budget	NYA	NYA	NYA	NYA	NYA
Indirect Tax Revenues	NYA	NYA	NYA	NYA	NYA
Occurance of Impacts					
When and where impacts will occur (positive and negative)	During the construction and operational stages, in the vicinity of the routes. Impacts to the wider area if car trips are removed from the highway network.	During the construction and operational stages, in the vicinity of the proposal. Impacts to local roads and junctions as traffic is removed from the highway network.	During the construction and operational stages, in the vicinity of the proposal. Impacts to local roads and junctions during construction and as traffic is removed from the highway network in the long term.	During the construction and operational stages, in the vicinity of the proposal i.e. along Cardiff Barrage. Impacts to local roads and junctions due to changes in traffic movements.	Across the Penarth Cardiff Barrage Corridor including local roads and junctions, Penarth town centre etc.
Who or what will experience the impacts	Users of the active travel network. Users of the local highway network. Residents, businesses and visitors to Penarth.	Users of the service. Users of the local highway network. Residents, commuters, businesses and visitors to Penarth. Visitors to Cosmeston Lakes Country Park.	Users of the service. Users of the local highway network. Residents, commuters businesses and visitors to Cogan, Penarth Marina and Penarth.	Users of Cardiff Barrage. Users of the local highway network. Residents, commuters, businesses and visitors to Penarth, Penarth Marina, Cardiff Bay and Cogan.	Users of the local highway network. Residents, commuters, businesses and visitors to the Penarth Cardiff Barrage Corridor.

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large Negative (- - -)
Not Yet Assessed (NYA)

Worksheet 11: Appraisal of Options against Deliverability

Option No.	Option	Feasibility (Technical)	Acceptability	Timescale	Risks	Comments
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	0	+ +	+	+	All Active Travel schemes within the INM have previously been consulted upon and approved by the Welsh Government, thus reducing the risks associated with this option. The INM contains a range of active travel scheme proposals that vary in technical feasibility from relatively small-scale schemes to large infrastructure projects. The INM programme contains schemes that are deliverable within the short, medium and long term, which partly reflects the technical feasibility of different schemes and the lead in time required for scheme development. The nature of the INM programme will enable schemes to be delivered in a phased approach, allowing for some quick wins in the early stages of the programme. The most technically complex of all scheme proposals within the INM is the Penarth Headland Link, which is a large-scale engineering project that has a 'predictive delivery time' within the INM of 10-15 years and is the only 'long-term' scheme within the programme. As this is part of a package of measures, higher risks may be associated with the largest-scale projects such as the Penarth Headland Link, though a number of localised improvements may be deliverable with far lower levels of risk. High quality improvements to the active travel network, including the Penarth Headland Link, were well supported at the WelTAG public consultation event held in Penarth. The deliverability scoring in this table reflects the whole of the INM programme of schemes. A greater assessment of the feasibility and risk associated with individual schemes will be developed at later stages of the WelTAG process if this option is recommended to be progressed.
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+	0	+	-	The option to provide a bus park and ride and sustainable transport links across Cardiff Barrage includes a number of discreet elements that will have different challenges in terms of technical feasibility and risk. The key elements are summarised as follows: - The proposed location for a bus park and ride facility at Cosmeston Lakes Country Park is understood to be on the site of an existing car park with gravel surfacing. The provision of a large park and ride car park at this site should be relatively straightforward in terms of technical feasibility. In terms of acceptability and risk, the location of the facility at Cosmeston Lakes Country Park will need to be carefully managed. For example the area is designated as a Local Nature Reserve and some areas are designated a Site of Special Scientific Interest (SSSI). These designations and the use of the country park by visitors and tourists will need to be carefully balanced with the use of the site as a park and ride facility. - The provision of bus priority measures between the park and ride facility and Cardiff Barrage is likely to present technical challenges due to the constraints of the existing highway network. Further development work is required to determine the preferred route for the bus priority scheme and the extent of bus priority measures proposed. This will impact upon the technical feasibility and the level of risk to delivery e.g. in terms of whether land acquistion is necessary to deliver the improvements. - The provision of a sustainable transport link across Cardiff Barrage is currently at a very early stage of development in terms of the nature of the sustainable transport options being proposed. The operation of vehicles of any sort on the barrage is likely to have technical challenges e.g. in terms of managing the interaction of vehicles on the barrage with pedestrians and cyclists, balancing the use of the barrage by vehicles with the operation of the barrage in relation to the passage of vessels. The introduction of sustainable transport modes across the Barrage may also be reliant on crossing third party land, which increases the risk associated with such a project. A further consideration in terms of risk is that Cardiff Barrage is under the control of Cardiff Council and implementation of a scheme along Cardiff Barrage is reliant on the support and close cooperation of Cardiff Council. A feasibility study has previously been undertaken, which was commissioned by Cardiff Council, to evaluate the technical and operational viability of providing a bus-based public transport route via the Cardiff Barrage (Cardiff Bay Barrage Transport Link, Arup, 2015). Although the feasibility study focuses on the use of the barrage by buses, the issues considered will be of relevence to the introduction of any sustainable transport options along the barrage. It is considered that the nature of the sustainable transport option proposed will impact on the acceptability of the proposal e.g. the degree of impact that the sustainable transport option will have on the current use of the barrage by pedestrians and cyclists. In general, support for sustainable transport priority measures was received at the WelTAG public consultation, though some voiced concerns over the potential effectiveness of a Park and Ride site at Cosmeston Lakes. Others voiced concern that the reliability of sustainable modes crossing the Barrage would be impacted by water craft movements into/out of the Barrage (also acknowledged within the 2015 Arup report), and also that sustainable transport modes crossing the Barrage may detract from an otherwise attractive walking and cycling environment. The deliverability scoring in this table is in relation to all elements of the option as described above. A greater assessment of the feasibility and risk associated with individual elements will be developed at later stages of the WelTAG process if this option is recommended to be progressed.
3	Multi-modal sustainable transport interchange	+	+	0	0	The proposal to deliver a multi-modal transport interchange at Cogan Station has a number of different elements that will have challenges in terms of technical feasibility and risk e.g. the delivery of improvements at an operational rail station such as the provision of a new platform and new facilities to improve pedestrian access between platforms, the delivery of highway improvements at a constrained and congested junction on the highway network, the potential need to acquire land to enable the delivery of a park and ride facility. In terms of risk, the delivery of large-scale improvements on operational rail land also has significant cost implications. In terms of timescales and risks to delivery, a key issue in relation to this option is the need for the scheme to be developed and delivered by Transport for Wales who have responsibility for improvements to the rail network. As such, the prioritisation and programming of the option to redevelop Cogan Station as a multi-modal transport interchange is not within the control of the local authority. In relation to acceptability, the proposal has the potential to redevelop currently vacant land, but would require careful management due to the dense nature of the urban environment. At the WelTAG public consultation event, concerns were raised that if Cogan is seen as an attractive Park and Ride site that traffic problems may become worse in the local area - particularly at the Baron's Court Junction. However, such an intervention may also help to improve the pedestrian and cycling environment highlighted as a problem at Cogan within the public consultation event.
4	Opening Cardiff Barrage to private vehicles during peak periods	+	- - -	-	- -	The operation of vehicles of any sort on Cardiff Barrage is likely to have technical challenges e.g. in terms of managing the interaction of vehicles on the barrage with pedestrians and cyclists, balancing the use of the barrage by vehicles with the operation of the barrage in relation to the passage of vessels. The introduction of private vehicles across the Barrage may also be reliant on crossing third party land, which increases the risk associated with such a project. A further consideration in terms of risk is that Cardiff Barrage is under the control of Cardiff Council and implementation of a scheme along Cardiff Barrage is reliant on the support and close cooperation of Cardiff Council. A feasibility study has previously been undertaken, which was commissioned by Cardiff Council, to evaluate the technical and operational viability of providing a bus-based public transport route via the Cardiff Barrage (Cardiff Bay Barrage Transport Link, Arup, 2015). Although the feasibility study focuses on the use of the barrage by buses, the issues considered will be of relevence to the introduction of private vehicles along the barrage. In terms of acceptability, it is considered there will be a number of concerns in relation to the introduction of private vehicles onto the barrage. This includes the impact that the introduction of vehicles will have on the current use of the barrage by pedestrians and cyclists and its use by leisure visitors and tourists. Although the introduction of private vehicles would be limited to peak periods, the volume of traffic that would be using the barrage is also likely to be of concern e.g. in terms of potential environmental impacts and the increase in traffic volumes on the local highway network in the vicinity of the barrage. A number of concerns were received at both the stakeholder and public WelTAG consultation events e.g. that opening the barrage to private vehicles at peak times may detract from an otherwise pleasant walking and cycling environment, the likely requirement to cross third party land and potential congestion caused by water craft movements into and out of the barrage. Other concerns included queries as to how the intervention would be managed (e.g. segregation of vehicles and pedestrians/cyclists) as well as how peak hour access to the barrage would be managed.
5	Do Minimum	0	- -	0	0	A do minimum approach assumes that no sustainable transport improvements are delivered and has therefore not been rated in terms of technical feasibility, timescales and risk. A do minimum approach would likely see the problems identified become worse, particularly given future developments planned for the Vale of Glamorgan area and an predicted increase in the population of the Cardiff Capital Region in years to come. As such this option has a negative rating in terms of acceptability, as a do minimum approach and a subsequent worsening of identified problems is unlikely to be an acceptable long-term option.

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)

Worksheet 12: Summary of Option Appraisal against the Strategic, Transport, & Management Cases

Option Ref	Option	Wales Transport Strategy Outcomes			WBOFGA Goals	Local Transport Plan Objectives	Cardiff Capital Region Strategic Objectives	Scheme Objectives					Tackling Problems	Appraisal Summary Table				Delivery
		Soc.	Econ.	Env.				1	2	3	4	5		Econ.	Env.	Soc. & Cul	Pub. Acc.	
1	Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel INM	+ +	+ +	+ +	+ +	+ +	+ +	+ + +	+ + +	+ + +	+ +	+ +	+ +	+ +	+	+ +	NYA	+
2	Bus park and ride and sustainable transport links across Cardiff Barrage	+ +	+ +	+	+	+ +	+	+ +	+ +	+ +	+ +	+	+	+	0	+ +	NYA	0
3	Multi-modal sustainable transport interchange	+ +	+ +	+	+	+ +	+	+	+ +	+	+ +	+	+	+ +	0	+ +	NYA	0
4	Opening Cardiff Barrage to private vehicles during peak periods	0	0	- -	- -	- -	-	- - -	- - -	- - -	0	-	- -	- -	- -	0	NYA	-
5	Do Minimum	-	- -	-	-	-	-	- -	- -	- -	- -	-	-	- -	-	-	NYA	0

Large positive (+ + +)
Moderate positive (+ +)
Slight positive (+)
Neutral (0)
Slight negative (-)
Moderate negative (- -)
Large negative (- - -)
Not Yet Assessed (NYA)

Key:
Scheme Objectives
1 = Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel
2 = Reduce barriers that constrain opportunities to increase travel by sustainable transport modes.
3 = Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being.
4 = Deliver sustainable transport improvements that encourage increased economic activity and support long term investment.
5 = Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.

Appendix 8 Impacts Assessment Tables

Option 1: Active Travel Proposals for Penarth within the Vale of Glamorgan's Active Travel INM		
	Impacts	Scale
Economic		
Business Users & Reliability Impact	NYA	NYA
Regeneration	An increase in Active Travel provision may lead to opportunities for regeneration as more of the public realm may be able to be dedicated to pedestrians and cyclists, as opposed to the private car. Suggestions were made at the public consultation event on 24th January 2019 to dedicate more of the Town Centre (particularly around Windsor Road) for the area to become more pedestrian friendly, with car parking spaces removed to allow for events such as markets.	+ +
Wider Impacts	Wider impacts may include increased patronage if certain aspects of the INM are successful (e.g. Headland Link connecting route to Penarth Esplanade with Cardiff Barrage). Other impacts may also lead to reduced traffic congestion on routes surrounding the study area as people travelling into/out of the study area switch to active modes.	+ +
Environment		
Noise	If a modal shift is achieved noise levels will be reduced as people switch to active modes which are generally quieter.	+ +
Air Quality	Air quality would be greatly improved as people will be encouraged to switch from polluting modes to active ones.	+ +
Greenhouse Gases	A positive contribution to emissions attributed to greenhouse gases will be achieved via a modal shift to unpolluting active modes.	+ +
Landscape	Option 1 is likely to have little impact on the landscape of the study area overall. The landscape impact of the Penarth Headland link will need to be considered as the proposal is further developed.	0
Townscape	As a modal shift is created, an opportunity in the future may be presented to dedicate more of the public realm to pedestrians and cyclists as opposed to private vehicles.	+
Historic Landscape	Option 1 is likely to have very little impact on the historic landscape of the town.	0
Cultural Heritage	Active Travel Proposals may have a small positive impact on the cultural heritage as communities will have improved walking and cycling connections between them.	+
Biodiversity	Option 1 is likely to have little impact on the biodiversity of the study area overall. The biodiversity impacts of the Penarth Headland Link will need to be considered as the proposal is further developed.	0
Water Environment	Option 1 is likely to have very little impact on the water environment of the study area. The only intervention that may have a Water Environment consideration would be the Penarth Headland Link.	0
Social and Cultural		
Commuting and Other Users	A small positive has been scored for commuting and other uses as Active Travel proposals and the implementation of routes may encourage more people to commute via active modes. To a certain extent this is also reliant on 3rd parties implementing measures to support commuting via active modes (e.g. via workplace cycle parking and facilities for changing).	+
Reliability Impact on Commuting and Other Users	Reliability is likely to improve as journey times by active modes are likely to be easier to predict journey times (and less reliant on other parameters e.g. timetables).	+
Physical Activity	A large positive has been scored for physical activity should there be a modal shift from sedentary modes to modes requring a level of physical activity.	+ + +
Journey Quality	Studies have shown that a journey undertaken via active modes (particularly walking) leads to an improved journey satisfaction (De Vos et al., 2016).	+ + +
Accidents	NYA	NYA
Security	NYA	NYA
Access to Services	Access to services is likely to be improved as additional routes connecting services with places of employment, education and residential addresses are created for active modes.	+ +
Affordability	NYA	NYA
Severance	Severance is likely to be improved greatly as walking and cycling routes (as developed with community consultation) are implemented.	+ + +
Option Values	NYA	NYA
Public Accounts		
Cost to Broad Transport Budget	NYA	NYA
Indirect Tax Revenue	NYA	NYA
Occurance of Impacts		
When and where impacts will occur (positive and negative)	During the construction and operational stages, in the vicinity of the routes. Impacts to the wider area if car trips are removed from the highway network.	
Who or what will experience the impacts	Users of the active travel network. Users of the local highway network. Residents, businesses and visitors to Penarth.	

Option 2: Bus Park and Ride and Sustainable Transport Links Across Cardiff Barrage		
	Impacts	Scale
Economic		
Business Users & Reliability Impact	NYA	NYA
Regeneration	This option may support future regeneration of the study area, as more users travel via more sustainable and efficient modes and the negative impacts of car use are reduced.	+
Wider Impacts	Wider impacts may include a reduced journey time via sustainable transport, and therefore potential for renewed confidence in sustainable modes. A reduced running cost attributed to reduced journey times may also be beneficial not only for the operator(s), but passengers who may experience benefits of this saving either through reduced fares or improved investment into more profitable services.	+
Environment		
Noise	A slight positive has been scored for noise, as a reduction in the number of vehicles in the study area (due to them being replaced with more sustainable, higher capacity modes) may have noise benefits.	+
Air Quality	The air quality in the area would be likely to be improved slightly due to a modal shift from the private vehicle to more sustainable modes. Limitations to an improvement in air quality include the possible creation of a Park and Ride site at Cosmeston, which still supports trips being made via the private car. Supporting investment into cleaner public transport vehicles may improve upon these positives.	+
Greenhouse Gases	A slight positive has been scored for greenhouse gases, as an improvement in sustainable transport options may lead to a reduction in the number of vehicles in the study area (due to them being replaced with more sustainable, higher capacity modes). Any improvements in the emissions from the type of sustainable vehicle being used would also make a positive contribute to greenhouse gases.	+
Landscape	The creation of a large car park at the Cosmeston Park and Ride site has contributed to the slight negative attributed to Landscape for this option.	-
Townscape	It is not expected that the townscape would be impacted by this option. The only expected changes may be redesigning of existing road layouts.	0
Historic Landscape	It is not expected that the Historic Landscape would be impacted by this option.	0
Cultural Heritage	A slight negative has been scored for cultural heritage due to the proposed siting of the park and ride at Cosmeston Lakes Country Park.	-
Biodiversity	The creation of a large car park at the Cosmeston Park and Ride site has contributed to the slight negative attributed to Biodiversity for this option.	-
Water Environment	It is not expected that the Water Environment would be impacted by this option. Any water environment impacts of the creation of a car park in the vicnity of Cosmeston Lakes Country Park will need to be considered as the proposal is further developed.	0
Social and Cultural		
Commuting and Other Users	It is expected that a moderate postive to be attributed to commuting and other uses due to improved journey times and easier access through the study area, connecting to Cardiff, Penarth Town Centre but also to wider destinations accessible via the public transport network surrounding the area.	+ +
Reliability Impact on Commuting and Other Users	The reliability impact on commuting and other users is likely to improve as greater efficiency in movement of people is seen when trips are converted from private vehicles to other forms of public sustainable transportation. Dedicated sustainable transport access across the Barrage is likely to further contribute towards the reliability of journeys between the Study Area and Cardiff Bay.	+ +
Physical Activity	The intervention would likely benefit as a slight positive on physical activity. Justifications for this slight positive include that public transport users may be more likely to use an active form of transport to travel from the nearest sustainable transport alighting point to their destination. The proximity of the propsoed Park and Ride to the Cosmeston Lakes attractive walking environment may also have the potential to encourage physical activity at this location.	+
Journey Quality	A moderate positive has been attributed to Journey Quality due to the likelihood that travel via sustainable modes will be prioritised through the corridor.	+ +
Accidents	NYA	NYA
Security	NYA	NYA
Access to Services	Access to services shows as a moderate positive due to improved sustainable transport options to access key destinations and the potential for a greater number of people (travelling via sustainable modes when compared with the private vehicle) to access a destination in the same amount of time.	+ +
Affordability	NYA	NYA
Severance	Severance may be improved as communities along the corridor would have access to improved sustainable transport services. Improvements in journey speed, reliability and likely patronage may subsequently encourage operators to run more frequent services.	+ +
Option Values	NYA	NYA
Public Accounts		
Cost to Broad Transport Budget	NYA	NYA
Indirect Tax Revenue	NYA	NYA
Occurance of Impacts		
When and where impacts will occur (positive and negative)	During the construction and operational stages, in the vicinity of the proposal. Impacts to local roads and junctions as traffic is removed from the highway network.	
Who or what will experience the impacts	Users of the service. Users of the local highway network. Residents, commuters, businesses and visitors to Penarth. Visitors to Cosmeston Lakes Country Park.	

Option 3: Multi-Modal Sustainable Transport Interchange		
	Impacts	Scale
Economic		
Business Users & Reliability Impact	NYA	NYA
Regeneration	A moderate positive is attributed to potential regeneration as the creation of a multi-modal sustainable transport interchange may incorporate/encourage development of currently vacant sites surrounding the Cogan station site.	+ +
Wider Impacts	A multi-modal sustainable transport interchange may lead to improvements to the wider area, particularly to travel to and from destinations that are able to be reached via direct connections from the interchange. Investment into the area may also encourage further investment by businesses/investors. Consideration will have to be given to location of Park and Ride if suitable, as this may have potential to increase traffic (particularly on approaches and across the Baron's Court junction).	+ +
Environment		
Noise	Noise is not likely to be influenced to a great extent via implementation of this option. A transfer to sustainable modes may have a positive impact on noise, however consideration would need to be given to the impact of a potential increase in traffic accessing the proposed park and ride site.	0
Air Quality	Air Quality is not likely to be influenced to a great extent via implementation of this option. A transfer to sustainable modes may have a positive impact on air quality, however consideration would need to be given to the impact of a potential increase in traffic accessing the proposed park and ride site.	0
Greenhouse Gases	Greenhouse gases are not likely to be influenced to a great extent via implementation of this option. A transfer to sustainable modes may have a positive impact on greenhouse gases, however consideration would need to be given to the impact of a potential increase in traffic accessing the proposed park and ride site.	0
Landscape	The landscape of the area is likely to see a slight positive as extensive redevelopment of the derelict and currently underutilised area immediately surrounding the station (and potentially further expansion should the option attract further investment).	+
Townscape	As above, this option may see the redevelopment of the areas immediately surrounding the station in the first instance, with additional potential should the option be successful at encouraging further investment.	+
Historic Landscape	It is not expected that the Historic Landscape will be affected by this intervention.	0
Cultural Heritage	It is not expected that the Cultural Heritage will be affected by this intervention.	0
Biodiversity	It is not expected that the Biodiversity will be affected by this intervention.	0
Water Environment	It is not expected that the Water Environment will be affected by this intervention. Any water environment impacts of the creation of a multi-modal interchange and park and ride will need to be considered as the proposal is further developed.	0
Social and Cultural		
Commuting and Other Users	A moderate positive is attributed for this option due to the potential of improved connection times, particularly for those who currently have to travel via Grangetown to change onto Penarth/Barry bound trains. Rail travel may also become more attractive for those within the catchment of Cogan Station due to an increase in the number of trains serving (as Penarth branch trains may stop) and due to the availability of a park and ride.	+ +
Reliability Impact on Commuting and Other Users	A moderate positive is seen for reliability impact on communting and other users due to the improved connections available via creation of a sustainable transport interchange. This may lead to an improved frequency of services, as well as options for interchange between modes.	+ +
Physical Activity	Physical activity is likely to be improved (slightly) as the interchange may encourage more people to use public transport and use active modes to travel from the nearest stop/station from/to their starting point or final destination.	+
Journey Quality	Journey quality is viewed to be a moderate positive due to the improved connections that will be made possible by a multi-modal transport interchange, which will likely see reduced journey times for those who currently are required to change.	+ +
Accidents	NYA	NYA
Security	NYA	NYA
Access to Services	Access to services would likely improve moderately with a multi-modal transport interchange at this location, particularly if additional services are included as part of the interchange plans. Additionally, access to the new Wellbeing Hub at Penarth Leisure Centre (Cogan) would be more easily accessible via public transport.	+ +
Affordability	NYA	NYA
Severance	Severance may be improved, particularly if the crossing of the A4160 Windsor Road is considered as part of the plans (highlighted as a problem at the public consultation event on 24th January 2019).	+ +
Option Values	NYA	NYA
Public Accounts		
Cost to Broad Transport Budget	NYA	NYA
Indirect Tax Revenue	NYA	NYA
Occurance of Impacts		
When and where impacts will occur (positive and negative)	During the construction and operational stages, in the vicinity of the proposal. Impacts to local roads and junctions during construction and as traffic is removed from the highway network in the long term.	
Who or what will experience the impacts	Users of the service. Users of the local highway network. Residents, commuters businesses and visitors to Cogan, Penarth Marina and Penarth.	

Option 4: Opening Cardiff Barrage to Private Vehicles During Peak Periods		
	Impacts	Scale
Economic		
Business Users & Reliability Impact	NYA	NYA
Regeneration	The opening of Cardiff Barrage to Private Vehicles during peak periods may restrict development over the Barrage as space may have to be dedicated to allow private vehicle movements.	-
Wider Impacts	Opening of the Barrage to private vehicles may lead to increased traffic on surrounding routes, such as from Cogan along Penarth Marina and from Penarth Town Centre along Paget Road. Wider impacts may also be experienced on the Cardiff side of the Barrage, as well as through Penarth Town Centre as drivers access the Barrage.	- -
Environment		
Noise	A determental impact on noise would be expected if private vehicles are permitted to cross the Barrage due to the noise associated with private vehicle movements.	- -
Air Quality	A moderate negative is attributed to air quality due to the expected type of vehicle emitting harmful pollutants onto the Barrage and approaching routes.	- -
Greenhouse Gases	A moderate negative is also attributed to greenhouse gases due to the expected type of private vehicles that would be used on the Barrage.	- -
Landscape	Landscape would be negatively affected. Whilst there is an operating road along the Barrage, traffic volumes along this would be expected to increase greatly at peak opening times. In addition, additional highway may need to be created to accommodate the additional traffic through third party land.	- -
Townscape	A negative impact is expected for the townscape, as transport improvements (particularly along the Barrage and approach roads) may need re-design to accommodate an increase in traffic at peak hours.	-
Historic Landscape	This option is not expected to have a significant influence upon the Historic Landscape of the area.	0
Cultural Heritage	This option is not expected to have a significant influence upon the Cultural Heritage of the area.	0
Biodiversity	There is potential negative impact on biodiversity due to the expected increase in number of private vehicle trips.	-
Water Environment	The Water Environment may be negatively affected due to the proximity of the proposed route to the water either side of the Cardiff Bay Barrage	-
Social and Cultural		
Commuting and Other Users	It is envisaged that access for commuters may be improved as drivers and passengers could avoid the congested Windsor Road and Baron's Court junctions to access Cardiff Bay (and onwards via the Eastern Bay Link Road) more easily.	+
Reliability Impact on Commuting and Other Users	The reliability impact is likely to improve as an additional option for drivers (and passengers) is opened across the Barrage.	+
Physical Activity	A strong negative has been attributed to Physical Activity. This is due to the potential opening the Barrage to private vehicles affecting an otherwise pleasant walking and cycling environment.	- - -
Journey Quality	No influence is likely to be attributed to journey quality. This is because whilst the situation may improve for drivers and passengers of private vehicles, the experience for those using active modes to cross the Barrage will be negativley affected.	0
Accidents	NYA	NYA
Security	NYA	NYA
Access to Services	Access to services is likely to be improved for private vehicle drivers and passengers as an additional route, avoiding the Windsor Road congestion, would be created.	+
Affordability	NYA	NYA
Severance	Severance has been rated as a neutral impact overall, although the Barrage may become more challenging to cross via foot or by cycle due to the increase in private vehicle traffic.	0
Option Values	NYA	NYA
Public Accounts		
Cost to Broad Transport Budget	NYA	NYA
Indirect Tax Revenue	NYA	NYA
Occurance of Impacts		
When and where impacts will occur (positive and negative)	During the construction and operational stages, in the vicinity of the proposal i.e. along Cardiff Barrage. Impacts to local roads and junctions due to changes in traffic movements.	
Who or what will experience the impacts	Users of Cardiff Barrage. Users of the local highway network. Residents, commuters, businesses and visitors to Penarth, Penarth Marina, Cardiff Bay and Cogan.	

Option 5: No Minimum		
	Impacts	Scale
Economic		
Business Users & Reliability Impact	NYA	NYA
Regeneration	Regeneration is likely to be negatively influenced as a lack of investment into the transport of the area is unlikely to encourage investment by businesses/stakeholders.	- -
Wider Impacts	Wider impacts may be felt in other areas as private vehicle users may, to avoid pockets of congestion, divert via unsuitable routes for the levels of traffic. Other negative impacts may be felt by those wishing to visit the study area, but discouraged due to the lack of transport infrastructure.	-
Environment		
Noise	A lack of action may result in additional traffic congestion, and thus increased noise associated with this.	-
Air Quality	Air quality is also likely to be made worse as an increase in expected population leads to an increase in those using routes and therefore an increase in vehicles waiting in congestion emitting pollution.	-
Greenhouse Gases	As above, it is likely that the increase in private vehicles will be those that emit greenhouse gases.	-
Landscape	The landscape is likely to be negatively influenced, as no improvements are likely to be made to currently uninviting/derelict areas of the study area.	-
Townscape	A negative impact is predicted upon the townscape as no improvements are likely to be made to currently uninviting/derelict areas of the study area.	-
Historic Landscape	It is not envisaged that the historic landscape will be significantly affected by this option.	0
Cultural Heritage	It is not envisaged that the cultural heritage of the area will be significantly affected by this option.	0
Biodiversity	Biodiversity may be negatively affected due to an expected increase in congestion	-
Water Environment	It is not envisaged that the water environment of the area will be significantly affected by this option.	0
Social and Cultural		
Commuting and Other Users	Commuters and those wishing to access other services are expected to experience a moderately negative impact from this option, due to the predicted increase in population and an increase in people travelling via all modes through the area.	- -
Reliability Impact on Commuting and Other Users	Reliability may be impacted as those travelling through the study area experience further congestion. The network resiliance also would not be improved and infrastructure may become more expensive to maintain with time.	- -
Physical Activity	A do minimum intervention is likely to do very little to encourage physical activity.	-
Journey Quality	Journey quality is also likely to suffer as a result of a do minimum approach due to the lack of solution for current and predicted levels of congestion.	-
Accidents	NYA	NYA
Security	NYA	NYA
Access to Services	Access to services may be negatively affected due to the current and predicted congestion, as well as current severance at various locations within the study area not being addressed.	- -
Affordability	NYA	NYA
Severance	Severance may be affected as nothing will be in place to combat areas where severance is highlighted as an issue (e.g. between Cardiff Barrage and Penarth Esplanade and when crossing the A4160 at Cogan).	-
Option Values	NYA	NYA
Public Accounts		
Cost to Broad Transport Budget	NYA	NYA
Indirect Tax Revenue	NYA	NYA
Occurance of Impacts		
When and where impacts will occur (positive and negative)	Across the Penarth Cardiff Barrage Corridor including local roads and junctions, Penarth town centre etc.	
Who or what will experience the impacts	Users of the local highway network. Residents, commuters, businesses and visitors to the Penarth Cardiff Barrage Corridor.	

Appendix 9 Review Group Comments

We | Listen Create Deliver

www.capita.co.uk/infrastructure

St David's House, Pascal Close, St Mellons, Cardiff, CF3 0LW T: 02920 803500

CAPITA

Penarth Cardiff Barrage Sustainable Transport Corridor

Stage 1 Consultation Report

February 2019

We | Listen Create Deliver

CAPITA

Project No: CS/096888 Doc Ref: cs/096888 Rev: P02

Client: Vale of Glamorgan Council
Issue Date: February 2019

Penarth Cardiff Barrage Sustainable Transport Corridor: Stage 1 Consultation Report

	Name	Signature	Date
Author	Luke Tizzard		11/02/2019
Checker	Martin Dolan		11/02/2019
Approver	Dave James		11/02/2019

Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:
P01	11/02/19	Issued to Client	L.Tizzard	D.James
P02	22/02/19	Minor amendments	L.Tizzard	D.James

CAPITA

GENERAL DISCLAIMER:

This report has been prepared by Capita Property and Infrastructure Limited (Capita) in favour of Vale of Glamorgan Council ("the Client") and is for the sole use and benefit of the Client in accordance with the agreement between the Client and Capita dated 8th November 2018 under which Capita's services were performed. Capita accepts no liability to any other party in respect of the contents of this report. This report is confidential and may not be disclosed by the Client or relied on by any other party without the express prior written consent of Capita.

Whilst care has been taken in the construction of this report, the conclusions and recommendations which it contains are based upon information provided by third parties ("Third Party Information"). Capita has for the purposes of this report relied upon and assumed that the Third Party Information is accurate and complete and has not independently verified such information for the purposes of this report. Capita makes no representation, warranty or undertaking (express or implied) in the context of the Third Party Information and no responsibility is taken or accepted by Capita for the adequacy, completeness or accuracy of the report in the context of the Third Party Information on which it is based.

FREEDOM OF INFORMATION:

Capita understands and acknowledges the Authority's legal obligations and responsibilities under the Freedom of Information Act 2000 (the "Act") and fully appreciates that the Authority may be required under the terms of the Act to disclose any information which it holds. Capita maintains that the report contains commercially sensitive information that could be prejudicial to the commercial interests of the parties. On this basis Capita believes that the report should attract exemption from disclosure, at least in the first instance, under Sections 41 and/or 43 of the Act. Capita accepts that the damage which it would suffer in the event of disclosure of certain of the confidential information would, to some extent, reduce with the passage of time and therefore proposes that any disclosure (pursuant to the Act) of the confidential information contained in the report should be restricted until after the expiry of 24 months from the date of the report.

Front Cover Photograph Acknowledgements

Active Travel Image – Source: Vale of Glamorgan https://www.valeofglamorgan.gov.uk/en/our_council/consultation/previous-consultations/Active-Travel.aspx

Cardiff Barrage Image – Source: Cardiff Bay https://www.cardiffbay.co.uk/listings/the-barrage-car-park/

Penarth Image – Source: Steve McKay

Stakeholder Workshop Image – Source: Capita

Penarth Headland Link Image – Source: Penarth News https://penarthnews.wordpress.com/2017/02/19/pro-bike-body-sustrans-pedals-into-the-penarth-headland-link-project/

Contents

Appendices

Glossary of Terms

GPG	Gwyrddio Penarth Greening
GVA	Gross Value Added
MPH	Miles per Hour
SUDs	Sustainable Urban Drainage Systems
WBOFGA	Well-Being of Future Generations Act
WelTAG	Welsh Transport Appraisal Guidance

1. Introduction

1.1 Context

Capita Real Estate and Infrastructure has been commissioned to undertake a Stage One: Strategic Outline Case to develop and appraise potential options for improving sustainable transport within and between Penarth and Cardiff barrage. The study area can be seen in Figure 1.1.

Figure 1.1 Study Area Map

(Shown on next page)

Two events relating to the Stage One: Strategic Outline Case were held at the Paget Rooms, Penarth Town Centre in January 2019, details as follows:

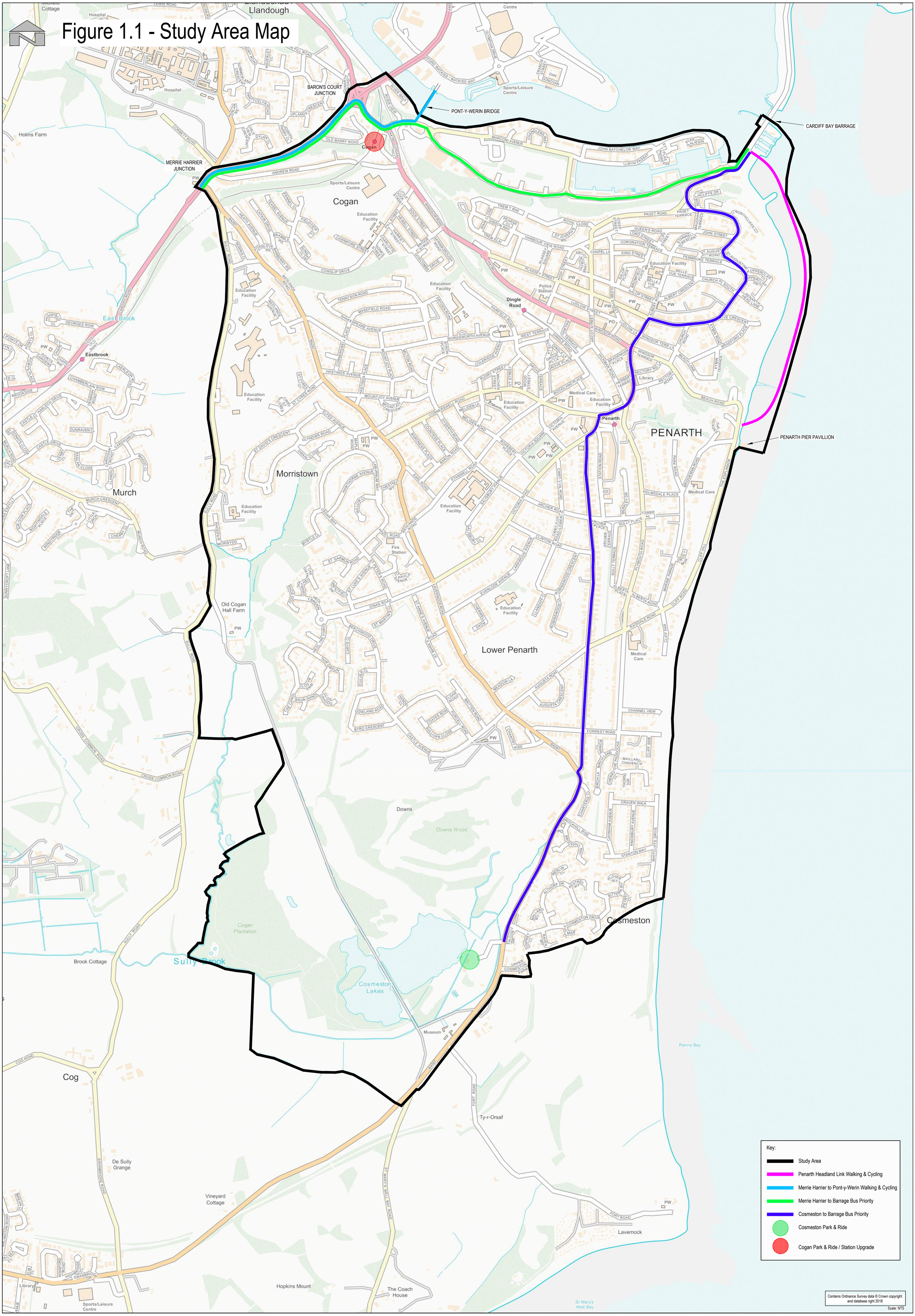
- **17th January 2019, 10:00 – 12:30: Stakeholder Workshop**
- **24th January 2019, 13:00 – 19:00: Public Consultation Event**

Across the two events representatives from the Vale of Glamorgan Council and Capita Real Estate and Infrastructure were on hand to deliver tasks that aimed to gather comments, views and suggestions on matters relating to transport issues within the study area.

Parties were invited to the Stakeholder Workshop via Arcadis Consulting UK Ltd on behalf of Vale of Glamorgan Council who contacted stakeholders directly by email with an invitation.

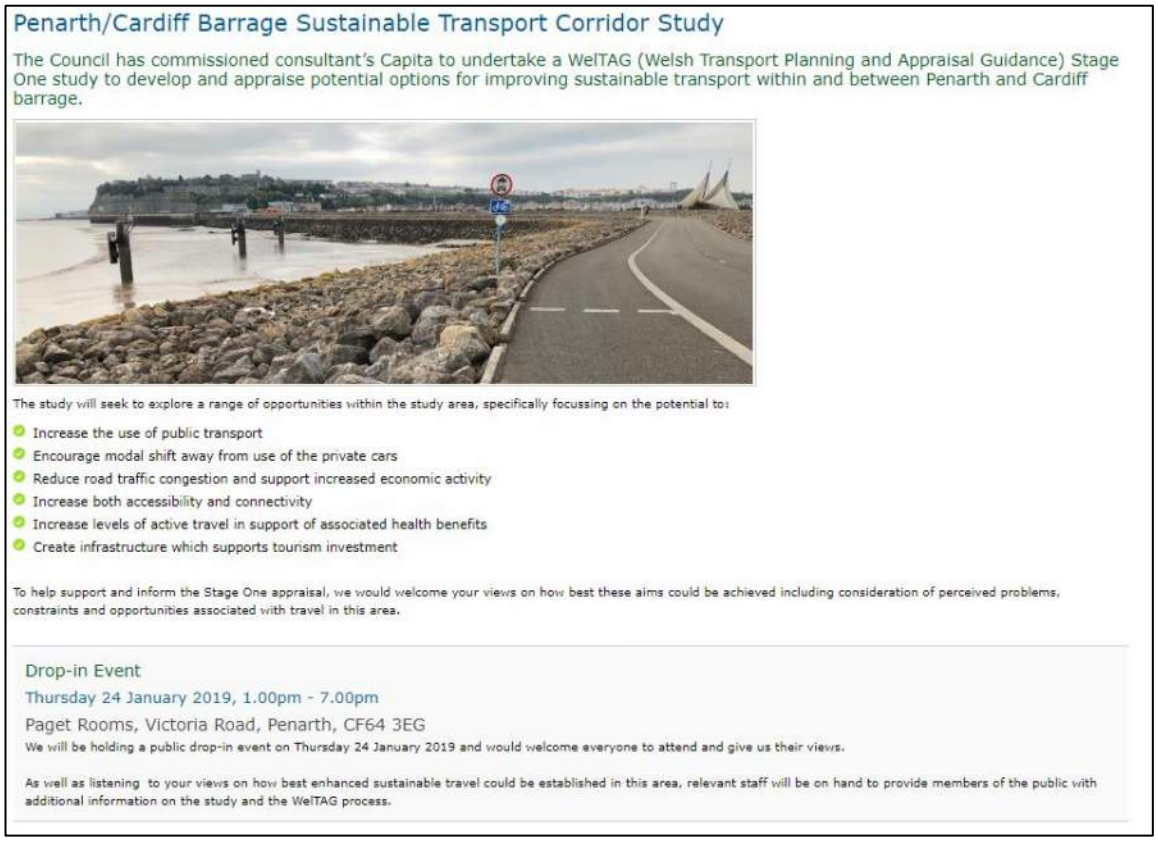
The Public Consultation Event was advertised on the Vale of Glamorgan Council's website, as the screenshot in Figure 1.2 shows.

Figure 1.1 - Study Area Map



Scale: NTS

Figure 1.2 Advert for the Public Consultation Event



An advertisement about the public consultation event was shown in the Penarth Times. Online news platform Penarth Daily News also previewed the event.

This document aims to act as a record, and summary, of the comments received at both events. Capita has not edited or amended any of the comments received in either the Stakeholder Workshop or the Public Consultation Event.

2. Stakeholder Workshop

2.1 Attendees

On 17th January 2019, a Stakeholder Workshop event was held at the Paget Rooms, Victoria Road, Penarth. Attendees included representatives from both local, regional and national government, transport operators, campaign groups as well as the local harbour authority, health team and utility company.

A full list of organisations represented at the workshop can be seen in Table 2.1. The workshop was also attended and managed by representatives of Capita Real Estate and Infrastructure and Arcadis Consulting UK Ltd on behalf of Vale of Glamorgan Council.

Table 2.1 Full list of attendees to Stakeholder Workshop

Organisation
Associated British Ports
Welsh Government
Vale of Glamorgan Council
GPG Management Committee
Cardiff Capital Region City Deal
Vale of Glamorgan Council
Cardiff Harbour Authority
Cardiff Bus
Cardiff Council
Councillor (Plymouth Ward, Penarth)
Vale of Glamorgan Council
Sully Town Council
Vale of Glamorgan Council
Penarth Town Council
Cardiff Harbour Authority
Councillor (St Augustine's Ward, Penarth)
Cardiff Bus
Vale of Glamorgan Council
Welsh Water
Councillor (St Augustine's Ward, Penarth)
Sustrans
Cardiff and Vale Local Health Team
South Wales Police
GPG Management Committee
Welsh Government
Councillor (Stanwell Ward, Penarth)

Attendees were given a short presentation which included a background to previous schemes discussed within the area, an introduction to the Welsh Government WelTAG process and an outline of tasks that were aimed to be completed as part of the workshop.

Attendees were split into five groups (Photographs 1 and 2) in order to complete the following workshop tasks.

Photographs 1 and 2: Stakeholder Workshop groups


2.2 Task Outline

2.2.1 Task One

Attendees were asked to discuss the opportunities that the study area presented with regards to sustainable and active travel interventions. Attendees were provided with a list of pre-identified opportunities on which they were encouraged to discuss, comment and critique.

Table 2.2 shows the pre-identified opportunities and the attendees' comments on them.

Table 2.2 Pre-identified opportunities and associated comments.

Identified Opportunity	Comments
Well-placed interventions may convert private vehicle trips into active and sustainable modes, thus reducing traffic congestion on existing routes	• Should replace 'well placed interventions' with 'opportunities.'; • Overarching; • Aspirational; and • Would love to get across Barrage in car on peak. If job requires travel often need personal travel options such as a car (e.g. 7am – 9am and 4pm – 6pm).
Buses between Cardiff and Penarth to run via the Barrage, which would significantly improve access to Cardiff/Cardiff Bay from Penarth and Penarth Marina	• Barrage for other uses? Will pedestrians use it in the peak hours? • Will running buses impinge on space for other pedestrians/cyclists? detracting from a safe environment for active travel; and • Suggestion that this should be electric buses only.
Opportunity to improve lighting provision across active travel routes as part of intervention	• Have to have lights to access Active Travel funding.
Opportunity to include proposals as part of wider Capital Region Metro project	• Funding opportunities? • Links from Metro/future phases/City Deal/Linking with existing routes/Active.
Improvements to existing/development of new active travel routes and sustainable transport infrastructure could improve disabled accessibility to/from/within the study area.	• Interventions could enable exclusive design; • Agreed, parents with buggies would benefit; • Need to build with desire lines, not just what looks good on a map; and • Electric buses/greener hub.

Identified Opportunity	Comments	
To provide economic benefits to Penarth and Cardiff	• Aspirational and long term.	
To provide economic benefits to the NHS via uptake of active travel modes, and thus reduce healthcare costs	• Aspirational and long term.	
Headland Link would create an easy, flat, walking and cycling link between Cardiff Bay and Penarth via Barrage	• Query as to how this would be quantified.	These are one aspect
Headland Link would create an exciting yet easy start/end to the Vale of Glamorgan section of the Wales Coast Path	• Query as to how this would be quantified.	
Headland Link has potential to increase levels of walking and cycling within/to/from Penarth, via providing commuters with a shorter and safe route to employers in the Bay	• Query as to how this would be quantified.	
Headland Link connection may bring Penarth Pier into the leisure offer of Cardiff Bay	• Query as to how this would be quantified.	

Attendees were also encouraged to add any further opportunities that they believe should be included as part of the study. A summary of suggestions are included within Table 2.3. A full list of suggestions for task one is included within Appendix A of this report.

Table 2.3 Summary of additional opportunities suggested by attendees.

• Expansion of walking buses project to more schools within study area. • To use right materials in interventions to reflect coastal location(s). • Expansion of NextBike/cycle hire scheme to Penarth. • Self-driving electric pods. • Monorail. • Reduce car usage and create modal shift to Active Travel. • Development opportunity left of the Custom House (Cardiff end of Headland Link). • Improve Active Travel links between Penarth and Cardiff Bay. • Improve Active Travel in Penarth. • Improve Public Transport provision into and out of Penarth. • Improve overall Health and Wellbeing of residents. • Include proposals as part of wider plan to increase rail provision in Study Area. • Reduction in vehicle ownership to create more space (freed up by parking). • Introduce shared spaces. • Link Cardiff and Vale tourism strategies. • Align with industrial strategy. • Maximise accessibility on-foot and cycle between Cogan and Penarth. • Improve priority for pedestrians and cycles at Cogan station using TfW improvements. • Expansion of 20mph limit zones. • Extend public transport links south of Penarth towards Sully/Barry. • Utilise advancements in technology to use electric buses across the Barrage. • Include SUDs legislation as part of designs. • Encourage high levels of footfall currently using Barrage to visit Penarth. • Prioritise bus movements into and out of Penarth. • Create a unified payment system for bus and rail; and • Increase of parking at Penarth outer Harbour (Park and Ride with Headland Project).

2.2.2 Task Two

After the identification of opportunities within the area, task two required attendees to review and comment on pre-identified problems and constraints in the study area. The results of this task are shown in Table 2.4.

Table 2.4 Pre-identified problems and associated comments.

Pre-identified Problem	Comment
Traffic congestion between Penarth and Cardiff (via Cogan)	*No comments made*
Lack of attractive Active Travel Routes between Penarth Esplanade and Cardiff	• Suggestion to also include 'Town Centre'
Currently challenging walking terrain (around Headland) between Cardiff Barrage and Penarth Promenade	*No comments made*
Unsuitable route between Penarth Esplanade and Cardiff Barrage (around Headland) for those with wheelchairs/pushchairs	*No comments made*
Missing commuter link between study area and Cardiff Bay.	• Replace 'missing' with 'poor' • Include bus journey problem as part of this identified problem; and • Needs clarity on transport mode
Current lack of destination at the end of Cardiff Barrage (Penarth end)	*No comments made*
Unreliable and slow bus journeys between Penarth and Cardiff (often requiring a change to travel to Cardiff Bay)	• Include this identified problem as part of 'Missing commuter link between study area and Cardiff Bay'
Lack of car parking at Penarth Esplanade	• Should be in brackets, may not be a problem if replaced by other modes
Lack of lighting along existing active travel routes	*No comments made*

The second part of this task required attendees to write any problems they felt should be added to the list of pre-identified problems and constraints. A list of responses can be found in Table 2.5.

Table 2.5 Additional problems suggested by attendees.

- Fear/protection of health and safety preventing people from leaving their car at home.
- Employer provisions for showers/storage/safe bike storage.
- Not enough shelter on Barrage.
- No current opportunities to hire bikes.
- Only so much space – potential conflicts between motorised vehicles and pedestrians.
- Opertaional barrage – water traffic given priority?
- LDP shows Park and Ride at wrong end of Penarth – benefit for outside of study area.
- Windsor Road/Plassey Street Congestion.
- Narrow Roads.
- Too many short distance trips undertaken by car users.
- Key destinations not accessible by sustainable transport modes.
- Low demand for communiting to Cardiff Bay via bus – bus across the Barrage may lack demand (need to check census data).
- Barriers to walking and cycling across Penarth due to volume of traffic on Windsor Road and Hickman Road.
- Speed of traffic from Cogan and Penarth along Windsor Road.
- No cycle infrastructure provision from Barrage to bottom of Zig-Zag path.
- Improve pedestrian and cycling access and priority to Cogan and Penarth stations.
- Sustainable transport (e.g. regular EV bus shuttle from centre to Cogan (Health/Leisure bus) and free shuttle bus).
- Air quality issues in Cogan.
- Gradient up to Penarth from Barrage.
- Decrease private motor traffic along Windsor Road/Penarth town centre – replace with walking/cycling/shuttle bus.
- Bad weather conditions (storms/high tides) – Headland Link.

- Debris washed up and cliff falls – Headland Link.
- Fair weather cyclists may limit usage of barrage to summer only.
- Topography of Penarth Esplanade.
- Parking costs at the Barrage; and
- Readily avaliable bicycle hire.

Attendees were also asked to discuss, comment and critique a number of pre-identified constraints that they felt are experienced within the study area, these are represented in Table 2.6.

Table 2.6 Pre-identified constraints and associated comments.

Pre-Identified Constraint	Comment
Tide dependent walking route around Headland	*No comments made*
Risk of rockfall (around Headland)	*No comments made*
Unsuitable route for those with wheelchairs/pushchairs (around Headland)	*No comments made*
Topography of study area restricting likelihood of active travel uptake (particularly between Penarth Esplanade and Cardiff Bay Barrage)	*No comments made*
Lack of sustainable transport alternatives	• Suggestion that the sustainable transport alternatives were unattractive rather than lacking.
Buses are reliant on road network and often do not have priority	*No comments made*
Potential for buses to cross Barrage may require crossing of third-party land	*No comments made*
Buses running across Barrage may detract from existing safe cycling and walking environment	*No comments made*
Interventions to increase vehicle parking at Penarth Esplanade may encourage private vehicle usage	*No comments made*
Third party apparatus and access requirements may affect potential routings of interventions	*No comments made*
Increases in provision of lighting may conflict with ecological concerns and shipping movements	*No comments made*
Construction of any large-scale interventions may impact upon residents of study area (during and post construction)	*No comments made*
Section of study area is included as part of the Severn Estuary European Marine Site	*No comments made*

Attendees were then asked to include any constraints they felt should be added to the list. These responses can be found in Table 2.7

Table 2.7 Additional constraints suggested by attendees.

- Uncontrollable weather/coastal erosion.
- Weathering of anything.
- Climate change.
- "Need to think differently".
- Crossing on the other side of the Barrage limited with routing options.
- Public transport timings influenced by boat movements into Barrage.
- Insufficient space in places for bus as well as cycle/walking.
- Autonomous pods/electric bikes/cargo bikes.
- Existing services and infrastructure – constraints if these are affected in practical and financial terms.
- Conflict between boat/bridge uses at Barrage and Pont-y-Werin.
- Bike lock up at place of work/destination.
- Shower facilities at place at place of employment.
- Park and Ride (in Sully or Cosmeston); and
- Interchangeable travel tickets to also cover bike usage.

2.2.3 Task Three

For the third task, participants were asked to discuss, comment and critique on a number of suggested scheme specific objectives. The suggested objectives and the comments concerning them are shown in Table 2.8.

Table 2.8 Suggested scheme specific objectives and their associated comments.

Suggested Scheme Specific Objective	Comment
Increase the usage of public transport	• This should be an outcome; • Improve bus priority.
Encourage modal shift away from the private car	• Particularly for short journeys to improve health and wellbeing • This should be prioritised
Reduce road traffic congestion and support increased economic activity	• This should be an outcome • This should be prioritised • Increased economic activity should be supported with better paid jobs (GVA)
Increase both accessibility and connectivity	• This is an outcome • These need to be separated between accessibility and connectivity
Increase levels of active travel in support of associated health benefits	• This is an outcome • Via expansion of the Next Bike? • Should replace 'increase levels' with 'Reduce barriers to uptake'
Create infrastructure which supports tourism investment	• Should support all investment, not just tourism • Should include that this investment should be sustainable

Attendees were also asked to also include any scheme specific objectives that they felt needed to be included. Their suggestions are presented in Table 2.9.

Table 2.9 Additional scheme specific objectives identified by attendees.

- Use inclusive design to increase tourism.
- Brexit-proof.
- Shorter journey opportunities for school journeys.
- Future proof use of latest technology (including renewable).
- Cleaner and greener.
- Ministerial priorities.
- Need to have long term vision.
- Improve infrastructure for sustainable modes of transport.
- Improve sustainable connectivity between Penarth and Cardiff Bay/Centre of Cardiff and vice-versa.
- Enhance Penarth and other areas of the Vale's economy by increasing visitor numbers.
- Improve access to employment.
- Electric vehicles (later query as to whether this will have any impact upon congestion).
- Wider fit to strategic agendas.
- Study area map needs to be widened to be more strategic.
- 'Carrots and Sticks' improve infrastructure and introduce car parking charges.
- Link to industrial strategy objectives – cleaner, greener, ageing population, mobility, artificial intelligence/data.
- Improve air quality especially around Cogan.
- Shuttle links – Penarth to Cogan (especially for the new Health Centre).
- Maximise SUDs features in accordance with recent legislation, which can encourage green infrastructure and therefore improve public health.
- Satifaction with walking/cycling facilities.
- Integrated ticketing – trains/buses/Next Bike.
- Miles of segregated cycle paths.
- Footfall and cycles on Barrage.
- Extending the NextBike.
- Oyster card across all travel options across Cardiff and the Vale.
- Opportunity to increase Park and Ride adjacent to Barrage car park and Sully and Cosmeston.
- Shuttle bus across the Barrage (should be electric).
- Water taxis (ideally electric).
- Better connections between trains and buses.
- More bus lanes (though appreciative of cost and constraints associated with this); and
- Section 106 funding – can this be used?

2.2.4 Task Four

Attendees were asked to develop a long list of solutions that aim to address the problems and constraints identified in Task Two. Firstly, attendees were asked to comment on existing potential identified solutions identifying the constraints/risks to each solution as well as stating the problems each solution addressed. They were also required to score each solution against the Five Ways of Working of the Well Being of Future Generations Act (Wales) (WBoFGA). Table 2.10 below shows results of Task Four.

Table 2.10 Existing potential identified solutions, comments and appraisal against WBoFGA.

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBoFGA?
Penarth Headland Link Walking and Cycling	• Weather • Maintenance of walkways	• Extension of Coastal Path • Continuation of Barrage route, with over 1 million barrage footfall potential to continue around to Penarth Esplanade	*No comments made*
Merrie Harrier to Pont-y-Werin Walking and Cycling	• Traffic crossings/busy roads/land availability • Pont-y-Werin bridge delay	• Lack of Active Travel links	*No comments made*
Cosmeston – Barrage Bus Priority	*No comments made*	• Improves attractiveness of using bus services	*No comments made*
Cosmeston Park and Ride	• Land availability/water with other transport/parking issues and resilience.	*No comments made*	*No comments made*
Cogan Park and Ride/Station Upgrade	*No comments made*	*No comments made*	*No comments made*
Vale Wide Parking Strategy	*No comments made*	*No comments made*	*No comments made*

Secondly, attendees were asked to identify other potential solutions and again state the constraints/risks these addressed and the problems each solution addressed. Then, as before, attendees were required to score each of their own solutions against the Five Ways of Working of the WBoFGA (Wales). These solutions are shown in Table 2.11 below.

Table 2.11 Additional potential solutions identified by attendees.

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
Creation of Multi-storey Parking on land adjacent to Cogan station	• Land earmarked for sheltered housing	• Parking/vehicle storage and lack of use at Cogan Station	• *Long Term* • *Integration*
Wellbeing hub and access to Cogan station. Improved through Active Travel Act inclusive design guidance.	• Design/Architecture would need to be in keeping with landscape.	• Lack of residential links to Cogan Station.	• *Collaboration* • *Involvement*

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
New car park on south west end of Barrage	• Design/Architecture would need to be in keeping with landscape.	• Lack of vehicle storage at barrage discourages non-car use.	• *Long Term* • *Integration*
Park and ride stops from Cosmeston	• Road width negates bus priority lane. Where are key travel points?	• High use of personal cars.	• *Prevention* • *Integration* • *Collaboration*
One-way systems. Employer incentives. Pool bikes/Next bikes	• Effective use of road space. • Commuters encouraged to make use of scheme (financial benefits).	• Perceptions of danger if using roads for walking/cycling.	• *Long Term* • *Integration* • *Collaboration* • *Involvement*
Company bikes/E-bikes for annual rent	• Short journeys/deliveries need early identification and opportunities need promotion.	• High use of car for short trips. • Reduction of short delivery journeys.	• *Prevention* • *Long Term* • *Integration* • *Collaboration* • *Involvement*
Speed limit at 20mph	• Spatial design. • Reduction of signage. Increase of road-based public spaces. • Public owned spaces	• Quality of air. • Quality of public spaces. • Perception of safety.	• *Prevention* • *Long Term* • *Integration* • *Collaboration* • *Involvement*
Bike Scheme	*No comments made*	• Give people the opportunities to use Active Travel easily.	• *Prevention* • *Collaboration*
Implement Active Travel links from the INM	*No comments made*	*No comments made*	*No comments made*
Improve bus shelters – RTI accessibility	*No comments made*	• More inclusive for passengers.	*No comments made*
Alternative solutions to short journeys	*No comments made*	*No comments made*	*No comments made*
Program to encourage Active Travel	*No comments made*	*No comments made*	*No comments made*
Demand responsive (e.g. Uber) & green expansion links.	*No comments made*	*No comments made*	• *Prevention* • *Integration* • *Collaboration* • *Involvement*
Light rail to Penarth and Cosmeston	• Financial	• Encourage people from cars onto train	• *Prevention* • *Long Term* • *Collaboration* • *Involvement*
Dedicated bus service to Llandough hospital	• Lack of usage	• Encourage employees/visitors out of cars and onto bus.	• *Prevention* • *Long Term* • *Collaboration* • *Involvement*

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
Regular circular bus from Dinas Powys to Penarth and Bay (every 15 – 20 mins)	• Usage (would need promotion).	• Inclusivity	• *Prevention* • *Long Term* • *Collaboration* • *Involvement*
More direct bus services to Cardiff city centre and Heath Hospital	*No comments made*	*No comments made*	• *Prevention* • *Long Term* • *Integration* • *Involvement*
Walking buses to schools in Penarth	*No comments made*	*No comments made*	• *Prevention* • *Long Term* • *Integration* • *Collaboration* • *Involvement*
Increase evening and weekend public transport services (particularly Sundays).	*No comments made*	*No comments made*	• *Prevention* • *Integration* • *Collaboration* • *Involvement*
Reduce congestion and traffic speed into town centre to increase walking and cycling (shared spaces).	*No comments made*	*No comments made*	• *Prevention* • *Integration* • *Collaboration* • *Involvement*
Improve cycle routes from Penarth residential areas to Barrage to encourage novice cyclists.	*No comments made*	*No comments made*	• *Prevention* • *Collaboration* • *Involvement*
Real time public transport information	*No comments made*	*No comments made*	*No comments made*
Integrated ticketing and introduction	*No comments made*	*No comments made*	*No comments made*
Car parking charges	*No comments made*	*No comments made*	*No comments made*
Congestion charge zone	*No comments made*	*No comments made*	*No comments made*
Kill the commute	*No comments made*	*No comments made*	*No comments made*
Tunnel between Cogan and Sports Centre	*No comments made*	*No comments made*	*No comments made*
Next bike scheme	*No comments made*	*No comments made*	*No comments made*
Infrastructure elements	*No comments made*	*No comments made*	*No comments made*
Bus route – widen Windsor Road	• Single lane traffic	• Reduce number of private vehicle use	• *Long Term*
Extended car park at Penarth Barrage	• Cost of infrastructure. • Availability of the Barrage (able to cross).	*No comments made*	*No comments made*
Park and Ride scheme.	• Initial investment cost (roughly £6m).	*No comments made*	• *Prevention* • *Long Term*

Potential Identified Solution	Comments (identify constraints/risks)	What problems does this address?	How does the solution consider the Five Ways of working of the WBOFGA?
Integrated ticket for water bus/land bus/bike hire			• *Integration* • *Collaboration*
Increased tourism into Penarth Marina and Esplanade	• Opening hours. • Cost to small/private businesses.	• Increased tourism and improved local economy. • Increased job opportunities. • Reduced lengthy travel, i.e. not having to travel to Cardiff Bay	• *Long Term* • *Integration* • *Collaboration* • *Involvement*

3. Public Consultation Event

3.1 Background

A public consultation event was held on the 24th January between the hours of 13:00 and 19:00 in the Paget Rooms, Victoria Road, Penarth. Between these hours a total of 116 people attended the consultation. Table 3.1 presents a breakdown of attendees recorded by hour.

Table 3.1 Number of attendees to the Public Consultation Event

Time	Attendees
13:00 – 14:00	17
14:00 – 15:00	12
15:00 – 16:00	30
16:00 – 17:00	8
17:00 – 18:00	19
18:00 – 19:00	30
Total (13:00 – 19:00)	**116**

Attendees were encouraged to attend the following four workstations (Photographs 3 and 4). These are listed in Table 3.2.

Table 3.2 Format of the Public Consultation Event

Workstation	Activity
1	Penarth INM Maps (for reference)
2	Identification of Problems and Proposals ideas of Solutions (Flipcharts)
3	Comments on proposals and identification of alternatives/constraints (Study Area Maps)
4	Identification of whether the scheme proposals comply with the goals of the Well-Being of Future Generations Act (Wales)

Photographs 3 and 4: Public Consultation workstations.

3.2 Problems Identified

A number of problems in relation to uptake of sustainable and active modes, as well as other traffic issues within and surrounding the study area were captured by attendees of the consultation.

Problems identified were captured into common themes and are presented as follows in Table 3.3. A full list of comments can be found in Appendix B.

Table 3.3 Problems identified at the Public Consultation Event

Problems Identified at Public Consultation Event
Safety • Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station) • Lack of safe cycle routes (Penarth Road, Windsor Road, safe cycling route) • Arcot Street/Windsor Road junction dangerous for cyclists • Pavements in Penarth are dangerous for users, in particular, disabled users. • Hill from Custom House to Penarth – pavement is not suitable for pedestrians, is dangerous for cyclists. Need to address the number of cars and their speed.
Public Transport • Poor bus accessibility and provision. • Problems with train service: unreliable, expensive, capacity needs increasing • Park & Ride – “old fashioned” • Need to get people out of cars and using public transport / active travel. (Modal Shift) • Lack of reliable water boat service throughout the year.
Traffic/Congestion • Plassey Street/Windsor Road junction – building a bigger roundabout won’t help traffic and pedestrians. Putting in pedestrian traffic lights will help people cross the road. • Grid-locked roads at the Marina - used as a “rat-run”. • On street parking in the immediate vicinity of Penarth Station leads to single lane traffic. • We need to reduce vehicles. Traffic everywhere (pollution).
Active Travel • Barrage should be traffic free – against buses along the barrage • Need to get people out of cars and using public transport / active travel. (Modal Shift) • We need to reduce vehicles. Traffic everywhere (pollution).
Other • Long journeys – look at whether people actually need to travel • Sully should be included in study area and transport plans.

Additionally, attendees annotated the printed study area maps at to highlight with any problems that concerned a specific location within the study area. This feedback is shown in Appendix C.

3.3 Suggested Solutions

A number of solutions to tackle the problems identified were also made by attendees of the Public Consultation Event. These are presented below (Table 3.4) along with a list of identified problems that they may help to address. Initial constraints and considerations for each of the proposals are also included in preparation for the WelTAG Stage 1 appraisal of options.

Table 3.4 Proposed solutions identified during the Public Consultation Event

Proposed Solution	Problems that may be addressed	Constraints/Considerations
Re-opening of tunnel below A4160 Windsor Road to Cogan Station	• Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station)	Would require investigation into suitability of tunnel for reopening (e.g. structural)
Replacement of Cogan roundabout with traffic signalled junction (with associated active travel crossings)	• Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station) • Rat-running via Marina • Modal shift to public transport / active travel. •	May require timings to be phased with Baron's Court Junction.
Left hand filter lane toward Penarth at Cogan	• Reduce traffic congestion.	Re-design of current road layout.
Improve bus services and pedestrian links towards Cogan	• Need to get people out of cars and using public transport / active travel. (Modal Shift) • Poor bus accessibility and provision. • Pavements in Penarth are dangerous for users, in particular, disabled users	Cost of additional buses. Allocation of space for buses and pedestrians.
Traffic lights needed at A1460 Cogan Hill to stop the marina being used as a rat-run.	• Grid-locked roads at the Marina - used as a "rat-run". • Lack of safe pedestrian crossing facilities at Cogan (Windsor Road/A4160 adjacent to Railway Station)	Could slow traffic down. Cost of installation of traffic lights.
Penarth Headland Link	• Lack of safe cycle routes. • Gridlocked roads at the Marina. • Hill from Custom House to Penarth. • Modal shift to public transport / active travel.	Subject to weather/storms and rockfall. High spring tide.
Next bikes brought to Penarth/ Vale of Glamorgan.	• Lack of safe cycle routes. • Barrage should be traffic free. • Reduce vehicles.	Would require investment in additional bikes and bike stations across Penarth.
Train services in the evening	• Problems with train service – capacity needs increasing	Cost of running and staffing additional trains.
Make Penarth Marina area 20mph speed limit.	• Rat-running via Marina • Hill from Custom House to Penarth • Lack of safe cycle routes. •	Slowing traffic down could lead to increased congestion.
Restricting parking to one side of each road	• On street parking in the immediate vicinity of Penarth Station leads to single lane traffic. • Lack of safe cycle routes.	Involves re-design of road layouts – moving white lines and parking bays.
Cable Car near Headland Link	• Rat-running at the Marina	Construction and cost of infrastructure required.

Proposed Solution	Problems that may be addressed	Constraints/Considerations
Pedestrian link between Tennyson Road and Cowslip Drive	• Pavements in Penarth are dangerous for users, in particular, disabled users. • Lack of safe cycle routes.	Construction of pathway between two locations. Current land ownership.
Pedestrian link between Fairfield Road and Gainsborough Road	• Pavements in Penarth are dangerous for users, in particular, disabled users. • Lack of safe cycle routes.	Construction of pathway between two locations. Current land ownership.
Sustainable transport route along the Esplanade and Cliff Road/Hill.	• Modal shift from cars to public transport / active travel.	Facilities for the route – bus stops, cycle bays/stations.
Continue Railway Walk for walking/cycling.	• Pavements in Penarth are dangerous for users, in particular, disabled users. • Lack of safe cycle routes. • Sully should be included. • Modal shift to public transport / active travel.	Maintenance/repair work for used/derelict parts of the Railway Walk.
Powered cycle lifts up the hill	• Need to get people out of cars and using public transport / active travel. (Modal Shift) • Lack of safe cycle routes (Penarth Road, Windsor Road, safe cycling route)	Installation costs. Maintenance – subject of weather.
More bus stops downhill on Pill Street	• Poor bus accessibility and provision. • Need to get people out of cars and using public transport / active travel. (Modal Shift)	Parked cars along Pill Street could limit opportunity for additional bus stops.
Light railway	• Need to get people out of cars and using public transport / active travel. (Modal Shift) • Problems with train service: unreliable, expensive, capacity needs increasing	Potential opposition to new rail tracks being built. Cost of construction.

Appendix D shows the solutions that were annotated onto the study area maps as they concern a specific location within the study area.

Additionally, attendees also commented on printed maps of the study area at workstation 3 to highlight solutions to tackle the problems identified. These are displayed in Appendix D.

Appendix A

Full List of Responses to Task One

Opportunities added by Stakeholders
• Other schools to be included as part of the Walking Buses project and cycling hubs
• Opportunity to use the right materials in interventions to reflect coastal location(s)
• Expansion of Next Bike scheme to Penarth
• Self-driving electric pods
• Monorail (Expensive, but sponsorship opportunities may exist)
• Shift away from cars to more active travel
• Development opportunity building next to Custom House (to the left) for car park
• Opportunity for multi-storey on current Barrage Car Park
• Improve Active Travel links between Penarth and Cardiff Bay
• Improve Active Travel in Penarth
• Improve Public Transport Provision in and out of Penarth
• Improve overall health and wellbeing of residents
• Include proposals as part of wider plan to increase rail provision within and south of study area
• Reduce vehicle ownership to create more space (freed up by parking)
• Expand bicycle hire to Penarth (including electric bicycle hire)
• Reduce congestion and traffic speed in Penarth Town Centre via introduction of shared spaces
• Link Cardiff with Vale tourism strategies to enhance opportunities
• Need to align with industrial strategy and focus on the 4 priorities (Mobility/Artificial Intelligence/Growing ageing population/Greener and carbon agenda)
• Maximise accessibility by foot and cycle to from Cogan/Penarth. Improve priority for pedestrians and cyclists at Cogan Station using TfW improvements to stations/visions in Metro area
• 20mph expansion (20's plenty)
• Air quality impact and social cohesion
• Extend public transport links south of Penarth towards Sully/Barry
• Headland Link
• Shuttle (Electric) across Barrage
• SUDs legislation
• High footfall across Barrage – opportunity to get footfall into Penarth
• Potential for modal shift – reduced travel time
• Increased parking at Penarth outer Harbour (Park and Ride would work with Headland Project)
• Use of electric buses across Barrage – huge costs against diesel engines and tourism into Penarth
• 20 mph limit expansion
• Prioritise bus movements in and out of Penarth
• Unified payment system for bus and rail

Appendix B

Full List of Problems Identified at Public Consultation Event

Problems Identified at Public Consultation Event
Regional transport links – mass transport, cycle network
Poor bus accessibility
Traffic congestion at Windsor Road, Cogan and the Merrie Harrier. Also, Dinas Powys congestion and Redland Heights congestion.
Lack of easy access into Cardiff by pedestrians/cyclists from/to Penarth.
Need to increase visitors from Cardiff Bay to Penarth front to improve economy and improve access for pedestrians/cyclists.
Hill down to Custom House, pavement not suitable for pedestrians, dangerous for cyclists, need to address number of cars, and the speed.
Absolutely no buses over the barrage. We have to do everything we can to preserve the traffic/car free parks of the city. Too many cars.
Lack of connected safe cycle routes e.g. dangerous junction and cycling on Windsor Road.
Train is regular but unreliable. Should be cheaper.
Penarth Headland link missing.
Safe cycling route
Prioritise traffic reduction through more accessible public transport. No point having more buses/routes if no one can afford them.
Ensure Park & Ride has additional stops, and any infrastructure needed doesn't ruin Cosmeston as an attraction.
Problem with old railway route where bikes and pedestrians both use whole width and cyclists too often don't have bells!
Lack of safe cycle route along Penarth Road.
Lack of reliable water boat service throughout year. Hear, hear!
Footpaths – incompletely represented on main maps. Old railway line path should continue to Sully area WITHOUT returning to the road. No reference on maps to paths through Kymin to Bradford Place to the Pier. Important it be retained.
Proposed headland link – Esplanade – Cardiff Barrage should be constructed. Public transport to Barrage across to Cardiff needed.
Pavements in Penarth. Hazardous to the disabled – and all!
There are two elements to the train problem 1. The capacity of the trains needs to be increased. 2. Provision must be made to accommodate parking in the vicinity of the station
There are two major constructions to road traffic in Penarth 1. The Baron's Court Junction – ideally this needs to be a fly-over, although this would be difficult to achieve. 2. There are only two bridges carrying road traffic over the railway.
At present all the streets in the immediate vicinity of Penarth station are parked solid every working day, leaving single lane traffic to operate in many streets. Consideration should be given to: 1. Creating several one-way systems to channelize traffic or 2. Restricting parking to one side of each road only.
Headland Link is big waste of money – only brings visitors to seafront – better to spend money on cycling links from town and improved train services.
Bus Park and Ride to be sited in Barry, to relieve traffic coming through Penarth and Dinas Powys.
Strong 'no' to opening barrage to motorised traffic – critical to protect it as a quiet, leisure facility.
Barrage should be traffic free. More cycle routes in Penarth. Stop parking on existing cycle routes. E.g. Castle Avenue, Beechwood Drive
Headland link car park. (On site of previous car park)
Obstacles to Cycling or Walking Enormous potential will be created for community to Penarth/Barry from Cardiff, and from the Vale/Penarth to Cardiff, by creating a flat, pleasant route to the Barrage via Penarth Headland Link.

Problems Identified at Public Consultation Event
• Will be capable of coping with both on the Link and recreational use. • And will create a visitor/tourist loop Cardiff → Barrage → Link → Esplanade → Alexandra Park → Town → Cardiff → Barrage, of international quality. • Will fill the embarrassing gap in the Wales coast path so close to the Capital City. Makes transport sense but coast paths, like other long-distance paths, create income as well as benefitting local people.
Walking from Llandough Hospital to Penarth via M4 junction.
Penarth R/B trees and shrubs – more greenery/shrubs.
1. At traffic lights it is very helpful to have box for cyclists. I am now 60 years and have started cycling for my new job. To have a slightly higher step so I can push off would be very helpful at traffic lights. 2. To encourage cycling, need more secure places for bikes. I have a £1,000 bike so would be reluctant to leave in a place which was not monitored. 3. In planning, consider older generation cycling as not so flexible.
Better access to take cycles on trains. Often the platforms are very low, and I could not easily lift my heavy bike off. Also, there are few carriages so no room. Trains discourage cycle and ride.
Streets are clogged with private parked cars and rat-run traffic making cycling in Penarth unpleasant and scary.
Allowing private transport across the barrage is not the answer for congestion – need to get people out of cars and using public transport/cycling/walking i.e. “Active Travel”.
Need to improve bus routes
Bus routes can’t start/finish at barrage as this would lead to a Park and Ride system, causing problems for residents of the Marina, as parking on roads would increase significantly.
Buses no longer come to Penarth Heights.
Emergency vehicle access between Royal Close and Trem Y Bae is compromised by key operated bollards.
Cycling and walking around Penarth doesn’t feel safe because of illegal parking and priority given to vehicles.
Unsafe cycle routes – needs to be safe for children.
Not enough capacity on the trains.
Long journeys – look at whether people actually need to travel - agile working/co-working in the community – would boost local economy too.
Grid locked roads – Marina used as a rat-run.
Building a bigger roundabout at the Plassey Street/Windsor Road junction will not increase traffic flow and help pedestrians. (NB Railway bridge in a fixed space). Putting in pedestrian traffic lights will help people cross the road.
Need link between Cardiff Bay and Penarth Waterfront avoiding busy junctions, enabling walking, cycling and a short route for sustainable vehicles.
Motor vehicles are to me the largest problem. • We need to reduce vehicles. • More designated zone free walkways. • Reduce congestion. • Encourage people to cycle by putting in place cycleways. • Stop large vehicles using road that are obviously inappropriate. • Traffic everywhere (pollution). • Penarth some roads not fit for purpose.

Appendix C

Annotated Study Area Map with Additional Problems Identified at The Public Consultation Event

Appendix C - Problems Identified at Penarth Public Consultation Event

BARON'S COURT JUNCTION

PONT-Y-WERIN BRIDGE

CARDIFF BAY BARRAGE

MERRIE HARRIER JUNCTION

PENARTH PIER PAVILLION

6

5

3

2

9

8

1

11

4

10

7

Problems

1. Currently roads around Grove Place/Grove Terrace/Dingle Rd are narrow due to parked cars on either side and “rat-run” traffic.
2. Issue with roundabout, cyclists & drivers coming along the wrong side of roundabout (near barrage).
3. Pavements on hill is unsafe/too narrow for pedestrians. Something to address traffic on this road.
4. Lots of roads converge in one place (Windsor Rd/Cornerswell Rd junction). Can be tricky to cross multiple roads as a pedestrian and cars shoot out when on a bike.
5. Disagree with the plans to make this (Windsor Rd) one way, would still be too dangerous to cycle & it appears to be a traffic flow exercise rather than improving sustainable transport.
6. Really hard to cross the road from the marina to access Cogan train station.
7. Pinch point for cyclists when cars are waiting at the lights going into town. Hard to get past in a safe place ahead of traffic.
8. Arcot St/Windsor Rd difficult to get across as pedestrian and cyclist when going along Arcot St and crossing Windsor Rd, suggest a zebra crossing with cycle lane.
9. One-way road with cycle lane in other direction - hasn't been implemented well. There isn't enough space for vehicles and as a result, they drive in the cycle lane which makes it quite dangerous.
10. There is a lane that runs parallel to Cornerswell Rd, to the rear of the houses on the southern side. Lots of children go this way to school. It could be made safer by raising the road when it hits the cross roads could also introduce filtered permeability to make it safe.
11. Street outside Victoria School could be made safer. Could widen the pavement, add street trees etc. to slow down cars and give priority to pedestrians.

Key:

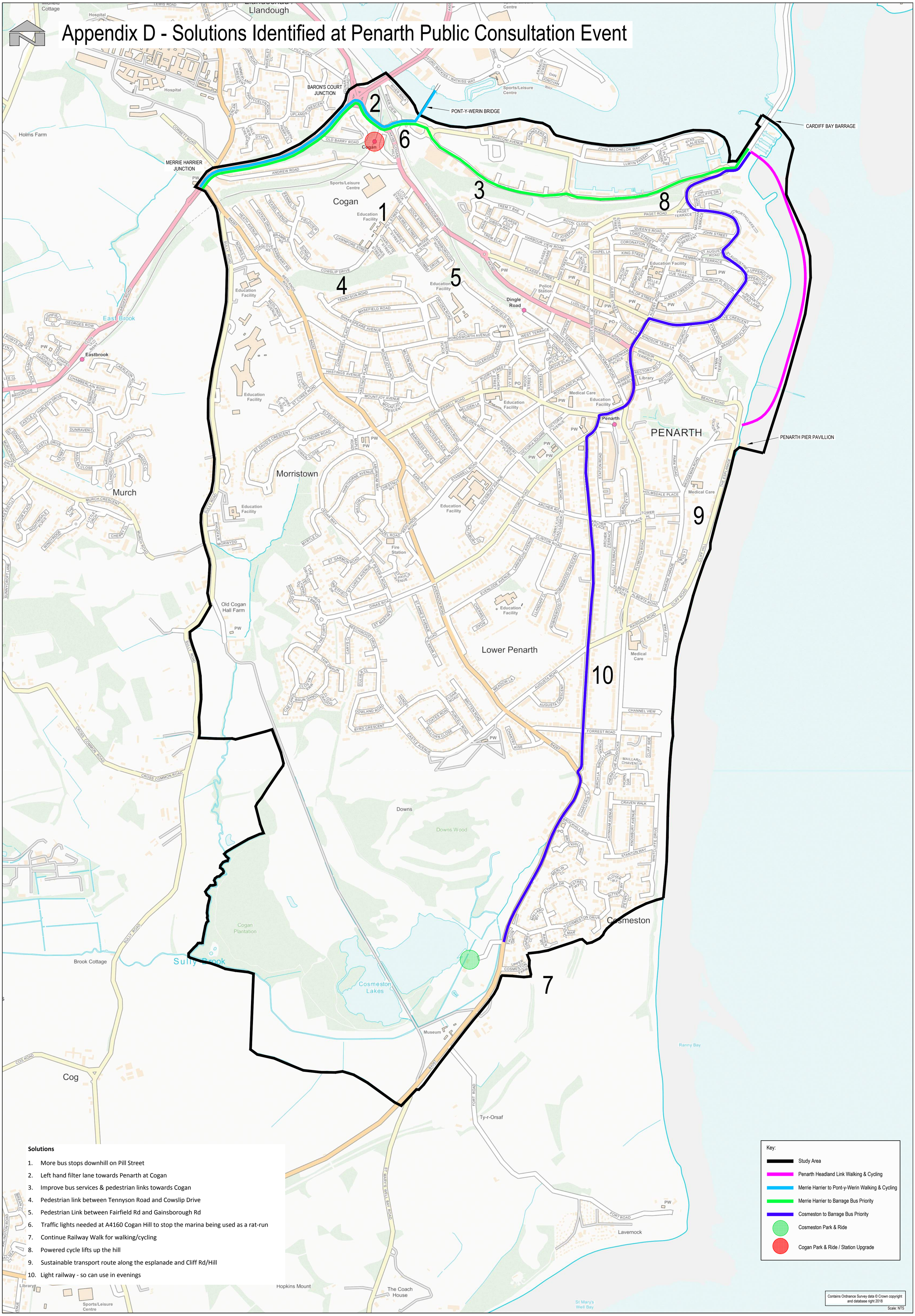
- Study Area
- Penarth Headland Link Walking & Cycling
- Merrie Harrier to Pont-y-Werin Walking & Cycling
- Merrie Harrier to Barrage Bus Priority
- Cosmeston to Barrage Bus Priority
- Cosmeston Park & Ride
- Cogan Park & Ride / Station Upgrade

Scale: NTS

Appendix D

Annotated Study Area Map with Additional Solutions Identified at The Public Consultation Event

Appendix D - Solutions Identified at Penarth Public Consultation Event



Solutions

1. More bus stops downhill on Pill Street
2. Left hand filter lane towards Penarth at Cogan
3. Improve bus services & pedestrian links towards Cogan
4. Pedestrian link between Tennyson Road and Cowslip Drive
5. Pedestrian Link between Fairfield Rd and Gainsborough Rd
6. Traffic lights needed at A4160 Cogan Hill to stop the marina being used as a rat-run
7. Continue Railway Walk for walking/cycling
8. Powered cycle lifts up the hill
9. Sustainable transport route along the esplanade and Cliff Rd/Hill
10. Light railway - so can use in evenings

Key:

- Study Area
- Penarth Headland Link Walking & Cycling
- Merrie Harrier to Pont-y-Werin Walking & Cycling
- Merrie Harrier to Barrage Bus Priority
- Cosmeston to Barrage Bus Priority
- Cosmeston Park & Ride
- Cogan Park & Ride / Station Upgrade

Scale: NTS

We | Listen Create Deliver

www.capita.co.uk/infrastructure

St David's House, Pascal Close, St Mellons, Cardiff, CF3 0LW T: 02920 803500