

Welsh Government

**Proposed residential development and
Single-form entry Primary School at
Upper Cosmeston Farm,
Penarth**

Transport Assessment for Planning Submission

June 2022

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1.0 INTRODUCTION

Background

- 1.1.1 Asbri Transport Limited have been appointed by Welsh Government to produce a Transport Assessment to accompany an outline planning application for the construction of a new residential development of up to 576 dwellings and provision for an accompanying 1-form entry Primary School.
- 1.1.2 This 2022 Transport Assessment (TA) report accounts for all comments received from the Highway Authority to date on both the TA reports that accompanied the pre-application consultation process and the TA that was submitted with the planning application.
- 1.1.3 A summary of scoping dialogue with the Highway Authority is detailed below.
- 1.1.4 The planning application site is located on 25.2 ha of Welsh Government owned land located along the southern fringes of Penarth, referred to as Upper Cosmeston Farm. The application site is allocated in the Vale of Glamorgan Local Development Plan as a Greenfield site for development.
- 1.1.5 The proposed development site is located approximately 2.5km south of Penarth town centre on greenfield land. It is anticipated that the residential dwellings associated with the site will be of a mixed tenure with 50% privately owned and 50% affordable.
- 1.1.6 The Local Development Plan also references the provision of a new primary and nursery school at the site. This Transport Assessment has accounted for the movement implications of a 1-form entry Primary school located on the southern sector of the application site.
- 1.1.7 The masterplan for the development proposals has been designed to ensure the redeveloped area will be permeable to sustainable movement on foot and by bicycle and that connectivity to the bus network is enhanced. The access strategy allows for safe and efficient movement to and from the development by active travel modes.

- 1.1.8 There have been two public consultation events which have been attended by Asbri Transport Limited. The proposed access strategy for the development and its wider transport and movement implications were discussed with members of the public.
- 1.1.9 In addition to this Transport Assessment, which includes a documented Transportation Implementation Strategy, the planning application submission is also accompanied by a comprehensive residential Travel Plan and a Travel Plan for the Primary School.
- 1.1.10 It is considered that the implementation of a Travel Plan will be incumbent (by way of a planning condition) on the housing developers who implement any detailed planning permissions in due course.
- 1.1.11 The planning application is accompanied by an Environmental Statement which includes a Traffic and Transport chapter. This Transport Assessment is a Technical Appendix to the Environmental Statement. The ES Transport Chapter has also been updated to accompany the 2022 re-submission.

Purpose of the Report

- 1.1.12 The purpose of this report is to detail the likely transport characteristics of the proposed development and identify the potential impact of the proposals on the surrounding transport network. This report also considers the on-site layout with regard to parking provision.
- 1.1.13 As detailed this report also addresses comments issued by the Highway Authority on the Transport Assessment that accompanied PAC process.

Scoping of the Transport Assessment Report

- 1.1.14 A scoping report detailing the proposed methodology for the TA was submitted to the Local Highway Authority in November 2018, this is attached in full at **Appendix A**.
- 1.1.15 Officers of the Highway Authority and their appointed highways consultant attended a pre-application meeting with the LPA, the development's project team and client on 22nd January 2019.

1.1.16 A response from the Highway Authority was subsequently received on 6th March 2019 which was included in the pre-application response letter from the Local Planning Authority. In the letter dated 6th March the Highway Authority stated the following:

‘In general, based on the scoping note and discussions held during the meeting, I do not consider there to be any contentious items or proposals (from a transport perspective). The proposed methodology and approach are robust and commensurate for a development of this size.’

1.1.17 The pre-application response also stated that the possible future-proofing of the development’s access strategy should be considered in terms of possible provision of spare operational capacity. The response also requested that the proposed active travel route through residential area of the site provides direct access to the school site.

1.1.18 In addition to the highways and transport content of the pre-application response letter, several specific comments were made on aspects of the TA scoping report. These comments have been considered and addressed within the TA.

1.1.19 The pre-application response letter also stated the following:

‘Having regard to the cost of providing and upgrading sustainable transport facilities, the Council’s Planning Obligations SPG provides a basis to consider the type of contribution that may be likely to mitigate the impacts of a development of this size. This is a key aim embodied in national and local planning and transport policies, which the Council is keen to deliver. In this case, a sustainable transport contribution will be required to ensure that the site is sufficiently accessible by a range of modes of transport other than the private car, such that it may be considered a sustainable site. This is likely to equate to £1,324,800’.

1.1.20 The pre-application response received from the Local Planning Authority is included in full at **Appendix B**.

- 1.1.21 Asbri Transport have also engaged informally with officers of the Highway Authority on various transport matters during the period leading to the planning submission.
- 1.1.22 There were discussions with officers of the Highway Authority in April 2019 regarding the impact of the proposals on the local highway network as well as signal timing data for the signalised junctions along the highway network which have been modelled as part of this assessment.
- 1.1.23 There has also been pre-application liaison with Passenger Transport officers regarding the provision of new bus stops on the development's frontage and public transport matters generally. This has also included specific discussion about bus movement into the development site.
- 1.1.24 Similarly, there has been discussion on the nature of the Active Travel infrastructure and improvements that are proposed in the planning application.

Highway Authority PAC Submission Response

- 1.1.25 The TA was submitted to the local highway authority in September 2019 as part of the pre-application consultation process. A comprehensive review was undertaken by Mott MacDonald on behalf of the Highway Authority and Asbri Transport received detailed comments from the highway authority in January 2020. These can be viewed in **Appendix C**.
- 1.1.26 Asbri Transport have revised and amplified this TA to address the comments received from the highway authority. This document noted

‘the general methodology and approach to the assessment has been agreed with the Highway Authority.’
- 1.1.27 Asbri Transport have had dialogue with officers of the Highway Authority and their consultant, Mott MacDonald on the aspects of the Transport Assessment where revisions or amplification has been sought.

- 1.1.28 Asbri Transport reviewed the LHA and MM comments and had a meeting with officers of the Highway Authority in October 2021 where the scope of further transport assessment work was discussed and agreed. It was agreed at the meeting that a number of matters could be concluded at reserved matters stage.
- 1.1.29 This was subsequently confirmed by email exchange between the officers and Asbri Transport that is appended at **Appendix D**.
- 1.1.30 As detailed, there was further discussion in October 2021 and this 2022 revised TA addresses the following matters:
- Provides an update on South Wales Metro matters relevant to Penarth
 - Comments on lighting levels along NCN 88 and the attractiveness of this Active Travel route.
 - Provides amplified highway safety analysis based on a full 2022 Welsh Government data-set and considers collisions involving vulnerable road users
 - Provides an update on discussions with the Authority on new bus stop provision and provision of a Toucan crossing on Lavernock Road in the vicinity of the site frontage.
 - Commits to the provision of a parking management strategy at a future date when the internal design of the development is known and parking matters are more evolved.
 - Reviews and reduces the trip generation for the proposed single form entry Primary school (which has reduced in size) and provides further information on the level of internalisation of trips.
 - Further examines with a 2022 traffic data-set and models the development's traffic impact on the Merrie Harrier signal-controlled junction and references other technical studies into its operational performance.

- Further examines the impact of the development on the Lavernock Road/Westbourne Road priority junction with a 2022 data-set.
- References the proposed second campus for Ysgol y Deri Special Educational Needs school which is the subject of a planning application on land immediately to the south of

Structure of the Report

1.1.31 Following this introductory section, the report is structured as follows:

- **Section 2** details a land use planning and transport planning policy review;
- **Section 3** details the existing situation and outlines existing highway safety within the vicinity of the site;
- **Section 4** of the report describes the development proposals and the access strategy for all modes of travel;
- **Section 5** sets out a Transport Implementation Strategy for the development proposals;
- **Section 6** considers the likely travel demand generated by the proposed development on the surrounding highway network;
- **Section 7** assesses the impact of the development on the performance of the local road network and public transport services; and,
- **Section 8** provides the conclusions of the report.

2.0 POLICY REVIEW

Introduction

2.1.1 This chapter of the report reviews national and local transport related planning policy guidance that is relevant to the proposed development.

Llwybr Newydd: The Wales Transport Strategy 2021

2.1.2 Llwybr Newydd sets out a vision for how our transport system can deliver priorities for Wales, helping to put us on a pathway to creating a more prosperous, green and equal society.

2.1.3 It sets a long-term direction and three urgent and immediate priorities:

- Priority 1 – Bring services to people in order to reduce the need to travel;
- Priority 2: Allow people and goods to move easily from door to door by accessible, sustainable and efficient transport services and infrastructure; and,
- Priority 3: Encourage people to make the change to more sustainable transport

2.1.4 The thrust of Llwybr Newydd is to achieve a shift away from private car use to more sustainable transport modes for the majority of journeys. Investment will be promoted into low-carbon, accessible, efficient and sustainable transport services and infrastructure that enable more people to walk, cycle and use public transport, and low-emissions vehicles.

2.1.5 Where there is a need for new transport infrastructure, the sustainable transport hierarchy should be considered to give priority to meeting the demand for travel by walking, cycling and public transport ahead of private motor vehicles.

Wales Spatial Plan 2008 – People, Places, Futures

2.1.6 The Wales Spatial Plan – People, Places Future (WSP) – was originally adopted by the National Assembly for Wales in November 2004, and updated in 2008 to bring the WSP into line with One Wales [see below] and to give status to the Area work which has developed over the previous two years.

2.1.7 In Wales, spatial planning is the consideration of what can and should happen where. It is a principle of the WSP that development should be sustainable. Sustainable development is about improving well-being and quality of life by integrating social, economic and environmental objectives in the context of more efficient use of natural resources.

2.1.8 The purpose of the WSP is to ensure that what is done in the public, private and third sectors in Wales is integrated and sustainable, and that actions within an area support each other and jointly move towards a shared vision for Wales and for the different parts of Wales.

Achieving sustainable development

2.1.9 The WSP states that:

‘In the context of responding to and mitigating the effects of climate change, the Wales Spatial Plan supports the development of spatially targeted responses. These include reducing the need to travel by co-locating jobs, housing and services, for instance, and changing behaviour in favour of ‘greener’ modes of travel, such as car sharing, public transport, walking and cycling.’

Future Wales: The National Plan 2040

2.1.10 Future Wales is the development plan for Wales, which sets out development policies for Wales as a whole. The Plan sets out strategies for addressing key national priorities through using the planning system.

2.1.11 The aim of the National Plan is to ensure that growth is shaped around sustainable forms of transport to deliver healthy environments.

2.1.12 The Plan identifies the need for well-connected development with better public transport networks and safer, more attractive active travel routes. The Plan has a strong focus on sustainable travel with policies on the South Wales Metro and incorporating more infrastructure for low emission vehicles.

2.1.13 Policy 31 – South Wales Metro states that, ‘Planning authorities should plan growth and regeneration to maximise the potential opportunities arising from better regional connectivity, including identifying opportunities for higher density, mixed-use and car-free development around new and improved metro stations.’

2.1.14 The National Plan also states that:

‘Facilitating access to the Metro by active travel will make an important contribution to modal shift from car to public transport journeys at a regional level. Achieving this will require high quality active travel routes linking neighbourhoods and trip destinations with metro stations. The provision of high quality, secure cycle parking at interchanges will also be essential’

Planning Policy Wales (Edition 11, February 2021)

2.1.15 Planning Policy Wales Edition 11 (PPW) sets out the land use planning policies of the Welsh Assembly Government (the Assembly Government). It is supplemented by a series of Technical Advice Notes (TANs). Procedural advice is given in circulars and policy clarification letters.

2.1.16 PPW states that:

‘The planning system should enable people to access jobs and services through shorter, more efficient and sustainable journeys, by walking, cycling and public transport. By influencing the location, scale, density, mix of uses and design of new development, the planning system can improve choice in transport and secure accessibility in a way which supports sustainable development, increases physical activity, improves health and helps to tackle the causes of climate change and airborne pollution by:

- **Enabling More Sustainable Travel Choices** – measures to increase walking, cycling and public transport, reduce dependency on the car for daily travel;
- **Network Management** – measures to make best use of the available capacity, supported by targeted new infrastructure; and,

- **Demand Management** – the application of strategies and policies to reduce travel demand, specifically that of single-occupancy private vehicles.’

2.1.17 The overarching goal of the Welsh Government is to reduce reliance on single occupancy vehicles and support a modal shift to walking, cycling and public transport.

2.1.18 The Assembly Government aims to extend choice in transport and secure accessibility in a way which supports sustainable development and helps to tackle the causes of climate change by: enabling more sustainable travel choices, manage both the current and future transport network effectively and minimising the need to travel via single-occupancy private vehicles. This will be achieved through the integration:

- Within and between different types of transport;
- Between transport measures and land use planning;
- Between transport measures and policies to protect and improve the environment; and,
- Between transport measures and policies for education, health, social inclusion and wealth creation.

2.1.19 PPW states that:

‘The planning system has a key role to play in reducing the need to travel and supporting sustainable transport, by facilitating developments which:

- Are sited in the right locations, where they can be easily accessed by sustainable modes of travel and without the need for a car;
- Are designed in a way which integrates them with existing land uses and neighbourhoods: and;
- Make it possible for all short journeys within and beyond the development to be easily made by walking and cycling.’

2.1.20 In addition, PPW outlines:

‘Transport Assessments can be required for any proposed development if the planning authority considers that there is a justification or specific need.’

Promoting cycling and walking

2.1.21 PPW details the Welsh Government’s objective of promoting active travel and references the Active Travel (Wales) Act 2013. This Act is referenced below.

‘The Active Travel Act (Wales) 2013 makes walking and cycling the preferred option for shorter journeys, particularly everyday journeys, such as to and from a workplace or education establishment, or in order to access health, leisure or other services or facilities. The Active Travel Act requires local authorities to produce Integrated Network Maps, identifying the walking and cycling routes required to create fully integrated networks for walking and cycling to access work, education, services and facilities.’

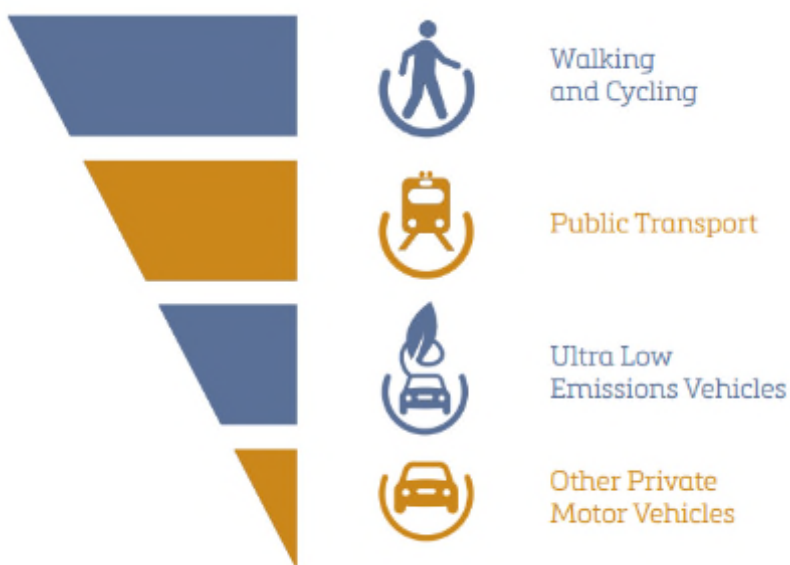
2.1.22 PPW also states that:

‘The planning system has an important role to play in promoting and supporting the delivery of the Active Travel Act and creating the right environments and infrastructure to make it easier for people to walk and cycle, including new and improved routes and related facilities.’

And,

‘Planning authorities should also seek to assist the completion of the national cycle network and key links to and from the network.’

2.1.23 PPW includes the following Hierarchy for Planning:



2.1.24 In relation to the sustainable transport hierarchy, PPW states that:

‘The sustainable transport hierarchy should be used to reduce the need to travel, prevent car-dependent developments in unsustainable locations, and support the delivery of schemes located, designed and supported by infrastructure which prioritises access and movement by active and sustainable transport.

The sustainable transport hierarchy must be a key principle in the preparation of development plans, including site allocations, and when considering and determining planning applications.’

2.1.25 PPW also references the Active Travel Act 2013 which is discussed in further detail in sub-section 2.7 below.

Parking

2.1.26 In relation to parking, PPW details:

‘Car parking provision is a major influence on how people choose to travel and the pattern of development...Planning authorities must support schemes which keep parking levels down, especially off-street parking, when well designed.’

2.1.27 Additionally, PPW states:

‘Parking provision should be informed by the local context, including public transport accessibility, urban design principles and the objective of reducing reliance on the private car and supporting a modal shift to walking, cycling and public transport. Planning authorities must support schemes which keep parking levels down, especially off-street parking, when well designed. The needs of disabled people must be recognised and adequate parking provided for them.’

2.1.28 PPW notes that Local authorities are required to develop an integrated parking strategy which complies with the overall transport and locational policies of the development plan. Additionally, maximum levels of parking for broad classes of development should be established in conjunction with a threshold size of development above which such levels will apply.

2.1.29 Technical Advice Note 18 also details national planning policy on parking matters and this is described in sub-section 2.8.

One Wales: Connecting the Nation

2.1.30 National transport policy for Wales is specified within the Wales Transport Strategy, One Wales: Connecting the Nation, which is supplemented by a series of Technical Advice Notes (TANs).

2.1.31 The goal of One Wales: Connecting the Nation is to:

‘Promote sustainable transport networks that safeguard the environment while strengthening our country’s economic and social life. The transport strategy identifies a series of high-level outcomes and sets out the steps to their delivery. The One Wales programme is working to achieve a nation with access for all, where travelling between communities and accessing services, jobs and facilities in different parts of Wales is both easy and sustainable, and which support the growth of our economy.’

Technical Advice Note 18: Transport (TAN18)

- 2.1.32 TAN 18 states at paragraph 3.3 that ‘The location of new residential development has a significant influence on travel patterns as the majority of trips start or finish at the home.’
- 2.1.33 TAN 18 identifies that Planning Policy Wales and the Wales Transport Strategy both aim to secure the provision of transport infrastructure and services, which improve accessibility, build a stronger economy, improve road safety and foster more sustainable communities. To achieve this and the core objectives, the following initiatives relevant to the proposed development are:
- Reducing the need to travel;
 - Promoting walking and cycling;
 - Managing parking provision; and,
 - Encouraging the location of development near other related uses to encourage multi-purpose trips.
- 2.1.34 Section 3.4 to 3.6 of TAN 18 references ‘Accessible Housing Development’, which in summary, seeks to ensure that housing development is sustainable in transport and movement terms including maximising the opportunity for residents to walk and cycle to local facilities and public transport stops.
- 2.1.35 TAN 18 notes that where larger housing development applications require a Transport Assessment information on measures to encourage sustainable travel, (as detailed in TAN 18) shall be incorporated in the TA.
- 2.1.36 The Local Authority detailed in their pre-application response that they would seek a significant, development-related financial contribution towards sustainable transport stating:

“Having regard to the cost of providing and upgrading sustainable transport facilities, the Council’s Planning Obligations SPG provides a basis to consider the type of contribution that may be likely to mitigate the impacts of a development of this size. This is a key aim embodied in national and local planning and transport policies, which the Council is keen to deliver. In this case, a sustainable transport contribution will be required to ensure that the site is sufficiently accessible by a range of modes of transport other than the private car, such that it may be considered a sustainable site. This is likely to equate to £1,324,800.”
(VoG pre-application response 6th March 2019).

Active Travel Act 2013 (Wales)

2.1.37 The Active Travel Act places a requirement on local authorities to continuously improve facilities for those who walk and cycle and to prepare information, such as maps, that identify current and potential future routes for their use.

2.1.38 The Act also requires highway authorities to have regard in the construction and improvement of highways to enhance provision for cyclists and pedestrians. The Active Travel Act makes provision for:

- Approved maps of existing active travel routes and related facilities in a local authority’s area;
- Approved integrated network maps of the new and improved active travel routes and related facilities needed to create integrated networks of active travel routes and related facilities in a local authority’s area;
- Requiring local authorities to have regard to integrated network maps in preparing transport policies and to make continuous improvements in the range and quality of active travel routes and related facilities; and,
- Requiring the Welsh Ministers and local authorities, in constructing and improving highways, to have regard to the desirability of enhancing the provision made for walking and cycling.

2.1.39 As is noted in Section 3 there is an existing active travel route on the eastern side of Lavernock Road in the vicinity of the application site.

Vale of Glamorgan Local Development Plan

2.1.40 The development site is allocated for residential development and a Primary School in the Local Development Plan.

2.1.41 The following is an extract from the LDP, which details what land uses have been allocated for the site.

'POLICY MG6 - PROVISION OF EDUCATIONAL FACILITIES

A new primary and nursery school at land at Upper Cosmeston Farm, Lavernock (1.0 ha)

POLICY MG7 - PROVISION OF COMMUNITY FACILITIES

In accordance with the recommendations of the assessment, Policy MG7 allocates land for the provision of new community infrastructure, to be provided in association with housing allocations at Barry Waterfront, St Cyres, Ogmere Residential Centre and Cosmeston Farm, Penarth.

POLICY MG2 (24) Land at Upper Cosmeston Farm, Lavernock 576

This 22.2 hectare greenfield site is located to the south of Penarth adjacent to Lavernock Road. Development of the site will be informed by a masterplan/development brief which will identify and safeguard provisions for major infrastructure comprising a 1.0 hectare site to provide a new primary and nursery school; 1 hectare of designated public open space and an additional 0.1 – 0.2 hectares for the provision of a new community facility, in accordance with Policies MG6 (5), MG28 (10) and MG7 (4). Affordable housing will be delivered in accordance with Policy MG4.

The Council's Engineers have advised that future development proposals should be supported by a robust Transport Assessment which evaluates and determines mitigation measures that alleviate any detrimental impact the development will have on the local highway network and associated road junctions.

A suitable and safe access will be required that conforms to current design criteria. In this regard, it is anticipated that the development will be served via a new junction onto Lavernock Road, which incorporates safe pedestrian/cycle

friendly facilities. The new development will be expected to contribute to the Council's aspirations for improved walking; cycling and public transport facilities and ensure good permeability both within and surrounding the site including improvements to the NCN88 between Penarth, Sully and Barry.'

Well-Being of Future Generations (Wales) Act 2015

- 2.1.42 The Well-Being of Future Generations (Wales) Act 2015 is about improving the social, economic, environmental and cultural well-being of Wales.
- 2.1.43 It aims to encourage public bodies to take in to consideration long-term aspirations, and reflect on the manner in which they work with people and communities to prevent problems.
- 2.1.44 The act identifies 7 well-being goals:
- A globally responsible Wales
 - A prosperous Wales
 - A resilient Wales
 - A Healthier Wales
 - A more equal Wales
 - A Wales of cohesive communities
 - A Wales of vibrant culture and thriving Welsh language
- 2.1.45 Large emphasis within the act is placed on "*The Sustainable Development Principle*", which ensures that public bodies act in a manner which meet the needs of the present without compromising the ability of future generations to meet their own needs.

**Vale of Glamorgan: Supplementary Planning Guidance: Parking Standards
March 2019**

2.1.46 The Vale of Glamorgan published a new version of their Car Parking Standards in March 2019. The SPG seeks to ensure a transparent and consistent approach to the provision of parking. It helps inform developers, designers and builders what is expected from them.

2.1.47 The guidance aims to standardise the approach to parking across new development within the Vale of Glamorgan. The guidance provides information on how to apply the parking guidance to development and change within the authority.

2.1.48 The SPG states that:

“Parking provision should be informed by the local context, including public transport accessibility, urban design principles and the objective of reducing reliance on the private car and supporting a modal shift to walking, cycling and public transport.”

2.1.49 The Vale is aware of its environmental responsibilities and the contributions that can be made to help mitigate climate change and recognises that Ultra Low Emission Vehicles (ULEVs) can aid in improving local air quality and reducing emissions.

2.1.50 Therefore, to encourage the take up of ULEVs, developers are encouraged to provide electrical vehicle charging points (EVCPs) wherever possible at a ratio of 10% of all parking spaces provided for residential developments.

2.1.51 The SPG also requires all residential developments to be accessible by bicycle and cycle storage must be considered in dwelling design. Where appropriate, communal cycle facilities may be provided

**Vale of Glamorgan Local Development Plan 2011 – 2026: Supplementary
Planning Guidance Travel Plans**

2.1.52 The purpose of the Travel Plan is to provide guidance to applicants on the production and implementation of travel plans associated with new major development proposals.

- 2.1.53 The guidance specifically provides information on:
- The council's requirements for Travel Plans and when they will be required;
 - The role of travel plans in encouraging shifts towards sustainable transport;
 - Different types of travel plans;
 - Travel plan content;
 - Their benefits; and
 - Travel plan monitoring.

2.1.54 A Travel Plan for the proposed residential development accompanies the planning submission.

2.1.55 Residential travel plans are designed to reduce the number and length of trips generated by the proposed development and support more sustainable forms of travel.

2.1.56 The Highway Authority have acknowledged that the residential Travel Plan is '*considered comprehensive.*'

Vale of Glamorgan Local Development Plan 2011 – 2026: Supplementary Planning Guidance Sustainable Development

2.1.57 The guidance sets out to raise awareness of how development land can contribute towards sustainability. The guidance advises a holistic approach to construction and to develop in a manner which protects the environment.

Penarth to Cardiff Barrage Sustainable Transport Corridor

2.1.58 The Vale of Glamorgan have commissioned consultant's Capita to undertake 'a WeITAG (Welsh Transport Planning and Appraisal Guidance) Stage One and Stage Two study to develop and appraise potential options for improving sustainable transport within and between Penarth and Cardiff barrage.

2.1.59 The study is focusing on the potential to:

- Increase the use of public transport;
- Encourage modal shift away from use of the private cars;
- Reduce road traffic congestion and support increased economic activity;
- Increase both accessibility and connectivity;
- Increase levels of active travel in support of associated health benefits;
- and,
- Create infrastructure which supports tourism investment.

WelTAG (Welsh Transport Appraisal Guidance)

“WelTAG is a framework for thinking about proposed changes to the transport system. It contains best practice for the development, appraisal and evaluation of proposed transport interventions in Wales. It has been developed by the Welsh Government to ensure that public funds are invested in a way that ensures they maximise contribution to the well-being of Wales, as set out in the Well-being of Future Generations (Wales) Act 2015 and to deliver the Act’s vision of the Wales we want: a more prosperous Wales, a resilient Wales, which supports healthy, functioning ecosystems and recognises the limits of the global environment, a healthier Wales, a more equal Wales, a Wales of more cohesive communities, a Wales of vibrant culture and a globally responsible Wales.”

2.1.60 There are five stages of the WelTAG process:

- Stage One – Strategic outline case
- Stage Two – Outline business case
- Stage Three – Full business case
- Stage Four – Implementation
- Stage Five – Post Implementation

2.1.61 ARCADIS Consulting (UK) Ltd has produced a WelTAG Stage One and Two report for the Dinas Powys Transport Network. The Stage One report was undertaken in 2017 and considers the problems, opportunities and constraints along with an appraisal of options to be considered.

2.1.62 The Stage One study was presented to Cabinet whereby the following options were confirmed to be taken forward for further consideration, following recommendation by the Council's Environment and Regeneration Scrutiny Committee on 14th September 2017:

- Do-minimum
- Bypass
- Multi-Modal Option
- Bypass and Multi-Modal Option

2.1.63 Following this, a Stage Two study was commissioned for the options recommended to be taken forward against a Do Minimum Option.

2.1.64 The purpose of Stage Two is to examine the list of options for tackling the problem under consideration in greater detail.

2.1.65 The Stage two report looks closely at several options to improve the strategic transport network, one of which is to improve multi-modal travel options and the other to provide a relief road in the Vale of Glamorgan.

Multi-Modal Option

2.1.66 The provision of a multi-modal option was identified as part of the Stage One study. The multi-modal option would provide the residents of Dinas Powys, as well as people who travel through Dinas Powys to access Barry, Penarth and Cardiff with alternative modes of transport to the private car. For the Stage Two study a more detailed multi-modal option has been developed. The multi-modal option covers all sustainable modes of transport namely bus, rail and walking and cycling.

2.1.67 The multi-modal option provides a programme of individual projects across all sustainable travel modes, which range from projects that are currently being developed in order to apply for Welsh Government funding in the short-term to projects that are programmed regionally in the medium to long-term. The following multi-modal plans have been considered:

Bus	<ul style="list-style-type: none"> • Bryn Y Don Park & Ride • Bus Service & Bus Stop Enhancements - Increased frequency. • Merrie Harrier Junction modification • Merrie Harrier to Barons Court Junction Bus Lane
Rail	<ul style="list-style-type: none"> • Eastbrook Station Upgrade • Dinas Powys Station Upgrade • Vale of Glamorgan Line Service/Capacity Enhancement
Walking & Cycling	<ul style="list-style-type: none"> • Merrie Harrier to Barons Court shared walking and cycling facility • Dinas Powys to Penarth Connections via Cosmeston • Dinas Powys Network • Barry to Dinas Powys Cycle Route

Relief Road

2.1.68 The potential alignments of the proposed relief road are set out below:

Green Alignment

2.1.69 The Green alignment seeks to avoid existing environmental constraints to form a 60mph single carriageway bypass to the east of Dinas Powys interconnecting with the A4055 approximately 0.9km south of the A4055 Cardiff Road/Cross Common Road priority junction, extending northwards to the east of Dinas Powys through primarily green wedge, and interconnecting with the A4055 at its junction with the B4267 at Merrie Harrier.

2.1.70 The WelTAG Stage Two design has been developed with the potential to provide integral public transport infrastructure and suitable crossings to retain east/west connectivity for walking and cycling.

2.1.71 The green alignment has the potential to alleviate congestion and capacity issues at junctions within Dinas Powys and reduce issues associated with air quality and noise pollution.

Pink Alignment

2.1.72 The Pink alignment follows the same principles as the Green alignment but allows for a roundabout to be developed that could link to Murch Road, to the east of Dinas Powys.

2.1.73 It would be anticipated that provision of a roundabout would lead to changes in traffic patterns on Murch Road, as a new connection is formed between the centre of Dinas Powys and the bypass.

Blue Alignment

2.1.74 The Blue alignment is extensively similar to the Green and Pink alignments whereby the carriageway extends south from the Merrie Harrier junction to the east of Dinas Powys. The Blue alignment bypasses the village of Sully to the west.

2.1.75 If a bypass is delivered, the existing adverse impact of road traffic specifically through Dinas Powys could be reduced. However, the increased length of route compared to the Green alignment and potentially marginal journey time benefits compared to the existing corridor, means that reductions in traffic are anticipated to be low.

Summary

2.1.76 Of the bypass options, the Green alignment offers the highest potential benefits, with the Blue alignment not likely to establish a high level of displacement of traffic from the corridor through Dinas Powys.

2.1.77 It is understood that the WelTAG Stage 2 report for Dinas Powys was issued in draft to the Council at the end of March 2019 and presented to the Cabinet of the Vale of Glamorgan on 15th April 2019.

2.1.78 The findings of the Cabinet report are referenced below:

“The Head of Neighbourhood Services and Transport advised that the report provided to Cabinet was an update on progress of the transport assessment being undertaken in Dinas Powys and identified, following a meeting of the Review Group for the study, the further work needed to be undertaken in respect of:

- Engaging with Network Rail to understand the constraints and potential costs associated with the construction of a by-pass and junction in the vicinity of the railway tunnel;
- Undertaking concept design, modelling and costing of suggested improvements to the Merrie Harrier junction to improve capacity. To consider costs in context of the by-pass scheme costs (blue and green options);
- Commissioning strategic modelling using the South-East Wales Transport Model of the by-pass proposals (via Transport for Wales who managed the model);
- Updating the economic appraisal for the green alignment and providing an appraisal for the blue alignment and update the transport case and the Stage 2 report;
- Undertaking public consultation on the findings of the Stage 2 report and finalising the Stage 2 report and making recommendations for option(s) to be taken forward to the WelTAG Stage 3 Full Business Case.”

Penarth to Cardiff Barrage Sustainable Transport Corridor WelTAG Stage Two

2.1.79 Following completion of WelTAG Stage One (May 2019) report into sustainable transport options for the Penarth to Cardiff Barrage Sustainable Transport Corridor, three options were approved for further consideration as part of a WelTAG Stage Two appraisal, encompassing:

- OPTION 1: Active Travel proposals for the Penarth to Cardiff Barrage Corridor
- OPTION 2: Cosmeston Bus Park and Ride and bus priority link across Cardiff Barrage
- OPTION 3: Cogan Multi-Modal Sustainable Transport Interchange

OPTION 1

2.1.80 Option 1 comprises a network of Active Travel links within the study area. The links included within the option are those routes within the Vale of Glamorgan Council's Active Travel Integrated Network Map (INM) that are considered to have most benefit to the Penarth to Cardiff Barrage Corridor.

2.1.81 The network of Active Travel routes within Option 1 includes the Penarth Headland Link (PHL) proposal, which is a proposed 1km rock-fill causeway between Penarth Esplanade and Cardiff Barrage to provide a shared-use pedestrian and cycle route. The option also includes complementary, area-wide active travel measures i.e., introduction of a 20mph zone/ limit and a bike hire scheme.

OPTION 2

2.1.82 This option consists of a bus park and ride and bus priority scheme providing a link along the Penarth to Cardiff Barrage Corridor. This option is no longer being pursued.

OPTION 3

2.1.83 Option 3 comprises a range of improvements to Cogan Station to create a multi-modal interchange facility and improve integration between rail and other transport modes. This includes the development of vacant land to provide an expanded park and ride facility with approximately 150 spaces, on-station improvements including an Access for All bridge over the rail line and improvements to Active Travel links and facilities.

2.1.84 Following completion of the WelTAG Stage Two appraisal and the project's Review Group meeting held on Tuesday 24th September 2019, the output of the WelTAG Stage Two study recommends the following:

- That OPTION 1 is progressed for further appraisal at WelTAG Stage Three
- That OPTION 3 is progressed for further appraisal at WelTAG Stage Three

Conclusion to Policy Review

- 2.1.85 The key objectives of the land use planning and transport policies are to deliver sustainable, safe transport to support the development. The policy context detailed has fully informed the development proposal. In transport terms the access strategy proposed for the development and the associated provision for Active travel has been discussed with the Highway Authority from a very early stage in the development.
- 2.1.86 Provision for active travel movement is to be made by way of physical infrastructure and the implementation of the Transportation Implementation Strategy which includes the effective implementation of a Travel Plan.
- 2.1.87 The development's Transportation Implementation Strategy is detailed in Section 5. This includes a package of physical, management and promotional measures related to the physical infrastructure, the design and location of the scheme, parking management and dedicated travel plan co-ordinators. Provision is also to be made for both passive and active ULEV charging infrastructure through-out the development. It is considered that the development meets the requirements of accessible housing development as defined in TAN 18: Transport.
- 2.1.88 It is understood that significant Section 106 obligations focused on active and sustainable travel will be sought by the Local Planning Authority.

3.0 EXISTING SITUATION

Introduction

3.1.1 In order to assess the impact of the development proposals it is necessary to establish the conditions that exist within the surrounding transport network. This section of the report therefore describes the existing transport network within the vicinity of the site.

Site Location

3.1.2 The proposed development site is located to the south of Penarth and to the immediate east of Lavernock Road. The site is bounded by residential housing estates to the north, the Bristol Channel to the east, farm land to the south and Lavernock Road to the west.

3.1.3 Penarth Town Centre is located approximately 2.5km to the north of the proposed site and the settlement of Sully is located approximately 2km to the south-west of the application site.

3.1.4 The location of the site and the local highway network is shown in **Figure 3.1**.



Figure 3.1: Site location & local highway network

Pedestrians and Cyclists

Pedestrians

- 3.1.5 Footway provision within the vicinity of the development site is of a reasonable standard with footway provision on the eastern side of Lavernock Road only adjacent to the application site's frontage.
- 3.1.6 The majority of roads to the north of the proposed development have footway provision on one or both sides of the carriageway with a number of formal and informal crossing facilities across Lavernock Road and its side roads. A controlled Toucan crossing for pedestrians and cyclists is located approximately 300m to the north of the proposed site access providing a safe crossing point to the north-bound bus stop and Cosmeston Lakes.
- 3.1.7 A dedicated pedestrian/cycleway runs along the western boundary of the site and this is signed accordingly. There is a shared active travel pedestrian/cycle way present along the eastern carriageway off Lavernock Road, providing access into central Penarth to the north.
- 3.1.8 It is noted that there is currently no footway provision present along the western side of the carriageway of Lavernock Road in proximity to the site. New footway provision is proposed and this is described in Section 4.
- 3.1.9 In addition to the above, a shared pedestrian/cycle National Cycle Network (NCN) Route 88 path runs directly to the north of the application site and follows the old railway line into Penarth Town Centre.
- 3.1.10 The route is in excellent condition and the path itself varies in width from 2.1m – 3m along its length with the total width of the old cutting being circa 6m. There is a pinch point at its northern end, where the link narrows to circa 1.8m as it passes behind the gardens of houses fronting Plymouth Drive and ultimately joins the footway along the western side of Plymouth Drive.

3.1.11 The Chartered Institution of Highways and Transportation (CIHT) guidelines ‘Providing for Journeys on Foot’ suggest that the desirable walking distance for ‘commuting/school’ walking trips is 500 metres, the acceptable distance is 1km, and 2km is the preferred maximum. The desirable walking distance for ‘Elsewhere’ (this includes access to local amenities) is 400m, the acceptable distance is 800m and 1.2km is the preferred maximum.

3.1.12 **Figure 3.2** details the local amenities within the local area.

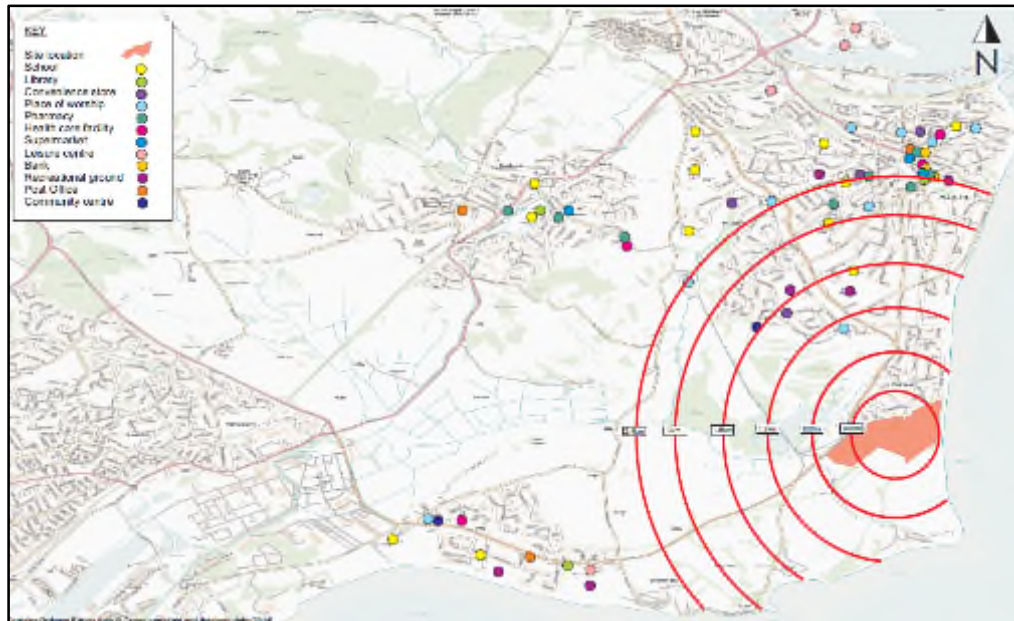


Figure 3.2: Local amenities within the area

3.1.13 **Figure 3.2** shows actual walk distance isochrones from the centre of the site and any local amenities/facilities that are within the walking distances detailed. These are set out in **Table 3.1** below.

Amenity/Facility	Distance
Harvester Restaurant	650 m
Glamorganshire Golf Club	800 m
Sully sports & social club	2 km
St Aubin Nurseries	2.1km
Evenlode Primary School	2.1 km
Sully library	2.25 km
Sully Post Office	2.5 km
Stanwell School	2.5 km
Penarth town centre	2.5 km
Penarth Railway Station	2.5 km
Westbourne School	2.6 km
Tesco Express	2.7 km
Penarth Library	2.7 km
Sully Surgery	3 km

Table 3.1: Distance to local amenities from the site

- 3.1.14 Figure 3.2 and Table 3.1 indicate site's location in terms of proximity and accessibility by foot or bicycle to a number of local facilities and public transport opportunities. The distances referenced in Table 3.1 are measured from the site frontage to Lavernock Road.
- 3.1.15 Additionally, the Welsh Coastal path (part of which forms a public right of way footpath) runs along the coast to the east of the site, providing pedestrians with a segregated walking route from road traffic.
- 3.1.16 Those who wish for a more tranquil and scenic route to Penarth and beyond to the north may opt to take this route.
- 3.1.17 The footpath can be seen in **Figure 3.3** along with the cycle routes within the vicinity of the site.

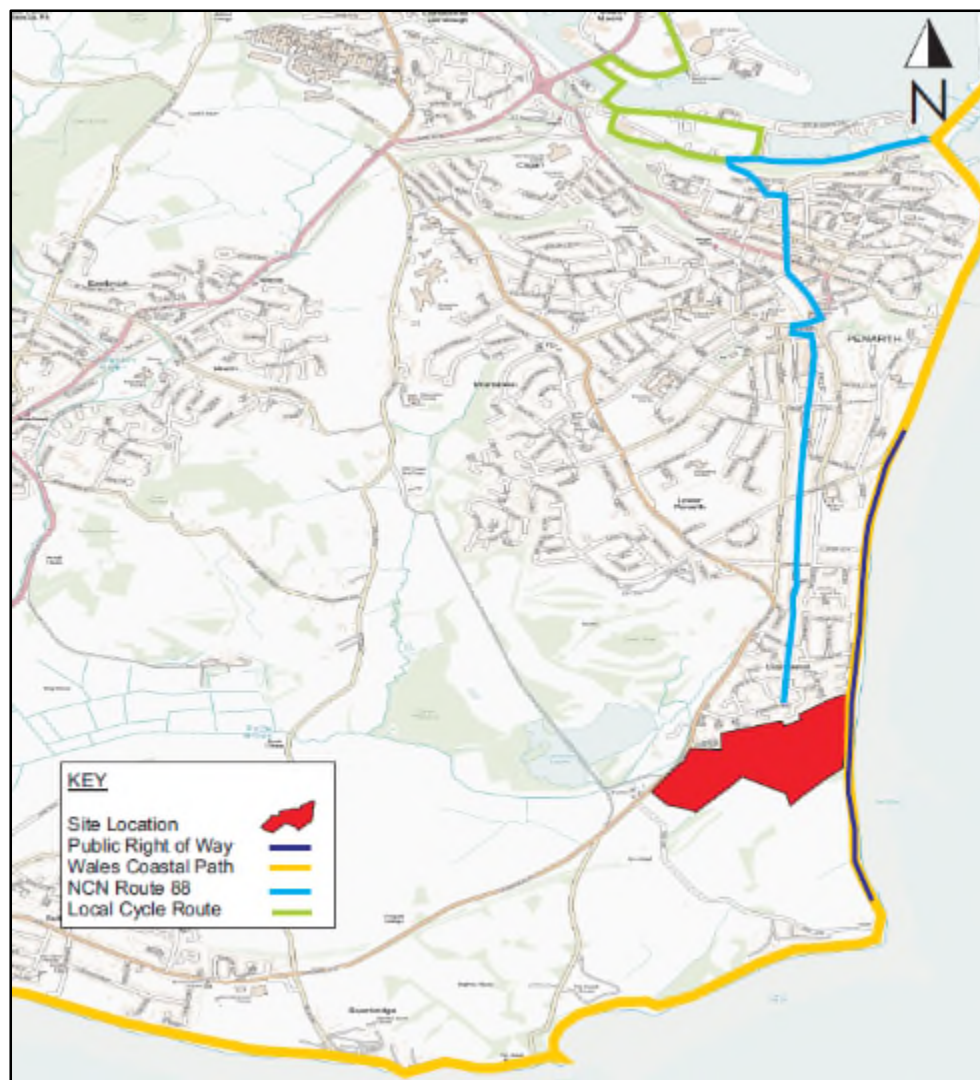


Figure 3.3: Public rights of way and local cycle network

Cyclists

- 3.1.18 Cycling as a mode of travel is ever increasing given the growing trend of recreational cycling and is seen as a key travel mode for mode shift away from the car.
- 3.1.19 As set out previously, National Cycle Network (NCN) Route 88 runs directly to the north of the application site and follows the old railway line into Penarth Town Centre, from there it links to NCN Route 8 which provides access into Cardiff City Centre.
- 3.1.20 NCN Route 88 is a proposed coastal route between Newport, Cardiff, Bridgend and Margam Country Park. At the moment, only short sections of the route are open.
- 3.1.21 Active Travel routes are proposed within the Vale of Glamorgan's LDP and part of these proposals include the extension of NCN Route 88 to trail south through the middle of the proposed development. This would provide an excellent level of off-road cycle and pedestrian connectivity from the development site into the centre of Penarth.
- 3.1.22 NCN Route 88 is currently unlit between the site and the centre of Penarth, however, overspill lighting from the residential areas along the route provide some intermittent lighting along the way.
- 3.1.23 The route is primarily bounded by vegetation and therefore is a ecological environment. It should be noted that any lighting provision is likely to have an impact on this ecological environment during the hours of darkness and therefore this would have to be considered as part of any lighting improvements going forwards.
- 3.1.24 Since the production of the TA that accompanied the PAC the ***Penarth to Cardiff Barrage Sustainable Transport Corridor Study*** has been published. The study includes the following as **Figure 3.4**.

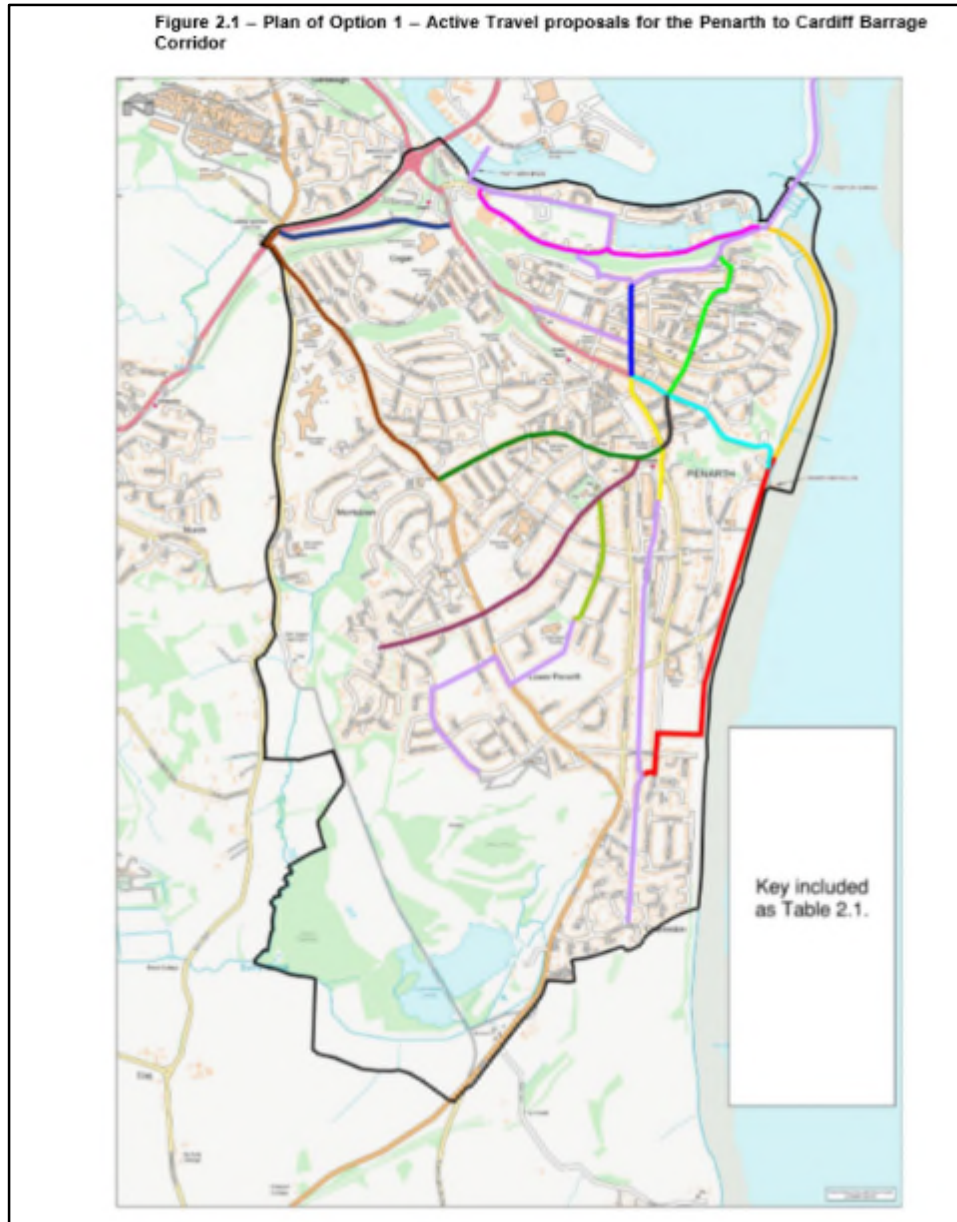


Figure 3.4 Active Travel Proposals

3.1.25 The alignment and design for the proposed Active Travel Routes will be discussed and agreed with officers of the Highway Authority. It is noted that the study states the following:

The majority of INM routes included in Option 1 follow the alignment of the highway network. The extent of improvements proposed have been limited by the constrained nature of the road network within Penarth and the limited space available to implement segregated, off-road Active Travel improvements. As a result, the majority of measures proposed are on-road improvements, with some larger-scale improvements proposed at key junctions.

3.1.26 The proposed active travel routes and cycle routes within the site’s vicinity are shown in **Appendix E**.

Public Transport

Bus

- 3.1.27 Bus services within the vicinity of the site are of a good standard in terms of route destinations and service frequencies, providing access throughout Penarth and destinations across the wider bus network such as Barry and Cardiff.
- 3.1.28 Currently, the closest bus stops to the site are located along Lavernock Road approximately 220m to the north of the proposed development site's northern boundary. The walk distance to the stops increases progressively the further south and east into the Masterplan area.
- 3.1.29 There are scheduled bus services calling at stops to the north and south of the proposed site access along Lavernock Road. The bus services calling at stops within the vicinity of the proposed development are shown in **Table 3.2**. A map of the local bus routes is shown in **Figure 3.4**.

Route No.	Route	Frequency
88	Penarth – Barry	Mon-Fri, hourly services between 07:33-14:33
	Barry – Penarth	Mon-Fri, hourly services between 07:19-15:19
94	Cardiff – Penarth – Sully - Barry	Mon-Fri, services half hourly to hourly from 06:45-22:24. Sat, 07:52-22:24, half hourly – hourly Sun, 07:52, then hourly from 09:24-21:24
	Barry – Sully - Penarth - Cardiff	Mon-Fri, services half hourly to hourly from 06:23-21:30. Sat & Sun, 06:59-21:30 half hourly – hourly
S51	Llandough – St Richard Gwyn High School	Mon-Fri, service at 08:31 (school days only)
	St Richard Gwyn High School – Llandough	Mon-Fri, service at 15:37 (school days only)
SC1	Barry – Penarth	Mon-Fri, service at 07:57 (school days only)
	Penarth – Barry	Mon- Fri, service at 14:50

Table 3.2: Summary of bus services operating in the vicinity of the site

- 3.1.30 As indicated in Table 3.2, the bus services operating within the vicinity of the site provide a good level of service and frequency with a number of bus services operating per hour within close walking distance of the proposed development site, enabling future occupants of the site to access 0900-1700 employment within Penarth, Cardiff or Barry.

3.1.31 This is accentuated by the fact that service 94 provides direct access to Penarth Railway station and opportunities to travel further afield than those identified above.

Rail

3.1.32 Penarth Railway Station is the nearest rail station to the site and is located roughly 2.5km to the north of the proposed site access.

3.1.33 The location of the railway station is shown in **Figure 3.5**.

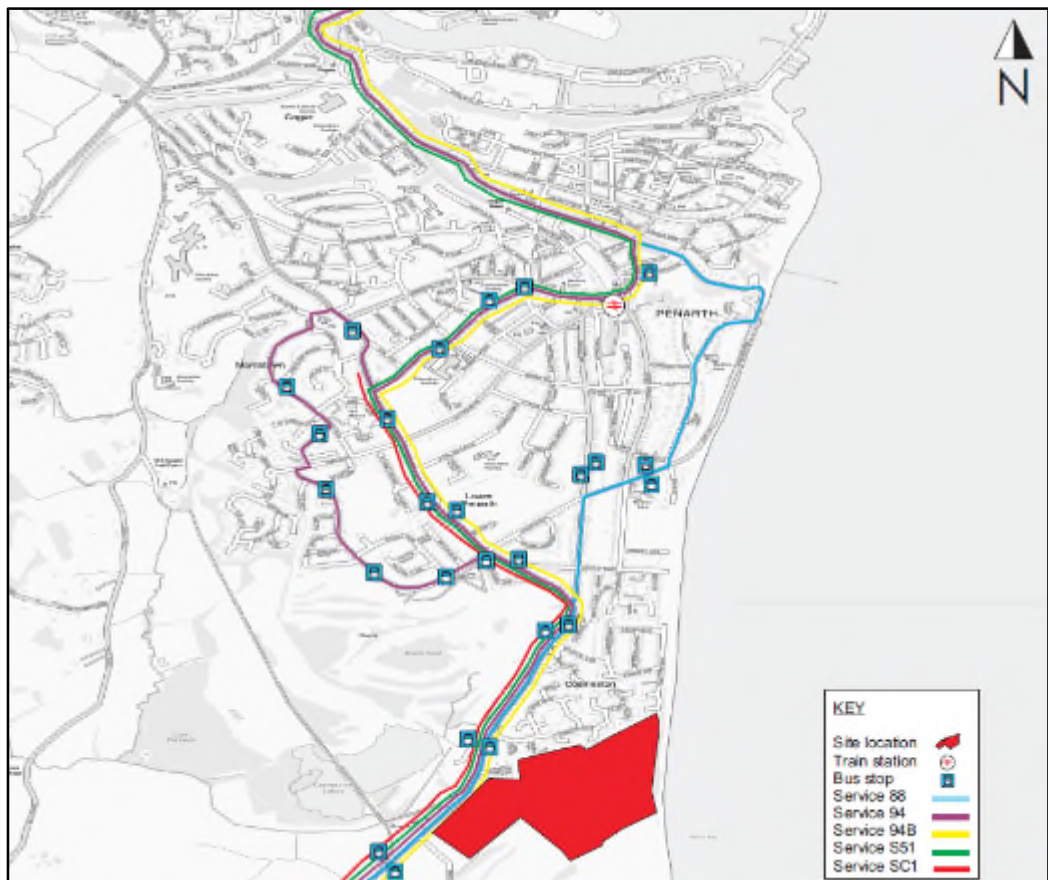


Figure 3.5: Public Transport Infrastructure

3.1.34 The station is served by Transport for Wales, operating local services along the Vale of Glamorgan Line to destinations such as Cardiff Central, Bargoed and Rhymney. Approximately four trains per hour run to Cardiff Central on weekdays and Saturdays. Evening services run twice hourly and Sundays see one train every two hours (a total of 6 a day). The journey time to Cardiff Central averages 13 minutes.

3.1.35 As set out above, the station is served by bus service 94, providing direct access from Cosmeston to Penarth Railway station.

3.1.36 In addition, a direct pedestrian and cycling link is provided from the heart of the housing stock within Cosmeston, running directly from the north of the application site along the old railway line to the rear of Penarth train station.

South Wales Metro

3.1.37 The South Wales Metro (SWM) will provide an improved and innovative rail network throughout the core valley lines from Cardiff city centre to Penarth.

3.1.38 It is proposed that 4 trains per hour will be in operation between Penarth and Cardiff with possible tram-trains enabling a further extension of the metro into Lower Penarth. In addition, further integration with the bus service network is proposed as part of the Metro proposals with major benefits expected key regional settlements including Penarth.

3.1.39 These proposals would increase the attractiveness and accessibility of public transport in the vicinity of the proposed development. A metro stop located in Lower Penarth would reduce the distance needed to travel to the existing railway station in Central Penarth.

Highway Network

3.1.40 The following section of the report describes the highway network in the vicinity of the site.

3.1.41 The local highway network and site location can be seen in **Figure 3.1**.

3.1.42 The highway network in the vicinity of the site is dominated by Lavernock Road which abuts the site's western boundary.

Lavernock Road

3.1.43 Lavernock Road, classified as the B4267, is a single carriageway distributor road that links Cosmeston to Lower Penarth and Sully.

- 3.1.44 Adjacent to the site, Lavernock Road is approximately 8.5m wide, with footway and adjacent highway verge of varying widths in the range of 2.5m to 3.5m along the eastern side of the carriageway only. There is highway verge on the western side of the road but there is no footway provision.
- 3.1.45 In the vicinity of the site's southern frontage to Lavernock Road, the road is unlit and is subject to a 40mph speed limit. To the north of the site's frontage the speed limit reduces to 30mph and street lighting is present. To the north of the application site the road is fronted predominantly by residential dwellings and some commercial premises such as public houses.
- 3.1.46 To the north of the site's northern boundary an active travel route for pedestrians and cyclists can be found. The route is hard surfaced and signed facilitating movements to Penarth.
- 3.1.47 As set out previously, there is a signal-controlled pedestrian crossing facility present in the vicinity of the access junction to Cosmeston Lakes where there are bus stops providing access to services operating in both directions.

Baseline Traffic Flows

- 3.1.48 In order to obtain traffic flows on the local highway network, classified junction turning counts were undertaken on Thursday 29th November 2018 during school term-time at the following junctions, which are shown in **Figure 3.6**:

1. A4231/A4055/Sully Moors Road roundabout junction
2. Sully Moors Road/B4267/Hayes Road roundabout junction
3. Lavernock Road/Cosmeston Lake Country Park priority junction
4. Lavernock Road/Cosmeston Drive priority junction
5. Lavernock Road/Westbourne Road priority junction
6. B4267/Augusta Road/Lavernock Road/Castle Avenue crossroads
7. Lavernock Road/Dinas Road/Victoria Road crossroads
8. Cardiff Road/B4267/A4055 signalised junction

9. A4055/B4267/Andrew Road signalised crossroads

10. A4055/A4160 signalised intersection

3.1.49 The raw data of these 2018 turning counts are shown in **Appendix F**. The highway network was operating normally with no road-works present within the study area on the day of the traffic surveys.

3.1.50 From the surveys, the weekday peak periods have been determined as 0745-0845 and 1630-1730.

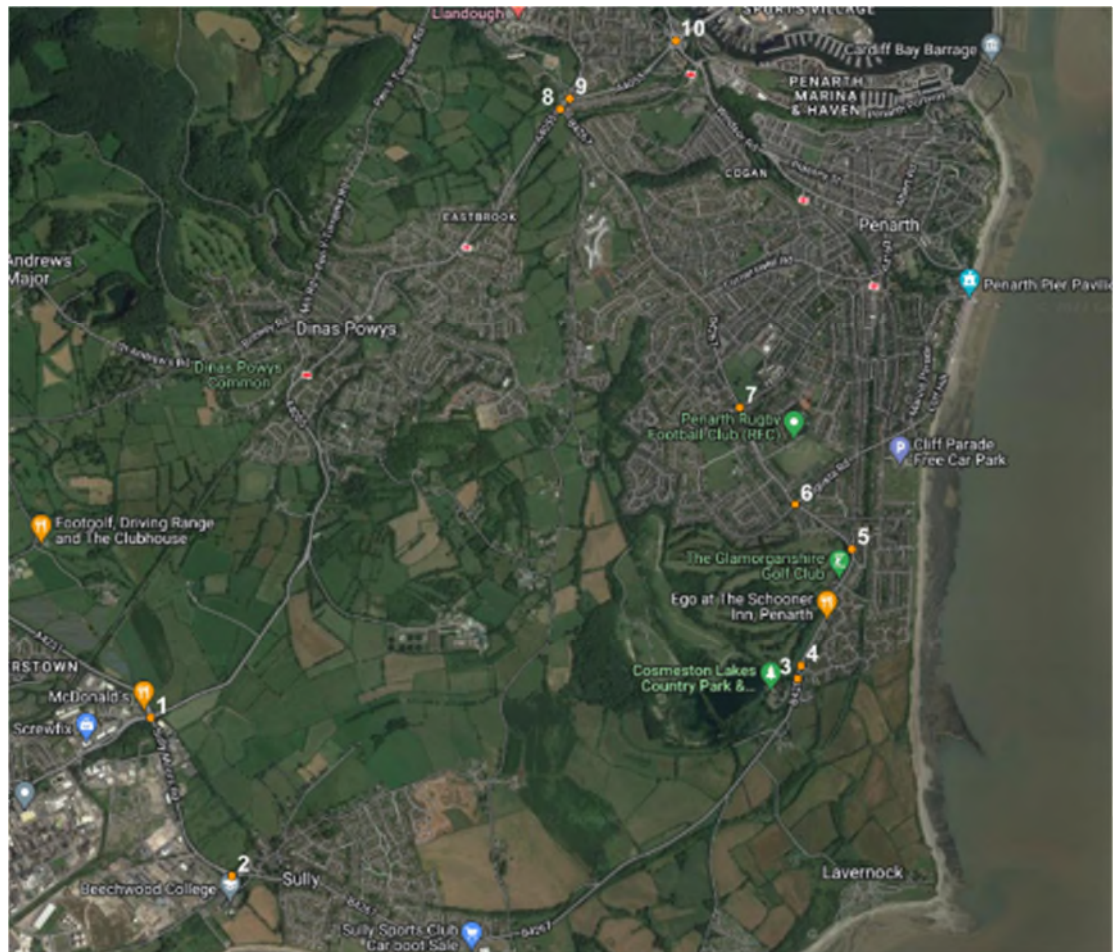


Figure 3.6: JTC Locations

3.1.51 Following consultation discussions with Vale of Glamorgan Highways officers, further traffic surveys were undertaken in May 2022, which are shown in **Figure 3.7** and **Figure 3.8**:

Junction Turning Counts - Tuesday May 17 2022

11. B4267 Lavernock Road/Westbourne Avenue priority T-Junction

12. B4267 Lavernock Road/Forrest Road priority T-Junction

13. Westbourne Avenue priority crossroads

Junction Turning Count/Full Origin Destination Survey - Tuesday May 24 2022

14. Merrie Harriers Junction: A4055/B4277 signal controlled staggered crossroads

Automatic Traffic Counts (ATC) - Tuesday May 17 to Monday 23 May 2022

- B4267 Lavernock Road south of Upper Cosmeston Farm
- B4267 Lavernock Road south of Stanwell Road

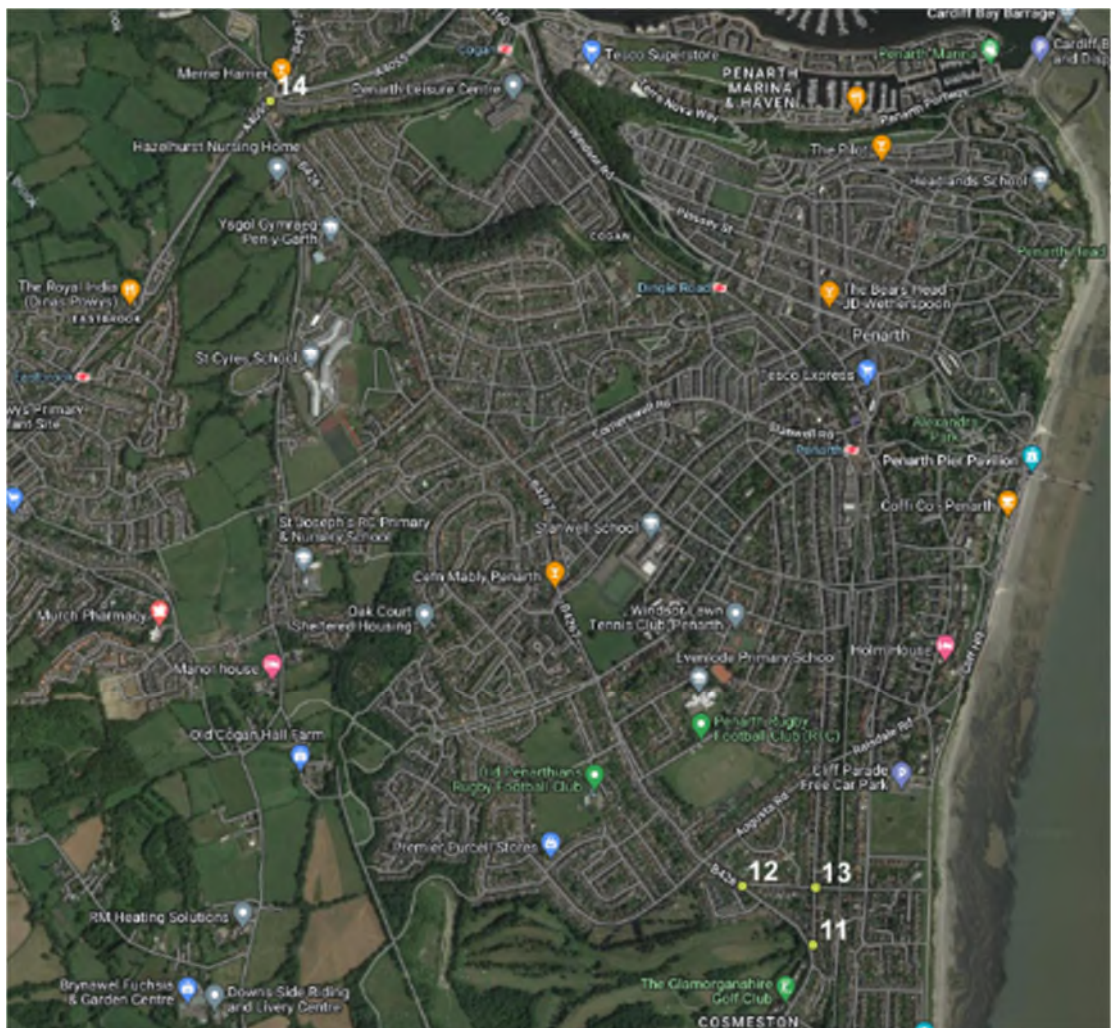


Figure 3.7: 2022 JTC Locations



Figure 3.8 2022 ATC Locations

3.1.52 The raw data of these 2022 counts are shown at **Appendix G**. For the purposes of this updated analysis the new base year for all junctions and calculations will be 2022.

3.1.53 These growth factors have been calculated using the TEMPro (v7.2) software, which considers growth in population, employment, and car ownership based on information derived from the National Trip Ends Model (NTEM) and the 2011 National Travel Survey. The growth factor between 2018 and 2022 is shown in **Table 3.3**.

Period	Level	Name	AM	PM
2018-2022	W02000244	The Vale of Glamorgan 008	1.0423	1.0423

Table 3.3: NTM growth factors

3.1.54 The base 2022 traffic flows for the study area are included in **Appendix H**

Highway Safety

3.1.55 This section of the report reviews collision data within the study area. This section of the TA has been amplified to address the comments of the Highway Authority on the previous TA's.

2015-2018

- 3.1.56 For the purposes of the PAC TA personal injury collision (PIC) data was obtained from www.Crashmap.co.uk for the most recent five-year period available for the study area. Analysis of this data informed the TA that accompanied the PAC. The Highway Authority recommended that further road safety analysis be undertaken which has been undertaken for this report.
- 3.1.57 A full data-set of collisions recorded in the same study cordon has been secured in 2020 from Welsh Government and as such the highway safety analysis that follows has been updated based on the 2020 data-set. This confidential data-set has included details of all factors and variables associated with the collisions.
- 3.1.58 The 2020 data-set includes collisions recorded during the period 2015 – 2019 and is understood to be the most current period for which data is attainable. It is considered that the data obtained for the year 2019 only includes the months of January – July, inclusively.
- 3.1.59 The study area for the collision data obtained from Welsh Government spans the length of the B4267 between the A4231/A4055/Sully Moors Road roundabout junction to the north west of the application site, to Llandough Hospital to the north of the application site.
- 3.1.60 The plot of the collision locations and the study area investigated is shown in **Figure 3.9 – 3.11** and summarised in **Table 3.3**.

Year	Collision Severity			Casualties
	Fatal	Serious	Slight	
2015	0	5	4	10
2016	0	1	9	14
2017	0	1	9	18
2018	0	0	9	12
2019	0	0	2	3
Total	0	7	33	57

Table 3.3: Summary of personal injury collision data

3.1.61 It is evident from **Table 33**, **Figure 3.9** and **Figure 3.10** that there has been a total of 40 collisions within the five-year period studied of which, 7 collisions were classified as serious and 33 as slight. There has been a total of 57 casualties as a result of the 40 collisions.

3.1.62 It is noted that no fatal collisions were recorded in the data-set provided by Welsh Government.



Figure 3.9: Serious Collisions recorded on the local road network (2015-2019)

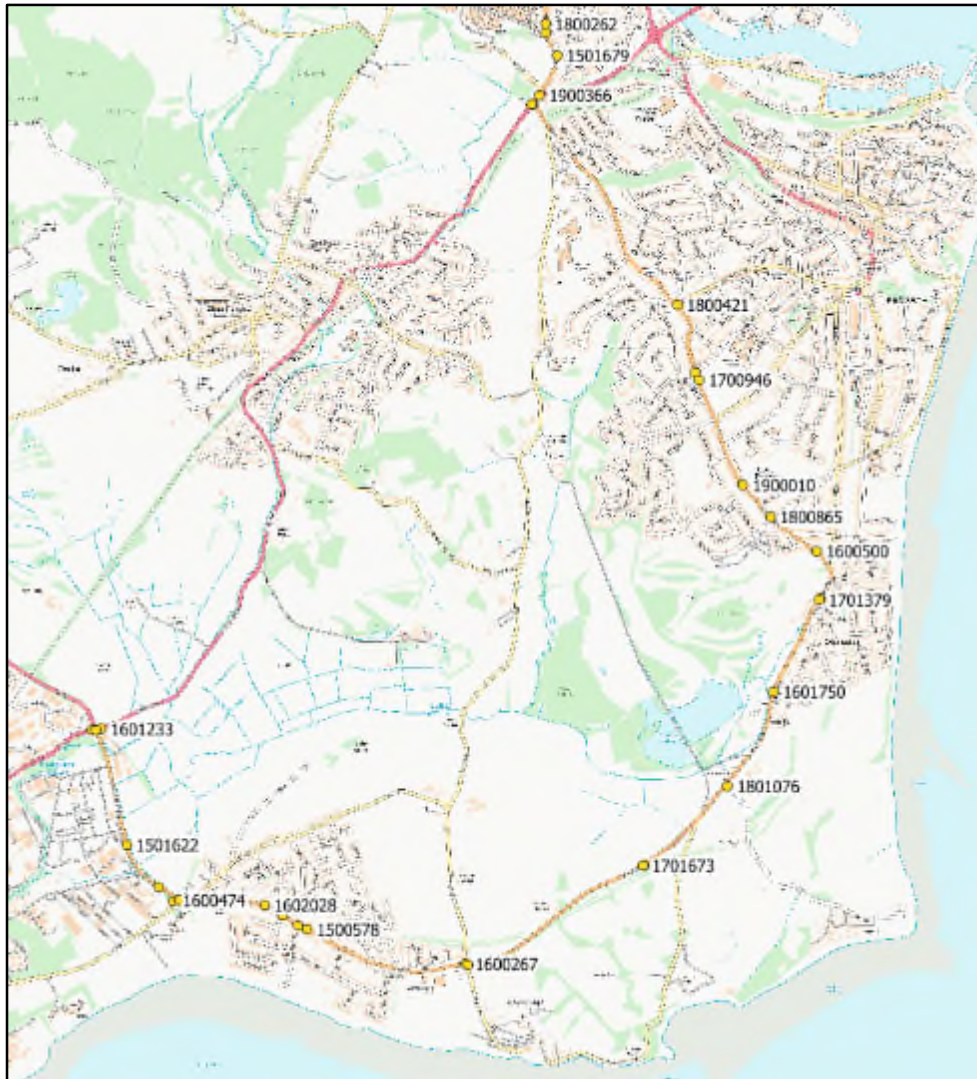


Figure 3.10: Slight Collisions recorded on the local road network (2015-2019)

Collisions involving Vulnerable Road Users

- 3.1.63 Of collision data-set analysed, 6 resulted in injuries to cyclists and 6 collisions involved injuries to pedestrians. As is evident from the collision plot included at **Figure 3.10**, these collisions are dispersed within the study area.
- 3.1.1 **Table 3.4** summarises the serious and slight collisions which involved NMUs reported within the study area.

Date & Time	Severity	Accident Reference	Description
06/03/2015 10:16AM	Serious	1500415	Elderly driver of V1 collided with pedestrian on zebra crossing.
24/05/2015 17:38PM	Serious	1500878	V1 has overtaken V2 on offside and turned left. V1 has struck V2 knocking rider off bicycle and onto floor causing injury.
13/07/2015 08:03AM	Serious	1501169	V1 collided with pedestrian who ran out into the road.
25/09/2015 17:13PM	Slight	1501679	V1 is a pedal cycle ridden by the injured person, (C1), 3/12/98. Whilst cycling downhill on Penlan Road, Llandough, intending to go to football training he lost control by travelling too fast and failed to negotiate the right hand bend.
11/04/2016 16:16PM	Serious	1600620	C1 has intentionally jumped in front of moving V1 (bus).
25/10/2016 08:27AM	Slight	1601750	C1 has crossed the road without looking and been struck by unknown V1. Driver stopped but C1 stated she was okay.
28/01/2017 19:52PM	Serious	1700179	V1 moved off when the lights changed at the crossroads when an intoxicated pedestrian jumped out in front of the vehicle and a collision occurred.
08/04/2017 15:07PM	Slight	1700582	V1 pedal cycle contravened red traffic light and travelled through the junction causing V2 to collide with it which was turning right.
19/09/2017 18:41PM	Slight	1701379	V1 turned right out of the golf club and collided with V2 pedal cycle.
14/07/2018 08:50AM	Slight	1801224	V2 a pedal cyclist has entered roundabout from Sully Moors Rd with intention of cycling around and back onto Sully Moors Rd when V1 approaching from south road and collided with cycle and has failed to stop.
23/08/2018 14:07PM	Slight	1801076	V1 pedal cycle was travelling along the pavement towards a t-junction. Whilst entering the road at the junction the rider was distracted by something on the opposite side of the road, could not brake in time and collided with the nearside of V2
06/12/2018 10:02PM	Slight	1900010	The driver of V1 stopped on the pavement. V1 then pulled forward and collided with two child pedestrians causing one to travel over the bonnet of the vehicle and the other making contact with the vehicle.

Table 3.4: NMU Collision details

3.1.2 **Figure 3.11 and 3.12** indicate the location of the serious and slight NUM collisions recorded on the highway network study area respectively.

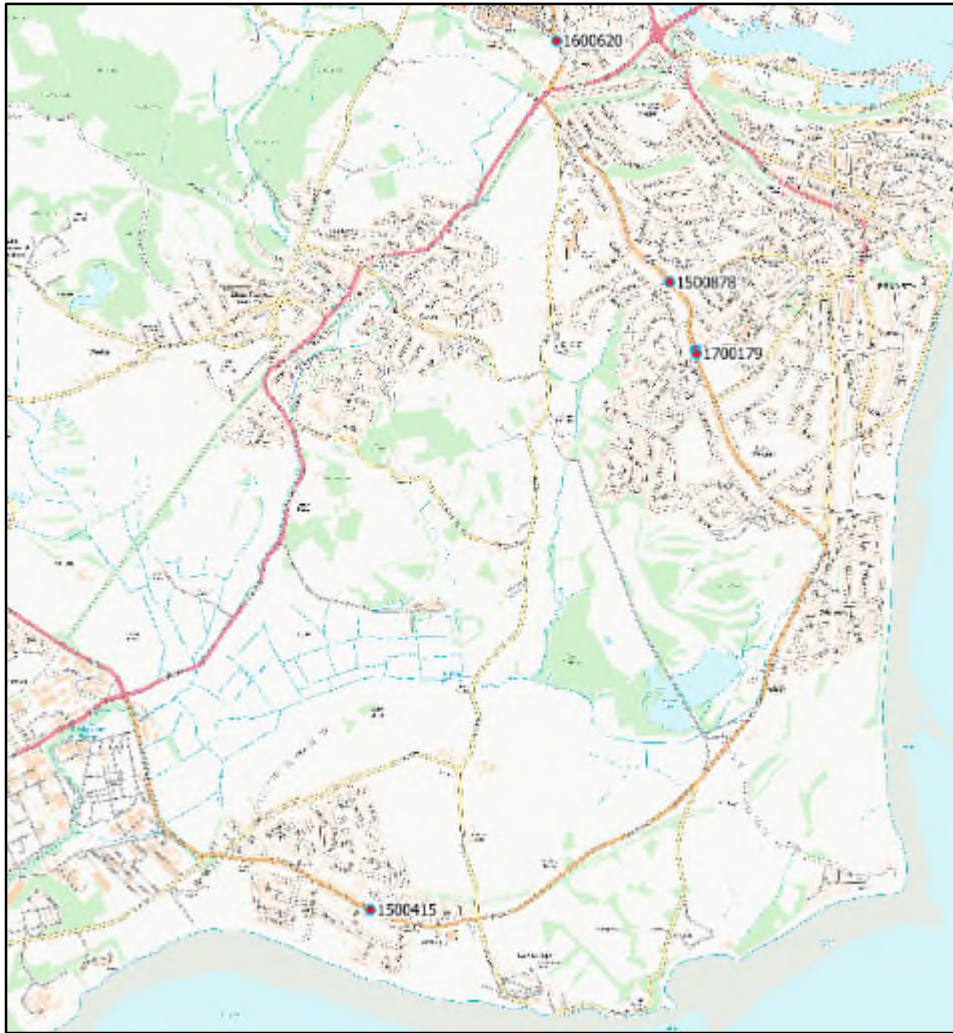


Figure 3.11: Serious NMU Collisions



Figure 3.12: Slight NMU Collisions

- 3.1.3 Having reviewed the description provided in the data-set, 3 of the 5 serious collisions appeared to result from pedestrians entering the carriageway without due care, although one of the collisions, 1600620 details that the pedestrian entered the path of a bus deliberately.
- 3.1.4 Collision 190010 involved a vehicle striking two child pedestrians resulting in the children sustaining slight injuries.
- 3.1.5 Of the 6 collisions involving cyclists 5 occurred at junctions, the sixth cyclist collision on Penlan Road resulted from the cyclist losing the control of the bicycle.

3.1.6 A review of the collision data for the five-year study period demonstrates that the surrounding area close to the proposed development does not experience any unusual collision patterns.

3.1.7 The majority of collisions were caused due to a driver's failure to pay proper attention. Most of the accidents were also concentrated on or around junctions which is to be expected due to the number of conflict points which occur as compared to link sections. As such, the analysis of accident records does not identify any significant patterns.

3.1.8 Based on the results of the collision data analysis it is considered that the development would not have a significant impact on the rate of collisions within the study area, over and above that which may be caused by an increase in traffic flows.

2019-2020

3.1.9 Further collision analysis has been undertaken in 2022 using data collected from Stats Wales which covers the period 2019 – 2020, the latest data available.

3.1.10 A summary of the collisions is below in **Table 3.5** and plotted in **Figure 3.14**.

Year	Slight	Serious	Fatal	Vehicles	Casualties
2019	3	1	0	9	5
2020	6	1	0	14	9

Table 3.5 Stats Wales Personal Injury Collisions

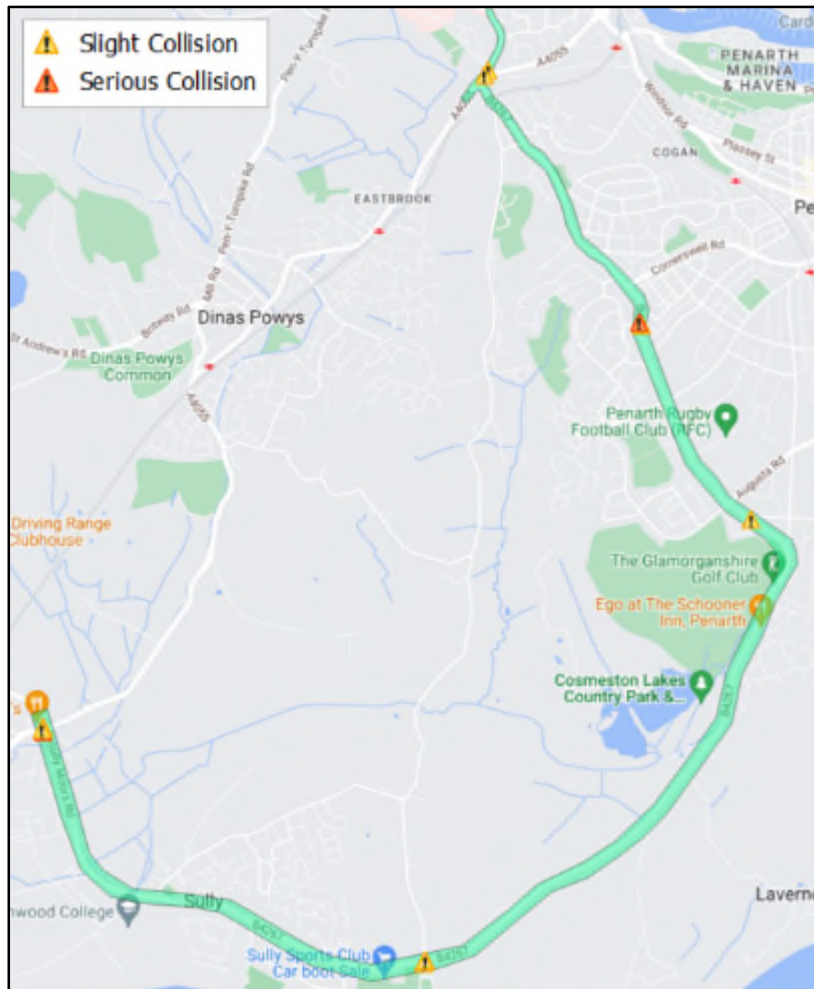


Figure 3.14 All Collisions recorded on the local road network (2019-2020)

- 3.1.11 The data shows that over the two-year period, there has been a total of 11 collisions; 9 slight collisions and 2 serious collisions.
- 3.1.12 Of the collisions in 2019, none involves casualties to pedestrians or cyclists and all involved cars. Of the collisions that occurred in 2020, none involved pedestrians but 2 collisions involve serious collisions.
- 3.1.13 To provide further detail of these collisions, data has been supplied by CrashMaps.co.uk. A summary of the attained data is summarised below in **Table 3.6**.

Date	Time	Severity	Accident Reference	Description
Monday, March 18, 2019	5:45:00 PM	Slight	2019621900366	Vehicle 1 collides with rears of vehicle 2 causing collisions with vehicle 3 & 4
Sunday, July 14, 2019	7:17:00 PM	Slight	2019621900953	Vehicle 1 turning right and collides with vehicle 2
Sunday, July 28, 2019	4:11:00 PM	Slight	2019621901016	Vehicle 1 front collision with the rear of vehicle 2
Monday, December 09, 2019	1:37:00 PM	Serious	2019621901606	Vehicle 1 collides with object on carriageway (bollard/refuge)
Tuesday, January 07, 2020	11:51:00 PM	Slight	2020622000106	Vehicle 1 collides with object on carriageway (lamp post).
Saturday, May 23, 2020	8:40:00 PM	Slight	2020622000481	Front end shunt for vehicles 1, rear shunt for vehicle 2 & 3.
Monday, September 14, 2020	3:34:00 PM	Slight	2020622000847	Vehicle 1 side collision with vehicle 2.
Thursday, October 29, 2020	11:02:00 AM	Slight	2020622000953	Vehicle 1 collides with object on carriageway (bollard / refuge). Vehicle 2 collision with vehicle 1.
Monday, November 23, 2020	12:55:00 PM	Slight	2020622001027	Collision involving car and pedal cycle. Neither vehicles impact.
Tuesday, November 24, 2020	7:16:00 AM	Serious	2020622001041	Collision involving car and pedal cycle. Vehicle 1 & 2 front point of contact.
Thursday, December 17, 2020	2:38:00 PM	Slight	2020622100029	Vehicle 1 turning right collided with vehicle 2 proceeding normally.

Table 3.6 Crash Maps Personal Injury Collisions 2019-2020

3.1.14 A full map of all collisions occurring from the period 2015-2020 has been plotted and is below in **Figure 3.13**. The data has been derived from a Stats Wales dataset.



Figure 3.13 Stats Wales Collisions (2015-2020)

4.0 DEVELOPMENT PROPOSALS

Land Use

- 4.1.1 It is proposed to construct up to 576 residential dwellings as well as a 1-form entry primary school on greenfield land located on the southern fringe of Penarth. The application also proposes community facilities of between 0.1-0.2 ha.
- 4.1.2 The planning application proposes a split of 50% privately owned dwellings (up to 288 dwellings) and 50% affordable dwellings (288).
- 4.1.3 Notwithstanding the fact the development proposals are outline at this stage, the proposed schedule of accommodation as detailed in the masterplan is set out in **Table 4.1**.

Accommodation Type	Area				Total
	1	2	3	4	
1 bed walk up flat	14	0	0	0	14
1 bed apartment	0	6	11	0	17
2 bed apartments	0	20	60	0	80
2 bed houses (semi/terrace/courtyard)	38	43	44	19	144
2 bed houses (detached)	0	0	7	2	9
3 bed houses (semi)	35	0	13	0	48
3 bed houses (terrace)	13	19	24	37	93
3 bed houses (detached)	0	28	28	2	58
4 bed houses (semi)	13	14	14	20	61
4 bed house (detached)	0	0	0	20	20
4/5 bed houses (detached)	0	0	0	32	38
Total	113	130	201	132	576

Table 4.1: Schedule of accommodation

- 4.1.4 As detailed in **Table 4.1**, the development proposes a varied mix of housing types across the site.
- 4.1.5 For the purposes of the TA, it has been assumed that the proposed primary school will accommodate 240 pupils. For the purposes of this assessment, the catchment area has been assumed to be the Plymouth and Sully Wards of the Vale of Glamorgan, located to the north-east/north-west and south-west of the site respectively.

- 4.1.6 At this stage, it is not known how occupation of the Primary School will be phased. However, for the purpose of this assessment it has been assumed that the school will be fully operational in 2027 with 240 pupils on roll.
- 4.1.7 Owing to the fact the application is outline, the development proposals are indicative at this stage and are subject to change during the reserved matters stage. However, it is envisaged that the general principles set out within the masterplan associated with this development will be retained within the final masterplan.
- 4.1.8 An indicative masterplan layout for the proposed development is shown in **Appendix I**. The indicative masterplan shows how the internal layout of the site works in terms of access for pedestrians, cyclists and vehicles.
- 4.1.9 The site is ideally located with regard to existing pedestrian/cycle links along Lavernock Road, Railway Walk and the coastal footpath, providing excellent active travel links to the wider area.
- 4.1.10 This is particularly the case with Railway Walk which, as set out previously, currently runs along the old railway cutting from the Penarth Town centre in a southerly direction and terminates to the north of the developments site boundary. This existing link is very well used by existing residents of the wider area and will play a key role in a providing direct, traffic free link from the proposed development site to Penarth rail station, Penarth Town Centre as well as convenient links towards secondary schools in the area.
- 4.1.11 Further details on the nature/surfacing of the roads, footways and appropriate traffic calming features will be shown within the detailed design engineering drawings.
- 4.1.12 The development will provide the necessary pedestrian and cyclist infrastructure within the site to encourage residents to walk and cycle, with 2m wide footways included on one or both sides of the carriageway across the site. Where appropriate, shared use private drives will also be included, prioritising the needs of pedestrians and cyclists over that of vehicles.

4.1.13 In order to maximise the sustainability credentials of the site, consideration of any provision/contribution via a Section 106 Agreement that could be made in order to promote and facilitate more sustainable journeys to/from the site will be considered during the planning determination process.

4.1.14 It is envisaged that possible Section 106 obligations could include facilities such as:

Nextbike Facility

4.1.15 Nextbike has recently been implemented in the city of Cardiff, which is a bike hire scheme providing access to 500 bikes from 50 docking stations across Cardiff allowing users to hire bicycles at a rate of £1 per 30 minutes, with a maximum daily charge of £10 per 24 hours.

4.1.16 The closest docking stations to the proposed development site is at Cosmeston Lakes.

4.1.17 It is understood that the provision of nextbike facilities is being considered for the wider area of Penarth and implementation of next bike will be investigated for this site. Given the proposed extension of NCN88, provision of a nextbike station within the development site would provide a sustainable and convenient mode of transport to travel directly from the site to Penarth Rail Station, which is some 2.5 km north of the site.

Improved Cycle Parking Facilities at Penarth Train Station

4.1.18 In order to encourage cycling as a sustainable mode of travel it is proposed to enhance the current level of cycle parking at Penarth Train Station.

Electric Car Club/Enterprise Car Club

4.1.19 Enterprise Car Club is a simplified car hire scheme allowing members to hire a range of cars and vans spread across an ever-increasing number of UK cities. Enterprise Car Club cars and vans are parked in their own designated bays and can be reserved for as little as half an hour, a day, or as long as needed.

4.1.20 The cars and vans are reserved via the Enterprise Car Club app, online or by phone in advance or at the last minute. You can access the vehicles using the app or an Enterprise Car Club access card.

- 4.1.21 Enterprise Car Club allows you to only pay for the time and distance you actually need a vehicle for, providing the convenience of using a vehicle, without the cost of owning and maintaining one. Enterprise Car Club can be hired from an hourly rate of £4, with a maximum daily charge starting at £32.35.
- 4.1.22 At the end of reservation, the vehicle is returned to the same designated bay it was picked up from.
- 4.1.23 Provision of Enterprise Car Club within the proposed development would be the first in this area of Penarth and would be of benefit to both residents of the proposals as well as the general public.

Car-share Club

- 4.1.24 Car sharing schemes such as Share Cymru www.sharecymru.carbonheroes.com allows users to register their regular journeys online to search for potential car sharers, cyclist and walkers. Sharing journeys saves money and reduces carbon footprint and congestion on the local highway network.

Additional Bus Services

- 4.1.25 In addition to the above, Section 106 obligations may be used to enhance the current level of bus service provision along Lavernock Road in order to increase frequency. In doing so, it is envisaged that an improved frequency of service will attract both new and existing residents onto busses, thereby potentially reducing the number of cars on the local road network and reducing the level of congestion witnessed along this corridor.
- 4.1.26 New bus stop provision is being investigated on the site's frontage to Lavernock Road and Section 106 funding may be allocated to improve current service provision.
- 4.1.27 The implementation of the Travel Plan will improve the sustainability of the site through promotion and raising awareness of more sustainable modes of travel. The Travel Plan includes modal share targets focused on increasing travel by sustainable and active travel modes. The implementation of the Travel Plan will be complemented by the infrastructure referred to above. The TP is mentioned in more detail in sub-section 4.8.

Pedestrian and Cycle Access

- 4.1.28 The proposed development will provide the necessary active travel infrastructure within the site to promote and encourage residents to walk and cycle as well as linking with the existing pedestrian/cycle links along Lavernock Road, Railway Walk and the coastal footpath.
- 4.1.29 Within the site itself, a sustainable community will be created that promotes active travel and positively connects with its immediate context giving priority to pedestrian movement. A pedestrian route linking the National Coastal Path and Cosmeston Lakes will also be established.
- 4.1.30 Walking and cycling will be promoted by effective implementation of the Travel Plan as a primary mode of transport for the residents of the new development. This will be facilitated by providing the necessary pedestrian and cycling infrastructure within the site to promote and encourage residents to walk and cycle by creating a network of interconnecting public open spaces throughout the site.
- 4.1.31 The key pedestrian access routes proposed as part of the development proposals are indicated in **Appendix J**, which identifies a number of access points to the existing coastal path that runs along the eastern boundary of the site will provided.
- 4.1.32 As mentioned previously, further enhancements include the extension of the existing NCN88 route through the site providing a direct active travel corridor from the site to Penarth Town Centre. As part of this consideration of the impact of lighting provision on the ecological environment will be investigated to allow for an increased perception of safety and security along the path during hours of darkness.
- 4.1.33 As part of the access proposals dropped kerbs and tactile paving are to be provided across both access junctions to allow pedestrians to utilise the footways along either side of the carriageway as indicated in **Appendix K**.
- 4.1.34 It is also proposed to provide a new signal-controlled Toucan crossing which will deliver a safe crossing location for pedestrians and cyclists wishing to access Cosmeston Lakes and the proposed new stop for north-bound bus services.

- 4.1.35 As such, it is proposed to provide footway on the western side of Lavernock Road, measuring approximately 2m in width, which will allow for those travelling on foot safe passage to and from the site and to allow greater ease of access to the northbound bus services and local amenities outlined in Figure 3.3 with greater ease.
- 4.1.36 It is estimated that the pedestrian provision outlined above will increase the ease at which pedestrians access the proposed bus stops.
- 4.1.37 Walking and cycling will be promoted as a primary mode of transport for the residents of the new development by implementation of the Travel Plan . Secure covered cycle storage facilities will be provided within the site for the exclusive use of the residents.
- 4.1.38 It is reasonable to assume that typical able-bodied people are capable of walking at least 2km for day to day activities. The thrust of current sustainability policy is that there will be an increasing propensity for people to use non-single car occupancy modes, of which walking is one. People will choose their mode based on their journey purpose, and it is reasonable to conclude that a proportion of journeys undertaken by residents will be on foot.
- 4.1.39 The propensity for people to walk or cycle depends on individual preferences and circumstances. These circumstances might include, for instance, the purpose of the journey, the attractiveness of it, and activity along the route, the weather, and the cost of alternatives.
- 4.1.40 The thrust of land use and transport policy is to promote and encourage the choice of walking and cycling above all else where travel needs to occur. Therefore, it is both reasonable to assume that walking is a viable and growing means of travel, and that new development, such as this one, should be designed to promote and encourage it.
- 4.1.41 In practice, the distance that any individual is likely to choose to walk depends on that individual and the circumstances, but it is fair to assume that over time, given current policies to encourage sustainable modes, the propensity for individuals to walk, and to walk further, will increase.

4.1.42 Sub-section 3.3 of this TA outlines The Chartered Institute of Highways and Transportation (CIHT) guidelines for walking.

4.1.43 The pedestrian links to Lavernock Road, the coastal footpath and the proposed extension of the cycle route along the old railway line offer direct pedestrian connection to the established network of routes towards local schools and public transport provision, as well as the retail offerings in Penarth Town Centre.

4.1.44 **Figure 4.2** shows the 15 and 30-minute walking isochrones from the centre of the proposed site which demonstrates that a proportion of Penarth is within an acceptable walking distance along with numerous facilities/amenities.

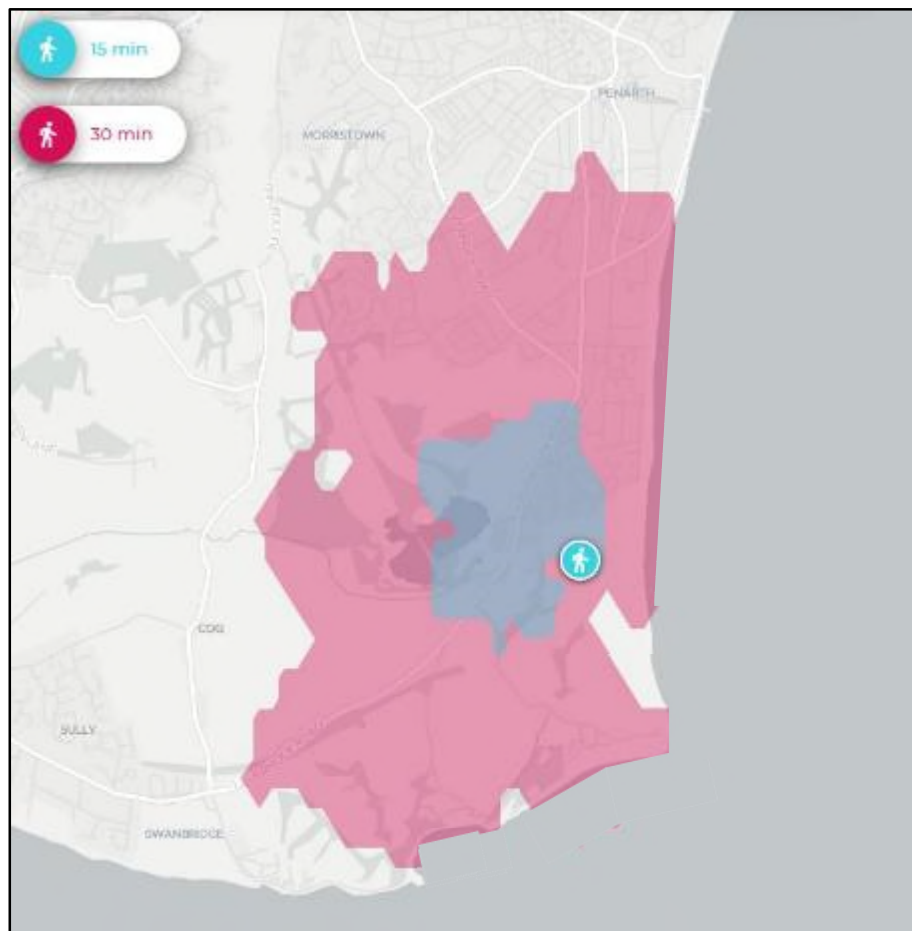


Figure 4.2: Walkable area within 15-30 minutes of the site (Source: TravelTime Maps)

4.1.45 **Figure 4.3** shows the area accessible by bicycle within 5km (30 minutes) of the site in accordance with the findings of both Sustrans and the now superseded PPG 13 policy which suggest that somewhere between 20-30 minutes is an appropriate time/distance for cycle commuting.

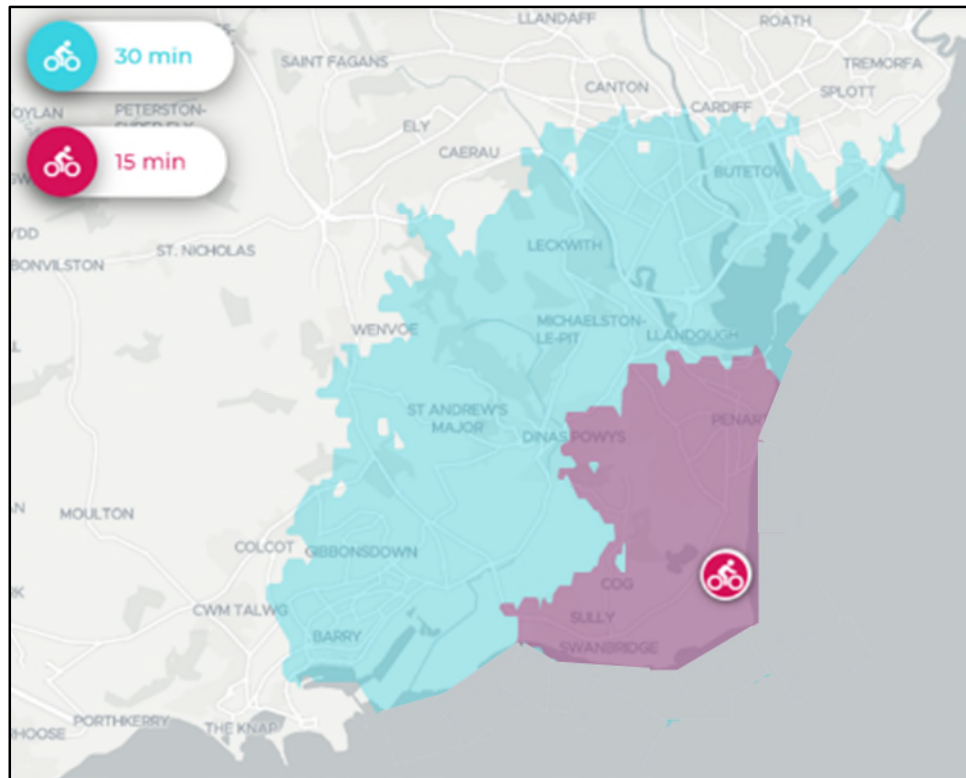


Figure 4.3: Cyclable area within 15-30 minutes of the site (Source: TravelTime Maps)

4.1.46 Figure 4.3 demonstrates that Penarth, Sully, Barry and a proportion of Cardiff are within acceptable cycling distance and time from the site.

4.1.47 The proximity of the site to proposed and existing bus stops enhances the sustainability of the site and conforms to local and national policy locating new developments close to public transport links and within walking distance of local facilities.

Travel Plan

4.1.48 A Travel Plan is a management tool designed to enable the users of a site to make more informed decisions about their travel. It aims to increase the attractiveness of travelling by more sustainable modes thus minimising adverse impacts of travel on the surroundings.

4.1.49 The implementation of a development-wide Travel Plan will improve the sustainability of the site through promotion and raising awareness of more sustainable modes of travel.

- 4.1.50 This is achieved by setting out a strategy for eliminating the barriers that prevent users of the site from using sustainable modes, within local policy aims. The Travel Plan will apply to both residents and visitors to the site.
- 4.1.51 The implementation of a well-designed, and properly managed Travel Plan can lead to an increase in the proportion of residents travelling by more sustainable modes.
- 4.1.52 An Interim Travel Plan for the proposed Primary School and a full Travel Plan for the residential element of the proposed development accompany the planning application. It is understood that their implementation will be incumbent on the school and on housing developers that may ultimately implement any planning permission granted.

Vehicle Access

- 4.1.53 As set out previously, the proposed development site is to be accessed via two ghost-island priority junctions along the western boundary of the site with Lavernock Road. Both will be constructed with dedicated right-turn lanes to relevant technical standards.
- 4.1.54 The Highway Authority noted in their response to the TA submitted with the PAC that 'The proposed access arrangement is considered acceptable in principle, subject to detailed design.'
- 4.1.55 Details of the proposed access design are indicated in **Figure 4.1**.
- 4.1.56 Both proposed access junctions have been spaced 135m apart, with the northernmost junction situated 75m south of the existing Cosmeston Drive junction.
- 4.1.57 The two main points of vehicular access to the site will also incorporate facilities for pedestrians and cyclist. A signal-controlled toucan crossing for both pedestrians and cyclists is proposed at the site's frontage to provide direct and safe access to Cosmeston Lakes. The crossing will also allow access to the north-bound bus services.

4.1.58 New bus stops are also proposed for services operating in both directions. The south-bound stop is now to be provided with a bus lay-by at the request of the Highway Authority.

4.1.59 These are also detailed on **Figure 4.1**.

Site Access Visibility

4.1.60 The required visibility splays to DMRB standards can be achieved for the existing 40mph speed limit of Lavernock Road. Notwithstanding, in order to maximise the sustainability credentials of the site, consideration of extending the 30mph in the village to beyond the site access will be considered at the reserved matters stage.

4.1.61 The required visibility splays at the proposed site access points are based on the sight stopping distance (SSD) of vehicles along the site frontage on Lavernock Road.

4.1.62 In accordance with the proposed speed limit of 30mph, the required SSD is 90m when applying technical guidance that is detailed in the Design Manual for Roads and Bridges.

4.1.63 Speed surveys in the vicinity of the proposed site access indicate that the 85th percentile speeds north and south-bound along Lavernock Road are 44.6 mph and 39.7 mph respectively.

4.1.64 Notwithstanding, it is proposed to extend the 30mph zone beyond the site access as part of the development proposals. This, in combination with the development proposals will change the nature of this section of Lavernock Road from its current rural form to that of a more urban nature which will inevitably encourage slower vehicle speeds and active travel.

4.1.65 As such, visibility splays have been based on Manual for Streets (MfS) standards for 30mph roads. **Appendix L** details a visibility splay of 2.4m 'x' distance by 90m 'y' distance to the north and south at both site accesses. It should be noted however, that sight-line dimensions in accordance with technical guidance contained within the Design Manual for Roads and Bridges can be achieved.

4.1.66 It can be seen from the diagram that the required visibility splays are accommodated within land owned by the applicant/highway authority.

4.1.67 Extending the 30mph zone beyond the site access could help promote and support improved sustainability links to local amenities, public transport infrastructure and help improve connectivity to the Active Travel routes in the area.

The need for Traffic Regulation Orders

4.1.68 The need for new traffic regulation orders for parking or other restrictions on Lavernock Road as a consequence of the development of the school will be assessed at reserved matters stage.

Service vehicle access

4.1.69 The proposed access points have been designed to accommodate a range of vehicles that are likely to service the site, including a 11.2m refuse collection vehicle (RCV) and a 11.3m bus.

4.1.70 As presented in **Appendix M**, swept-path analysis has been undertaken at each of the site accesses demonstrating that a refuse vehicle and bus can access and depart the site satisfactorily.

Road Safety Audit

4.1.71 The proposed access arrangement has been subject to a Stage 1 Road Safety Audit (RSA) which was undertaken on 12th June 2019.

4.1.72 The findings of the audit can be seen in **Appendix N**.

4.1.73 The recommendations included in the RSA have been taken into account and the access arrangement has been adjusted accordingly. This has included re-positioning the bus stops and a minor relocation of the proposed Toucan crossing as shown on Figure 4.1.

Construction Impact

- 4.1.74 As this is an outline planning application, the impact of construction traffic will be set out within a separate Construction Management Plan (CMP) which is anticipated to be required by way of a planning condition imposed on any permission granted.
- 4.1.75 The CMP will set out how the effect of construction traffic will be managed on the local highway network during the anticipated construction period. The purpose of a CMP is to ensure that the effect of construction traffic is mitigated against, particularly in relation to local residents and any air quality issues. The CMP seeks to control, the timings, routing and volume of traffic entering/leaving the site during the construction period.

Mitigation

- 4.1.76 As set out previously, in order to maximise the sustainability credentials of the site, consideration of any provision / contribution that could be made in order to promote and facilitate more sustainable journeys to/from the site.
- 4.1.77 In order to improve access from the site to the wider areas of Penarth, proposals for sustainable public transport links include the provision of new bus stops on Lavernock Road in the vicinity of the site's frontage.
- 4.1.78 The Masterplan has also been designed to allow for bus movement through the site.
- 4.1.79 In addition, the extension of the 30mph zone in the village to beyond the site access will be considered at the reserved matters stage in order to support improved sustainability links to public transport infrastructure and Active Travel routes.

Parking Provision

Car Parking

- 4.1.80 As stated previously, approval is sought for outline planning permission for both the residential element of the development and the proposed primary school. As such, details such as the exact parking numbers have not been finalised and will be detailed at the reserved matters stage.

- 4.1.81 Notwithstanding, parking at the development will be provided in accordance with the Vale of Glamorgan County Council's Supplementary Planning Guidance (March 2019).
- 4.1.82 At this stage, it is anticipated that an average of 1.7 spaces per dwelling will be provided across the Masterplan site. The Vale of Glamorgan's SPG details that the Authority will take into account a number of factors when assessing development's parking requirements. These include:
- Public Transport Accessibility
 - Availability of private buses, taxi services and car pooling
 - Accessibility to local goods and services
 - Highway safety implications
 - The production of a Travel Plan.
- 4.1.83 In compliance with the Vale's SPG, it is also anticipated to include Electrical Vehicle Charging Points (EVCPs) on all household driveways and to provide 5% of car parking spaces for flats and multiple occupancy dwellings with EVCPs.
- 4.1.84 **Table 4.2** below outlines the maximum number of car parking spaces that could be provided based on the adopted standards.
- 4.1.85 As identified in Table 4.2, a maximum of 1,539 car parking spaces could be provided in accordance with the Vale of Glamorgan's adopted parking standards. It is anticipated that the majority of spaces will be located on-plot or within dedicated parking courts.
- 4.1.86 Owing to the fact the planning application is outline, it is envisaged that the precise level of car parking provision will be detailed at the reserved matters stage. The Masterplan however proposes a lower level of parking than that permissible by way of full application of the Authority's maximum parking standards.

- 4.1.87 As part of any detailed application for either the primary school or the residential element associated with the site a car parking management strategy will be produced.
- 4.1.88 For the primary school this will include arrangements for pick up / drop off during the morning and afternoon peaks.
- 4.1.89 For the residential element, it is considered that the level of car ownership across the development and the package of active and sustainable travel infrastructure will influence parking demand at the application site.

Dwelling Type	Parking Standard	No. of units	Guidance Parking Provision
Primary School			
1 commercial vehicle space		N/A	1
1 space per member of teaching staff		TBC	30
3 visitor spaces		N/A	3
Residential – Houses			
1 bed	1 space per bedroom	31	31
2 bed	1 space per bedroom	233	466
3 bed	1 space per bedroom	199	398
4 + 5 bed	Maximum of 3 spaces	113	495
Visitor	1 space per 5 units	576	115
Total		576	1505
Total overall provision			1539

Table 4.2: Car parking provision

Car Ownership Rates – location – 2011 Census data

- 4.1.90 The most recent evidence of car ownership rates can be obtained from the 2011 Census and is consistent with the findings of the Government's *2007 Residential Car Parking Research*.
- 4.1.91 Dwelling size and type are major factors in determining car ownership levels. Census and survey data show that car ownership among occupiers of flats is normally lower than that for houses.
- 4.1.92 **Table 4.3** provides data obtained from the 2011 census, setting out car ownership based on the size of households within the middle layer census ward that includes Cosmeston.

Cars - 2011	Households (no.)	Households (%)
No cars or vans in household	594	14
1 car or van in household	1837	43
2 cars or vans in household	1446	33
3 cars or vans in household	332	8
4 or more cars or vans in household	109	3
All categories: Car or van availability	4318	100

Table 4.3: 2011 Census car ownership – Cosmeston

4.1.93 As such, within the middle layer census ward identified above, 57% of households have access to 1 car or fewer, 33% have access to 2 cars and only 8% with access to 3 cars or more.

Cycle Parking

4.1.94 Cycle parking at the proposed development will be provided in accordance with the Vale of Glamorgan’s adopted parking standards. Note 6 of Appendix 4 of the cycle parking standards states:

‘All residential developments must be accessible by cycles and cycle storage must be a factor of dwelling design. In appropriate circumstances, convenient communal facilities may be provided.’

4.1.95 As such, cycle Parking is to be provided for all houses and will be incorporated in dwelling design.

Phasing of Development

4.1.96 As set out previously, it is envisaged that the proposed development will be developed as four separate areas, as detailed below:

- Area 00: Community Sports Pitch & 1 Form Entry Primary School
- Area 01: Lakeside Crescents – 113 dwellings;
- Area 02: Limestone Terraces – 127 dwellings;
- Area 03: Garden by the Sea – 200 dwellings; and,
- Area 04: Marconi’s Vistas - 132 dwellings.

4.1.97 Owing to the fact this planning application is outline, the end developer is not known at this stage, the level of build rate is unknown. However, for the purpose of this assessment a number of assumptions have been made on the number of houses built per year as detailed in section 6 of this TA.

5.0 TRANSPORTATION IMPLEMENTATION STRATEGY

Overview

- 5.1.1 This chapter details a Transport Implementation Strategy (TIS) for the proposed development in line with the guidance specified in TAN 18.
- 5.1.2 To address and manage the impacts associated with the proposed development, this section presents mitigation measures that will be implemented at the new development to encourage sustainable travel and to address issues associated with private car use.
- 5.1.3 The TIS should set a framework for monitoring the objectives and targets, including the future modal split of transport to development sites.
- 5.1.4 TAN 18: Transport (2007) details that a TIS is intended to achieve three things:
- Identify what policy objectives and requirements are set by the development plan in terms of access to the development and movements in and around the site;
 - Identify what access arrangements are required for a successful development (meeting the needs of the developer, end user, addressing impacts on neighbours and existing movements surrounding the site); and
 - Specify the package of physical, management and promotional measures needed to accommodate the requirements identified above, such as physical infrastructure, the design and location of buildings, parking management, financial incentives and dedicated travel plan co-ordinators.
- 5.1.5 It is considered that the proposed access strategy and wider integration with local transport networks is consistent with the objectives and requirements of the local development plan.

5.1.6 The transport planning of the proposed development has integrated the objectives of the Travel Plan with the physical design of the masterplan. The views offered by the public during the public consultation event on 1 April 2019 have been accounted for in the Masterplan evolution. There was a desire for improved bus and cycling infrastructure articulated by some members of the public.

5.1.7 The aim of a TIS is to simultaneously promote sustainable modes of transport such as walking, cycling and public transport, while minimising the number of single occupancy car trips to and from the site. The Travel Plan is a specified component of the TIS.

Objectives and Targets

5.1.8 As part of the Travel Plan, the development will need to develop a set of objectives that the implementation of the plan will be trying to achieve.

5.1.9 These could include objectives around trying to reduce private car use and encouraging more residents, pupils and staff to walk or cycle to employment and education. Targets can then be identified to act as indicators of how successful the development is being in achieving the objectives.

5.1.10 The existing mode splits for journeys to work for Cosmeston, the Vale of Glamorgan and Wales as a whole have been presented in **Table 5.1** below. The data has been taken from the 2011 Census data using the QS701EW table. It should be noted that 'not in employment' figures have been excluded from **Table 5.1**.

5.1.11 Table 5.1 provides an estimate of the baseline mode split for all journey to work in the area. Consequently, aims and objectives of the TIS can be derived from this baseline.

5.1.12 The baseline demonstrates that the majority of residents within Cosmeston (71.9%) currently drive to work. This figure is higher than the current amount who drive to work in the Vale of Glamorgan and Wales as a whole (68.9% and 67.4% respectively).

Method of Travel to work	Cosmeston	Vale of Glamorgan	Wales
Work mainly at or from home	5.7%	5.2%	5.4%
Underground, metro, light rail, tram	0.1%	0.1%	0.1%
Train	4.6%	5.5%	2%
Bus, minibus, coach	3.9%	2.7%	4.6%
Taxi	0.3%	0.5%	0.5%
Motorcycle, scooter or moped	0.5%	0.6%	0.6%
Driving a car or van	71.9%	68.9%	67.4%
Passenger in a car or van	5.0%	5.8%	6.8%
Bicycle	2.2%	1.4%	1.4%
On foot	4.9%	8.6%	10.6%
Other method of travel to work	0.8%	0.7%	0.6%

Table 5.1: 2011 Census Data: Travel to work

- 5.1.13 The proportion of active travel work journeys in Cosmeston are lower than those in the Vale of Glamorgan and Wales as a whole. Table 5.1 outlines that 7.1% of commuters in Cosmeston travel to work on foot or by bicycle, whereas the same journeys account for 10% and 12% in the Vale of Glamorgan and Wales respectively.
- 5.1.14 Public transport journeys (those undertaken by train, bus, mini bus or coach) in both Cosmeston and the Vale of Glamorgan account for 8.5% and 8.2% respectively.
- 5.1.15 Suggested targets are provided in **Table 5.2** which are based on achieving a reduction in car use, offset by an increase in walking and cycling to reflect the significant infrastructure improvements the development will deliver.
- 5.1.16 The measures responsible for achieving the targets presented above are outlined within the following strategies:
- Walking Strategy (Section 5.2)
 - Cycling Strategy (Section 5.3)
 - Public Transport strategy (Section 5.4)

Objective	Target	Base	Mode share target		
			Year 1	Year 2	Year 5
Reduce the proportion of SOV trips to and from the site	To reduce the mode share for car drivers	72%	69%	67%	62%
	To increase the mode share for car passengers	5%	6%	7%	8%
Increase the proportion of walking and cycling trips to and from the site	To increase the mode share for walkers	5%	5.5%	6%	7%
	To increase the mode share for cyclists	2%	2.5%	3%	4%
Increase the proportion of public transport trips to and from the site	To increase the mode share for rail	5%	5.5%	6%	7%
	To increase the mode share for bus	4%	4.4%	5%	6%
Enable occupiers to make informed decisions about how and when they travel for all trips to and from the site	Every new occupier to receive travel Information within one month of occupation	100%	100%	100%	100%

Table 5.2: Modal split targets

5.1.17 Not only does the TIS seek to encourage shifts towards sustainable transport within the proposed development, but within neighbouring communities to ensure sustainable connectivity between residential clusters in the area.

5.1.18 There are four key stages to creating a socially inclusive community, which in turn encourages non-motorised and sustainable travel. These are:

- Design
- Choice
- Behaviour
- Network Management

Design

- 5.1.19 Through designing, communities that are conducive to pedestrian movement, the use of the private vehicle can be minimised.
- 5.1.20 Walkable communities are ones which prioritise pedestrian safety through sufficient street lighting, lower traffic speeds, improved footway provision and mixed-use developments. These communities prioritise the needs of pedestrians over those of private vehicles.
- 5.1.21 In the process of designing these communities, residents have the opportunity to enhance their social capital through engaging with neighbours. As a result, the natural instinct may not be to drive longer distances to recreational activities.
- 5.1.22 Rather, the natural instinct may be to travel shorter distances (ones which may be bridged via active and healthy modes) to interact with friends or partake in recreational activities.

Choice

- 5.1.23 Providing residents with a range of travel options minimises reliance on private vehicles. Through expanding the range of travel options to residents the risk of social exclusion induced by private travel is curtailed.
- 5.1.24 Providing residents with a choice of travel options ensures that contributing to road congestion is a personal decision as opposed to a necessity. Additionally, 'choice' increases the propensity to shift towards a cleaner mode of transport.

Behaviour

- 5.1.25 Educating residents on their travel behaviour may also minimise car dependency. As awareness increases regarding the consequences to certain travel options, the likelihood of shifts to more sustainable modes of transport increases.

Network Management

- 5.1.26 In order to promote more sustainable communities, it is important to consider network capacity. Car travel, for example, per person occupies the greatest proportion of the carriageway. Consequently, private vehicles are the least efficient use of the carriageway.
- 5.1.27 Promoting public and/or active travel, however, can be used to maximise the capacity of the highway network. Each strategy for the development will now be detailed in turn.

Walking Strategy

- 5.1.28 Walking is a core component of active travel, therefore playing a vital role in the success of sustainable transport strategies.
- 5.1.29 As mentioned previously, the likelihood of walking depends on a range of personal factors. Such factors may include the purpose of that journey, the weather, physical capability or the costs of alternative modes of transport to name but a few.
- 5.1.30 Within modern land-use and transport policy, walking and cycling (in areas where transport needs to occur) are placed at the core of concerns. As part of a new development such as this one, it is reasonable to assume that the same principles may apply.
- 5.1.31 According to the 2014 Travel to School Survey, around 75% of primary school children walk under 1 mile to school (1.6km) and around 25% walk between 1 and 2 miles to school (approximately 1.6 – 3.2km). Similarly, the 2014 Travel to School Survey states that over 75% of secondary school children walk under 1 mile to school, and over 50% walk between 1 and 2 miles. The nearest primary school to the development is located approximately 2.1km walking distance from the site, whereas the closest secondary school is located approximately 2.5km from the site. Consequently, it may be assumed that a reasonable number of trips to school will be made by active modes.

- 5.1.32 It is also noted that a school is proposed as part of the development, further supporting the notion that a reasonable amount of school trips may be made via sustainable modes on completion of the scheme.
- 5.1.33 It can be anticipated that emphasis on sustainable travel within transport policy may encourage an increase in the amount who travel on foot.
- 5.1.34 Sustrans state that only two in five short journeys (under 5 miles) are made on foot, bike or public transport. The remainder of these journeys are made by car. While it is acknowledged that it is necessary to make some short journeys by car (those that involve carrying heavy shopping), a large proportion of journeys can be made on foot and therefore contribute towards a sustainable transport strategy.
- 5.1.35 The benefits of walking include:
- A boost to the economy through a cheaper infrastructure;
 - Positive health outcomes via a cheap and convenient form of exercise;
 - Relieving congestion on the road network; and
 - An improvement in air quality.

The Proposed Development

- 5.1.36 In order to encourage travelling on foot to, from and within the development, scheme proposals include:
- A Toucan crossing to be located centrally between the two proposed access points and footway provision on the western side of Lavernock Road to allow access to Cosmeston Lakes and the north-bound bus stop;
 - The continuation of an existing active travel route (NCN88) on a north-south axis through the development site;
 - The provision of new bus stop infrastructure to current accessibility standards;

- New links to Whitcliffe Drive.

Travel Plan

- 5.1.37 Accompanying this Transport Assessment as part of the outline planning application is a Travel Plan, detailing the opportunities to walk and cycle to-from and within the development. It also encourages public transport use by residents of and visitors to the site.
- 5.1.38 A framework Travel Plan has also been prepared for the single-from entry Primary School and this accompanies the planning application.

Summary

- 5.1.39 The walking strategy above has outlined the potential of walking as a mode of transport in spearheading a sustainable transport strategy, providing walking is presented as the most efficient mode of transport over short distances.
- 5.1.40 The design and layout of the proposed development, supported by this walking strategy and the travel plan referenced above, will facilitate and promote the option of walking as a mode of transport. Prioritising walking as a mode of transport will foster healthier and more socially inclusive communities in which people can live, work and play.
- 5.1.41 In addition, the proposed Toucan crossing provides the development with better connectivity with Cosmeston Lakes.

Cycling Strategy

- 5.1.42 A range of factors influence the distances that people are prepared to cycle – such as journey purpose, cycling conditions and physical ability to name but a few. Statistics published in 2017 reveal that in cities such as Copenhagen, 41% of all trips to work and study are made via bicycle. In the UK, cities such as London and Bristol are examples of where the amount cycling to work or education is gradually increasing.
- 5.1.43 There is no specific guidance on comfortable cycling distances, however Sustrans imply that up to 5 miles is an appropriate distance.

5.1.44 The DfT LTN 1/04 – Policy, Planning and Design for Walking and Cycling state that the average length for cycling journeys is 4km (2.4 miles) however people will cycle up to three times this distance for other purposes.

5.1.45 At a speed of 15km/h (approximately 9mph), a distance of between 7.5km and 11.25km may be reached.

Proposed Development

5.1.46 To encourage cycling to, from and within the site, as previously outlined, proposals include an extension of the existing NCN route 88 which ends abruptly to the north of the site to date.

5.1.47 Active Travel routes are proposed within the LDP and are to be located through the middle of the proposed development and along the east of Penarth to follow the coast and link the proposed development to Cardiff Bay.

5.1.48 Additionally, each dwelling will have convenient cycle storage, which will further encourage the use of bicycle in the development.

Summary

5.1.49 The existing cycle network in the vicinity of the site, as previously outlined, is reasonable to the north of the site. The existing network provides passage along the coast to Penarth. Proposals to extend this network will provide residents with increased sustainable travel options, that is, to travel sustainably to the south.

Public Transport Strategy

5.1.50 The site will be designed to provide residents with improved access to bus services along Lavernock Road.

5.1.51 The planning application proposes to provide new bus stops in the vicinity of the site frontage and the masterplan has also safeguarded land within the site to allow for future bus service penetration into the site at an appropriate date.

Travel Plan

- 5.1.52 Accompanying this Transport Assessment as part of the outline planning application are 2 Travel Plans, one for the school use and another for the residential development. These detail the opportunities to use active travel and public transport services to travel to and from the development.
- 5.1.53 The implementation of the Travel Plans is seen as key to the successful delivery of the Transportation Implementation Strategy.

Summary

- 5.1.54 The principal of the TIS is to detail the core values of the development behind encouraging shifts towards more sustainable and active modes of transport. The TIS proposes a package of physical infrastructure measures such as active travel routes on identified desire lines, improved public transport accessibility, and demand management in the form of restrained parking provision for elements of the development.

6.0 TRANSPORT CHARACTERISTICS

Introduction

6.1.1 This section of the report outlines the likely volumes of traffic generated by the proposed development and identifies the likely impact of the proposals on the surrounding network.

6.1.2 As has been detailed in the preceding section of the report, the planning application seeks permission for the development of up to 576 residential dwellings as well as a 1-form entry primary school.

Trip Generation

6.1.3 The trip generation for the proposed residential development and primary school have been obtained from the TRICS 7.5.4 trip generation database.

6.1.4 It should be noted that average trip rates have been utilised to predict trip generation for the proposed residential and primary school associated with the development. Justification of this approach is detailed below.

6.1.5 The current land use and transport policy context in Wales is not to predict and provide for movement by the private car. On the contrary, the transport hierarchy detailed in Planning Policy Wales places all other travel modes above that of the private car, which the development proposals for this site advocate.

6.1.6 The filtering applied during the interrogation of TRICS resulted in 12 comparable sites. The TRICS Good Practice guidance states that 20 sites should be selected if trying to achieve an 85%ile trip rate.

6.1.7 As such, there are insufficient sites within TRICS to generate an 85th percentile trip rate.

6.1.8 In addition, a comparison of local trip rates has been undertaken to gain an understanding of the level of trips generated by existing housing within the vicinity of the site indicates that the average trip rates generated from TRICS are actually a worst-case compared with the local trip rates identified. Details of the local trip rates are analysed later on within this section of the TA.

6.1.9 Therefore, the use of average trip rates is considered both robust and appropriate for the scale/nature of the development proposals.

Consideration of active travel/public transport provision

6.1.10 In addition to the above, the trip generation flows associated with the development proposals have been suppressed to take into account the following active travel provision/bus enhancements/Travel Plan and Metro proposals.

6.1.11 Based on the active travel provision/bus enhancements and Travel Plan proposed as part of the development proposals as well as the future Metro proposals in the area, trip generation rates associated with the residential development have been reduced by 10%.

6.1.12 This reduction is deemed as both robust and appropriate given the level of enhancements proposed as part of the development proposals.

Phasing of the Development

6.1.13 As set out previously, it is envisaged the development will be built in a number of phases. In order to relate this to the assessment years, the following occupation has been assumed:

- 2019 Baseline – no development;
- 2027 – 260 residential dwellings occupied plus operational 1 form entry Primary school;
- 2032 – 576 residential dwellings occupied plus school.

6.1.14 It should be noted that the trip rates for the assessment years have been calculated based on a 10% reduction in order to take into account the proposed significant active travel/bus enhancements/metro improvements and effective implementation of the Travel Plan.

Residential – 576 dwellings

6.1.15 Sites from the database have been selected on the basis of the following criteria:

- Land use: Residential – Mixed private/affordable housing;

- Survey days: Monday-Friday;
- Number of units: 93 to 500 units; and,
- Location of development: UK, excluding Greater London, Northern Ireland and Republic of Ireland.

6.1.16 The multi-modal trip generation for the proposed residential element of the development is outlined in **Table 6.1, Table 6.2 and Table 6.3** below and the full TRICS output is included in **Appendix O**.

Peak period	Trip rates			Vehicles		
	Arrive	Depart	Total	Arrive	Depart	Total
2027 – 260 dwellings (including 10% reduction for active travel)						
0800-0900	0.139	0.372	0.511	33	87	120
1700-1800	0.314	0.153	0.467	73	36	109
2032 – 576 dwellings (including 10% reduction for active travel)						
0800-0900	0.139	0.372	0.511	72	193	265
1700-1800	0.314	0.153	0.467	163	79	242

Table 6.1: Vehicle trip generation – Mixed private/affordable dwellings

6.1.17 In 2027, it is predicted that 260 residential dwellings could generate 120 vehicle movements (two-way) in the AM peak period and 109 vehicle movements (two-way) in the PM peak period (minus 10% for active travel/public transport improvements).

6.1.18 By 2032, when it is assumed that the development could be fully built out and 576 residential dwellings could generate 265 vehicle movements (two-way) in the AM peak period and 242 vehicle movements (two-way) in the PM peak period (minus 10% for active travel/public transport improvements).

Peak Period	Trip Rates			Pedestrians		
	Arrive	Depart	Total	Arrive	Depart	Total
0800-0900	0.030	0.151	0.181	17	87	104
1700-1800	0.051	0.027	0.078	29	16	45

Table 6.2: Pedestrian trip generation – 576 mixed private/affordable dwellings

6.1.19 It is evident from **Table 6.2** that, based on a development of 576 dwellings, the development could generate up to 104 pedestrian movements (two-way) in the AM peak period and up to 45 pedestrian movements (two-way) in the PM peak period.

Peak Period	Trip Rates			Cyclists		
	Arrive	Depart	Total	Arrive	Depart	Total
0800-0900	0.002	0.010	0.012	1	6	7
1700-1800	0.010	0.006	0.016	6	3	9

Table 6.3: Cyclist trip generation – 576 mixed private/affordable dwellings

6.1.20 It can be seen from **Table 6.3** that, in total, the proposed development could generate up to 7 cyclist trips (two-way) in the AM peak period and up to 9 cyclist trips (two-way) in the PM peak period.

6.1.21 Notwithstanding the above, it is envisaged that the level of cycling trips generated by the development proposals would in reality be much higher for this development given the level of new cycle infrastructure provided, linking in with NCN 88 providing a direct link with Penarth train station and Penarth Town Centre.

6.1.22 In addition, it is envisaged that the existing provision of a Nextbike station at Cosmeston Lakes and possibly a new station within the site will further encourage cycle trips to and from the development.

Local Trip Rates

6.1.23 In addition to the trip rates derived from TRICS, local trip rates have been assessed to gain an understanding of the level of trips generated by existing housing within the vicinity of the site.

6.1.24 The housing provision accessed off Cosmeston Drive totals 364 residential dwellings and is served off one access junction, located approximately 220m from the northern boundary of the proposed development.

6.1.25 The trips rates for Cosmeston Drive have been calculated by factoring the number of vehicles arriving and departing Cosmeston Drive during the AM and PM peak periods by the number of dwellings (364).

Peak Period	Trip Rates			Vehicles		
	Arrive	Depart	Total	Arrive	Depart	Total
0800-0900	0.100	0.379	0.479	58	218	276
1700-1800	0.329	0.120	0.449	189	69	258

Table 6.4: Vehicle trip generation for 576 dwellings using locally calculated trip rates

6.1.26 It is evident from Table 6.4 that, based on 576 residential dwellings, using the local trip rates the development could generate 276 vehicle movements (two-way) in the AM peak period and 258 vehicle movements (two-way) in the PM peak period.

6.1.27 It is noted that the adjusted trip rates as derived from the TRICS database are very similar to those of the locally derived trip rates detailed in Table 6.4 above.

6.1.28 The trip rates derived from the TRICS database have been validated against local (vehicular) surveys undertaken, which show 11 and 15 greater vehicle movements in the AM and PM peaks respectively as calculated from local surveys compared with those derived from TRICS.

6.1.29 It is considered that the derived trip rates with the 10% reduction factor are robust and in reality with current Welsh Government policy objectives the traffic generation of the completed development will be less than forecast.

Primary School – 240 pupils

6.1.30 The development proposes to provide a single-form entry Primary School with a capacity of up to 240 pupils.

6.1.31 Sites from the database TRICS have been selected on the basis of the following criteria:

- Land use: Education – Primary;
- Survey days: Monday-Friday;
- Number of pupils: 92 to 531 and,
- Location of development: UK, excluding Greater London, Northern Ireland and Republic of Ireland.

6.1.32 It should be noted that only 2 of the sites identified within the TRICS analysis have Travel Plans, whereas the proposed primary school will have a Travel Plan established from its outset. As such, the trip rates used are considered to be worst-case.

Internalisation of primary school trips

6.1.33 There is no provision for a secondary school on the proposed development site, as such, all secondary education trips will be external to the site. However, owing to the fact a primary school is proposed within the development site, which is envisaged to be built by 2027, a number of education trips will be internalised from within the residential development with primary school aged children.

6.1.34 It is envisaged that a number of internal trips will be made by residents with Primary school aged children within the development itself, as well as from dwellings within Cosmeston Drive, Upper Cosmeston Farm and the 24 residential dwellings at the southern end of Whitcliffe Drive.

6.1.35 For the purposes of this analysis an arbitrary and reasonable internalisation factor of 10% has been applied to the derived Primary School TRICS trip rates.

6.1.36 While a certain proportion of residential trips will be to/from the proposed new Primary School located within the development site no reduction has been applied for the purposes of this analysis.

6.1.37 The vehicular trip generation for the proposed primary school is therefore outlined in **Table 6.5** below and the full TRICS output is included in **Appendix P**.

Peak period	Trip rates			Vehicles		
	Arrive	Depart	Total	Arrive	Depart	Total
0800-0900	0.238	0.161	0.399	51	35	86
1700-1800	0.018	0.033	0.051	4	7	11

Table 6.5: Vehicle trip generation – primary school – 240 pupils

6.1.38 It can be seen from Table 6.5 that the proposed 1-form entry primary school could generate up to 86 two-way vehicle movements in the AM peak period and up to 11 two-way vehicle movements in the PM peak period.

Total Trip Generation

6.1.39 The total vehicle trips generated by the proposed residential element of the development and 1

6.1.40 -form entry primary school are detailed in **Table 6.6** below.

Peak period	Vehicles		
	Arrive	Depart	Total
2027 – Residential (260 units) + school			
0800-0900	84	122	206
1700-1800	77	43	120
2032 – Residential + school			
0800-0900	123	228	351
1700-1800	167	86	253

Table 6.6: Total vehicle trips generated

6.1.41 It can be seen from the table above that the proposed development is predicted to generate a maximum of 336 vehicles two-way in the AM peak period and 246 vehicles two-way in the PM peak period in 2032.

Future Year Base Traffic Flows

6.1.42 To take account background traffic growth on the local highway network within the vicinity of the site between the 2022 Base Year and the 2027 and 2032 future years, growth factors have been applied to the 2022 base year flows.

6.1.43 These growth factors have been calculated using the TEMPro (v7.2) software which extracts the relevant growth factors from the National Trip End Model (NTEM).

6.1.44 The study area assessed within this TA falls within the geographical area of MSOA The Vale of Glamorgan 008.

6.1.45 TEMPro guidance specifies that the growth factors for individual areas are derived from forecasts at a local authority level which are informed by allocated housing and employment sites within the associated local development plans. The following developments, which are included as part of the current Vale of Glamorgan LDP proposals, have therefore been removed from the future year data:

- 1) Land at Upper Cosmeston Farm – 576 Dwellings (this application)
- 2) Land West of Swanbridge Road, Sully – 325 dwellings (2013/01279/OUT)

6.1.46 This reduces the potential for double counting of traffic flows associated with considering specific committed development sites which are also included in the TEMPro growth factors.

6.1.47 This level of household reduction has been applied to The Vale of Glamorgan as an overall district and then split proportionally over all MSOA areas, based on the housing numbers within TEMPro for each MSOA area in the entire of The Vale of Glamorgan.

6.1.48 The TEMPro alternative assumption calculations have been set out in **Appendix Q**. The factors, which have been applied to the 2018 and 2022 observed base year flows, are identified in **Table 6.7** below.

Period	Level	Name	AM	PM
2018-2027	W02000244	The Vale of Glamorgan 008	1.0841	1.0863
2018-2032	W02000244	The Vale of Glamorgan 008	1.1208	1.1238
2022-2027	W02000244	The Vale of Glamorgan 008	1.0402	1.0422
2022-2032	W02000244	The Vale of Glamorgan 008	1.0753	1.0782

Table 6.7: NTM growth factors

6.1.49 The 2027 and 2032 future year base traffic flows are set out in **Appendix R**.

Committed Development

6.1.50 As set out previously, the following schemes have been considered as committed development within this TA.

Land south of Cog Road, Sully – Planning Ref 2013/01279/OUT

- 6.1.51 Outline planning permission was granted for up to 325 residential dwellings on land to the south of Cog Road, Sully in May 2016. This forms part of a larger project which could accommodate up to 450 dwellings. The site has been allocated in the Vale of Glamorgan Local Development Plan for a residential development of up to 500 homes. The development is to be accessed via two priority junctions, one along Cog Road and the other via Swanbridge Road.
- 6.1.52 The Transport Assessment dated and prepared by Vectos on behalf of Taylor Wimpey has been reviewed and the committed development traffic attraction has been extracted.
- 6.1.53 The forecast growth contained within the NTM growth factors in addition to the traffic generation associated with the committed development set out in this report provides a robust assessment for future year traffic growth.
- 6.1.54 A reserved matters application for the development is currently being processed by the Vale of Glamorgan during the time of writing this TA – planning ref 2019/00111/RES.
- 6.1.55 The committed development flows are shown in **Appendix S**.

Future Year Base + Committed Traffic Flows

- 6.1.56 The future year base + committed development traffic flows have been obtained by combining the future year base traffic flows with the committed development flows. The 2027 and 2032 base + committed traffic flows are also shown in **Appendix S**.

Distribution of Development Flows

- 6.1.57 The development traffic has been assigned to the local highway network from the origin/destination information contained within the 2011 census data for The Vale of Glamorgan 008F lower layer super output area.
- 6.1.58 Travel to work data has been obtained from table *QS701EW – Method of travel to work* contained within the Office for National Statistics Census 2011. The Census Travel to Work data is shown in **Appendix T**.

- 6.1.59 The derived development trip distribution to the local highway network and the resultant development flows for 2027 and 2032 are shown in **Appendix U**.
- 6.1.60 It should be noted that traffic has been assigned using the fastest/most convenient route using Google Maps to assign traffic flows.
- 6.1.61 The majority of residents living in the Vale of Glamorgan 008 lower layer super output area work within the Vale or the county of Cardiff.

Network entry/exit point	Percentage Distribution
W02000239: The Vale of Glamorgan 003	3%
W02000240: The Vale of Glamorgan 004	8%
W02000241: The Vale of Glamorgan 005	19%
W02000242: The Vale of Glamorgan 006	2%
W02000244: The Vale of Glamorgan 008	6%
W02000245: The Vale of Glamorgan 009	3%
W02000248: The Vale of Glamorgan 012	5%
W02000250: The Vale of Glamorgan 014	2%
W02000251: The Vale of Glamorgan 015	3%
W02000384: Cardiff 018	3%
W02000392: Cardiff 026	2%
W02000398: Cardiff 032	14%
W02000400: Cardiff 034	2%
W02000402: Cardiff 036	3%
W02000404: Cardiff 038	3%
W02000406: Cardiff 040	3%
W02000412: Cardiff 046	4%
W02000422: Cardiff 048	9%
W02000423: Cardiff 049	6%
Total	100%

Table 6.8: Percentage distribution to wider road network

Future Year Base + Committed + Development Traffic Flows

- 6.1.62 The future year base (including committed) + development traffic flows have been obtained by combining the committed development and Cosmeston development flows with the 2027 and 2032 base traffic flows, which are also shown in **Appendix U**.

7.0 IMPACT OF THE DEVELOPMENT PROPOSALS

Introduction

7.1.1 This section of the report identifies the impact of the development proposals on the operational performance of the surrounding highway network and identifies any mitigation measures to reduce the impact of development generated traffic, should these be required.

7.1.2 The following 10 junctions have been assessed:

1. A4231/A4055/Sully Moors Road roundabout junction
2. Sully Moors Road/B4267/Hayes Road roundabout junction
3. Lavernock Road/Cosmeston Lake Country Park priority junction
4. Lavernock Road/Cosmeston Drive priority junction
5. Lavernock Road/Westbourne Road priority junction
6. B4267/Augusta Road/Lavernock Road/Castle Avenue crossroads
7. Lavernock Road/Dinas Road/Victoria Road crossroads
8. Cardiff Road/B4267/A4055 signalised junction
9. A4055/B4267/Andrew Road signalised crossroads
10. A4055/A4160 signalised intersection

Impact Assessment

7.1.3 A vehicular impact assessment has been undertaken that calculates the primary trip generation of the proposed development on the wider road network at the junctions identified above.

7.1.4 In addition, a percentage impact assessment for 2027 and 2032 has been undertaken that calculates the impact of the primary trip generation of the proposed development on the wider road network at the junctions identified above.

7.1.5 The vehicular and percentage impact assessment is shown in **Table 7.1**.

Junction	Total junction flow				% Impact	
	Base (Including Committed)		Development			
	AM	PM	AM	PM	AM	PM
2027						
A4231/A4055/Sully Moors Road	3916	3584	22	20	1%	1%
Sully Moors Road/B4267/Hayes Road	2312	1888	22	20	1%	1%
Lavernock Road/Cosmeston Lake Country	1601	1373	162	97	10%	7%
Lavernock Road/Cosmeston Drive	1709	1501	164	98	10%	7%
Lavernock Road/Westbourne Road	1568	1459	169	99	11%	7%
B4267/Augusta Road/Lavernock Rd/Castle Ave	1053	1015	132	76	13%	7%
Lavernock Road/Dinas Road/Victoria Road	1333	1294	104	72	8%	6%
Merrie Harriers Junction	2927	2970	68	62	2%	2%
A4055/A4160	4408	4553	59	54	1%	1%
2032						
A4231/A4055/Sully Moors Road	4043	3703	48	44	1%	1%
Sully Moors Road/B4267/Hayes Road	2384	1946	48	44	2%	2%
Lavernock Road/Cosmeston Lake Country	1654	1419	273	203	16%	14%
Lavernock Road/Cosmeston Drive	1766	1551	277	206	16%	13%
Lavernock Road/Westbourne Road	1620	1508	288	208	18%	14%
B4267/Augusta Road/Lavernock Rd/Castle Ave	1088	1050	195	156	18%	15%
Lavernock Road/Dinas Road/Victoria Road	1378	1338	181	154	13%	12%
Cardiff Road/B4267/A4055	3022	3068	150	137	5%	4%
A4055/A4160	4555	4707	131	120	3%	3%

Table 7.1: Percentage Impact Analysis

7.1.6 As seen in Table 7.1, the proportionate effect of the development traffic the junctions closest to the site are generally the highest, with an impact of 18% at Lavernock Road/Cosmeston Lake Country junction and B4267/Augusta Road/Lavernock Rd/Castle Ave during the 2032 AM peak period.

7.1.7 The high impact at B4267/Augusta Road/Lavernock Rd/Castle Ave is thought to be due to the fact that a large proportion of vehicles currently turn right onto Westbourne Road and therefore the impact on the adjacent junction is skewed.

7.1.8 A threshold for assessment of +5% has been used. Where the effect of the development proposals is greater than 5%, detailed junction modelling work is undertaken to quantify the effect in terms of queue lengths and junction capacity.

7.1.9 The impact of the development at the following junctions is 5% or less during both the 2027 and 2032 AM and PM peak periods for the assessed periods.

- A4231/A4055/Sully Moors Road roundabout junction
- Sully Moors Road/B4267/Hayes Road roundabout junction
- Merrie Harriers signalised junction
- A4055/A4160 signalised intersection

7.1.10 Therefore, it is considered that the overall impact of the development proposals is negligible at the junctions identified above and do not require capacity assessment.

7.1.11 The Highway Authority noted in their observations on the PAC Transport Assessment that the 'Merrie Harrier' signal-controlled junction of Cardiff Road/B4267/A4055 should be 'subject to detailed modelling to quantify the effect of the development traffic.'

7.1.12 Asbri Transport are aware that while this junction was modelled as part of the Dinas Powys Transport Network Study which included suggested radical modifications to the junction at this location as part of proposals for a Dinas Powys bypass, the bypass is no longer a scheme to be taken forward by the Vale of Glamorgan:

7.1.13 For the purposes of this analysis additional modelling of the Merrie Harriers junction has now been undertaken.

7.1.14 As such, capacity assessments have been undertaken at the following junctions:

1. Lavernock Road/Northern site access T-junction;
2. Lavernock Road / Southern site access T-junction;
3. Lavernock Road/Cosmeston Drive priority T-junction;
4. Lavernock Road/Westbourne Road priority T-junction;
5. B4267/Augusta Road/Lavernock Road/Castle Avenue crossroads; and,
6. Lavernock Road/Dinas Road/Victoria Road signals.

7. Merrie Harriers signal-controlled junction

- 7.1.15 It should also be noted that the future year assessed of 2032 is 10 years after the base year and therefore it is almost impossible to predict the capacity of the local junctions in 2032.

Junction Capacity

- 7.1.16 In order to understand the resultant effect from the change in traffic flows, capacity analysis has been carried out at the key junctions using the computer modelling software Junctions 9 for priority junctions and roundabout junctions and LINSIG to assess the signalised junctions.

Definition of modelling terms – Junctions 9

LOS – Level of Service

- 7.1.17 In this instance, model outputs show the un-signalised level of service values for each peak hour, based on the average delay per arriving vehicle.

- 7.1.18 The LOS system uses the following alphabetised categories:

- A = Free flow
- B = Reasonably free flow
- C = Stable flow
- D = Approaching unstable flow
- E = Unstable flow
- F = Forced or breakdown flow

Queue length

- 7.1.19 The queue lengths stated in the capacity assessment results represent the average maximum queue lengths in Passenger Car Units (PCUs) on each approach arm across the peak hour.

- 7.1.20 They are therefore indicative of queuing extents at the busiest point of the peak hour and are not representative of average conditions.

RFC – Ratio Flow to Capacity

7.1.21 The ratio of flow to capacity provides a measure of the utilised capacity of a junction approach arm. Arms exceeding a ratio of 0.85 (i.e. 85% capacity utilised) are considered to be approaching capacity and characteristically have light-to-moderate levels of queued traffic flow. Arms exceeding a ratio of 1.00 (i.e. 100% capacity utilised) are considered to be over capacity and are characterised as having heavy volumes of queued traffic.

7.1.22 Results that exceed RFCs of 1.00 generate queue lengths that are subject to exponential growth. However, the instability of flows through over-capacity approach arms, results in an inherent difficulty in calibrating modelled outputs to observed conditions. For this reason, queue lengths attributed to overcapacity approach arms should be seen as indicative rather than representative

Definition of modelling terms – Linsig

7.1.23 LinSig calculates a Degree of Saturation (DoS) as a percentage. A 90% or less DoS value is generally considered to result in satisfactory operation of any arm of a signalised junction. Values between 90% and 100% suggest that the arm is approaching its theoretical capacity, while values in excess of 100% indicate that the arm of the signalised junction is over capacity.

7.1.24 LinSig also provides a Practical Reserve capacity (PRC) percentage figure, which is an overall assessment of the amount of spare capacity available at a signalised junction. In most cases, a DoS value of between 90% and 100% results in a negative PRC figure, indicating there is no spare capacity available. Theoretical capacity of each individual arm is however only reached when the DoS passes 100%.

Junction Capacity Modelling

Northern Site Access

7.1.25 As stated previously, it is anticipated that the residential dwellings to be served off the southern site access will be built out first, therefore, it is proposed that only a proportion of residential dwellings served by the northern access will be occupied by the year 2027.

7.1.26 Therefore, the operation of the northern site access priority junction has been assessed with 162 units for future year assessment period of 2027 and 446 units for the future assessment period of 2032 using Junctions 9. The results of the analysis are presented in **Appendix V** and shown in **Table 7.2** below.

7.1.27 Each arm of the junction is represented as follows:

- Arm A – Lavernock Road (N)
- Arm B – Northern site access
- Arm C – Lavernock Road (S)

Approach Arm	With Development					
	0800-0900			1700-1800		
	Max Q	RFC	LOS	Max Q	RFC	LOS
2027 Future year assessment (180 units)						
Stream B-C	0.0	0.02	A	0.0	0.01	A
Stream B-A	0.2	0.19	C	0.1	0.07	B
Stream C-A	2.2	0.53	A	0.8	0.30	A
Stream C-B	0.0	0.53	A	0.0	0.30	A
2032 Future year assessment (496 units)						
Stream B-C	0.1	0.07	A	0.0	0.03	A
Stream B-A	1.2	0.55	D	0.3	0.22	C
Stream C-B	2.4	0.55	A	1.0	0.34	A
Stream C-B	0.0	0.55	A	0.0	0.36	A

Table 7.2: Northern Site Access

7.1.28 From Table 7.2, it can be seen that the proposed northern access junction of the development is likely to operate within capacity for both future year assessment periods.

Southern Site Access

7.1.29 The proposed southern site access has been assessed for future year assessment periods of 2027 and 2032 using Junctions 9.

7.1.30 It is anticipated the full 72 dwellings to be built and occupied by 2027 and will also see the proposed Primary School in operation.

7.1.31 The results of the analysis are presented in **Appendix W** and shown in **Table 7.3**.

7.1.32 Each arm of the junction is represented as follows:

- Arm A – Lavernock Road (N)
- Arm B – Southern site access
- Arm C – Lavernock Road (S)

Approach Arm	With Development					
	0800-0900			1700-1800		
	Max Q	RFC	LOS	Max Q	RFC	LOS
2027 year of opening (72 units + Primary School)						
Stream B-C	0.0	0.02	A	0.0	0.01	A
Stream B-A	0.2	0.19	C	0.1	0.05	B
Stream C-B	0.0	0.02	A	0.0	0.01	A
Stream A-BC	0.5	0.35	A	0.8	0.44	A
2032 Future year assessment (72 units + Primary School)						
Stream B-C	0.0	0.02	A	0.0	0.01	A
Stream B-A	0.3	0.20	C	0.1	0.06	B
Stream C-B	0.0	0.02	A	0.0	0.01	A
Stream A-BC	0.6	0.37	A	0.9	0.46	A

Table 7.3: Southern Site Access

7.1.33 The above table demonstrates that the southern site access is likely to operate well within capacity in all assessment scenarios with a maximum RFC of 0.46 achieved along Lavernock Road (S) in the 2032 PM peak period.

Lavernock Road/Cosmeston Drive priority junction

7.1.34 The operation of the Lavernock Road/Cosmeston Drive priority junction has been assessed for each of the assessment periods using Junctions 9. The results of the analysis are presented in **Appendix X** and summarised in **Table 7.4** below.

7.1.35 Each arm of the junction is represented as the following:

- Arm A – Lavernock Road (N)
- Arm B – Cosmeston Drive
- Arm C – Lavernock Road (S)

Approach Arm	No Development						With Development					
	0800-0900			1700-1800			0800-0900			1700-1800		
	Max	RFC	LOS	Max	RFC	LOS	Max	RFC	LOS	Max	RFC	LOS
2022												
Stream B-AC	1.4	0.59	D	0.2	0.17	C						
Stream C-A	1.8	0.48	A	0.8	0.31	A						
Stream C-B	0.0	0.48	A	0.1	0.32	A						
2027												
Stream B-AC	2.1	0.70	E	0.3	0.21	C	3.9	0.83	F	0.3	0.23	C
Stream C-A	2.1	0.52	A	0.9	0.32	A	2.8	0.59	A	1.1	0.37	A
Stream C-B	0.0	0.52	A	0.1	0.33	A	0.0	0.59	A	0.1	0.38	A
2032												
Stream B-AC	2.7	0.75	F	0.3	0.22	C	9.6	1.01	F	0.4	0.28	D
Stream C-A	2.3	0.53	A	0.9	0.33	A	3.7	0.65	B	1.3	0.40	A
Stream C-B	0.0	0.53	A	0.1	0.34	A	0.0	0.65	B	0.1	0.42	A

Table 7.4: Lavernock Road/Cosmeston Drive priority junction

- 7.1.36 It can be seen from Table 7.4 that the Lavernock Road/ Cosmeston Drive priority junction operates within capacity during the 2022 base and 2027 future year scenarios without and without the development.
- 7.1.37 For the 2032 future year scenario, while the No Development scenario also operates within capacity, with the proposed development, traffic wishing to exit the Cosmeston Drive arm onto Lavernock Road does experience some congestion and delay.
- 7.1.38 While the RFC shown is relatively high the number of vehicles affected by the delay is low with a moderate level of delay for each vehicle. In reality traffic exiting Cosmeston Drive, when faced with this delay will adjust their perception of an appropriate gap with which to join the major road.
- 7.1.39 This situation could be modelled by an adjustment to the site intercept for this arm, which would reduce the RFC and level of congestion and delay to an acceptable level for the few vehicles making this movement during the peak hours.

Lavernock Road/Westbourne Road Priority Junction

7.1.40 The operation of the Lavernock Road/Westbourne Road priority junction has been assessed for each of the assessment periods using Junctions 9 in PICADY mode. The results of the analysis are presented in **Appendix Y**.

7.1.41 Initially the 2022 Base model has been run utilising the standard PICADY mode with the results shown in **Table 7.5**. Each arm of the junction is represented as the following:

- Arm A – Lavernock Road (N)
- Arm B – Westbourne Road
- Arm C – Lavernock Road (S)

Approach Arm	No Development						With Development					
	0800-0900			1700-1800			0800-0900			1700-1800		
	Max Q	RFC	LOS	Max Q	RFC	LOS	Max Q	RFC	LOS	Max Q	RFC	LOS
2022												
Arm B-AC	0.6	0.36	A	2.2	0.69	C						
Arm C-AB	105.5	1.23	F	1.5	0.52	A						
2027												
Arm B-AC	0.7	0.41	A	3.0	0.76	C	48.5	1.57	F	4.7	0.84	D
Arm C-AB	178.7	1.35	F	2.0	0.59	B	304.3	1.53	F	2.9	0.67	B
2032												
Arm B-AC	0.8	0.43	A	3.5	0.78	C	59.4	1.66	F	8.0	0.91	E
Arm C-AB	210.4	1.40	F	2.3	0.61	B	438.2	1.67	F	4.6	0.76	C

Table 7.5: Lavernock Road/Westbourne Road priority junction

7.1.42 The results show a significant level of congestion and delay on the Lavernock Road south arm during the AM peak. This is as an inevitable result of the large right turn movement at this junction for traffic travelling towards Penarth Town Centre and Seafront

7.1.43 This movement was observed to be 494 vehicles, which makes up 57% of the northbound traffic flows. With no space for a right turn lane at this location the right turning traffic will delay the straight-ahead traffic while waiting for gaps with which to execute the right turn movement.

- 7.1.44 Such a level of delay is difficult to represent in a mathematical model, with the measures of delay and RFC simply increasing to unreasonable and unreliable levels beyond any practical limits.
- 7.1.45 As such the modelled results cannot be used in absolute terms but as an indication of the fact that the junction currently operates over capacity.
- 7.1.46 Nevertheless, the Lane Simulation tool has been used to model the Lavernock Road/Westbourne Road priority junction. Lane Simulation allows junctions to be modelled using a simple simulation method.
- 7.1.47 This can model effects that may be difficult to model otherwise such as unequal lane usage. In this case, lane simulation models movement of turning vehicles from A-B and B-C explicitly, hence representing the situation more realistically.
- 7.1.48 For PICADY junctions, capacities and RFCs are not shown when using Lane Simulation because although base capacities are taken from the core PICADY model, they are combined and adjusted in various ways which mean that the throughput and queue and delay are the most useful measure of performance.
- 7.1.49 Table 7.6 again demonstrates that the Lavernock Road (S) arm of the junction currently experiences a poor level of service (F) with queues forming during the 2022 Base AM peak scenario. This is considered to occur as a result of the high level of right turning movements into Lavernock Road to access Penarth.
- 7.1.50 Westbourne Road also experiences capacity constraints in the PM peak period with a large number of movements travelling to south on Lavernock Road. The capacity constraints further deteriorate with the inclusion of additional movements as a result of the committed and proposed developments.

Approach Arm	No Development				With Development			
	0800-0900		1700-1800		0800-0900		1700-1800	
	Max Q	LOS	Max Q	LOS	Max Q	LOS	Max Q	LOS
2022								
Arm A	0.0	A	0.0	A				
Arm B	1.1	B	11.7	F				
Arm C	108.7	F	1.7	B				
2027								

Arm A	0.0	A	0.0	A	0.0	A	0.0	A
Arm B	1.2	C	24.6	F	1.8	C	55.7	F
Arm C	174.2	F	2.4	B	310.7	F	4.8	C
2032								
Arm A	0.0	A	0.0	A	0.0	A	0.0	A
Arm B	1.4	C	33.2	F	2.4	D	84.7	F
Arm C	219.0	F	2.9	C	437.7	F	5.2	D

Table 7.6: Lavernock Road/Westbourne Road priority junction with lane simulation

- 7.1.51 However, it should be noted that this is an existing constraint with the junction already experiencing queueing during the AM and PM peak periods with the proposed development not being the cause of the capacity problems.
- 7.1.52 Potential mitigation measures at this junction are constrained by junction layout and land constraints. The junction is located on a relatively tight bend in Lavernock Road with visibility issues, while any junction enhancements to provide space for a right turn facility would require significant land take outside of the highways' boundary.
- 7.1.53 Whether in the form of a ghost right turn lane, a roundabout with 2 lane flared entry or traffic signals the required length of right turn lane to avoid blocking back would require widening of Lavernock Road for a significant distance.
- 7.1.54 Given the prevailing high traffic demands at this junction there is not sufficient scope with which to provide a material improvement at this location without a large-scale scheme, which would be prohibitive in terms of disruption and cost.
- 7.1.55 In the future, unless there is a significant change in travel behaviour and movements in the area any potentially successful mitigation measures would involve a wider traffic management scheme encompassing movements to/from Penarth Town Centre and the Seafront.
- 7.1.56 It is suggested that a localised traffic management scheme may offer the greatest benefit to network performance in this location. This will be investigated further with the Highway Authority in terms of a potential contribution to any future VoG schemes in this area.

7.1.57 As stated above the congestion at this junction is an existing daily occurrence. Therefore, in conclusion, given the unreliable nature of the modelling results at such a congested junction it is not possible to quantify the impact of the development traffic at this junction with any accuracy.

7.1.58 Nevertheless, given the numbers of vehicles involved the impact of the proposed development upon the operation of the junction is likely to be marginal.

Lavernock Road (N)/Augusta Road/Lavernock Road (S)/Castle Avenue Priority Cross Road Junction

7.1.59 The operation of the Lavernock Road (N)/Augusta Road/Lavernock Road (S)/Castle Avenue priority crossroads junction has been assessed for each of the assessment periods using Junctions 9. The results of the analysis are presented in **Appendix Z** and shown in **Table 7.6** below.

7.1.60 Each arm of the junction is represented as the following:

- Arm A – Lavernock Road (N)
- Arm B – Augusta Road
- Arm C – Lavernock Road (S)
- Arm D – Castle Avenue

7.1.61 Table 7.6 indicates that the Lavernock Road/Augusta Road/Castel Avenue crossroads priority junction operates within capacity in all development scenarios. All RFC values fall well below 0.85.

Approach Arm	No Development						With Development					
	0800-0900			1700-1800			0800-0900			1700-1800		
	Max Q	RFC	LOS	Max Q	RFC	LOS	Max Q	RFC	LOS	Max Q	RFC	LOS
2022												
Stream B-ACD	0.3	0.20	B	0.3	0.22	B						
Stream A-BCD	0.0	0.04	A	0.1	0.08	A						
Stream D-ABC	0.5	0.32	B	0.2	0.17	B						
Stream C-ABD	0.0	0.02	A	0.0	0.02	A						
2027												
Stream B-ACD	0.3	0.24	B	0.3	0.25	B	0.3	0.26	C	0.4	0.27	C
Stream A-BCD	0.0	0.04	A	0.1	0.08	A	0.0	0.04	A	0.1	0.08	A

Stream D-ABC	0.6	0.38	C	0.2	0.19	B	0.7	0.42	C	0.2	0.20	B
Stream C-ABD	0.0	0.02	A	0.0	0.02	A	0.0	0.03	A	0.0	0.03	A
2032												
Stream B-ACD	0.3	0.24	B	0.4	0.27	C	0.4	0.29	C	0.4	0.30	C
Stream A-BCD	0.0	0.04	A	0.1	0.09	A	0.1	0.04	A	0.1	0.09	A
Stream D-ABC	0.6	0.38	C	0.2	0.20	B	0.9	0.47	C	0.3	0.22	B
Stream C-ABD	0.0	0.02	A	0.0	0.02	A	0.0	0.03	A	0.0	0.03	A

Table 7.6: Lavernock Rd/Augusta Rd/Castle Avenue Cross Road Junction

Lavernock Road/Dinas Road/Victoria Road Signals.

- 7.1.62 The operation of the above signalised junction has been assessed for each of the assessment periods, using the JCT program LinSig version 3. The results of the analysis are presented in full in **Appendix AA** and summarised in **Table 7.7** below.
- 7.1.63 The junction has been modelled based on the extant four stage method of control, with each arm running separately. The pedestrian crossing facility has been modelled every other cycle as on-site observations have indicated that pedestrian demand is very low. It should also be noted that the junction operates under the control of optimisation software (MOVA). This ensures that cycle and stage timings are optimised dependent on the throughput over detector loops within the road surface of the individual approach arms.
- 7.1.64 A limitation of LinSig V3 is that the software only allows capacity calculations based on fixed cycle times. Stage timings can be optimised for every scenario however throughout the peak period modelled these cannot be amended to reflect varying degrees of demand.
- 7.1.65 As such, it is industry practice that any junction that operates under MOVA control and is modelled through LinSig V3 will likely with 10 – 15% more capacity than is predicted in the model.

Approach arm		No Development				With Development			
		0800-0900		1700-1800		0800-0900		1700-1800	
Lane	Description	DoS	Max Q	DoS	Max Q	DoS	Max Q	DoS	Max Q
2022									
1/1	Lavenock Road North	82.8%	11.8	79.2	16.3				
2/1	Victoria Rd	81.1%	9.9	77.9	9.3				
3/1	Lavenock Road South	82.0%	14.6	78.6	12.2				
4/1	Dinas Road	81.2%	11.8	79.0	6.9				
		PRC: 8.7%		PRC: 13.7%					
2027									
1/1	Lavenock Road North	88.5%	13.9	86.5%	19.3	95.1%	17.2	90.9%	22.4
2/1	Victoria Rd	88.4%	12.0	84.8%	11.1	95.9%	15.1	89.6%	12.1
3/1	Lavenock Road South	89.3%	17.8	86.1%	14.4	96.1%	23.9	91.8%	16.9
4/1	Dinas Road	89.6%	14.8	86.1%	8.3	95.0%	17.5	88.8%	9.0
		PRC: 0.4%		PRC: 4.0%		PRC: -6.8%		PRC: -2.0%	
2032									
1/1	Lavenock Road North	91.2%	15.2	89.6%	20.7	103.7%	27.3	99.1%	32.0
2/1	Victoria Rd	91.1%	13.1	87.7%	12.0	104.5%	22.8	97.5%	16.0
3/1	Lavenock Road South	92.5%	19.6	88.6%	15.3	104.6%	41.3	99.1%	24.5
4/1	Dinas Road	92.4%	16.0	88.6%	9.1	102.9%	24.9	98.4%	12.9
		PRC: -2.7%		PRC: 0.4%		PRC: -16.2%		PRC: -10.1%	

Table 7.7: LINSIG analysis – Lavernock Road/Dinas Road/Victoria Road – Existing staging

7.1.66 It can be seen from Table 7.7 that the Lavernock Road/Dinas Road/Victoria Road signalised junction operates close to its theoretical capacity in the 2022 base year. For the forecast future base year scenarios (including committed development).

7.1.67 In 2027 the junction is pretty much operating at capacity while in 2032 the AM peak hour has the junction forecast to be operating over capacity with a PRC of -2.7%. The mean maximum queue is forecast to reach 20 pcu's on the southbound arm of Lavernock Road in 2022 with the Degree of Saturation for all 4 arms exceeding 90%.

7.1.68 When a modelled junction has reached this level of congestion and delay the results created by putting even further traffic into the model are increasingly unrealistic and should be interpreted with care.

7.1.69 Therefore, when the development traffic is added the increase in congestion and delay produced by the model is out of proportion with the level of additional traffic. Nevertheless, the results for both 20277 and 2032 with the additional forecast development traffic will create additional congestion and delay.

7.1.70 However, as this analysis is based on both fixed cycle and stage timings it is considered that the optimisation software in operation at the junction will allow it to operate more efficiently.

7.1.71 As such, it is considered that in reality the junction will generally operate closer to the theoretical capacity than the model would suggest.

Mitigation

7.1.72 Having examined the existing phases and stages at the junction, mitigation measures have been identified for this junction which would free up additional capacity.

7.1.73 The Lavernock Road/Dinas Road/Victoria Road signalised junction currently operates as four separate stages for traffic, giving each arm green time individually and an all-green phase for pedestrians, which is called upon intermittently. There is scope to improve the operation of the junction as a whole with a simple adjustment to the signal staging.

7.1.74 The existing four-stage traffic sequence could be replaced with a more efficient two-stage sequence that would incorporate right-turning traffic operating under priority control in the middle of the junction.

7.1.75 For the purposes of this analysis only the models for 2032 have been run with the proposed stage modifications, with the results summarised in **Table 7.8** and also included in full at **Appendix AA**.

7.1.76 Table 7.8 indicates that the proposed changes to the signal staging would result in a more efficient operation of the junction compared to the existing situation, with a significant improvement in the operation of the junction for all scenarios, with up to and including the 2032 with development scenario.

7.1.77 For the 2032 AM with development scenario the overall junction PRC has increased from -16.2% to 20.4%, with the maximum Degree of Saturation decreasing from 104.6% to 74.7% and the maximum queue reducing from 42.3 to 12.6 pcu.

7.1.78 With the proposed new 2 stage sequence replacing the existing 4 stage sequence the proposed development will have a marginal impact upon the operation of the junction and be accommodated while remaining well within theoretical capacity.

Approach arm		With Development			
		0800-0900		1700-1800	
Lane	Description	DoS	Max Q	DoS	Max Q
2032					
1/1	Lavernock Road North	44.6%	7.0	66.9%	12.6
2/1	Victoria Rd	47.0%	6.0	59.8%	6.6
3/1	Lavernock Road South	74.7%	13.6	46.7%	7.0
4/1	Dinas Road	72.8%	9.1	65.2%	4.8
		PRC: 20.4.%		PRC: 34.5%	

Table 7.8: LINSIG analysis – Lavernock Road/Dinas Road/Victoria Road Modified staging

Merrie Harriers Signals.

7.1.79 The operation of the Merrie Harriers signalised junction has been assessed for each of the assessment periods, using the JCT program LinSig version 3. The results of the analysis are presented in full in **Appendix AB** and summarised in **Table 7.9** below.

7.1.80 The junction configuration is in the form of a staggered crossroads with the A4055 as the major road. The junction has been modelled based on the extant four stage method of control.

7.1.81 While there is a pedestrian crossing facility on the Barry Road arm of the A4055, this has a low pedestrian demand and is only called intermittently and does not have its own stage. Thus, it has little if any impact upon the operation of the junction for vehicular traffic.

7.1.82

7.1.83 The validation of the model has been sought through a comparison of the modelled queues and the observed queues during the AM and PM peak periods from on-site observations, survey video footage and Google Maps

7.1.84 An indication of the average peak period delay at this junction is shown in **Figures 7.1** and **7.2** for the AM and PM peaks respectively.

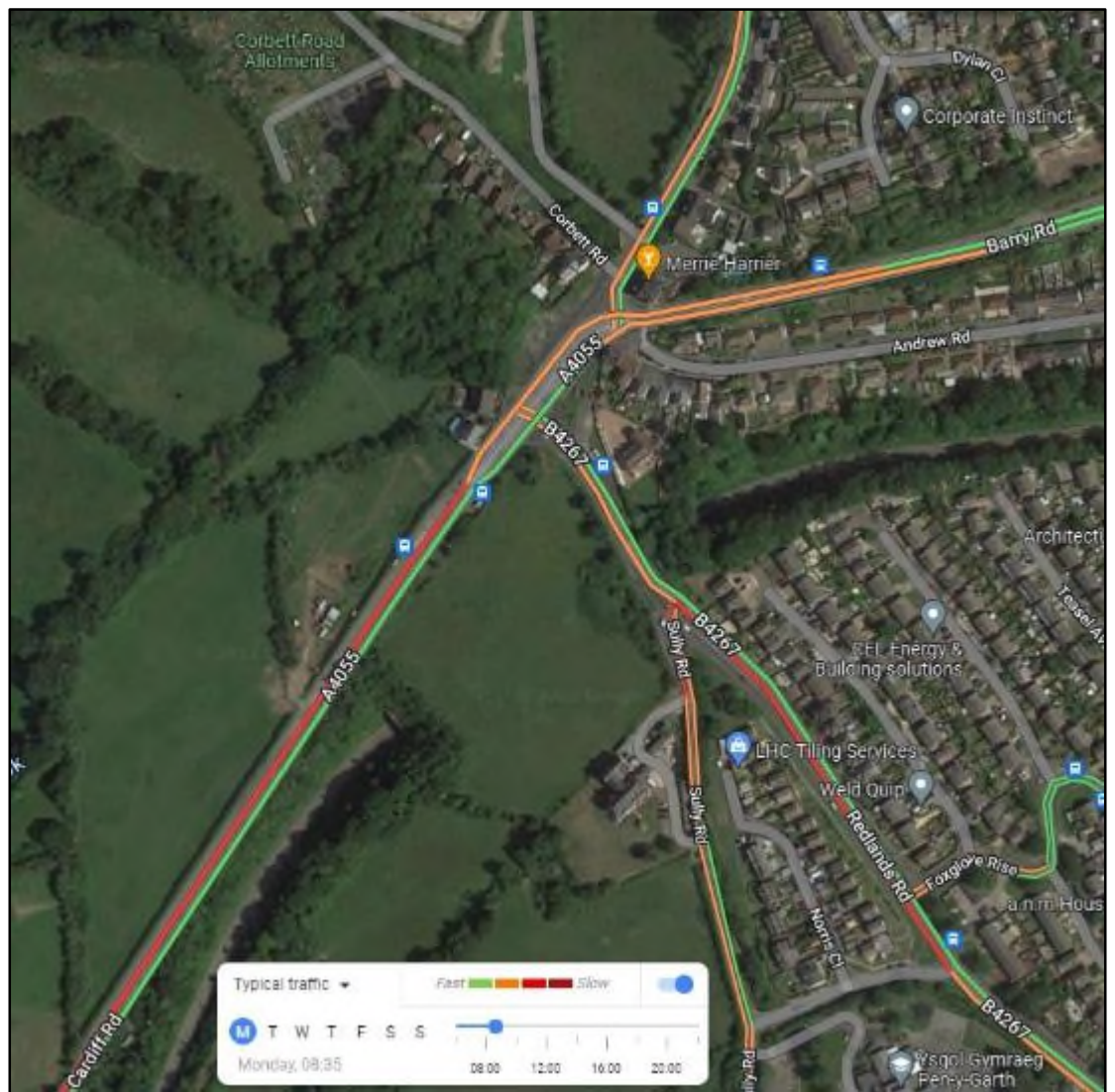


Figure 7.1: Merrie Harriers Junction – Average AM Peak Hour Delay

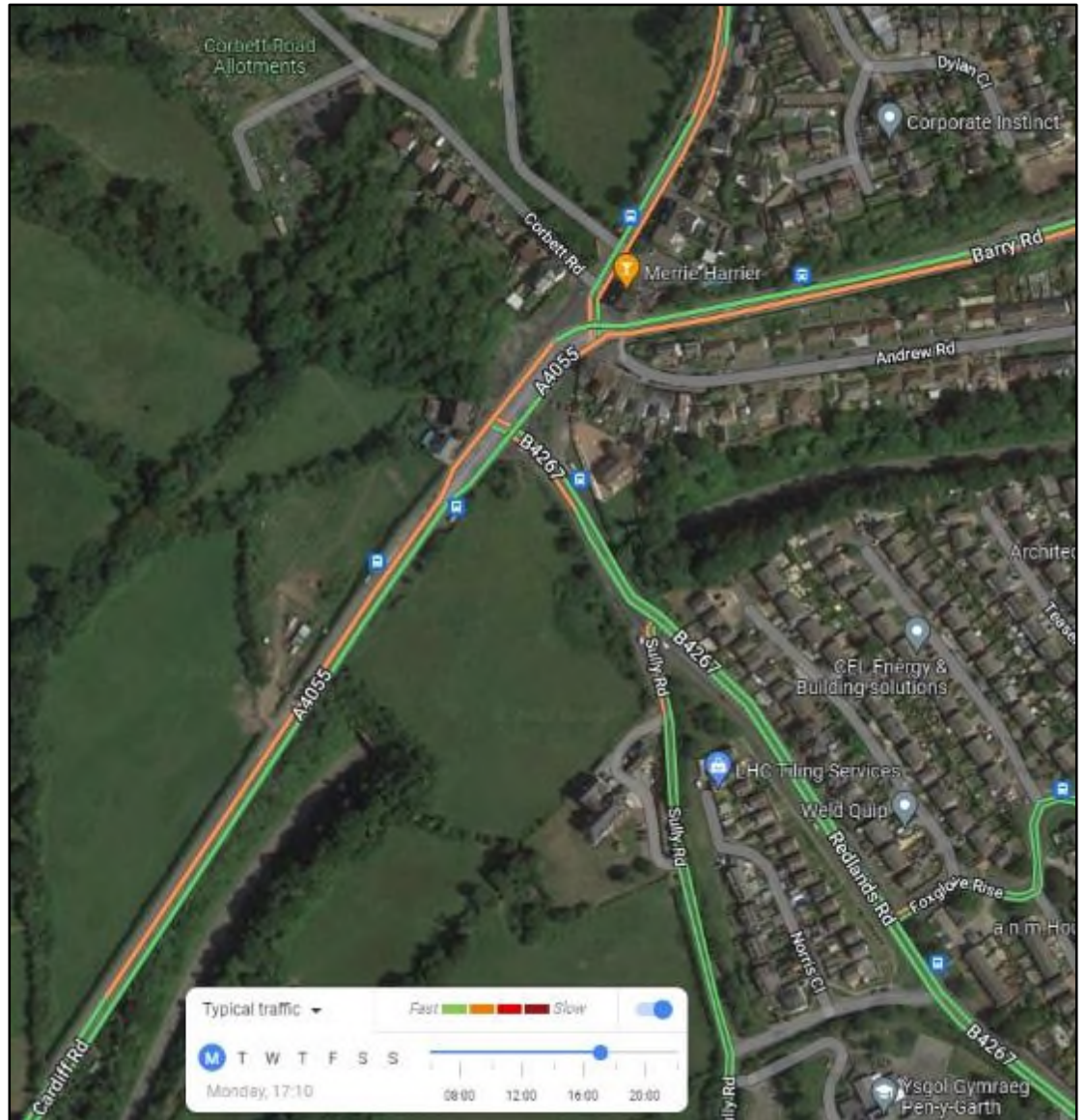


Figure 7.2: Merrie Harriers Junction – Average PM Peak Hour Delay

- 7.1.85 This shows a large level of delay on the A4055 western arm along with moderate delay on the A4055 eastern arm and the B4267 Redlands Road during the AM peak hour. During the PM peak hour there is moderate delay on each of the 4 entry arms.
- 7.1.86 This delay is reflected in the base model results with these arms having appropriated degrees of saturation and mean maximum Queue. The results demonstrate a moderate to severe level of congestion and delay at the junction, which reflects the queues and delays from the on-site observations.

- 7.1.87 It can be seen from Table 7.8 that the Merrie Harriers signalised junction operates very close to capacity during the 2022 base year AM peak, with a degree of spare capacity in the PM peak.
- 7.1.88 It should also be noted that the junction operates under the control of optimisation software (MOVA). This ensures that cycle and stage timings are optimised dependent on the throughput over detector loops within the road surface of the individual approach arms.
- 7.1.89 A limitation of LinSig V3 is that the software only allows capacity calculations based on fixed cycle times. Stage timings can be optimised for every scenario however throughout the peak period modelled these cannot be amended to reflect varying degrees of demand.
- 7.1.90 As such, it is industry practice that any junction that operates under MOVA control and is modelled through LinSig V3 will likely with 10 – 15% more capacity than is predicted in the model.
- 7.1.91 However, as this analysis is based on both fixed cycle and stage timings it is considered that the optimisation software in operation at the junction will allow it to operate more efficiently.
- 7.1.92 For the future year base scenarios (including committed development) the junction operates over capacity during the AM peak in both 2027 and 2032, while in the PM peak operating close to capacity in 2027 and over capacity in 2032.
- 7.1.93 While the additional development traffic does increase the level of delay, the impact is marginal. Once the Degree of saturation reaches 100% any additional traffic will have an increasingly unrealistic impact upon the modelled congestion and delay, with the absolute results having to be treated with caution in terms of interpretation.

Approach arm		Base (Including Committed)				With Development			
		0800-0900		1700-1800		0800-0900		1700-1800	
Lane	Description	DoS	Max Q	DoS	Max Q	DoS	Max Q	DoS	Max Q
2022									
1/1	Barry Rd Ahead & Left	57.4%	10.7	57.2%	11.5				
1/2	Barry Rd Ahead & Right	47.4%	2.1	72.5%	5.6				
2/1&2/2	B4267 Redland Rd	88.2%	15.8	80.7%	10.9				
3/1&3/2	A4055 Cardiff Rd	89.3%	23.5	80.3%	18.6				
4/1&4/2	B4267 Penlan Rd	85.7%	11.0	81.7%	12.9				
5/1	B4267 Stagger WB Left	30.5%	1.3	34.9%	1.6				
5/2	B4267 Stagger WB Ahead	21.8%	3.8	27.2%	5.0				
6/1	B4267 Stagger EB Left	22.4%	0.2	13.1%	0.1				
6/2	B4267 Stagger EB Ahead	60.2%	1.1	61.7%	1.1				
7/1	A4055 left to Penlan Rd	24.2%	0.2	11.7%	0.1				
		PRC: 0.7%		PRC: 10.2%					
2027									
1/1	Barry Rd Ahead & Left	61.3%	12.0	69.1%	16.2	62.6%	12.5	71.6%	17.4
1/2	Barry Rd Ahead & Right	64.6%	2.6	78.7%	5.6	66.7%	2.7	83.2%	6.3
2/1&2/2	B4267 Redland Rd	97.8%	25.6	86.7%	12.8	99.1%	29.4	90.3%	14.7
3/1&3/2	A4055 Cardiff Rd	96.6%	32.9	88.8%	23.4	100.2%	39.7	88.8%	23.4
4/1&4/2	B4267 Penlan Rd	96.8%	16.0	88.8%	15.6	97.5%	16.6	90.0%	6.1
5/1	B4267 Stagger WB Left	33.1%	1.5	38.8%	1.8	34.1%	1.5	41.3%	2.0
5/2	B4267 Stagger WB Ahead	22.9%	4.0	30.5%	5.7	23.6%	4.1	30.5%	5.4
6/1	B4267 Stagger EB Left	24.5%	0.3	15.7%	0.2	26.2%	0.4	16.3%	0.2
6/2	B4267 Stagger EB Ahead	66.6%	1.4	66.3%	1.3	68.0%	3.1	67.4%	1.4
7/1	A4055 left to Penlan Rd	26.7%	0.3	14.0%	0.1	28.6%	0.3	14.5%	0.1
		PRC: -8.7%		PRC: 1.3%		PRC: -11.3%		PRC: -0.3%	
2032									
1/1	Barry Rd Ahead & Left	62.6%	12.5	73.9%	18.5	65.2%	13.5	78.9%	21.5
1/2	Barry Rd Ahead & Right	74.5%	3.3	82.2%	5.7	73.2%	3.3	96.6%	10.3
2/1&2/2	B4267 Redland Rd	101.0%	32.6	89.8%	14.2	106.5%	54.1	93.0%	17.6
3/1&3/2	A4055 Cardiff Rd	96.6%	39.2	91.7%	25.6	105.3%	56.8	95.4%	28.8
4/1&4/2	B4267 Penlan Rd	100.0%	18.9	91.7%	17.1	101.8	21.0	94.3%	18.8
5/1	B4267 Stagger WB Left	34.2%	1.5	40.1%	1.9	36.3%	1.6	45.6%	2.2
5/2	B4267 Stagger WB Ahead	23.7%	4.1	31.4%	5.9	24.8%	4.3	32.3%	5.9
6/1	B4267 Stagger EB Left	25.1%	0.4	16.2%	0.2	27.5%	0.4	17.4%	0.2
6/2	B4267 Stagger EB Ahead	68.4%	2.1	68.6%	1.5	68.1%	3.1	70.9%	1.6
7/1	A4055 left to Penlan Rd	22.1%	0.3	14.5%	0.1	30.0%	0.3	15.4%	0.1
		PRC: -12.2%		PRC: -1.9%		PRC: -18.3%		PRC: -7.3%	

Table 7.8: LINSIG analysis – Merrie Harriers – Existing staging

Mitigation

- 7.1.94 As stated above the congestion at this junction is an existing daily occurrence. While the junction is currently congested and operating close to or at capacity during peak periods and this situation is forecast to worsen in the future the potential impact of the proposed development upon the operation of the junction is likely to be marginal.
- 7.1.95 Nevertheless, the developer is willing to undertake in discussions with VoG regarding the potential for any monetary contribution to any future highways' infrastructure schemes at the Merrie Harriers junction.

Summary

- 7.1.96 The results of the junction modelling show that, with the exception of the Lavernock Rd/Westbourne Road and Merrie Harriers junctions, that there are no major issues with regards to operational capacity identified on the majority of the junctions and that the local highway network can generally accommodate a residential development comprising 576 dwellings and a primary school.
- 7.1.97 As part of the planning application process discussions will be held with highway officers at the Vale of Glamorgan Council to determine the appropriate and proportionate contribution to wider area highways infrastructure mitigation schemes to be proposed by VoG.
- 7.1.98 The analysis also indicates that the operation of the Lavernock Road/Dinas Road/Victoria Road signalised junction could be improved to the benefit of existing road users.
- 7.1.99 However, as discussed above, it is considered that predicting the level of traffic associated with a future year of 2032 is impossible to accurately predict given the possible proposals for this area of the VoG, including the Metro, possible bus frequency improvements and other potential highways infrastructure improvements.

8.0 CONCLUSION

Summary

- 8.1.1 Asbri Transport Limited has been appointed by the Welsh Government to produce a Transport Assessment in support of a planning application for the proposed development of up to 576 residential dwellings, a 1-form entry Primary School and associated community facilities on land to the east of Lavernock Road, Cosmeston.
- 8.1.2 The site is situated within close proximity to public transport infrastructure, including bus stops along Lavernock Road, with frequent services providing access around Penarth and in to Cardiff and the wider highway network. In addition, the site is ideally located with regard to existing pedestrian/cycle links along Lavernock Road, Railway Walk and the coastal footpath, providing excellent active travel links to the wider area.
- 8.1.3 It is proposed to provide vehicular access along the western boundary of the site onto Lavernock Road in the form of two ghosted right turn priority junctions.
- 8.1.4 Improved pedestrian provision is to be provided in the form of a signalised Toucan crossing located between the northern and southern access points along Lavernock Road. It is also proposed to extend Railway Walk (NCN88) into the development site, providing opportunity for active travel.
- 8.1.5 Existing bus stops are located to the north of the proposed development along Lavernock Road and it is proposed to provide two new bus stops with north bound and south bound services in the immediate vicinity of the development.
- 8.1.6 The planning application proposes to re-locate the start of the 30-mph speed limit to a location west of the proposed development site.
- 8.1.7 Trip generation for the proposed development has been derived for the TRICS 7.5.6 trip generation database. It is predicted that the proposed development as a whole is likely to generate 351 vehicles two-way in the AM peak period and 253 vehicles two-way in the PM peak period, which equates to an additional 6 and 4 vehicular movements per minute during the AM and PM peak hours respectively.

- 8.1.8 The proposed development traffic has been assigned to the local highway network from the origin/destination information contained within the 2011 census data for The Vale of Glamorgan 008F lower layer super output area.
- 8.1.9 Capacity analysis indicates that no major issues are identified at the majority of the junctions analysed within this TA as a result of the development proposals comprising 576 dwellings and a primary school.
- 8.1.10 The analysis also indicates that the operation of the Lavernock Road/Dinas Road/Victoria Road signalised junction could be improved to the benefit of existing road users.
- 8.1.11 However, as discussed above, it is considered that predicting the level of traffic associated with a future year of 2032 is impossible to accurately predict given the possible proposals for this area of the VoG, including the Metro, possible bus frequency improvements and other potential highways infrastructure improvements.
- 8.1.12 It should also be noted that the 2027 and 2032 future years include both committed development flows and a Temprow growth factor and it is considered that this may result in overestimating the traffic growth in these assessment years.

Conclusion

- 8.1.13 It is considered that the development is appropriate and acceptable in traffic and transport terms and that the traffic movements associated with the development proposals could be accommodated on the highway network.
- 8.1.14 The proposed development site is located with good access to public transport services operating on Lavernock Road, with frequent services running from bus stops within the site's vicinity. The site is also situated within walking distance of a number of amenities/facilities, reducing the need for private car-borne trips.

8.1.15 Consideration has been given to mitigation by way of the provision of Active Travel and Passenger Travel infrastructure with a good level of active travel improvements proposed. An effective Travel Plan encouraging and facilitating active and public transport will be implemented at all aspects of the development.