MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council
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Notice

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Acronyms and Abbreviations

AQMA	Air Quality Management Area
AVTM	Ashton Vale Temple Meads scheme
B&NES	Bath and North East Somerset Council
BCC	Bristol City Council
CP5	Control Period 5
CPZ	Controlled Parking Zone
CTMP	Construction Traffic Management Plan
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EAST	Early Assessment Summary Tool
ES	Environmental Statement
GBATS	Greater Bristol Area Transport Model
GJT	Generalised Journey Times
GPD	General Permitted Development
GRIP	Governance for Railway Investment Projects
GTA	Guidance for Transport Assessment (Archived)
GVA	Gross Value Added
GWML	Great Western Main Line
GWR	Great Western Railway
HE	Highways England
IEP (IET)	Intercity Express Programme (Trains)
IP	Interpeak
JLTP	Joint Local Transport Plan
JSP	Joint Spatial Plan
JTB	Joint Transport Board
JTS	Joint Transport Study
LDF	Local Development Framework
LEP	Local Enterprise Partnership
LGV	Light Good Vehicle
LMVR	Local Model Validation Report
LSTF	Local Sustainable Transport Fund
LTN	Local Transport Note
LTPP	Long Term Planning Process
MfS	Manual for Streets
MoD	Ministry of Defence
MOIRA	Rail industry timetable-based modelling tool (note that the name of the software is not actually an acronym or abbreviation)
MOVA	Microprocessor Optimised Vehicle Actuation
NC	Near Certain Development
NCN	National Cycle Network

NE	Natural England
NMU	Non-Motorised User
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPS NN	National Policy Statement for National Networks
NRIL	Network Rail Infrastructure Limited
NRTF	National Road Traffic Forecasts
NRTS	National Rail Travel Survey
NSDC	North Somerset District Council
NSIP	Nationally Significant Infrastructure Projects
OA	Output Area
OAR	Option Assessment Report
OBC	Outline Business Case
ORR	Office of Rail and Road
OSGR	Ordinance Survey Grid Reference
PBC	Preliminary Business Case
PCU	Passenger Car Unit
PDFH	Passenger Demand Forecast Model
PEIR	Preliminary Environmental Impact Report
POD	Portishead Line
PRoW	Public Right of Way
RDM	Rail Demand Model
RF	Reasonably Foreseeable Development
RFC	Ratio of Flow to Capacity
RUS	Route Utilisation Strategy
SADMP	Site Allocations and Development Management Policies
SEP	Strategic Economic Plan
SGC	South Gloucestershire Council
SPD	Supplementary Planning Document
TA	Transport Assessment
TEMPRO	Trip End Model Presentation Program
TPH	Trains per Hour
TQEZ	Temple Quarter Enterprise Zone
TRO	Traffic Regulation Order
UWE	University of the West of England
VDM	Variable Demand Model
WebTAG	DfT Transport Appraisal Guidance
WoE	West of England

Glossary of terms

Term	Description
Governance Definitions	
'the four West of England Councils' or 'the WoE Councils'	The four West of England Councils comprise; Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire Councils.
JTB	The four West of England Councils' Joint Transport Board
WoE LEP	The West of England Local Enterprise Partnership
Definitions used to clarify the Areas of Works being considered	
'the Portishead Branch Line DCO scheme (MetroWest Phase 1)' or 'the DCO Scheme'	The Development Consent Order (DCO) scheme includes a 13.7 km section of railway, which comprises; the Nationally Significant Infrastructure Project (NSIP) works and the Associated Development works. The DCO Scheme includes the red line boundary for railway infrastructure, rail stations, car parks, pedestrian /cycle /highway infrastructure and maintenance compounds from Portishead to Ashton Junction in south Bristol.
'the NSIP works'	The NSIP works includes 5.45 km section of railway from a new station at Portishead to Portbury Dock Junction then to the new junction at Pill.
'the Associated Development works'	The Associated Development works comprise; • New railway station at Portishead; • Car parks, pedestrian / cycle / highway infrastructure at Portishead including re-alignment of Quays Avenue, widening of the shared use path on the west side of Quays Avenue and a new bridge near Trinity Primary School; • Re-opening the former Pill station (southern platform) including car parks, pedestrian / cycle / highway infrastructure; • New maintenance compounds from Portishead to Pill Junction; • Works to the Portbury Freight Line; • Construction compounds between Portishead and Ashton Junction;

Term	Description
	• New maintenance compounds between Pill and Ashton Junction, • Works to upgrade the existing Portbury Freight Line from Royal Portbury Dock to Ashton Junction, to enable operation of both passenger train and freight train services and associated works to pedestrian /cycle /highway infrastructure including modifications to the NCN26.
'the General Permitted Development works' or 'GPD works'	The General Permitted Development (GPD) works include; the South Bristol Parson Street Junction upgrade (including signalling cabling/equipment to Ashton Junction), Bedminster Down Relief Line (partial re-instatement), Severn Beach / Avonmouth Signalling Enhancement and Bathampton Turnback.
'the Portbury Freight Line' or POD Line	The Portbury Freight Line is the existing operational freight line from Portbury Dock to Parson Street Junction.
'the Portbury Dock Spur'	The Freight Dock Spur is a section of 500 metres of railway from Portbury Dock Junction to Royal Portbury Dock, owned by Bristol Port Company. The Spur forms part of the POD line.
'Portbury Dock Junction'	Portbury Dock Junction is located west of Pill where the POD Line diverges from the route of the disused railway to Portishead. The junction is not in operational use and the POD Line is formed of plain track at this location.
'Pill Junction'	Pill Junction is a proposed junction east of Pill station on Pill Viaduct where the tracks that will be in parallel through Pill Station will join to form the western end of the single line section from Clifton Junction.
'Ashton Junction'	Ashton Junction is the existing junction located in south Bristol on the Portbury Freight Line forming the eastern end of the single line section through the Avon Gorge approx. 1km west of Parson Street Junction.
'Parson Street Junction'	Parson Street Junction is an existing junction located in south Bristol connecting the Portbury Freight Line with the Bristol to Taunton main line.
Part D	**Other Frequently Used Railway Terms**
BASRE	Bristol Area Signalling Renewal and Enhancement
Filton Four Track	The relaying of two additional tracks from Bristol Temple Meads to Filton
FOC	Freight Operating Company

Term	Description
GRIP	Governance for Railway Investment Projects
GWML	Great Western Main line
NE	Natural England
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NRIL	Network Rail Infrastructure Limited
Occupation Crossing	Privately operated crossings over or under railway lines to allow landowners access to land that would have been severed by the construction of the railway.
PSP	Principal Supply Points for signalling equipment
RRAP	Road Rail Access Point
REB	Relocatable Equipment Building for signalling and other rail equipment
TOC	Train Operating Company
NCN26	National Cycle Route 26, managed by Sustrans

SECTION 1

Introduction

1.1 Background

1.1.1 CH2M (now Jacobs) has been appointed to prepare a Transport Assessment (TA) in support of the Portishead Branch Line Development Consent Order (DCO) scheme (MetroWest Phase 1) proposal to reopen the Portishead line with stations at Portishead and Pill in North Somerset (“the DCO Scheme”). The overall MetroWest Phase 1 project seeks to enhance rail services on the Severn Beach line and for local stations between Bristol Temple Meads and Bath Spa together as well as the re-opened Portishead line.

1.1.2 The MetroWest Phase 1 project comprises the delivery of infrastructure and passenger train operations to provide enhanced services on the Severn Beach line, local stations on the Bath to Bristol line and for a reopened Portishead Branch Line with stations at Portishead and Pill. The re-opened Portishead Branch Line will maintain the existing freight train operations as well as re-introduce passenger train services on an hourly basis. The project is being led by North Somerset District Council ("NSDC") on behalf of the four West of England (WoE) councils – NSDC; Bath & North East Somerset Council ("B&NES"); Bristol City Council ("BCC"); and South Gloucestershire Council ("SGC") – as a third party promoted rail project, funded by the four councils and the WoE Local Enterprise Partnership (LEP). The project includes infrastructure to be consented through a DCO and infrastructure which falls within Network Rail Infrastructure Limited’s ("NRIL") General Permitted Development rights ("the GPD works"). The passenger train service is to be delivered through either the Department for Transport’s re-franchising process or via a bi-lateral agreement between the four councils and a train operating company (TOC). The project is to be delivered by the rail industry and the four councils.

1.2 Scheme overview

The MetroWest Programme

1.2.1 The West of England (WoE) Councils, shown in Figure 1.1, together with the West of England Combined Authority ("WECA") are progressing plans to deliver a series of strategic enhancements to the local rail network over the next five years and beyond, through the MetroWest Programme. The aim of the MetroWest Programme is to establish a ‘Metro’ local rail network, similar to comparable sized city regions, through targeted investment in strategic rail corridors, including existing lines, freight only lines and dis-used lines.

1.2.2 The MetroWest Programme currently comprises:

- the MetroWest Phase 1 scheme;
- the MetroWest Phase 2 scheme;
- the Portway Park & Ride station scheme; and
- a range of new station/re-opening schemes, subject to separate business cases and smaller scale localised enhancement schemes.

1.2.3 These are a diverse range of interventions from large schemes increasing the UK passenger train network (network mileage and number of stations) entailing both infrastructure and service enhancements, to more modest localised projects.

1.2.4 The MetroWest Programme is being jointly promoted by the four WoE Councils and WECA, working alongside NRIL, Great Western Railway (GWR) and the wider rail industry.

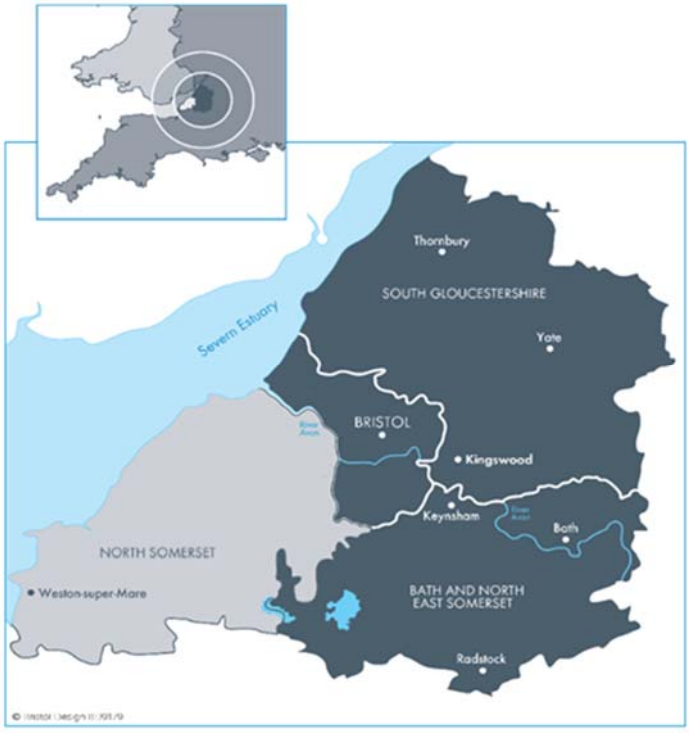

Figure 1-1: The West of England Councils

1.2.5 Each project has a lead authority; MetroWest Phase 1 is being led by NSDC; and MetroWest Phase 2 is being led by SGC.

- MetroWest Phase 1 proposes to enhance the Severn Beach Line and the Bath Spa to Bristol Line to operate a half hourly train service and re-open the Portishead Line with an hourly train service. Two new stations are proposed, at Portishead and Pill. The new train services will also service 16 existing stations.
- MetroWest Phase 2 proposes to enhance the Yate to Bristol Line to operate half hourly train service and introduce an hourly train service on the Henbury line (freight only) to Bristol. Three new stations are proposed at Henbury, North Filton and Ashley Down. The new train services will also serve 6 existing stations.

1.2.6 The current MetroWest Programme which is planned to be delivered by late 2021, is being taken forward as a third party promoted programme with an estimated total capital cost of over £150M, for delivery during the early stages of Control Period 6 (2019-2024). Further projects are expected to be added to the MetroWest programme in due course, potentially establishing a medium-term investment programme.

1.2.7 The combined MetroWest Phase 1 and Phase 2 proposals are shown in Figure 1.2. The MetroWest Phase 1 and Phase 2 proposals span five local rail corridors:

- Phase 1: Severn Beach Line – upgrade to half hourly passenger service (hourly for St. Andrews Road station and Severn Beach station);
- Phase 1: Bath Spa to Bristol Line – upgrade to half hourly passenger service;
- Phase 1: Portishead Line – re-open with an hourly passenger service;
- Phase 2: Yate to Bristol Line – upgrade to half hourly passenger service; and
- Phase 2: Henbury to Bristol Line – re-introduce hourly passenger service.

1.2.8 The MetroWest Programme is has been developed in collaboration with the rail industry. Although it was established as a conventional third party promoted programme, it is not standalone, but a sub-programme within the wider Great Western Programme, for delivery in early control period 6.

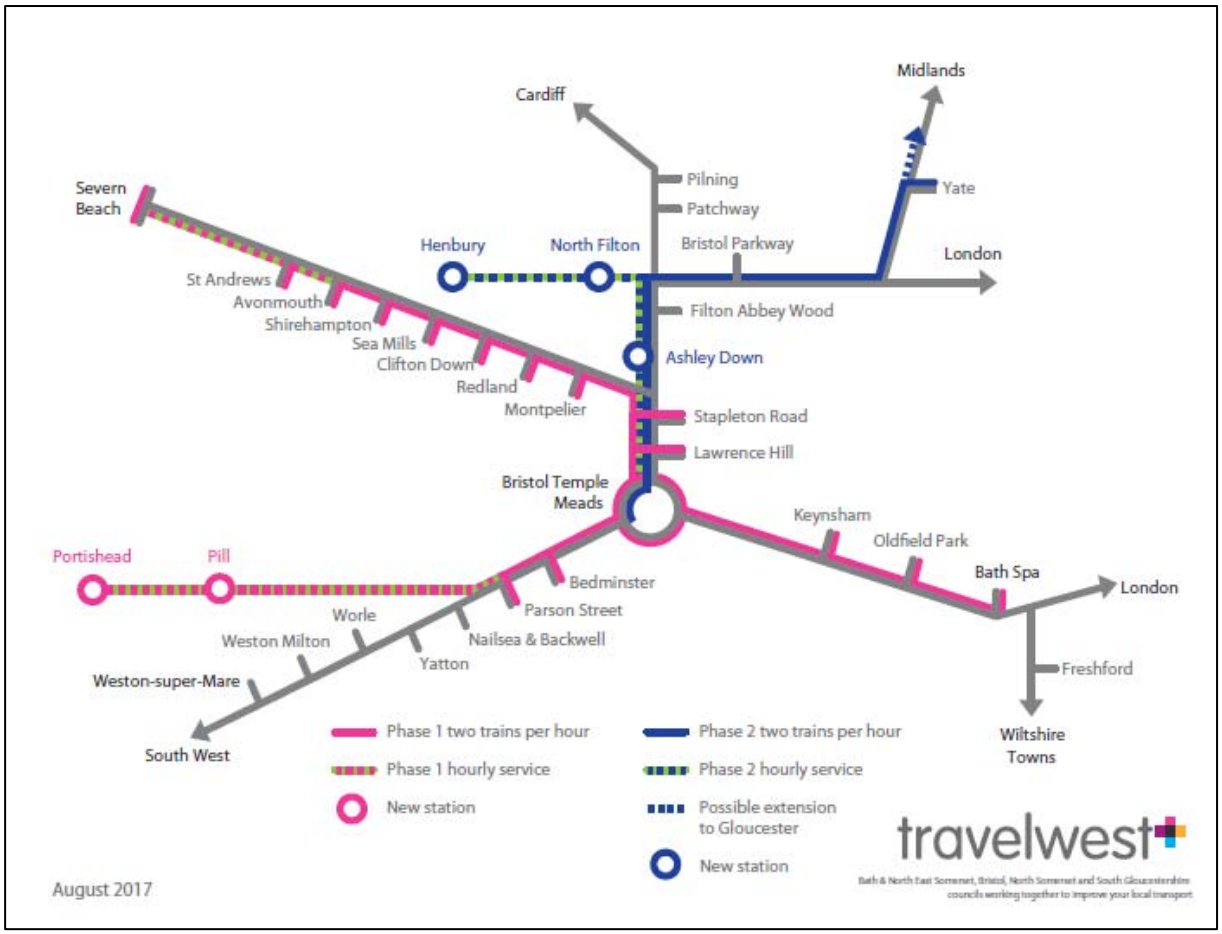

Figure 1-2: MetroWest Phases 1 & 2

MetroWest Phase 1 project

1.2.9 The MetroWest Phase 1 project comprises the delivery of infrastructure and passenger train operations to introduce new/enhanced rail passenger services across Bristol with a service pattern between Portishead, Bath Spa and Severn

Beach, with intermediate stops. This will entail upgrading the existing freight only line between Parson Street junction and Portbury Dock junction (Pill), reinstatement of the current disused line between Portbury Dock junction and Portishead, and various minor works to facilitate the operation of the Phase 1 train services. A new station will be required at Portishead and the former station at Pill will be re-opened. Passenger services include:

- Half-hourly service for the Severn Beach line (hourly for St. Andrews Road and Severn Beach);
- Half-hourly service for Keynsham and Oldfield Park stations on the Bath Spa to Bristol line; and
- Hourly service on a reopened Portishead Branch Line with stations at Portishead and Pill.

1.2.10 The MetroWest Phase 1 project was mobilised in 2013 and originally included proposals to operate a half hourly passenger train service on the Portishead Branch Line. The project feasibility stage (including GRIP Stage 2) was completed in 2014 and reported in the Preliminary Business Case and endorsed by the WoE Joint Transport Board. Subsequently, further feasibility work has been carried out (including GRIP Stage 3), which identified a need to refine the scheme from the initially proposed 2 trains per hour service on the Portishead line to 1 train per hour. Other aspects of the project (Severn Beach Line and Bath Spa local services) remained unchanged. The assessments presented in this TA are based on hourly services on the Portishead Line. An Outline Business Case (OBC) was completed at the end of 2017, which was submitted to the Department for Transport ("DfT") as part of a bid for funding through the Large Local Majors fund (which was unsuccessful).

MetroWest Phase 1 Objectives

1.2.11 The MetroWest Phase 1 principal business objectives are:

- To support economic growth, through enhancing the transport links to the Temple Quarter Enterprise Zone ("TQEZ") and into and across Bristol city centre, from the Portishead, Bath and Avonmouth and Severn Beach arterial corridors;
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future-proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath and Avonmouth, and Severn Beach;
- To improve accessibility to the rail network with new and reopened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents; and
- To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors.

1.2.12 In addition, the MetroWest Phase 1 supporting objectives are:

- To contribute to reducing traffic congestion relative to a ‘Do Minimum’ scenario (as opposed to current levels of congestion) on the Portishead, Bath and Avonmouth, and Severn Beach arterial corridors;

- To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak; and
- To contribute to reducing the overall environmental impact of the transport network.

MetroWest Phase 1 – A committed policy

1.2.13 The MetroWest programme of improvements has been a long-standing aspiration of all the West of England authorities and is identified in their Core Strategies. It therefore has an established and agreed policy context and complements the overarching development plans for the local area. The MetroWest Phase 1 is identified in the Joint Local Transport Plan 3 (JLTP3) (referenced as Greater Bristol Metro and Portishead line) as a future priority scheme following delivery of the current three bus rapid transit schemes and the Weston and Bath package.

1.2.14 The MetroWest programme will be delivered over the next five to ten years including through NRIL Control Period 6 (2019-2024). The MetroWest programme will also extend the benefits of strategic transport interventions that have been delivered or about to be delivered by the West of England councils. These include the three MetroBus schemes (Ashton Vale to Temple Meads, South Bristol Link and North Fringe to Hengrove Package), Bath Package, Weston Package and the Local Sustainable Travel Fund programme. The delivery of these projects, together with the MetroWest programme, will result in better modal integration between rail, bus and active modes, providing an important step towards seamless modal transfer at key hubs across the West of England.

1.3 Consenting regime

1.3.1 The Planning Act 2008 introduced the DCO as the means of seeking planning permission for developments categorised as Nationally Significant Infrastructure Projects (NSIPs). NSIPs can include railway schemes where the railway will be constructed wholly within England, be part of a network operated by an approved operator, and the construction is not permitted development.

1.3.2 Under the Planning Act 2008, the scheme is classed as a NSIP and therefore needs to obtain development consent from the Secretary of State for Transport.

1.3.3 The scheme comprises the re-construction of the disused railway line between Portishead and Pill, the construction of a new station at Portishead, refurbishment of the disused station in Pill and the enhancement works to the Portbury freight line, is being sought under the DCO process.

1.3.4 NSDC as the lead council, has been working closely with NR to ensure that all the work streams required to deliver the design, planning approvals and construction are progressed in tandem.

1.3.5 Figure 1.3 shows the location of the DCO Scheme (red line).

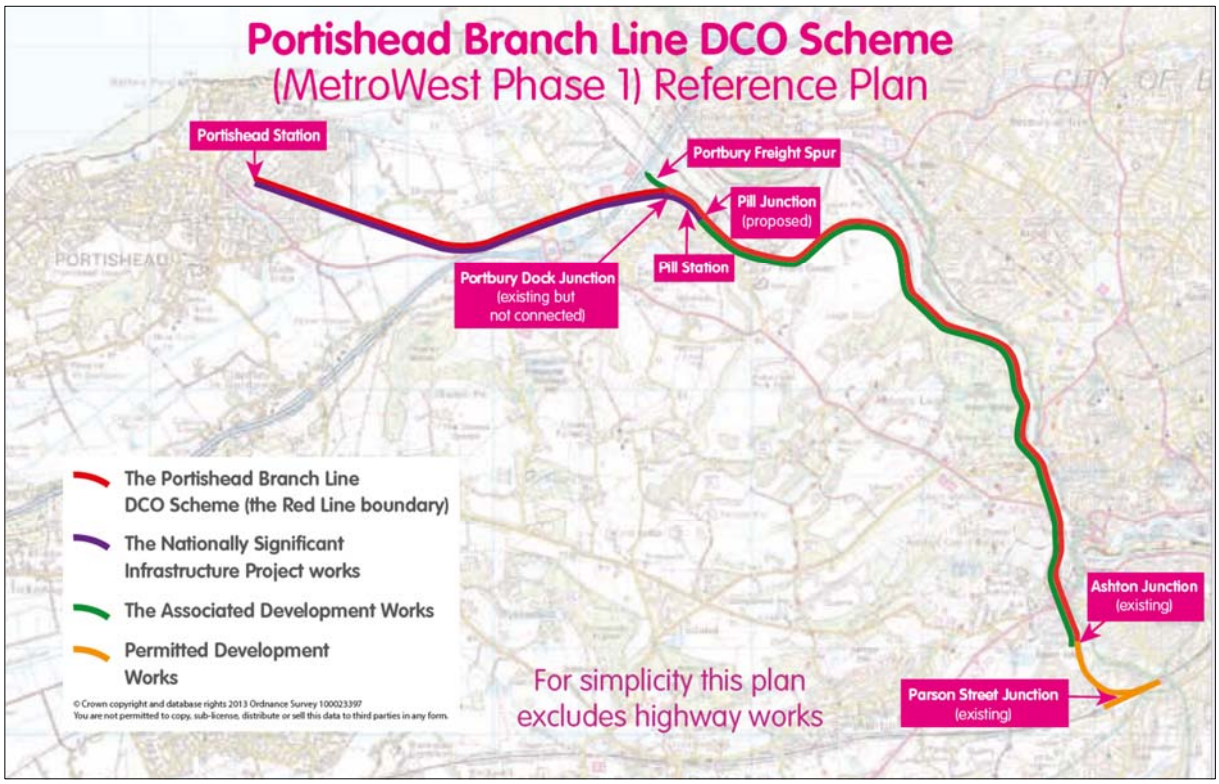

Figure 1-3: Portishead Branch Line DCO scheme (MetroWest Phase 1) – Indicative Red Line Boundary

1.3.6 The NSIP as defined under the Planning Act 2008, comprises of the reconstruction of 4750 metres of disused railway from Quays Avenue in Portishead, North Somerset (OSGR ST471765) to Pill in North Somerset (OSGR ST520762) with 750 metres of new parallel track through Pill village. The NSIP in summary includes a permanent railway of approximately 5500 metres long from Quays Avenue in Portishead to the existing operational railway (Portbury freight line) to the east of the M5 Motorway, then running parallel to the existing operational railway to a new junction east of Pill Viaduct (Pill Junction), to connect with the existing operational railway. The NSIP works comprises; the works to deliver the railway infrastructure, rail stations, car parks, pedestrian / cycle / highway infrastructure and maintenance compounds from Portishead to Pill Junction.

1.3.7 The other works required for the Scheme, such as the new stations, works to the highway at Portishead and Ashton Vale Road and the alterations to the railway between Pill and Ashton Vale Level Crossing are defined as Associated Development under Section 115 of the Planning Act 2008.

1.3.8 Only the proposed infrastructure for the Portishead Branch Line is included in the DCO Scheme, as all the other works are within the existing operational railway and can be delivered utilising NRIL's General Permitted Development rights. The rail service to be delivered by the DCO Scheme is one train per hour, and this is reflected in the TA. Though the potential to run an additional service at peak times (referred to as an 'hourly plus service') is also being considered, providing an approximate 45-minute frequency in the peak periods.

1.4 The applicant

1.4.1 The MetroWest Programme is being jointly promoted by the four WoE Councils and WECA which has responsibility for strategic and transport planning, working alongside NRIL, Great Western Railway (GWR) and the wider rail industry. The Portishead Branch Line DCO (MetroWest Phase 1) scheme is being promoted by NSDC.

1.5 Scope of the report

Transport Assessment scoping

1.5.1 As part of the preparation, a TA Scoping Report has been written and a copy is located at **Appendix A**. This document has been informed by feedback and discussions with the Planning Inspectorate, NSDC, BCC and Highways England (HE). The content of the TA has been further informed by the stage 1 stakeholder consultation that was undertaken by NSDC during summer 2015. **Appendix A** also contains a copy of notes of the meetings held.

1.5.2 A number of matters were raised as part of the scoping and this TA seeks to address them directly. These include (this list is not exhaustive):

- Greater assessment of the construction impacts of the scheme on the highways network. Whilst dependent to a certain extent on the accompanying GRIP3 work, this should consider delivery routes and interim arrangements;
- A wider assessment of the parking impacts particularly in Portishead – taking into account existing parking demand and behaviour at other equivalent railway stations; and
- The need to look at the A369/St Georges Hill at Easton in Gordano junction, M5 J19 and a wider consideration of increased level crossings closures at Ashton Vale Road.

Consultation

1.5.3 As part of the preparation of the TA, a scoping document was prepared and submitted to the relevant highway authorities – Highways England, NSDC and BCC. The consultation responses, as presented in Table 16-3, confirmed the general approach of the TA but additional focus was needed in the following areas.

- Greater assessment of the construction impacts of the DCO Scheme on the highways network. Whilst dependent on the Construction Strategy, this should consider such matters as delivery routes.
- A wider assessment of the parking impacts particularly in Portishead – taking into account existing parking demand and behaviour at other equivalent railway stations.
- The need to look at the A369/St George's Hill at Easton-in-Gordano junction, M5 Junction 19 and a wider consideration of increased level crossings closures at Ashton Vale Road on Winterstoke Road.

1.5.4 The preparation of the TA was also informed by the public consultation undertaken by NSDC. Consultation on the Portishead Branch Line was

undertaken between 22 June and 3 August 2015. Whilst some 95% of respondents supported the scheme overall, the main traffic or parking issues were:

- General concerns over the impact on parking, congestion and traffic surrounding the stations;
- Adequacy of parking spaces at the stations;
- Concerns relating to safety;
- Impacts to existing cycle paths;
- Concerns relating to pedestrian access; and
- Impacts on local roads during construction works.

1.5.5 Further localised consultation work was carried out in 2016 in relation to:

- Pill station; and
- Ashton Vale Road area.

1.5.6 Further consultation work was undertaken in November/December 2016 in relation to a potential Ashton Vale Road alternative access. Details of consultation work are set out in various Consultation Reports, which can be found at: https://metrowestphase1.org/documentarchive/

1.5.7 Following the completion of the DCO Scheme's outline design including GRIP 3 (Option Selection) for two trains per hour in March 2017, along with an updated scheme capital cost estimate, the amount of works required for a half hourly hour service were considerably higher than estimates made at the feasibility design stage (GRIP 2). This made the half hourly scheme unviable at the present time.

1.5.8 As a result, the four WoE councils determined to take a staged approach to the delivery of the MetroWest Phase 1 project as follows.

- The proposals for the Severn Beach Line and Bath Spa to Bristol Line remain unchanged i.e. half hourly services and associated infrastructure.
- The proposals for the Portishead Branch Line are to be delivered in two stages:
    1. The initial stage is to deliver infrastructure to operate an hourly service; the potential to run an additional service at peak times is being considered (referred to as an 'hourly plus service'), providing an approximate 45-minute frequency in the peak periods, as it may be possible to operate this with the planned infrastructure.
    2. It is envisaged that a second stage will be promoted separately at some point after delivery of the initial stage, to upgrade the infrastructure to operate a half hourly passenger train service. This second stage will require separate statutory processes, business case and funding package and will not be progressed until after the delivery of the initial stage. There is currently no estimated opening date for this stage.

1.5.9 It is likely that an alternative highway access to Ashton Vale industrial estate will be required should funding for the second stage be identified.

1.5.10 In addition to the consultation above, Stage 2 formal consultation was undertaken between October and December 2017. Further details of consultation work are reported separately in DCO documentation.

1.6 TA Guidance

1.6.1 Where possible, published guidance and standards have informed the structure of this TA. The DfT Guidance for Transport Assessment (GTA) was formally archived in October 2014. Nationally, this document has been replaced by two principal elements - 'Transport evidence bases in plan making and decision taking' and stronger reference to the existing National Planning Policy Framework (NPPF). At a local level, local authorities have been adopting new standards which largely replicate the GTA but reflect local priorities and circumstances.

1.6.2 The Transport Evidence Bases in Plan Making is less prescriptive than the previous guidance but cites a number of headings that need to be followed particularly in relation to the analysis of the transport impacts of local plans.

1.6.3 In the NPPF, paragraph 32 sets out all developments or schemes that generate significant amounts of transport movement should be supported by a TA or a Transport Statement (TS). Local planning authorities must make a judgement as to whether a proposal would generate significant amounts of movement on a case by case basis.

1.6.4 In identifying a need for a TA, the scale and level of detail should be established early in the development management process. This may include:

- The planning context of the development/scheme proposal;
- The area, scope and duration of the study;
- Assessment of public transport capacity, walking and cycling provision and highway network capacity;
- Road trip generation and trip distribution methodologies and assumptions about the development proposal;
- Measures to promote sustainable travel;
- Safety implications of the development/scheme; and
- Mitigation measures where applicable including scope and implementation strategy.

1.6.5 The scope and level of detail in a TA will vary from site to site but the following should be considered in defining the scope of the proposed assessment:

- Information about the proposed development/scheme, site layout including the proposed transport access and layout across all modes of transport;
- Information about neighbouring uses, amenity and character, existing functional classification of the nearby highway network;
- Data about the existing public transport provision including the provision and frequency of services and the proposed public transport changes;
- A qualitative and quantitative description of the travel characteristics of the proposed scheme, including movements across all modes of transport that would result from the development and in the vicinity of the site;

- An assessment of trips from all directly relevant committed development in the area (essentially development where there is a reasonable degree of certainty that development will progress within the next three years);
- Data about current traffic flows on links and at junctions within the study area and the identification of critical links and junctions;
- An analysis of injury accident records in the most recent three or five-year period;
- An assessment of the likely associated environmental impacts of transport related to the development (such as air quality management areas);
- Measures to improve the accessibility of the location (such as footway and cycleway links);
- Description of parking facilities in the area and the parking strategy of the development;
- Ways of improving sustainability by reducing the need to travel; and measures to deal with the residual impacts of the development.

1.6.6 NPPF states that assessments should be based on normal traffic flow and usage conditions (for example, non-school holiday periods, and typical weather conditions). Projections should use local traffic forecasts such as TEMPRO drawing where necessary on National Road Traffic Forecasts (NRTF). In assessing the impacts, this TA goes beyond this and also utilises outputs from a rail demand model based on the West of England stations and a strategic transport model for Bristol and the surrounding area. The process is explained in Section 5.

1.6.7 The timeframe that the assessment covers should be agreed with the relevant consenting authority in consultation with the relevant transport network operators and service providers. However, in circumstances where there will be an impact on a national transport network, this period will be set out in the relevant Government policy.

1.6.8 NSDC produced a Supplementary Planning Document (SPD) on TAs which was published in December 2015, located within the Highway Document Design Guide. The document offers guidance on the thresholds required for a transport assessment and guidance on the scope of the TA.

1.6.9 The DfT Circular 02/2013 sets out the way in which Highways England will engage with communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the strategic road network. The document states that Highways England should provide the local planning authority or other relevant consenting bodies with its assessment of the transport impact, as generally derived from a TA or TS incorporating a Travel Plan as required in the NPPF, produced by the promoter of the development concerned in line with current DfT guidance or on a basis otherwise agreed with Highways England. Where appropriate, conditions may be agreed to offset any unacceptable impacts that may be identified through the assessment process.

1.6.10 The planning guidance document ‘The Strategic Road Network –Planning for the Future’ provides guidance on the approach taken by Highways England to engaging in the planning system and the issues looked at when considering

draft planning documents and planning applications. It offers advice on the information Highways England would like to see included in a planning application. The document specifies that TAs should generally be carried out in line with prevailing government guidance in agreement with Highways England, through pre-application and scoping.

1.7 Structure of this Transport Assessment

1.7.1 Based on the above approach and methodology, after the introduction in Section 1, the remainder of the TA is structured as follows:

- **Section 2: Policy Context**. This section outlines the pertinent national and local policies that need to be considered as part of the scheme. The aim of this section is to demonstrate the extent to which the scheme is aligned with these policies.
- **Section 3: Scheme Proposals**. This section outlines the context and detail of the scheme. It then examines the scheme proposals, particularly in the context of Portishead and Pill stations, Ashton Vale Road, the rail service pattern and the impacts on existing level crossings.
- **Section 4: Existing Conditions**. The aim of this section is to outline and understand the existing baseline conditions within the scheme area. This includes a review of existing land uses and committed development. The existing highway network is considered with a focus on both principal and local links and junctions. The section sets out an analysis of both the existing highway flows and parking conditions based on the surveys undertaken in the early part of 2015. The section also sets out accident data for the 5-year period by severity and looking at causal factors. Section 4 examines sustainable transport networks by reviewing both public transport provision and walking and cycling. This includes an analysis of the existing opportunities to access the station sites by sustainable means and includes a review of Non-Motorised User (NMU) data. The Section concludes by considering the existing level crossings.
- **Section 5: Impact Methodology and Assumptions**. This section outlines the methodology that has been used to determine the likely demand for the scheme. In doing so, a number of assumptions have had to be made and these are outlined here together with their rationale.
- **Section 6: Strategic Operational Impact Assessment**. This part of the TA outlines the strategic impact of the scheme on the highway network, and public transport.
- **Section 7: Local Operational Impact Assessment**. Within this section the local highway impacts of the scheme are assessed. The extent of the impacts and assessment are based on the scoping discussions that were held – with certain junctions, parking and walking and cycling networks being specifically identified.
- **Section 8: Construction Impact Assessment**. This part of the TA outlines the impact of the scheme construction on the local road network and Public Rights of Way (PRoWs).

- **Section 9: Development of Mitigation Measures**. This builds upon the impact assessment and tests measures that may deal with some of the concerns that have been identified.
- **Section 10: Transport Implementation Strategy**. This part of the TA summarises the measures that need to be implemented in support of the scheme. These include the additional infrastructure that will be required as well as the Construction Traffic Management Plan and the Outline Station Travel Plans.
- **Section 11: Summary and Conclusions**. The final section outlines the main conclusions of the TA.

1.7.2 There are 14 Appendices to this TA:

- **Appendix A: Scoping Report and Meeting Notes** – sets out the approach to the transport assessment, including study area and methodologies to be used; also includes the result so key meetings related to scoping the transport assessment.
- **Appendix B: List of Committed Developments** – includes committed developments in the DCO study area.
- **Appendix C: Report of Surveys** – sets out details (and results) of surveys undertaken for the transport assessment, including traffic counts, non-motorised users counts and a bus survery.
- **Appendix D: Accident Data** – contains accident data retrieved for the period 1st November 2011 to 30th November 2016 for Bristol City Council areas, and 1st November 2011 to 30th June 2016 for North Somerset Council areas.
- **Appendix E: Transport Modelling (network plots)** – a series of (27) plots from the Simulation and Assignment of Traffic to Urban Road Networks ("SATURN") traffic model showing results of scheme modelling.
- **Appendix F: Junction Assessments** – presents outputs from junction modelling carried out for the assessment (6 junctions in Portishead and 1 in Pill).
- **Appendix G: Distribution and Assignment** – details of initial assignment of scheme traffic flows in the vicinity of Portishead and Pill stations.
- **Appendix H: Avonmouth/Severnside impacts (including level crossings)** – focused assessment of the Avonmouth/Severnside area, in particular considering level crossings in the area providing access to the port.
- **Appendix I: Parking Surveys** – outline of parking surveys carried out in the vicinity of Portishead and Pill stations, as well as near Ashton Vale Road.
- **Appendix J: Walking and Cycling Plan** – consideration of walking and cycling in the study areas around Portishead and Pill stations, through an NMU audit.
- **Appendix K: Construction Traffic Management Plan ("CTMP")** (DCO Document Reference 8.13) – contains an assessment of the impacts of the construction transport management plan.

- **Appendix L: Match Day Pedestrian Impacts** – information about activity in the vicinity of Ashton Vale Road before/during/after a football match at Ashton Gate Stadium.
- **Appendix M: Outline Station Travel Plans Portishead and Pill** – sets out the outline station travel plans for operations at Portishead and Pill stations.
- **Appendix N: Ashton Vale Road Junction Assessments** – this appendix brings together a series of reports and technical notes relating to the interaction between road and rail traffic at the signalised junction and level crossing at the Ashton Vale Road / Winterstoke Road junction.

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1.8 Previous versions of the TA

1.8.1 Note that the assessments in this TA, in support of the DCO Scheme, supersedes any previously published analysis, such as transport assessments issued as part of the DCO's Preliminary Environmental Impact Report ("PEIR"). In particular, previous assessments assumed a 2-trains per hour service on the Portishead Line, and the impact this had in the Ashton Vale Road area have been substantially re-assessed.

SECTION 2

Policy Context

2.1 Introduction

2.1.1 This section outlines the national and local transport and planning policies that the scheme needs to take account of. The emphasis throughout is to demonstrate the extent that the scheme is aligned to these policies and priorities.

2.2 National Policies and Strategies

2.2.1 The DCO Scheme will be determined in accordance with the decision-making framework set out in the Planning Act 2008 and National Planning Statement for National Networks (NPS NN) for NSIPs, and with consideration of other nationally important or relevant policies, such as those within the NPPF. The national legislative and policy framework relevant to the DCO Scheme are described in Table 2.1.

2.3 Local Policies and Strategies

2.3.1 The local planning framework comprises a number of key adopted documents which form the statutory development plan for each authority, against which proposals seeking planning permission are assessed. These comprise saved policies from extant Local Plans as well as new emerging policy documents. MetroWest Phase 1 affects all four West of England Authorities while the DCO Scheme lies within the jurisdiction of two of the local planning authorities, NSDC and BCC. Table 2.3 summarises the local planning framework for NSDC and BCC. The main planning policies relevant to the DCO Scheme are presented in Chapter 6 of the ES (DCO Document Reference 6.19).

2.4 Emerging Policies and Strategies

2.4.1 The aim of this section is to note emerging policies and strategies. It is important to stress that these policies have not yet been adopted at the time of writing and as such as do not have satisfy the requirements. The emerging policies relevant to the DCO Scheme are described in Table 2.4.

2.5 Summary of Key Issues

2.5.1 This section has outlined the national and local transport policies and strategies pertinent to the scheme. The review indicates that the scheme is well placed to meet these policies by promoting modal shift towards sustainable transport, provide an alternative mode between Portishead and Bristol and would facilitate economic regeneration and growth. MetroWest Phase 1 has been a committed scheme for the WoE authorities for some years and is therefore committed in policies, and has shaped subsequent policies and strategies. There are, however, a certain number of outstanding policy matters for the scheme as follows:

- The scheme currently sits outside the vehicle and cycle parking standards for NSDC and so will take account of NSDC Local Plan policy CS11;
- Within Bristol, the impacts of increased level crossing downtimes, under policy DM23 Transport Development Management of the Site Allocations and Development Management Policies ("SADMP"), need to be considered; and
- The highway design (including footways, cycleways and right of ways) will need to take account of the requirements of the adopted NSDC Highways Development Design Guidance.

Table 2.1: National Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
Planning Act 2008	The Planning Act 2008 introduced the DCO regime as the means of seeking planning permission for developments categorised as NSIPs. These include railway schemes, where the railway when constructed [or altered] will be wholly within England, is part of a network operated by an approved operator, and where the construction is not permitted development	The proposed works to build the new railway between Portishead and Pill on NSDC and NRIL land is considered to be a NSIP for the following reasons: • The scheme when built will be wholly in England. • The scheme will form part of a network operated by an approved operator. The proposed new section of railway exceeds the threshold length of 2km.	Sections 6.3.2 to 6.3.10
The National Policy Statement on National Networks (December 2014)	This statement focuses upon the development of nationally significant infrastructure including road and rail networks. The document generally provides planning guidance for the promoter and the basis for examination for the examining authority and the Secretary of State where appropriate	Much of the statement concentrates upon the development and improving the resilience of the strategic highway network. The document states that the rail network should: • Offer a safer and reliable route to work; • Should facilitate an increase in both business and leisure travel; • Support existing public transport provision; • Facilitate better access to public services; and • Enable the transport of freight across the country including to and from ports. The proposed scheme is aligned with the national statement as it would offer a robust alternative to the A369 corridor between Portishead and Bristol where congestion in the peak hour is a major concern. It will enable both Portishead and Pill to be linked to the national rail network for the first time since the 1960s which will facilitate greater business and economic activity. Table 2.2 sets out the NPS areas that should be addressed in the TA.	Sections 6.3.134 to 6.3.7825

Table 2.1: National Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
National Planning Policy Framework (the NPPF) (March 2012)	NPPF published by the Department for Communities and Local Government (DCLG) sets out the planning policies to achieve sustainable development. The NPPF seeks to promote growth whilst creating a high quality built environment underpinned by vibrant communities.	The pertinent aspects of the NPPF that need to be considered as part of a TA include: • Promoting sustainable transport (policy 4): This policy supports development that reduces greenhouse gases and reduces congestion, facilitates the use of sustainable modes of transport and develops strategies for the provision of viable infrastructure. • Requiring good design (policy 7): Good design is seen as a key aspect of sustainable development, is indivisible from good planning and should contribute positively to making places better for people. Good design applies to individual buildings, public and private spaces and wider area development schemes. Good design should not only enhance the aesthetic appearance of the development, but ensure that the development functions well, optimises the potential of the site, and creates safe and accessible environments for all. • Promoting healthy communities (policy 8): Developments can contribute to promoting healthy communities by providing safe environments free from crime, good access, and protecting and enhancing walking and cycling routes. There is a presumption in the NPPF in favour of sustainable development which is underpinned by a number of core principles as follows: • To proactively drive and support sustainable economic development to deliver the infrastructure that the country needs; • To support the transition to a low carbon future in a changing climate;	Sections 6.3.7926 to 6.3.9138

Table 2.1: National Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
		• To contribute to conserving and enhancing the natural environment and reducing pollution; and • To actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling. The promotion of sustainable modes of transport is intrinsically linked to the above. The NPPF aims to integrate planning and transport by noting that transport policies can help facilitate sustainable development as well as contributing to wider sustainability, health and economic objectives. Sustainable transport also improves accessibility to consumer and labour markets for businesses and improving access to jobs for the labour force. The scheme represents a considerable enhancement of public transport in the WoE as it will provide Portishead and Pill with a new and additional public transport alternative and satisfy the requirements of NPPF.	
Network Rail Long Term Planning Process (LTPP)	The LTPP focusses on the strategic planning of the rail network. The process is designed to be flexible so as to take into account the different requirements and demands on the network from various stakeholders.	The LTPP includes the preparation of market studies, route studies and cross-boundary analyses – of which the Great Western Route Utilisation Strategy is one	Section 6.6.3931
Great Western Route Utilisation Strategy (March 2010)	The existing NRIL Great Western Route Utilisation Strategy (RUS) seeks to establish the strategic direction of the railway from a systematic analysis of the future requirements of the network. The RUS seeks to balance the capacity, passenger and freight demand, operational	The RUS identifies a number of issues with the rail network within the West of England area. These include: • Overcrowding on local services into Bristol Temple Meads particularly during peak periods; • Bottle necks on the Filton Bank between Dr Days junction (east of Bristol Temple Meads) and Filton Abbey Wood;	Section 6.6.3830

Table 2.1: National Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
	performance and cost whilst addressing the requirements of funders and stakeholders. The current iteration of the RUS focuses on the 10 year period to 2019 but also considers the implications of the growth in demand over a 30 year period.	• Track and signalling constraints particularly at junctions and crossovers at Bristol East, St Anne's and towards Parson Street; and • Limited standard pattern timetable services into Bristol including the Severn Beach Line. The RUS has a number of interventions and infrastructure improvements. These include the four tracking of the Filton Bank which will also be used by the electrification of the Great Western Main Line ("GWML"). Improvements to capacity at Bath Spa and increase in line speeds between Bristol Temple Meads and Bridgwater	
Network Rails Hendy Review	In November 2015 Sir Peter Hendy reported to the Secretary of State for Transport on the replanning of NRIL's Investment Programme. The purpose of the review was *"... to conduct a thorough review of the enhancement programme in England & Wales to see what can be delivered in an affordable and timely way within the funding period to 2019."* A subsequent 'Enhancements Delivery Plan Update' report was published in January 2016, which included a chapter covering projects that make up the 'Great Western Capacity Programme and Electrification'	MetroWest Phase 1 is not specifically dependent on GWML electrification being complete in the Bristol area, so deferral of sections of electrification does not directly impact on MetroWest Phase 1. However, there are knock-on effects relating to MetroWest Phase 1 dependency on elements of related infrastructure. There are also linkages with the electrification programme in terms of the detail and timing of rolling stock cascades within the GWR franchise fleet, and the types of trains available to run services. MetroWest Phase 1 services have been planned as part of the timetable envisaged when Intercity Express Programme (IEP/IET) trains are operational, and specifically the timetable assuming that all IEPs are electrically powered. Deferring electrification is possible because IEP trains for the GWML are all being built as bi-mode trains that can run on diesel power where electrification is not in place, but it is likely that they will not be able to achieve the previously envisaged (all electric) timetable. This has the effect of increasing the	

Table 2.1: National Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
		constraints on other services on the network in the area, including proposed MetroWest Phase 1 services. Hence, infrastructure changes associated with the electrification programme deliver capacity benefits needed by MetroWest Phase 1 services. Specifically, MetroWest Phase 1 services are dependent on Bristol East Junction remodelling and Filton Bank 4-tracking. In the case of Bristol East Junction, this is partly as a result of changes to timetable assumptions precipitated by deferral of electrification and bi-mode operation of IEP trains. However, funding for the enhancement of Bristol East Junction has not yet been secured in CP5 (which ends in March 2019), and electrification will also probably follow its remodelling. Filton Bank 4-tracking is programmed for completion in December 2018 (Enhancements Delivery Plan Update report), though it will now be electrified after its completion	

Table 2.2: Assessment of the TA against the NPS

NPS Ref	Topic	Key issues	The focus of the TA
2.2	Addresses congestion and crowding to provide safe, expeditious, resilient networks supporting social and economic activity, capable of stimulating and	The benefits of the Project are as follows: • reducing the rate of congestion growth; • improving economic activity; and • reducing journey times.	The purpose of the scheme to promote modal shift which would improve access to employment and economic opportunities such as the Temple Quarter Enterprise Zone around Bristol Temple Meads station

Table 2.2: Assessment of the TA against the NPS

NPS Ref	Topic	Key issues	The focus of the TA
	supporting economic growth		
2.9	Enhance accessibility for non-motorised users	• Demonstrate and improve linkage between Portishead and Bristol. • Provide a safe link by means of a bridge between Trinity Primary School and the residential land to the south of the line. • Reduce impact on PRoWs between Pill and Portishead.	Metro West Phase 1 is primarily a public transport scheme and there will be a need to ensure the stations are readily accessible to pedestrians and cyclists.
2.29	Driver of economic growth and social development	• Safe and reliable route to work; • Increase business and leisure travel; • Support reasonable and local public transport to connect communities and public services with workplaces and with each other; • Provide for transport of freight.	MetroWest Phase 1 has a clear business strategy and is closely aligned with the strategic aims and responsibilities of the four West of England authorities, the LEP and NRIL and provides a tangibly integrated approach to the travelling public by providing the basis for a truly 'Metro' level of service for West of England local rail network, alongside the substantial investment in the long distance rail routes to and from the West of England. The MetroWest Phase 1 principal business objectives are: • To support economic growth, through enhancing the transport links to the TQEZ and into and across Bristol city centre, from the Portishead, Bath and Avonmouth and Severn Beach arterial corridors. • To deliver a more resilient transport offer, providing more attractive and guaranteed (future-proofed) journey times for commuters, business and residents into and across Bristol, through better

Table 2.2: Assessment of the TA against the NPS

NPS Ref	Topic	Key issues	The focus of the TA
			utilisation of strategic heavy rail corridors from Portishead, Bath and Avonmouth, and Severn Beach. • To improve accessibility to the rail network with new and reopened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents. • To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors
2.35	Reducing pollution and congestion	Demonstrate the air quality and travel time improvements resulting from the scheme	The scheme is likely to reduce the overall impact of traffic growth on the highway network and as such the overall impact on air quality is likely to be negligible. There may be some localised impacts around the stations and the railway line alignment
5.201 - 5.218	Impacts on transport networks	Assess local plan policies on demand management and other relevant policies; consult with the highway authority and local planning authority	MetroWest Phase 1 has been assessed against national and local transport and planning policies and this is outlined in section 2 of this TA. Consultation with highway authorities has been undertaken to inform this TA with the elements and this is outlined in section 1

Table 2.3: Local Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
Joint Local Transport Plan 3 2011 to 2026 (March 2011)	The plan, published by the West of England authorities outlines the transport strategy for the period up to 2026. It focuses on five goals: reducing carbon emissions, supporting economic growth, improving accessibility, providing for a safe, healthy and secure population, and enhancing quality of life.	The plan outlines the West of England as one of the fastest growing economies in the UK and a critical hub for the South-West's economy. It also highlights major transport improvements as a key priority for businesses. The plan aims to synchronise transport investment with major development and regeneration areas, such as Bristol's TQEZ. The plan indicates that residents in North Somerset would be beneficiaries of any investment in transport infrastructure. Currently, residents in the district have the worst accessibility to major employment sites of any residents across the West of England. Only 21% of residents can access major employment sites by public transport within 20 minutes, compared to a regional average of 31%. Only 55% of residents have access within 40 minutes, compared to 73% for the West of England. MetroWest Phase 1 will provide both a new link and alternative mode to and from the centre of Bristol with improved connections to North Bristol, Avonmouth and Bath. The key strategy of the plan is to support economic growth by providing an affordable, low carbon, accessible, integrated, healthy, safe and reliable transport network. Provision of reliable public transport infrastructure is considered to be a vital mechanism for achieving this strategy. In particular, the plan acknowledges a range of major transport schemes that were prioritised through the DfT's Regional Funding Allocation. These major schemes include significant investment in rail infrastructure such as MetroWest Phase 1. The scheme aims to reinstate rail connections between Portishead and Bristol, to provide enhanced accessibility.	Sections 6.6.1 to 6.6.4

Table 2.3: Local Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
West of England LEP Strategic Economic Plan 2015 to 2030 (March 2014)	The Strategic Economic Plan (SEP) prepared by West of England LEP outlines how the region will achieve sustainable economic growth over the plan period. Specifically, the SEP was prepared to support the West of England's attempts to secure government funding to assist economic development in the region between 2015 and 2021, via the Local Growth Deals initiative.	Within this context, the SEP aims to facilitate the creation of more than 25,000 jobs and develop an economy worth around £25bn per year (which also contributes some £10bn to the Treasury annually). The LEP vision is to encourage sustainable economic growth and the creation of substantial numbers of new private sector jobs by: • Supporting growth of key sectors; • Driving innovation and creativity and the development of new technologies, products and services; • Skilling the workforce to meet needs of our businesses now and in the future. Retaining existing talent, raising aspirations and marketing talent to inward investors; • Assisting business start-up and growth; and • Making the West of England highly attractive to inward investors and existing companies by securing improved transport, environmental and broadband infrastructure that business needs; providing access to a range of employment land and premises; facilitate new housing and community structure; maintaining an outstanding physical environment and high quality of life to retain and attract highly skilled workers and graduates. The SEP positions the West of England as 'the city region of choice for a sustainable future', based on the region's legacy of innovation, world class university and research facilities, strong visitor economy and high quality of life. This positioning is supported by a focus on five priority sectors: creative and digital media, low carbon, high tech industries, advanced engineering and aerospace and professional services. The SEP highlights	Sections 6.6.12 to 6.6.14

Table 2.3: Local Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
		that expansion of these sectors will be driven by a number of 'levers of growth', including investment and promotion and places and infrastructure. In particular, infrastructure is presented as a key enabler of growth in the region, with MetroWest rail improvements Phase 1 and Phase 2 emphasised as key cross-boundary infrastructure interventions in the SEP. The SEP makes reference to the contribution to the region's economy and jobs as a result of MetroWest Phase 1. These economic outputs will be achieved by increasing the connectivity between Temple Quarter Enterprise Zone and the West of England's various Enterprise Areas, meaning major employment sites are brought closer to the skilled workforce residing in the region.	
North Somerset Local Plan (March 2014)	The Local Plan for North Somerset guides future development within the DCO Application Area and comprises the following formal documents: • North Somerset Council Core Strategy (April 2012) (see below) • Sites and Policies Plan Part 1: Development Management Policies (July 2016) • Saved policies from the Replacement Local Plan (March 2007) • Long Ashton Neighbourhood Development Plan 2013 – 2033 (May 2015)	Of these plans, the policies within the Core Strategy, the saved policies of the Replacement Local Plan and the policies within the Sites and Policies Plan Part 1: Development Management Policies are considered to be of particular relevance to the application.	Sections 6.5.3 to 6.5.9

Table 2.3: Local Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
	• West of England Joint Waste Core Strategy (2011)		
North Somerset Council Core Strategy (April 2012)	The Core Strategy sets out the broad long-term vision, objectives and strategic planning policies for North Somerset up to 2026. It was the subject of a legal challenge in 2012 in respect of housing supply Figures and was remitted to the Planning Inspectorate and was the subject of independent hearings in March 2014.	The policies of particular relevance to the DCO Scheme are shown in Table 6.1 of the ES. An assessment of the DCO Scheme's compliance with these policies is provided in Appendix 1 of the Planning Statement (DCO Document Reference 8.11).	Sections 6.5.10 to 6.5.11
Safeguarding in Local Plans (February 2015) (Incorporating Main Modifications, January 2016)	The development management policies are generic policies that are used when assessing a range of planning applications and development proposals. It does not contain site allocations, but instead focuses on a broad range of development issues such as the Green Belt, major transport schemes, development in the countryside and retailing.	The area in which the proposed scheme will be located comes under the safeguarding policy in "Sites and policies plan part 1 development management" (Publication Version) (February 2015) which complements the strategic context set out in the Core Strategy, and it states existing and proposed railway lines have a policy aim: • To protect existing and proposed railway lines from inappropriate development. Policy DM22 goes on to say: • A corridor extending 10 metres either side of the existing tracks of the Taunton-Bristol railway line as shown on the Proposals Map is safeguarded for the provision of additional tracks. Development within this corridor will be permitted if it would not prejudice future capacity enhancements. • Land shown on the Proposals Map is safeguarded for the following alignments. Development will only be permitted if it would not prejudice the use of these alignments for rail traffic:	Sections 6.5.15 to 6.5.16

Table 2.3: Local Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
		Weston Railway Loop southern chord; and Portishead – Pill (for the Portishead to Bristol railway line including railway stations and associated car parking and highway works). Those policies of particular relevance to the DCO Scheme are shown in Table 6.3 of the ES while an assessment of the DCO Scheme's compliance with these policies is provided in Appendix 1 of the Planning Statement (DCO Document Reference 8.11).	
North Somerset Parking Standards (November 2013)	The North Somerset Parking Standards Supplementary Planning Document (SPD) defines and outlines the authority's approach to parking for new schemes/developments	The document explains that at non-residential locations, it is essential to manage the demand for car use by ensuring that the availability of car parking spaces does not discourage the use of alternative transport modes whilst ensuring that commuter car parking does not adversely impact on the surrounding local area. Refer to Section 7.5.1 of the TA for further details.	Section 6.5.5
North Somerset Highways Design Guide (October 2015)	The North Somerset Highways Design Guide sets out the standards and approach to design in connection with highways, footways, accesses and a range of other aspects of highway design.	The guidance applies to all highways schemes relating to new development within North Somerset including alterations or works to the existing highway and other transport infrastructure and associated works. Refer to Section 7.6.1 of the TA for further details.	N/A
Bristol Local Plan – Core Strategy (June 2011)	The Bristol Core Strategy is part of the Local Plan (formerly the Local Development Framework), which sets out the overall approach and spatial strategy for future development in Bristol and provides the overarching strategic policy and guidance to deliver	The policies within the Bristol City Council Core Strategy of particular relevance to the DCO Scheme are shown in Table 6.4 of the ES. An assessment of the DCO Scheme's compliance with these policies are provided in Appendix 1 of the Planning Statement (DCO Document Reference 8.11).	Sections 6.5.20 to 6.5.23

Table 2.3: Local Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
	sustainable communities and economic growth across the City.		
Site Allocation and Development Management policies (SADMP) Local Plan (July 2014)	This document supports the Core Strategy and outlines the development management policies, site designations and allocations.	Those policies within the Site Allocations and Development Management Policies of particular relevance to the DCO Scheme are shown in Table 6.5 of the ES. An assessment of the DCO Scheme's compliance with these policies is provided in Appendix 1 of the Planning Statement (DCO Document Reference 8.11).	Sections 6.5.24 to 6.5.26
Bristol Central Area plan (March 2015)	This document, which is part of the Bristol Local Plan, explores how Bristol City Centre will develop to the period up to 2026. It supports policy BCS2 of the Core Strategy that seeks to provide around 150,000 sq. m of net additional office space, 7,400 new dwellings and improved connectivity by transport.	The scope of the DCO works do not extend into the boundary of the Central Area Plan and therefore the policies of the Plan have not been considered further.	Sections 6.5.27 to 6.5.28

Table 2.4: Emerging Policies

Policy	Description	Objective/Relevance to TA	Ref. to ES
WoE Joint Spatial Plan	This proposed statutory document was drafted to establishthe housing requirement to be accommodated across the four West of England local authorities for the period from 2016 to 2036. The plan itself was to provide a robust evidence base to inform each of the local authorities' Local Plan reviews.	The scope of the plan was limited to the following spatial matters: The overall housing requirement to be accommodated in the WoE; The broad strategic distribution of housing and employment land including strategic locations and key sites; and Identification of strategic infrastructure proposals including transport required to deliver the scale of the development envisaged. This work will be replaced by a new Spatial Development Strategy, from the West of England Combined Authority (along with NSDC). The draft Spatial Development Strategy should be available later in 2021.	N/A
WoE Joint Transport Study	B&NES, BCC, NSDC and SGC are preparing a joint study in parallel with the WoE Joint Spatial Plan, which is looking at how to meet the need for housing and employment space up to 2036.	The Joint Transport Study provided people with an opportunity to voice their opinion on how transport should be provided in the West of England over the next 20 years. One of the concepts up for discussion and consultation was to undertake further improvements to the MetroWest rail concept which could improve the Henbury line, new rail line re-openings, and provide more capacity between Bristol and Bath and to South Wales.	N/A
North Somerset Guidance on Transport Assessments	In December 2015, North Somerset Council issued a new guidance document on preparation of transport assessments. Whilst this guidance largely seeks to replicate the previous GTA, it has been tailored to the policies and priorities of North Somerset.	Refer to sections 1.7 and 1.8 of the TA	N/A

SECTION 3

Scheme Proposals

3.1 Introduction

3.1.1 This section of the TA summaries the main elements of the proposal. The focus here is on the transport related aspects of the development such as the proposed service level, access and parking arrangements around the stations.

3.2 Scheme description

3.2.1 MetroWest Phase 1 will introduce new / enhanced rail passenger services across Bristol with a service pattern between Portishead, Bath Spa and Severn Beach, with intermediate stops. This will entail upgrading the existing freight only line between Parson Street junction and Portbury Dock junction (Pill), reinstatement of the current disused line between Portbury Dock junction and Portishead, and various minor works to facilitate the operation of the Phase 1 train services. A new station will be required at Portishead and the former station at Pill will be re-opened.

3.2.2 The following engineering works have been proposed, in order to deliver MetroWest Phase 1 and shown in Table 3.1.

Table 3.1: MetroWest Phase 1 Proposed Engineering Works [1]

Work Number	Description
1, 1A, 1B	A new single track railway between Portishead and the New Pill Junction
2	Realignment of Quays Avenue Portishead
2A	A new surface water drain from Phoenix Way
3	New Pedestrian and Cycle boulevard south of Harbour Road, Portishead
4	New Car Park, combined pedestrian and cycle track and vehicular access onto Harbour Road, located south of Harbour Road, Portishead
5	New Portishead Station
6	New Station Car Park
7	A combined pedestrian and cycle overbridge to the south west of Trinity School, Portishead
7A, 7B, 7C	New paths to connect Portishead station to the Village Quarter, Portishead
7D	Temporary Construction compound, Tansy Lane, Portishead
7E	Underground electrical supply cables
8, 10B, 11A, 11B	Temporary Construction Haul Roads
9, 10, 10A	Permanent maintenance compound (and temporary construction compound) at Sheepway, Portbury. Temporary diversion of current cycle path at Shipway Gate Farm, Portbury to accommodate new compound
11	Improvement to existing agricultural access to the highway of Sheepway
12	Permanent new access to the highway known as the Portbury Hundred, Portbury
12A	Temporary construction compound to the north of the Portbury Hundred

Work Number	Description
13	Improvement of existing access and parking area
13A	Temporary vehicle turning space
14, 14A, 14B	Works to bridleways LA15/21/20 and LA8/66/10 at Royal Portbury Dock Road. Realignment of current permissive cycle route under Royal Portbury Dock Road, Portbury.
15	Temporary path to connect Bridleway LA8/66/10 with the highway of Marsh Lane
16	Realignment of existing permissive cycle route
16A	Temporary construction compound
16C	Permanent road rail access point
17	Temporary construction haul roads and construction compound at Lodway Farm, Pill, and temporary rail siding and access to the highway of the Breaches, Easton in Gordano
17A	Temporary construction haul road between Work No. 17 and footpath LA8/5/40, Pill
18	New bridleway
19	Installation of railway signalling equipment and a new railway signal at the Port of Bristol Company's Royal Portbury Dock
20	Temporary diversion of part of National Cycle Network Route 41
20A	Demolition of existing bridge and construction of new bridge and abutments
20B	Demolition of existing garages and temporary construction compound
21, 21A	New car park and road rail access point and railway maintenance compound
22	New railway station at Pill
22A, 22B	New bus stop and temporary construction compound

Work Number	Description
23	Temporary construction compound beneath and to the north of Pill Viaduct at Underbanks, Pill
24, 24A	New permanent vehicular compound and access at Chapel Pill Lane, Ham Green together with temporary construction compound
25	Reconstruction of Quarry Underbridge No. 2 and Temporary construction compound and ramp
26, 26A	A permanent vehicular access and compound together with temporary construction compound
26B	New permanent vehicular access, at Clanage Road, Ashton from the land to the north of the Bedminster Cricket Club
28	Improvement of the junction of Winterstoke Road with Ashton Vale Road, Ashton
29	Temporary construction compound within the rail freight facility at Liberty Lane, Bristol

3.3 Portishead station

3.3.1 Portishead station will be the terminus of the new service and will be located to the southeast of the Quays Avenue, Harbour Road and Phoenix Way roundabout. It will have a single platform and will be staffed. In order to accommodate the new station, Quays Avenue will be modified to re-align the northern part of Quays Avenue to the west, undertake alterations to Phoenix Way and relocate the existing roundabout approximately 100 metres to the west. The highway alterations will also include various formal and informal pedestrian crossings and cycling route enhancements including widening of the shared use path on the west side of Quays Avenue. Figures 3.1 to 3.3 show the location of the station with the corresponding highway improvements.

3.3.2 The scheme will provide two car parks – one to the immediate north of the station which will be accessed directly off Phoenix Way. This car park will comprise 67 spaces, of which 13 spaces will be allocated for disabled users and 3 allocated to the train company. The car park will also include a covered bicycle parking area to accommodate approx. 50 bicycles as well as a small area for drop off movements and for taxis. The second car park is proposed to the south-west of the station site and will be accessed from Harbour Road. This car park which is linear in shape will comprise 209 standard parking spaces of which 6 will be allocated for disabled users. The scheme also proposes double-yellow lines in the vicinity of the station on Quays Avenue, Harbour Road and Phoenix Way.

3.3.3 To support movement and circulation around the station, there are a number of enhancements to the pedestrian and cycling environment. A toucan crossing across Quays Avenue is proposed which will link the new bus stops that are planned to the south west of the station site. The crossing is also aligned with a new shared use path which will provide the principal pedestrian and cyclist access from the station towards the town centre. The station will also link with proposed footpaths connecting with the Trinity Primary School crossing (proposed overbridge, refer to section 3.6.1) along both the north and south side of the railway.

3.4 Pill station

3.4.1 The proposed Pill station will be a one platform unstaffed facility with a car park. Passenger access to the station will be from the former station forecourt building on Station Road.

3.4.2 The main car park for the station will be located further to the northwest along Monmouth Road and will be accessed directly from Monmouth Road. The main car park will comprise of 58 spaces while a further 3 spaces designated for disabled users will be provided at the station forecourt and will be accessed from Station Road. Having mobility impaired parking facilities close to the platform will greatly benefit the utility of the station for those who might find parking at the proposed car park at Monmouth Road too challenging a distance. There will also be drop-off / pick-up provision at the station forecourt for 3 vehicles. A shelter by the entrance will house a ticket machine, waiting area, seating and cycle parking for about 20 bicycles. Vehicular access into and out of the new station forecourt will be

one-way, with the entrance off Sambourne Lane and the exit onto Station Road.

3.4.3 The station proposal will also see minor enhancements to the pedestrian environment surrounding the station with informal crossing points added along Monmouth Road. These will be reinforced by parking controls in specific locations such as Monmouth Road, Chapel Row, Myrtle Hill, Chapel Row and Station Road that will improve visibility for pedestrians.

3.4.4 Figures 3.4 to 3.8 show the location of the station with the corresponding highway improvements.

Located in Part 2 of Appendix 16.1

Figure 3-1: Indicative Portishead station preferred option – Drawing 1

Located in Part 2 of Appendix 16.1

Figure 3-2: Indicative Portishead station preferred option - Drawing 2

Located in Part 2 of Appendix 16.1

Figure 3-3: Indicative Portishead station preferred option - Drawing 3

Located in Part 2 of Appendix 16.1

Figure 3-4: Indicative Pill station preferred option - Drawing 1

Located in Part 2 of Appendix 16.1

Figure 3-5: Indicative Pill station preferred option - Drawing 2

Located in Part 2 of Appendix 16.1

Figure 3-6: Indicative Pill station preferred option- Drawing 3

Located in Part 2 of Appendix 16.1

Figure 3-7: Indicative proposed parking restrictions in Portishead

Located in Part 2 of Appendix 16.1

Figure 3-8: Indicative proposed parking restrictions in Pill

3.5 Ashton Vale Road

3.5.1 The Ashton Vale Road level crossing, immediately adjacent to the Winterstoke Road / Ashton Vale Road junction, is located on the currently freight-only line that serves Royal Portbury Dock, that will see passenger services reinstated to Portishead by MetroWest Phase 1. At present therefore, while only occasional freight trains serving the port use the line now, MetroWest Phase 1's Portishead passenger services will introduce regular passenger trains, and thus in turn result in more closures of the Ashton Vale Road level crossing to road traffic.

3.5.2 The transport assessment at the PEIR stage considered a proposed Portishead train service of 2 trains per hour per direction. A requirement of this service level was that the level crossing needed modification, with the introduction of a second running line through it, as trains would have passed in the area. This in turn also could have resulted in long closures of the level crossing to road traffic, as trains passing could entail closures that run on from each other. Analysis of the impact that this would have had on road traffic indicated that queuing and delays were expected to increase significantly on Winterstoke Road northbound and on Ashton Vale Road itself. Hence, an Ashton Vale Alternative Access Road (AVAAR) was considered, that would have replaced the level crossing.

3.5.3 With the MetroWest Phase 1 passenger service to Portishead subject to this TA of 1 train per hour per direction, the level of impact on Ashton Vale Road is lower. In the first instance, with half the number of passenger trains the level crossing is closed fewer times in a typical day. Moreover, infrastructure changes no longer include modification from the crossing's current layout; retaining a single railway line through means that trains no longer pass each other on the level crossing, and there will always be a gap between closures. The level crossing will remain operational.

3.5.4 Measures are still proposed at the Winterstoke Road / Ashton Vale Road junction to address issues that increasing level crossing closures could cause, in the form of extending the left-turn lane on the northbound side of Winterstoke Road and upgrading the mode of control of the signals to 'Microprocessor Optimised Vehicle Actuation' (MOVA). The extended left-turn flare on Winterstoke Road will contain queuing traffic without blocking the adjacent ahead movement, whilst queuing traffic at the junciton will be better managed with MOVA. An alternative access to Ashton Vale Road is no longer required.

3.5.5 To fully consider the impact on the road junction, and the effects of the highway measures proposed, analysis of the junction using LinSIG and VISSIM models have been undertaken. This is reported further elsewhere in this TA. **Appendix N** brings together discussions of data, modelling methodology and results.

3.6 Other elements of the scheme

3.6.1 The scheme will include a number of other enhancements as follows:

Portishead Trinity bridge

3.6.2 To the east of the new station at Portishead is a permissive footpath across the line that provides one of the main access routes to the Trinity Anglican Methodist Primary School from the residential areas on the south side of the railway. The re-opened railway line will sever this footpath and as a result, a new pedestrian and cycle bridge will be constructed to the southwest of the primary school over the Portishead Branch Line Railway as shown in Figures 3.9 and 3.10. This bridge will be designed to comply with the Equalities Act 2010 so it is suitable for disabled users as well as cyclists and will connect Tansy Lane on the north side of the line to Galingale Way on the south side.

3.6.3 While the bridge will be accessible for cyclists, its proposed width at 3m means cyclists will be expected to dismount when using it. The existing permissive at grade crossing over the dis-used railway will be stopped up.

Other Pedestrian, Cyclist and Equestrian Measures

3.6.4 Other pedestrian, cyclist and equestrian improvements in addition to those outlined above in the immediate vicinity of the station include:

In Portishead

- Extension and widening of the shared footway and cycleway along the west side of Quays Avenue opposite the junction with Galingale Way to the existing crossing point west of the junction with Conference Avenue;
- A new pedestrian and cycling boulevard linking the informal pedestrian and cycling link over Portbury Ditch to the station;
- Existing footway widened to form a 3m wide pedestrian and cycling path;
- Parallel pedestrian and cycling paths between Portishead station and Trinity School bridge; and
- Replacement of the existing traffic island on Quays Avenue with a pedestrian island west of the junction with Conference Avenue.

Between Portishead and Pill

- Diversion of the permissive path that forms part of National Cycle Route No. 26 to accommodate the construction of the new maintenance compound and access road on the northern side of the railway off Sheepway (to align with National Grid's for the Hinkley Point C Connection Project).

- Existing cycling infrastructure (forming part of National Cycle Network 26) under the Royal Portbury Dock Road Bridge, Marsh Lane Bridge and the M5 Bridge to be realigned and rebuilt to allow both the permissive route and railway to pass under Portbury Dock Road.
- On Royal Portbury Dock Road, an existing uncontrolled bridleway (LA8/66/10) crossing over the road will be enhanced.
- Works to National Cycle Route 26 are also proposed in the vicinity of the M5 underbridge.
- Works to allow for the extension of bridleway LA8/67/10 north of the M5 underbridge to connect with NCN 41 to the east of the M5 that connects with Pill.
- There are a number historic crossings along the disused line between Pill and Portishead, that will be closed under the DCO Scheme, including:
  - Crossing serving former oil depot
  - Informal Trinity Primary School crossing between Galingale Way and Tansy Lane
  - Moor Lane
  - Sheepway 1 (enhancements to existing access south of the disused railway via the Sheepway overbridge)
  - Sheepway 2
  - Elm Tree Farm (alternative access provided via the A369 road)
  - Portbury Station
  - Drove Crossing
  - Portbury no. 3
  - Manor Farm no. 2
  - Manor Farm no. 1
  - Lodway Farm

Ashton Vale Road area

3.6.5 The Barons Close pedestrian crossing is located approximately 200 metres south of the Ashton Vale Road level crossing as shown in Figure 3.12. This crossing is temporarily closed, as part of implementing the AVTM MetroBus m2 scheme. MetroWest Phase 1 is proposing to close this crossing as part of the DCO Scheme on safety grounds, due to the speed of approaching passenger trains, and the constrained visibility due to the track radius. A risk assessment for Barons Close level crossing has been undertaken, and is available as part of DCO documentation.

3.6.6 Changes in the Ashton Vale Road area are shown in Figure 3.11.

Located in Part 2 of Appendix 16.1

Figure 3-9: Trinity bridge General Arrangement (sheet 1)

Located in Part 2 of Appendix 16.1

Figure 3-10: Trinity bridge General Arrangement (sheet 2)

Located in Part 2 of Appendix 16.1

Figure 3-11: Scheme changes in the Ashton Vale Road area

Located in Part 2 of Appendix 16.1

Figure 3-12: Barons Close Pedestrian Crossing Point (currently closed)

Signals and track

3.6.7 Elements of MetroWest Phase 1 which are proposed:

- Works on the Portbury Freight Line include:
  - Replacement of signalling equipment of the half kilometre section of railway from Portbury Dock to Portbury Dock Junction, within the land of the Bristol Port Company.
  - Upgrade work from Pill Junction to the western portal of Pill Tunnel where the existing and new railway tracks combine to the single track. This will include the installation of an intermediate signal in the Avon Gorge, minor track and access improvements for maintenance purposes.
- The partial reinstatement of the "down relief line" at Bedminster;
- A track crossover and signalling at Bathampton to allow trains to turn around at Bath off the main line

Maintenance and Emergency Access

3.6.8 A number of permanent maintenance and emergency access points have been identified and these are detailed in Table 3.2. Figures 3.13-3.15 show the location of these access points.

Table 3.2: Description of proposed maintenance and emergency access points

Ref	Access point	Description
MEA-1	Portishead, Station car park	Dedicated vehicle space for NRIL Staff and emergency access point
MEA-2	Portishead, Trinity bridge	Pedestrian emergency access point
MEA-3	Sheepway (Figure 4.9 of the ES)	HGV emergency access point
MEA-4	Portbury Hundred (Figure 4.10 of the ES)	LGV maintenance access point
MEA-5	Marsh Lane Overbridge	LGV maintenance and emergency access point
MEA-6A	Pill, Station forecourt	Emergency access point (*to be confirmed)
MEA-6B	Pill, Station car park	LGV maintenance and emergency access point
MEA-7	Ham Green via Chapel Pill Lane (see Figure 4.15 of the ES)	HGV maintenance and emergency access point
MEA-8	Avon Gorge, near Leigh Court	Pedestrian maintenance access point (via 2.4m wide access steps to railway)
MEA-9	Avon Gorge, near Leigh Woods	Pedestrian maintenance access point (via 2.4m wide access steps to railway)
MEA-10	Avon Gorge, near Suspension Bridge	Pedestrian maintenance access point (via 2.4m wide access steps to railway)
MEA-11	Clanage Road (Figure 4.9 of the ES)	HGV maintenance and emergency access point
MEA-12	Ashton Vale level crossing	LGV maintenance and emergency access point

Located in Part 2 of Appendix 16.1

Figure 3-13: Proposed Portishead and Sheepway Maintenance and Emergency Accesses

Located in Part 2 of Appendix 16.1

Figure 3-14: Proposed Pill and Avon Gorge Maintenance and Emergency Accesses

Located in Part 2 of Appendix 16.1

Figure 3-15: Proposed Ashton Vale Maintenance and Emergency Accesses

3.7 MetroWest Phase 1 passenger rail service pattern

3.7.1 MetroWest Phase 1 comprises delivery of infrastructure and passenger train operations to provide:

- Half-hourly service for the Severn Beach line (hourly for St. Andrews Road station and Severn Beach station);
- Half-hourly service for Keynsham and Oldfield Park stations on the Bath Spa to Bristol line; and
- Reopened Portishead Branch Line with stations at Portishead and Pill, with an hourly service.

3.7.2 The assessments presented in this report are based on the following rail service pattern:

- Portishead to Avonmouth: 1 train per hour all day;
- Portishead to Bath Spa: 1 train per hour all day; and
- Severn Beach to Bristol Temple Meads: 1 train per hour all day.

3.7.3 Stopping at: Pill, Parson Street, Bedminster, Bristol Temple Meads, Keynsham, Oldfield Park, St. Andrews Road, Avonmouth, Portway, Shirehampton, Sea Mills, Clifton Down, Redland, Montpelier, Stapleton Road, Lawrence Hill and route terminus stations.

3.8 Summary scheme elements

3.8.1 This section has outlined the proposals for the scheme, the scheme station infrastructure, signalling and service changes, plus other modal shift inducing infrastructure. Key issues for consideration in this TA are:

- New station at Portishead and the reopening of the station at Pill;
- Road alignment on Quays Avenue (Portishead) to accommodate the new station;
- New car parks and cycle parking for both stations;

- Pedestrian and cycling facilities to encourage walking to and from the stations and centres;
- Changes to pedestrian and cycling infrastructure, especially to existing crossing points of the railway alignment;
- Junction improvements at Ashton Vale Road/Winterstoke Road;
- Changes to the signals on certain parts of the line; and
- Changes to the service patterns.

3.8.2 It is recognised that the scheme is being planned with a number of measures to address transport impacts. These components of the schemes are summarised in sections 9 and 10.

SECTION 4

Existing Conditions

4.1 Introduction

4.1.1 The aim of this section is to outline the existing baseline conditions and understand the implications for the scheme. This should include an understanding of the existing transport networks and their operation but also other factors such as land uses and committed developments.

4.2 Existing land uses

4.2.1 In order to provide a context for the potential trip generation at the proposed Portishead and Pill stations and also the potential impacts arising from changes to crossing points and increased level crossing closures, a review of existing land uses is required. The focus here is not to provide an exhaustive list, but rather to get an overview of some of the land use considerations that need to be factored into this TA.

Portishead

4.2.2 Located approximately 12km to the west of Bristol City Centre, Portishead is a growing town with a population of approximately 27,000 people (based on Portishead wards in the 2011 Census). The town has undergone considerable redevelopment and expansion over the last decade with several new major developments at Portishead Vale, the Village Quarter and Port Marine (which is currently in its final phase of build).

4.2.3 Figure 4.1 shows the indicative land uses in the vicinity of the proposed Portishead station.

4.2.4 The Figure shows the new developments that have emerged in recent years in the vicinity of the station. To the north, east and south are the new residential developments whereas to the immediate west there are some new retail and mixed used developments.

4.2.5 The town centre continues to be largely focussed on a narrow strip along High Street although the new retail developments have been built towards Harbour Road, Old Mill Road and Wyndham Way. A number of industrial and warehousing units remain and these are clustered in Old Mill Road and off Harbour Road.

Portishead to Pill

4.2.6 The section of the line east of Portishead towards Easton-in-Gordano and Pill is semi-rural around the village of Sheepway until it passes the extensive commercial Portbury Port site to the north. There is some agricultural land to the south which this is bound by the M5 and the A369.

Pill

4.2.7 Pill is an historic village, located some 7.5kms west of Bristol City Centre with a population of approximately 3,500 (based on Pill wards in the 2011 Census). Together with the neighbouring villages of Easton-in-Gordano to the south west and Ham Green to the east, it is a continuous urban area.

4.2.8 Figure 4.2 shows Pill is largely residential throughout with local services and shops to support the community. A business park is located in Ham Green to the east (the Eden Office park) together with more recent housing.

Ashton Vale Road Level Crossing

4.2.9 Ashton Vale is a largely commercial and industrial area to the south west of Bristol City Centre. It is bounded by a residential area east of the A3029 Winterstoke Road and another residential area just south of some playing fields. Immediately west of the area is the Bristol and North Somerset boundary where planning restrictions exist on development as shown in Figure 4.3.

4.2.10 Ashton Vale Industrial Estate has a single access (Ashton Vale Road) from Winterstoke Road which crosses the existing freight line adjacent to the Winterstoke Road/Ashton Vale Road signal controlled junction. A number of businesses are served by the access including Babcock Integrated Technology, Manheim Bristol, Avonline, Bristol City Timber, Kenny Group and ETM Contractors. Dedicated left and right-turning lanes on Winterstoke Road accommodate vehicular access onto Ashton Vale Road.

Located in Part 3 of Appendix 16.1

Figure 4-1: Indicative land uses in the vicinity of Portishead Station

Located in Part 3 of Appendix 16.1

Figure 4-2: Indicative land uses in the vicinity of Pill Station

Located in Part 3 of Appendix 16.1

Figure 4-3: Indicative land uses in the vicinity of Ashton Vale Road

4.3 Committed development

4.3.1 Within the vicinity of the scheme, there are a number of developments that are likely to emerge over the next few years. The GBATS4[2] strategic modelling underpinning this TA takes account of a large listing of both employment and residential developments. **Appendix B** provides a listing of these developments – which are broken down by Near Certain (NC) and

[2] GBATS4 is a strategic transport demand model of the greater Bristol area and includes both highways and public transport. This model has been developed to be compliant with WebTAG principles, and has been used to assess, a number of schemes in the area that have been given funding approval by the DfT. GBATS4 produces matrices of trips and journey data (time, cost and distance) for three time periods (AM peak, inter-peak and PM peak hours) and several modes (car, bus, rail and bus rapid transit) also subdivided by user class (commuting, other home based trips and business journeys) and income level of travellers

Reasonably Foreseeable (RF) – following discussion with local authority planning officers.

4.3.2 These new developments, which are eventually expected to increase the population of Portishead to over 30,000 people by 2021, are largely on former brownfield industrial sites. There are no NC and RF developments along the Avon Gorge.

4.3.3 Figures 4.4 to 4.6 show the extent of committed developments along the DCO redline in the vicinity of the DCO application area together with Table 4.1.

Table 4.1: Committed Developments

Application No.	Description
Portishead – North Somerset Council	
00/P/1846/O	Residential development of 110 dwellings
00/P/1864/O	Residential development of 94 dwellings
03/P/1991/F	4 no. 2 storey office buildings with associated car parking and landscaping.
07/P/1052/RM	Residential development of 140 dwellings
11/P/0955/F	Food store
11/P/1099/F	Residential development of 58 dwellings
11/01685/RM	3-storey office block persuant to outline application 08/P/1257/O
11/P/2294/F	Residential development of 13 dwellings
12/P/1255/O	Furniture store, petrol filling station/kiosk and associated car parking
12/P/2033/F4	Employment development comprising office use.
14/P/0359/CUPA	Prior approval for change of use from Offices (Use Class B1) to residential (Use Class C3)
14/P/2570/F	Erection of an assisted living development comprising 118 apartments and integrated care support and well-being facilities
15/P/2111/F	Second floor extension to provide 9 no. residential units
16/P/1608/F	Residential development of 69 dwellings and office building (approved with legal agreement)
16/P/2066/F	Residential development of 93 dwellings and offices (approved with legal agreement)
17/P/1229/F	Erection of 33 no. dwellings

Table 4.1: Committed Developments

Application No.	Description
Pill & East-in-Gordano– North Somerset Council	
11/P/0053/F	Change of use from Public House to 12 dwellings (flats)
13/P/0510/F4	Extension of time for 10/P/0165/F (Erection of two-storey office building)
14/P/1196/O	4 no. B1 Office Units
16/P/0944/F	Conversion and sub division of the grade II Burwalls House from use class Sui Generis to use class C3 (residential) to 5 no. residential flats. Demolition of existing buildings in the annexe (excluding the former coach house and Lodge) and replacement with 6 no. residential dwellings (excluding The Lodge).
16/P/1531/F	Creation of new car park access from Portbury Way and alteration of access/car parking arrangements
16/P/1938/F	Construction of access between cargo storage areas Plot 25 and 26 in Royal Portbury Docks across the public highway at Marsh Lane together with the installation of a traffic signal control system and associated works, including the widening of the Marsh Lane carriageway
16/P/1987/F	Development of site for port related use
Bristol – Bristol City Council	
08/03578/F	Mixed use commercial and residential development
09/02242/P	Residential development of 137 dwellings
10/00813/P	Mixed use comprising around 145 residential units, 5000sqm of employment floor space and around 600sqm of retail floor space.
10/04691/R	Demolition of vacant building and construction of new building comprising 10 no. 1-bed units and 4 no. 2- bed units, 1 no. commercial unit and under-croft parking.
10/05279/F	Demolition of existing factory buildings (Use Classes B1 and B2) and erection of new office building (Use Class B1)
11/01851/F	Residential development of 78 dwellings
12/03180/F	Change of use of part of the building to a nursery and construction of an all-weather sports pitch
13/01483/F	Erection of bridge link
13/03517/F	Demolition of the existing Williams Stand, Wedlock Stand, former Hire-Rite building and 65 Ashton Road; erection of new Williams and Wedlock Stands with accommodation including

Table 4.1: Committed Developments

Application No.	Description
	community facilities, conferencing and hospitality, public house, club museum and club shop; and remodelled Dolman Stand, to include modifications to concourse, alterations to the front seating deck and alterations to front roof canopy; internal alterations to the Aty Stand and concourse; new sports pitch, car parking, landscaping (including fencing and paving); and associated infrastructure and engineering works. Stadium capacity to increase to 27, 000.
13/05786/F	New service centre on former industrial site
15/00291/P	Outline planning application for the erection of new buildings for academic, administration and support purposes (6,500m use class d1) and associated infrastructure including provision of a new public transport facility, amendments to car park layout, revised access arrangements and landscaping; and the demolition of 4,198m existing buildings, with all matters reserved except for siting, massing and access.
15/00545/F	Residential development of 14 dwellings
15/01988/F	Residential development of 110 dwellings
16/01699/P	Development of existing manufacturing site
16/01991/SCR	Residential development of 50 dwellings
16/04343/F	Extension to existing groundkeepers store
16/04957/F	Extension to workshops and office space
17/01789/F	Erection of a self-storage unit, use class B8, with ancillary uses, on site car parking provision and landscaping
17/01878/F	Demolition of existing buildings and erection of replacement building for indoor recreation use (Class D2) with associated car parking
17/06559/FB	Erection of 133 no. dwellings (pending approval)
Identified in WoE Joint Spatial Plan and Transport Study – Draft Strategy	Residential development of 400 dwellings (Adjacent to South Bristol Link Road, Ashton Vale)

4.3.4 In addition to committed developments, Table 4.2 outlines the main infrastructure and improvement schemes to future year networks. The MetroWest schemes are specifically excluded from the model, as the model reported here is the MetroWest Phase 1 Do Minimum. The MetroWest schemes were included in the GBATS4 for scheme testing purposes.

Table 4.2: Additional Infrastructure included in MetroWest Future Year Do Minimum Scenario

Scheme	Description
20mph speed limits	Roll out of 20mph speed limits across Bristol
CPNN Off-site Works Package	A38 Filton roundabout. Capacity and safety improvements on 3-arms. Widening of M5 J16 motorway off-slips, A38 North and circulatory carriageway. Signing & lining changes on M5 J17 southbound off-slip. Widening of Merlin Road exit from roundabout and Highwood Lane entry to Merlin Road junction. Widening of southbound approach at A38 Aztec West Roundabout. A4018 Bus Corridor. Crow Lane, Charlton Road, Greystoke Avenue junction improvements. Local bus service enhancements. Capacity and safety improvements on Gipsy Patch Lane.
MetroBus	Rapid transit from Ashton Vale to Temple Meads via Bristol city centre. North Fringe to Hengrove Package. New highway link and bus route between A370 and Hengrove Park
Temple Circus Project	Redesign of Temple Circus roundabout. Related changes to the end of Victoria Street, The Friary, Temple Way, Temple Gate, connection with Redcliffe Way, Bath Bridge Roundabout
Managed Motorway Scheme	M4 Junctions 19-20 & M5 Junctions 15-17
Cribb's BRT Extension	Extending the NFHP BRT route from The Mall back to Parkway; bus priority on Gipsy Patch Lane and Hatchet Road.
M5 Junction 19	Replacement of left turn off the south bound exit slip, with a two lanes
London Paddington – South Wales Rail Electrification	Extra services between Bristol Temple Meads and London Paddington via Bristol Parkway included
Residents Parking	Roll out of residents parking permit scheme across central Bristol
Portway P&R Rail Station	Opening of rail station at Portway Park and Ride Site

Located in Part 3 of Appendix 16.1

Figure 4-4: Committed developments in the vicinity of the DCO application area – Portishead

Located in Part 3 of Appendix 16.1

Figure 4-5: Committed developments in the vicinity of the DCO application – Pill and East-in-Gordano area

Located in Part 3 of Appendix 16.1

Figure 4-6: Committed developments in the vicinity of the DCO application – Ashton Vale area

4.4 Existing highway network

Principal links and junctions

Portishead

4.4.1 The town of Portishead is connected to the wider strategic and local highway networks by the links as shown in Figure 4.7. The main roads in the town are:

- A369 Wyndham Way – which connects the eastern part of Portishead, the marina and the town centre with the principal link to the M5 at junction 19;
- B3214 Bristol Road – which connects to the town centre, the western part of Portishead and the various settlements south of Portishead;
- Cabstand and Nore Road – which links the town centre and western parts of Portishead particularly along the coastline;
- West Hill and Down Road – which is the main access route between the western parts of Portishead and the town centre; and
- Harbour Road/Quays Avenue – which links Wyndham Way with the marina area and the new areas in eastern Portishead.

Pill

4.4.2 The A369 is the principal access route to and from Pill with two main junctions at St Georges Hill in Easton-in-Gordano and Pill Road. Heywood Road and Lodway forms part of a ‘spine’ road that serves the larger settlement as shown in Figure 4.8.

Ashton Vale

4.4.3 Ashton Vale has three strategic routes towards the centre of Bristol:

- A369 which links Portishead and Pill with the City;
- A370 which is a major route in North Somerset and is one of the principal links between Weston-Super-Mare and Bristol; and,
- A3029 which is a major access route to south Bristol and the A38 to the Airport.

4.4.4 Just north of the level crossing site is the Ashton Vale underpass which connects with Brunel Way and enters the City at Hotwells. Figure 4.9 illustrates these principal routes.

Located in Part 3 of Appendix 16.1

Figure 4-7: Principal and main roads in Portishead

Located in Part 3 of Appendix 16.1

Figure 4-8: Principal and Main Roads in Pill

Located in Part 3 of Appendix 16.1

Figure 4-9: Principal and main roads in Ashton Vale

Local links and junctions

Portishead

4.4.5 Figure 4.10 shows the local highway network around the Portishead station site. Below is a short review of the local highways that surround the proposed station site in Portishead. These are based on observations undertaken in autumn 2014 and spring 2015.

Figure 4-10: Portishead station site and local highway network

Port Marine - Phoenix Way

4.4.6 Phoenix Way is part of the main circular road that serves the new developments at the Portishead Vale, the Village Quarter and Port Marine. Port Marine which has been built in the last decade has been built to a layout that attempts to curtail car use through limiting the number of both on-street and off-street car parking available. This is evidenced in Figure 4.11 which shows the more restricted width of Phoenix Way with a limited number of parking bays. This has the effect of reducing the level of parking but also reduces traffic speeds as there is insufficient space for oncoming vehicles to pass each other.

Port Marine – Malin Parade

4.4.7 Malin Parade is a short residential street that is located northwest of Phoenix Way and approximately 200m from the proposed Portishead Station. The unadopted road is relatively narrow which results in a limited level of on-street parking. Most of the properties have access to private communal parking areas which are located behind the houses.

Port Marine – Marjoram Way

4.4.8 Marjoram Way is an adopted street that runs from Phoenix Way to a junction with Tarragon Place. The road is the principal access point to Trinity Primary School and as a result parking controls are in place in the vicinity of

the school. This includes double yellow lines and parking restrictions during school hours. Given the layout of Marjoram Way which is less than 6m wide in certain places, the double yellow lines help facilitate the flow of traffic along the road as shown in Figure 4.12. Designed to the same layout and standards as neighbouring streets, Marjoram Way has a limited number of small parking bays that can accommodate up to three cars each. These are supplemented by off-street communal parking bays that are located to the rear of the properties.

Port Marine – Camomile Walk

4.4.9 Camomile Walk located approximately 250m from the station is a private road which is accessed directly off Marjoram Walk. The road is relatively narrow which constrains the level of on-street parking. As with neighbouring streets, there are off-road parking bays available for local residents.

Port Marine – Finisterre Parade

4.4.10 Finisterre Parade forms part of the principal access routes around the Port Marine area. The road layout and alignment is designed to facilitate slower journeys and reduce car use through the limited availability of on-road parking spaces. The road has been adopted by the local authority.

Harbour Road

4.4.11 Harbour Road is the main link that connects the eastern part of Portishead with the town centre and the wider local highway network. Harbour Road can be broadly broken down into three sections which reflect the immediate land use.

4.4.12 The first stretch is from Station Road to the Marina. This area effectively forms part of the Town Centre and is characterised by recent commercial and residential development. The developments include two supermarkets, a hotel and a large car park. Harbour Road itself has been reconfigured with the development and has a raised table in the vicinity of the main pedestrian crossing point to the Marina. The width of the road is reduced and on-street parking is restricted to one side of the highway. Also within the same location, a footway is present only on the east side of the road.

4.4.13 The second stretch of Harbour Road is from the Marina towards the Portbury Ditch and Newfoundland Way (Figure 4.13). This stretch is characterised by new developments coming on stream. The alignment of the highway is generally straighter with footways on both side. Given the developments are located away from the highway edge, forward visibility is good. There are no parking controls in place.

Figure 4-11: Port Marine – Phoenix Way

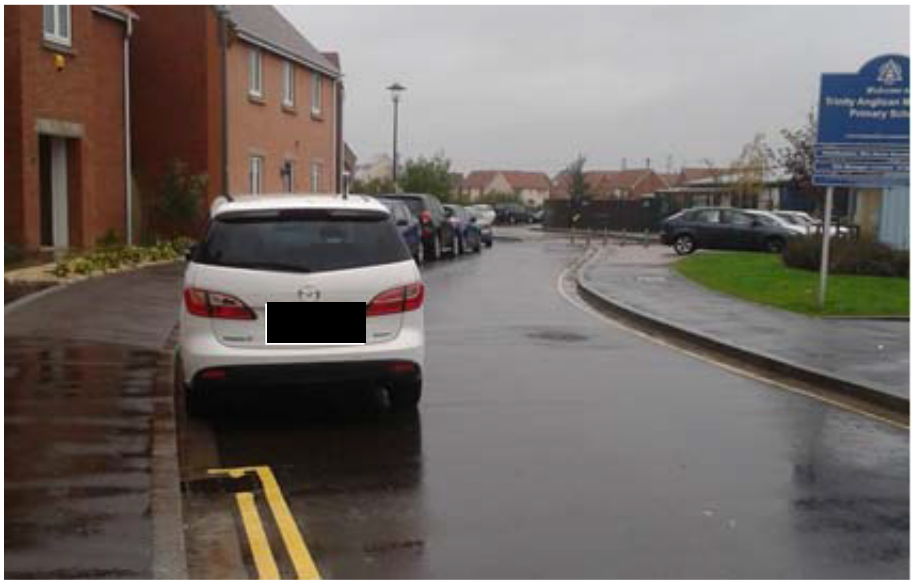

Figure 4-12: Port Marine – Marjoram Wy in vicinity of Trinity Primary School

Figure 4-13: Newfoundland Way

4.4.14 The final stretch of Harbour Road is from the Portbury Ditch to the junction with Phoenix Way and Quays Avenue as shown in Figure 4.14. This stretch provides access points to two industrial estate areas as well as more recent office development, the Marina Healthcare Centre and a sheltered housing complex. On the west side of the highway, the land between the former railway line and Harbour Road is not developed and will form part of the parking proposals as part of the scheme.

4.4.15 One aspect of these land uses is that generally off-street parking provision is more limited (particularly in the case of the health centre) which results in a significant demand for on-street parking. This is evidenced in this TA under parking conditions. The width of the highway means that parking on both sides of the road could potentially impede the two-way flow of traffic along Harbour Way.

Haven Way

4.4.16 Haven Way is a short private road that provides access from Harbour Way to a small industrial area, the Marina Healthcare Centre and a sheltered housing complex. The road is relatively narrow which means parking is largely confined to one side, otherwise vehicles would have difficulty in passing opposing traffic as shown in Figure 4.15.

4.4.17 One feature of Haven Way are abnormal sized HGV movements. It is noted that parking levels on Haven View and Harbour Road result in problems for HGV turning movements.

Figure 4-14: Harbour Road – in the vicinity of the Marina Healthcare Centre

Figure 4-15: Haven Way

Gordano Gate Business Park – Serbert Close

4.4.18 Serbert Close is one of the roads that make up the Gordano Gate Business Park. A small cul-de-sac off Serbert Road, this private highway provides access to several office buildings. Each of the properties has a communal private parking area.

Gordano Gate Business Park – Serbert Road

4.4.19 Another of the roads that makes up the business park is Serbert Road. Principal land uses along this road are office and light industrial/warehousing units with ancillary activities. Most of the premises have off-street parking provision available which reduces the demand for on-street parking.

Gordano Gate Business Park – Serbert Way

4.4.20 Serbert Way (Figure 4.16) is the principal access route to the Gordano Business Park and retail park. The dominant land use on Serbert Way is the Sainsbury's Supermarket which opened in October 2014. Located along Serbert Way also are a hotel and a chain restaurant/pub. On-street parking was observed – principally to do with the surrounding offices and ancillary services.

Figure 4-16: Serbert Way

Galingale Estate – Conference Avenue

4.4.21 Conference Avenue is located approximately 300m South West from the proposed station location, and has two distinct land uses – residential on the east side and an office park on the west side. Both land uses have off-street parking available which reduce the level of on-street parking.

4.4.22 Conference Avenue itself has some traffic calming features such as raised tables and build outs which have a beneficial impacts on controlling traffic speeds.

Galingale Estate – Galingale Way

4.4.23 Galingale Way is an adopted residential street located approximately 150 metres from the station, and is the principal means of access to the estate with a number of junctions with neighbouring streets. Generally, most of the estate has off-street parking provided which results in a low number of vehicles parked on the public highway.

4.4.24 Galingale Way itself has two sections. The section that has a junction with Quays Avenue includes a small communal garden and has both vertical and horizontal traffic calming features. The road itself forms part of the National Cycle Network Route 26.

4.4.25 A second section which routes through a small parkland area links up to Tydeman Road. The adopted road also has some traffic calming features such as bricked surface treatments as shown in Figure 4.17.

Galingale Estate – Mulberry Avenue

4.4.26 Mulberry Avenue is a short link that weaves between Conference Avenue and Galingale Way. The road has a bricked raised table in a central section. The road width is relatively narrow which has the added impact of reducing vehicle speeds further.

Galingale Estate – Mulberry Close

4.4.27 Mulberry Close is a residential cul-de-sac that arcs from Mulberry Avenue towards Conference Avenue. The road is similar to neighbouring streets with off-street parking available to residents.

Galingale Estate – Peartree Field

4.4.28 Peartree Field is an adopted residential cul-de-sac that is located directly South West of the station location. The street, which is screened off from the railway line alignment by vegetation, can only be accessed directly from Galingale Way by both vehicles and pedestrians. As with other neighbouring residential streets, the layout and traffic calming features are similar.

Galingale Estate – Tydeman Road

4.4.29 Tydeman Road is a residential street to the South East of the station location and provides access to a number of side streets. The housing is generally more recent thus the layout conforms to patterns as laid out in publications such as Manual for Streets 2. Most of the housing has off-street parking available although the narrow width of the street restricts on-street parking.

Figure 4-17: Galingale Way

Pill

4.4.30 Figure 4.18 shows the local highway network around the Pill station site. Below is a short review of the local highways that surround the proposed station site in Pill. These are based on observations undertaken in autumn 2014 and spring 2015.

Station Road

4.4.31 Station Road (Figure 4.19) links Lodway and Heywood Way with the eastern part of Pill and will be the principal route for vehicle accessing the station from the west. The highway is located in the older part of the village and as a result the highway width is narrow in many parts that requires parking controls to facilitate the flow of traffic. Apart from residential land uses, Pill Clinic is also located here and has a specific amount of off-street parking available.

Avon Road

4.4.32 Avon Road (Figure 4.20) provides a link to the residential area in North East Pill. This area is characterised by post war housing located closer to the river. Many of the properties have off-street parking available compared to older parts of the town.

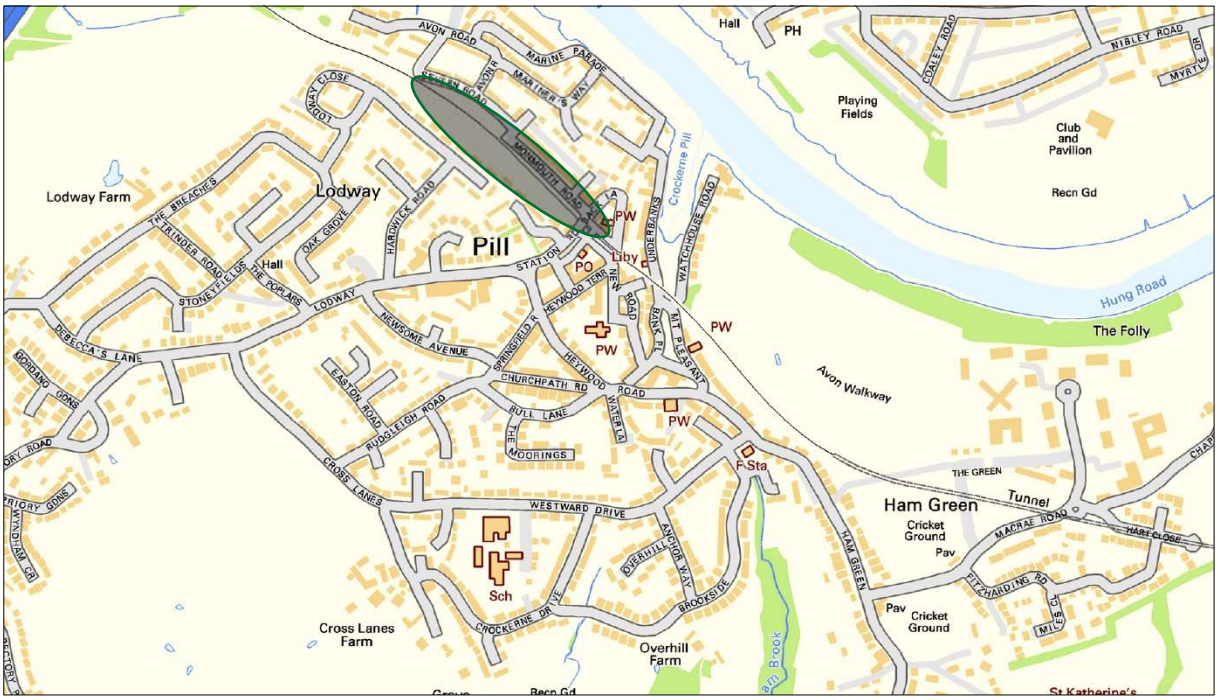

Figure 4-18: Pill station site and local highway network

Figure 4-19: Station Road Pill

Figure 4-20: Avon Road, Pill

Back Lane and Chapel Row

4.4.33 Back Lane and Chapel Row forms a circular road in the older part of the town and has the same characteristics of a narrow highway width with properties located close to the highway edge. In many places, footways are lacking although traffic flows are very low. Back Lane and Chapel Row form a highway loop to the immediate north of the station entrance. Mainly residential, it is characterised by older and more densely concentrated housing types with limited off-street parking. Back Lane is narrow in parts so much so that a footway is not present

Church Walk and Heywood Terrace

4.4.34 Church Walk and Heywood Terrace is a small area of largely terraced streets that is located to the South West of the station site. The area has the same characteristics of limited levels of off-street parking space being available. In certain places, road markings have been added to improve the operation of the highway.

Crusty Lane

4.4.35 Located opposite to the proposed entrance to the station, Crusty Lane is a short cul-de-sac comprising a few houses. All the dwellings have off-street parking which means there is available on-street parking space close to the junction with Monmouth Road.

Hardwick Road and Lodway Close

4.4.36 Hardwick Road (Figure 4.21) and Lodway Close are located north west of the station though have no direct vehicle access. Hardwick Road and Lodway Close forms part of a small post-war housing estate that has a lower density with a number of properties of having off-street parking provision.

Mariners Way

4.4.37 Located to the North East of the proposed station site and close to the river, Mariners Way forms part of a small post-war housing estate. The road provides an alternative route to Station Road to reach this part of Pill. Some

of the properties have off-street parking and so have similar conditions to other parts of the town.

Monmouth Court

4.4.38 Monmouth Court (Figure 4.22) and Monmouth Road form a road that runs parallel to the proposed station site and will be the principal vehicle access to the station. A feature of Monmouth Court is the presence of a footway on one side only and a road width that only permits parking on the one side which makes it difficult for vehicles to pass each other. However, most of the dwellings have off-street parking available.

Monmouth Road

4.4.39 Monmouth Road will be the main vehicle access point to the car park and will provide the pedestrian link to the proposed station entrance on Station Road. The road mainly consists of housing that do not have off-street parking although a private lane (and garages) exist along of the rear of the street. The highway width is constrained as shown in Figure 4.23 with the presence of a footway on the one side only. The carriageway width does create difficulties for vehicles to pass each other especially with the volume of parked vehicles on the highway. However, there are spaces between parked cars allowing for cars to pass provided by residential driveways. The low vehicle speeds and the segregation between traffic and the footway caused by on street parking supports the safe movement of pedestrians along this link.

Sambourne Lane

4.4.40 Located to the west of the station site, Sambourne Lane is a small cul-de-sac comprising retirement bungalows with limited parking provision. The road also provides access to the Pill Clinic car park as shown in Figure 4.24.

Severn Road

4.4.41 Severn Road extends from Monmouth Court and runs parallel to the railway line before a short lane to Avon Road. The road width is narrower than Monmouth Court with no footway present but a number of properties have private parking.

Figure 4-21: Hardwick Road

Figure 4-22: Monmouth Court

Figure 4-23: Monmouth Road

Figure 4-24: Samborne Lane

Access to Pill Tunnel

4.4.42 The tunnel is accessed from Ham Green via Macrae Road and Chapel Pill Lane. These roads mainly serve residential properties as well as a number of commercial units and a hospice located on Chapel Pill Lane. There are footways located along Macrae Road from Ham Green while pedestrian facilities are absent on Chapel Pill Road.

A369 Clanage Road

4.4.43 Clanage Road (A369) provides a link between the A370 to the south and Rownham Hill to the north which leads into Leigh Woods. The road primarily serves residential properties as well as Avon and Somerset Constabulary and Bedminster Cricket Club. There are pedestrian facilities present along one side of the highway to a point where its leads onto Rownham Hill.

Ashton Vale

4.4.44 Ashton Vale is a mixed industrial and residential area of South West Bristol. The area has generally good links to central Bristol as a result of the dual carriageway A370 Brunel Way to Hotwells. Currently, the existing Parson Street to Portbury freight line cuts through the industrial, commercial area and residential areas of Ashton Vale.

4.4.45 The scheme proposals will directly impact on the existing Ashton Vale road level crossing which provides access to an industrial estate. The existing Ashton Vale Road is accessed directly from Winterstoke Road through a signalised junction. This junction permits northbound left turns (in the direction of Bristol City Centre) only with southbound right turns not permitted by the layout of the junction. Exiting traffic from Ashton Vale Road have the option to either turn left northbound or right southbound.

Other elements of the Scheme

4.4.46 In addition to the above, the other elements of the scheme will involve signal and track layout changes in Ashton Vale, Avonmouth and Bathampton. Existing NRIL access points to the operational railway line will be utilised for these works.

Weight restrictions

4.4.47 Figure 4.25 provides the weight restrictions along the scheme alignment. This generally shows the weight restrictions are located away from the scheme and largely apply to unclassified minor roads. On this basis, there are no restrictions to consider.

Speed limits

4.4.48 Along the principal roads in Portishead, a 30mph speed limit generally applies with a few exceptions such as in the residential areas of Port Marine where a 20mph zone applies. Higher speed limits apply on the A369 Portbury Hundred south of Portishead.

4.4.49 In Pill, the main Lodway/Heywood Road/Ham Green road through the area is 30 mph with higher speed limits applying outside Pill.

Existing Traffic Regulation Orders

4.4.50 Figures 4.26 and 4.27 show the extent of existing traffic orders in Portishead and Pill respectively.

4.4.51 Within Portishead, the main orders are in and around the town centre. These largely relate to prohibiting or restricting waiting as not to impede the flow of traffic through the centre. Outside Portishead town centre, other controls are in place in the vicinity of the proposed station are:

- Stretches of Marjoram Way near Trinity Primary School;
- On Harbour Road near the health centre; and
- Old Mill Road with double yellow line road markings.

4.4.52 In Pill, there are fewer restrictions but essentially there is prohibition of waiting along one side of Station Road and parts of Heywood Road near the centre. These controls are geared towards ensuring that the flow of traffic is not impeded given the relatively narrow carriageway width.

4.4.53 Figure 4.28 shows the extent of existing TROs within Ashton Vale Industrial Estate. Parking is mainly unrestricted with only the section from the Winterstoke Road junction to the access to Manheim having restrictions in place in the form of double yellow line road markings along both sides.

Located in Part 3 of Appendix 16.1

Figure 4-25: Weight restrictions

Located in Part 3 of Appendix 16.1

Figure 4-26: Parking restrictions in Portishead

Located in Part 3 of Appendix 16.1

Figure 4-27: Parking restrictions in Pill

Located in Part 3 of Appendix 16.1

Figure 4-28: Parking restrictions in Ashton Vale

4.5 Existing highway flows

Overview

4.5.1 To understand the traffic flows and conditions on the highway network, manual turning counts were undertaken in February 2014 with automatic traffic count (ATC) data recorded in February 2015. The count was undertaken in accordance with Design Manual for Road and Bridges (DMRB) Volume 12: Traffic Appraisal of Road Schemes – Chapter 6, Section 6.2 and had the following criteria:

- Undertaken for 14 consecutive calendar days excluding school holidays for a two-week period;
- Hour flows recorded;
- Undertaken in both directions;
- AM and PM peak hours to be identified;
- Vehicles to be classified by length: and
- Summary for each week to give 12, 16, 18 and 24 hour totals as well as 5 and 7 day averages.

4.5.2 In addition to the traffic counts collected for this traffic assessment, a large data collection exercise was undertaken in 2014 to inform the GBATS4 revalidation.

4.5.3 Additional counts have been done in the Ashton Vale Road area, as noted in **Appendix N**.

Portishead

4.5.4 Traffic counts were undertaken at locations as shown in Figure 4.29. A report of surveys in **Appendix C** details the scope and methodology of the counts undertaken.

4.5.5 Figure 4.31 provides a summary of the peak AM (08:00 to 09:00) and PM (17:00 to 18:00) flows; this reveals a number of trends about existing flows as follows:

- The highest flows both in the morning and afternoon peaks were observed along the A369 Wyndham Way and Portbury Hundred corridor;
- The two way flow along Quays Avenue is fairly consistent between the morning and evening peaks. This reflects the outflow from the residential area of Port Marine in the morning peak but the inflow towards the commercial and industrial areas around the marina. This trend is effectively reversed in the evening peak;
- The evening flows into the Gordano Business Park are higher than the morning peak indicating the impact of Sainsbury's Supermarket is more pronounced later in the day; and
- The Portbury Hundred junction as the principal vehicle access route into and out of Portishead is the most heavily trafficked although the Sheepway arm has much lower flows.#

Located in Part 3 of Appendix 16.1

Figure 4-29: ATC Locations in Portishead

Located in Part 3 of Appendix 16.1

Figure 4-30: ATC Locations in Pill

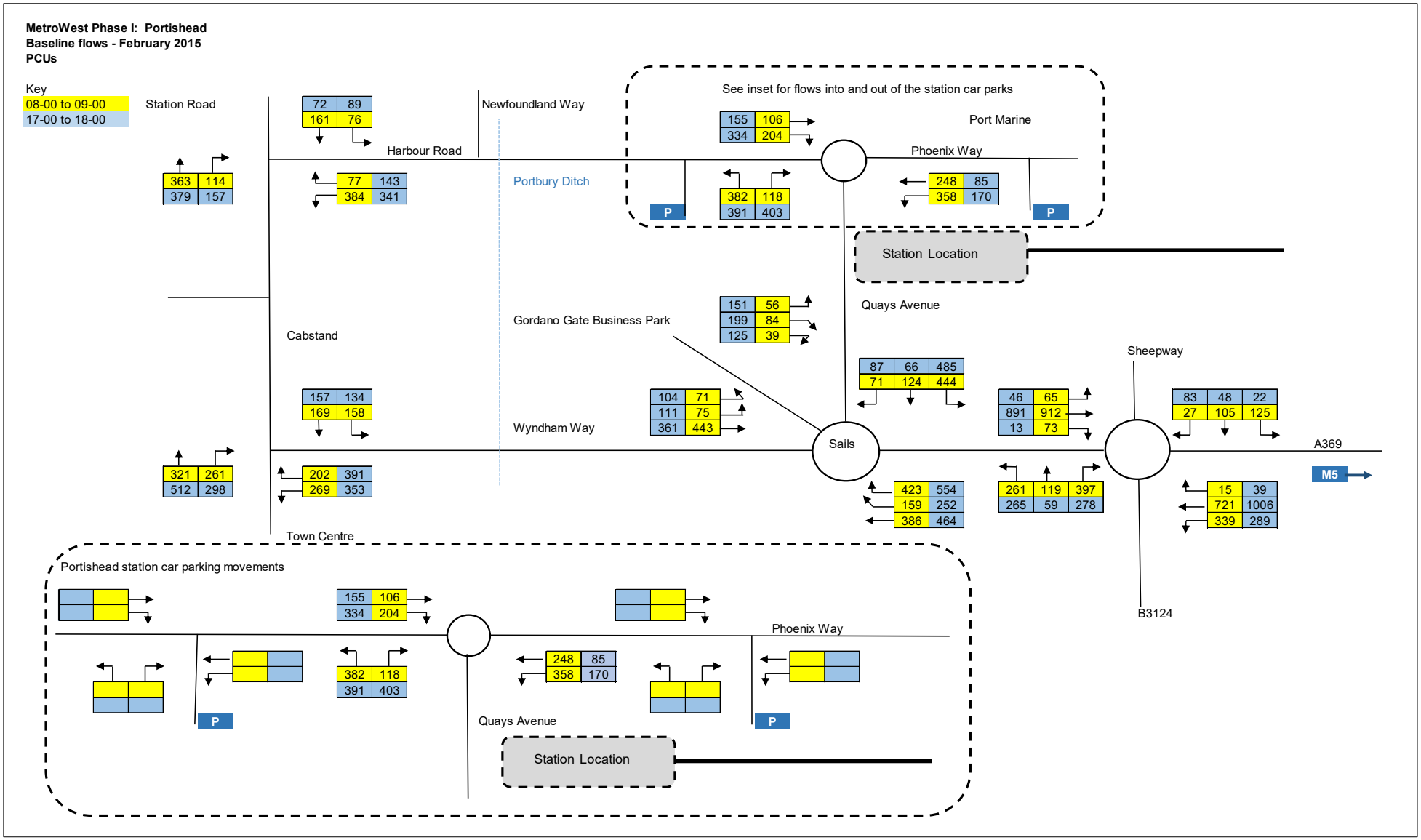

Figure 4-31: Baseline AM and PM traffic flows in Portishead (Passenger Car Unit (PCUs)

Pill

4.5.6 Figure 4.30 shows the ATC locations in Pill. The Report of Surveys in **Appendix C** provides information on the scope and the methodology of the count.

4.5.7 As a result of TA scoping discussion, a request was made to assess traffic flows at the junction of the A369/St Georges Hill. This data has been recorded by NSDC at a different period and is outlined in **Appendix C**.

4.5.8 Figure 4.32 provides a summary of the peak AM (08:00 to 09:00) and PM (17:00 to 18:00) flows; this reveals a number of trends about existing flows as follows:

- The main flows within Pill are along Heywood Road and Lodway. There is a larger north-south directional flow towards Bristol in the AM peak and this reversed in the PM peak;
- The traffic volumes along Station Road and Monmouth Road reflect the largely residential area of Pill. There is a directional variation which again reflects the morning and evening peaks.

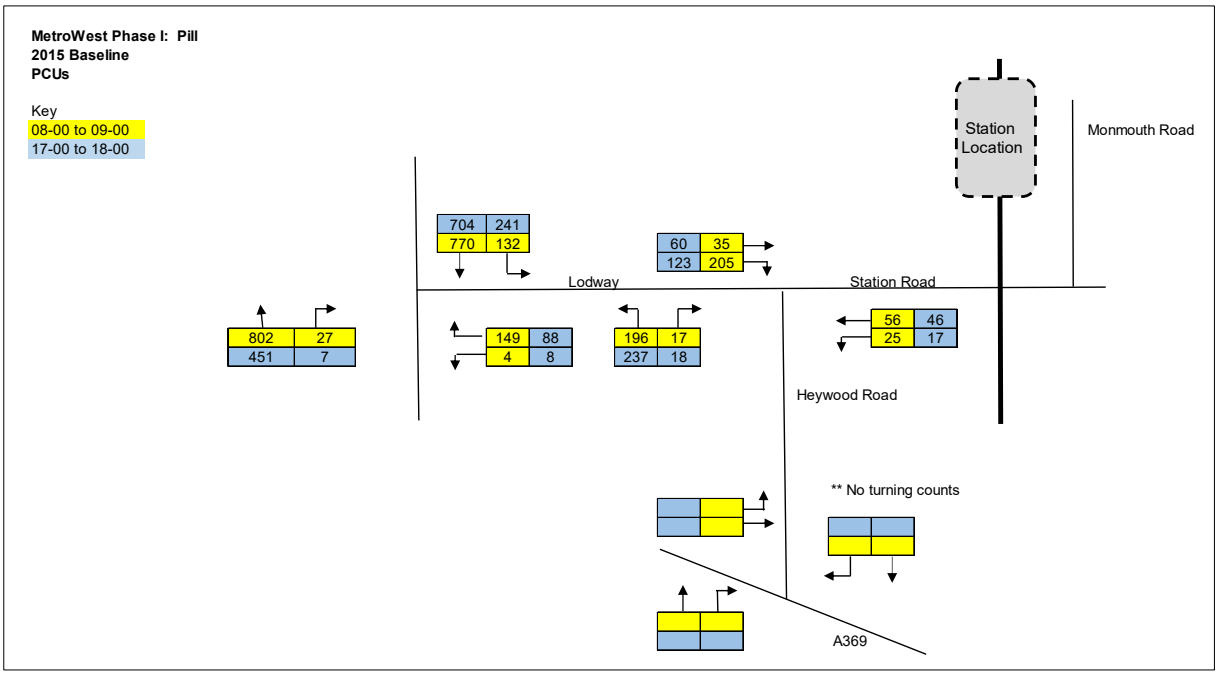

Figure 4-32: Baseline AM and PM traffic flows in Pill (PCUs)

Ashton Vale

4.5.9 A series of traffic counts have been undertaken in the Ashton Vale area, in each of the years 2014-2018, though the detail of counts in each year has varied:

- 2014 – Manual classified count (MCC) of movements on Ashton Vale Road;
- 2015 – Automatic traffic count (ATC), classified, of movements on Ashton Vale Road (across the level crossing);

- 2016 – MCC of most movements at the junction, including all traffic movements from Winterstoke Road south of the junction and all movements from Ashton Vale Road;
- 2017 – MCC of all movements at the junction, including all traffic movements from Winterstoke Road approaches both north and south of the junction; and
- 2018 – ATC, classified, of all movements at the junction.

4.5.10 The Report of Surveys in **Appendix C** provides some information on the scope and methodology of the initial counts. Further analysis of counts undertaken is reported in **Appendix N**.

4.5.11 The Ashton Vale Road Traffic Counts technical note in **Appendix N** considers the counts over time. It concludes that the most recent traffic count (ATC, March 2018) indicate that traffic flows through the Ashton Vale Road / Winterstoke Road junction have reduced overall from previous counts. This is most notable for Winterstoke Road itself.

4.5.12 The 2018 ATC indicated a degree of day-to-day variability in movements through the Ashton Vale Road / Winterstoke Road junction. Within this variation, the maximum profile recorded is very similar to the 2017 MCC. Day to day variation is more marked on Ashton Vale Road than the other arms of the junction, though Ashton Vale Road only accounts for around 5% of all junction inflows. It is particularly apposite to note this for movements into the Ashton Vale Road industrial estate, which indicates that this movement (from Winterstoke Road south to Ashton Vale Road) was higher in 2017 than on average in 2018. This is in spite of MetroBus m2 construction works on-going at the time of the 2017 count that restricted use of one lane out for this movement. Overall, it was considered that the traffic counts taken in 2017 are representative of conditions that are present at the junction now, and indeed going back over several years.

4.5.13 Furthermore, comparison of counts over 5 years (2014-2018) indicates that there has been little measurable change in the operation of Ashton Vale Road in the context of the Ashton Vale Road / Winterstoke Road junction.

2019 traffic counts

4.5.14 A series of counts were undertaken for selected sites in Portishead and Pill in April 2019, in order to consider whether the traffic situation has changed significantly since the main counts that were used as the basis for traffic analysis detailed in this TA were carried out (in 2015).

4.5.15 Counts were undertaken at six sites, four in Portishead and two in Pill, as follows (site numbers are those shown on Figures 4.29 and 4.30):

- Site 1 – Portishead, Quays Avenue (south of Conference Avenue)
- Site 9 – Portishead, Wyndham Road
- Site 12 – Portishead, Quays Avenue (north of Galingale Way)
- Site 15 – Portishead, A369 Portbury Hundred
- Site 17 – Pill, Lodway
- Site 23 – Pill, Pill Road

4.5.16 Tables 4.3, 4.4 and 4.5 show comparisons of 2015 and 2019 counts, specifically 5-day (weekday) averages for 12-hour (07:00-19:00), 16-hour (06:00-22:00) and 24-hour totals respectively. Figures 4.33-4.38 show hour-by-hour comparisons of counts at the six sites.

4.5.17 The tables indicate that total traffic over the day has generally increased, and especially so on Quays Avenue, but that it has not changed much at the other sites. However, the figures indicate that peak time traffic has not actually changed much at any of the sites. Further comparison discussion can be found in the local operational impact assessments considering junction performance (section 7).

Table 4.3: 2015 & 2019 comparison of traffic counts (12-hr totals)

Site & Location			Direction 1			Direction 2		
			2015	2019	change	2015	2019	change
1	Portishead	Quays Ave	5,774	6,568	13.8%	5,536	6,101	10.2%
9	Portishead	Wyndham Rd	6,824	6,971	2.2%	6,112	6,024	-1.4%
12	Portishead	Quays Ave	5,995	6,751	12.6%	5,729	6,230	8.7%
15	Portishead	Portbury H	10,835	10,996	1.5%	10,838	11,170	3.1%
17	Pill	Lodway	1,795	1,864	3.9%	2,107	2,027	-3.8%
23	Pill	Pill Rd	2,417	2,270	-6.1%	2,088	2,149	2.9%

Table 4.4: 2015 & 2019 comparison of traffic counts (16-hr totals)

Site & Location			Direction 1			Direction 2		
			2015	2019	change	2015	2019	change
1	Portishead	Quays Ave	6,718	7,590	13.0%	6,377	7,134	11.9%
9	Portishead	Wyndham Rd	7,906	8,133	2.9%	7,179	7,119	-0.8%
12	Portishead	Quays Ave	6,972	7,844	12.5%	6,607	7,268	10.0%
15	Portishead	Portbury H	12,647	12,973	2.6%	12,688	12,970	2.2%
17	Pill	Lodway	2,059	2,160	4.9%	2,391	2,327	-2.7%
23	Pill	Pill Rd	2,707	2,568	-5.1%	2,335	2,410	3.2%

Table 4.5: 2015 & 2019 comparison of traffic counts (24-hr totals)

Site & Location			Direction 1			Direction 2		
			2015	2019	change	2015	2019	change
1	Portishead	Quays Ave	6,976	7,862	12.7%	6,590	7,390	12.2%
9	Portishead	Wyndham Rd	8,205	8,440	2.9%	7,521	7,430	-1.2%
12	Portishead	Quays Ave	7,234	8,130	12.4%	6,823	7,524	10.3%
15	Portishead	Portbury H	13,241	13,645	3.0%	13,387	13,640	1.9%
17	Pill	Lodway	2,136	2,244	5.1%	2,497	2,435	-2.5%
23	Pill	Pill Rd	2,804	2,664	-5.0%	2,418	2,513	3.9%

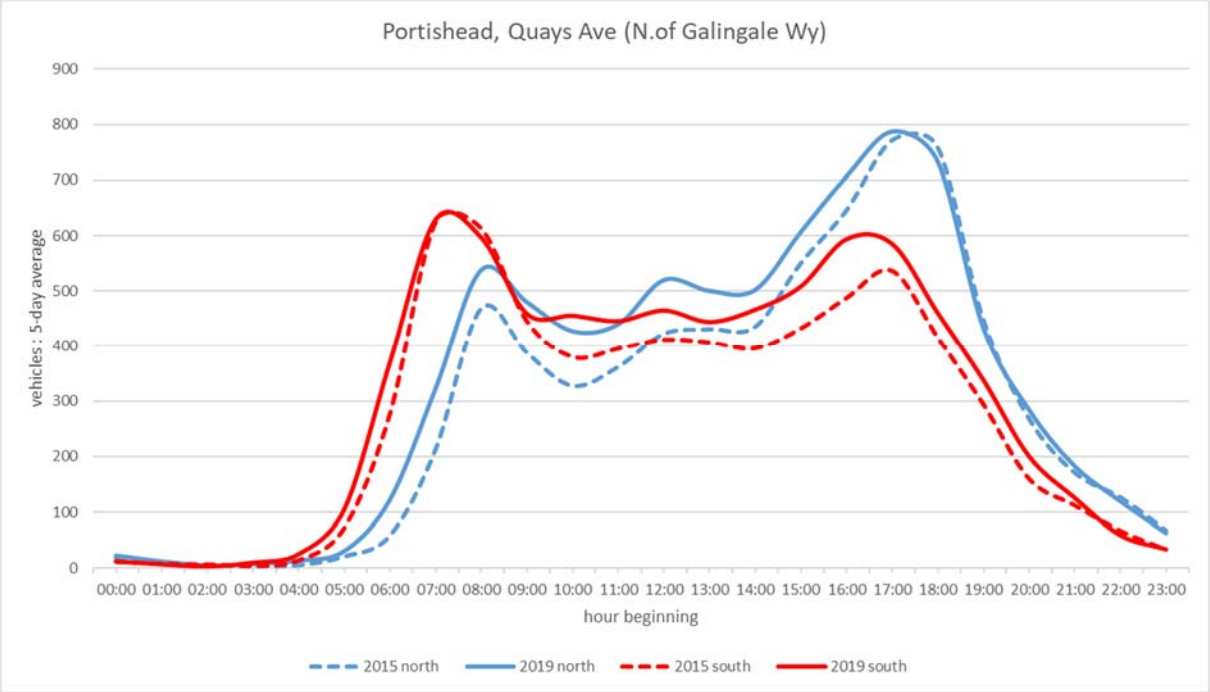

Figure 4-33: Comparison of counts: Quays Avenue (Site 1)

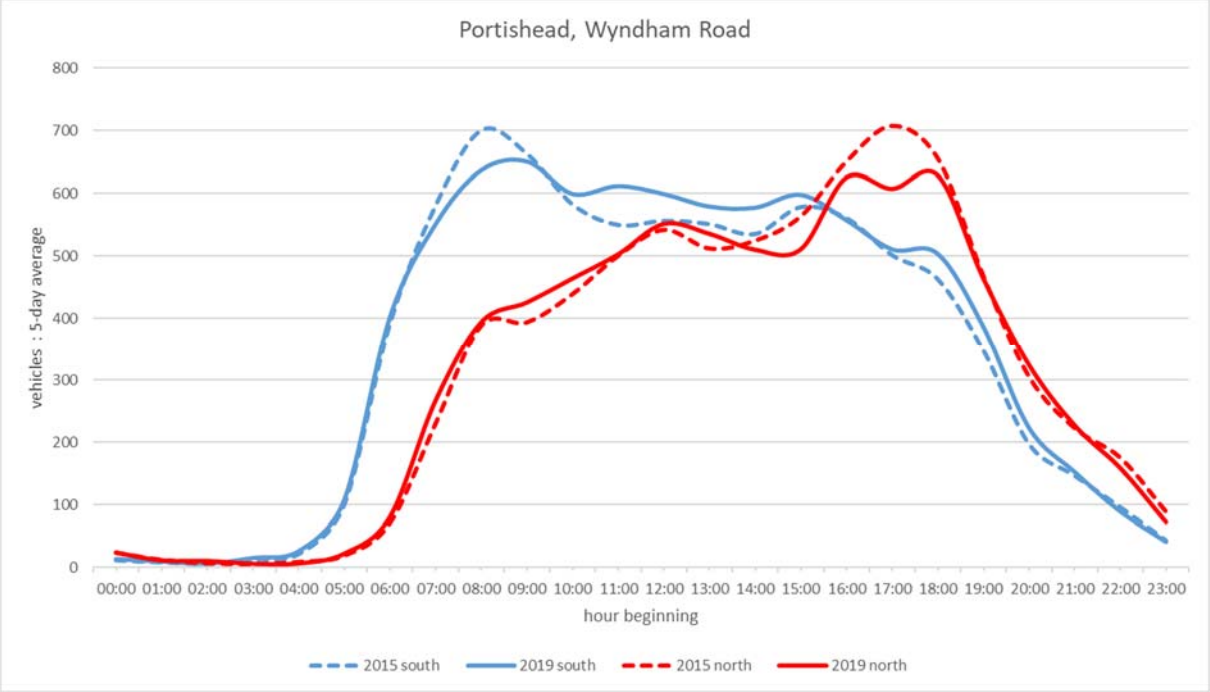

Figure 4-34: Comparison of counts: Wyndham Road (Site 9)

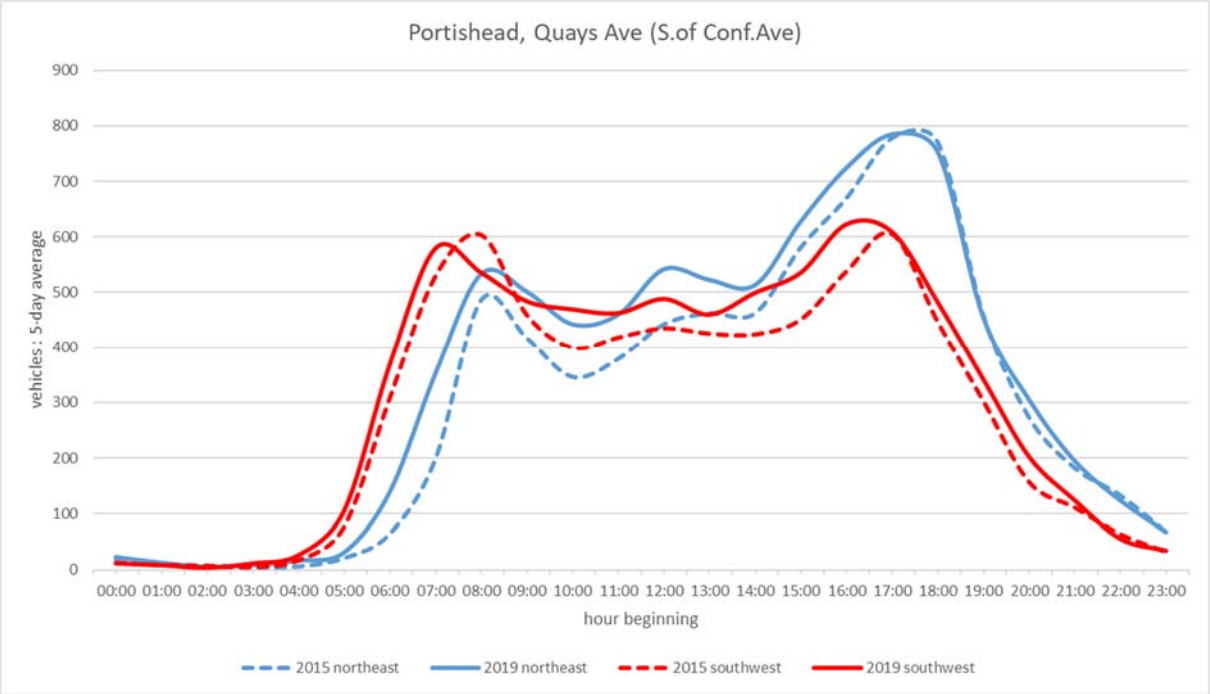

Figure 4-35: Comparison of counts: Quays Avenue (Site 12)

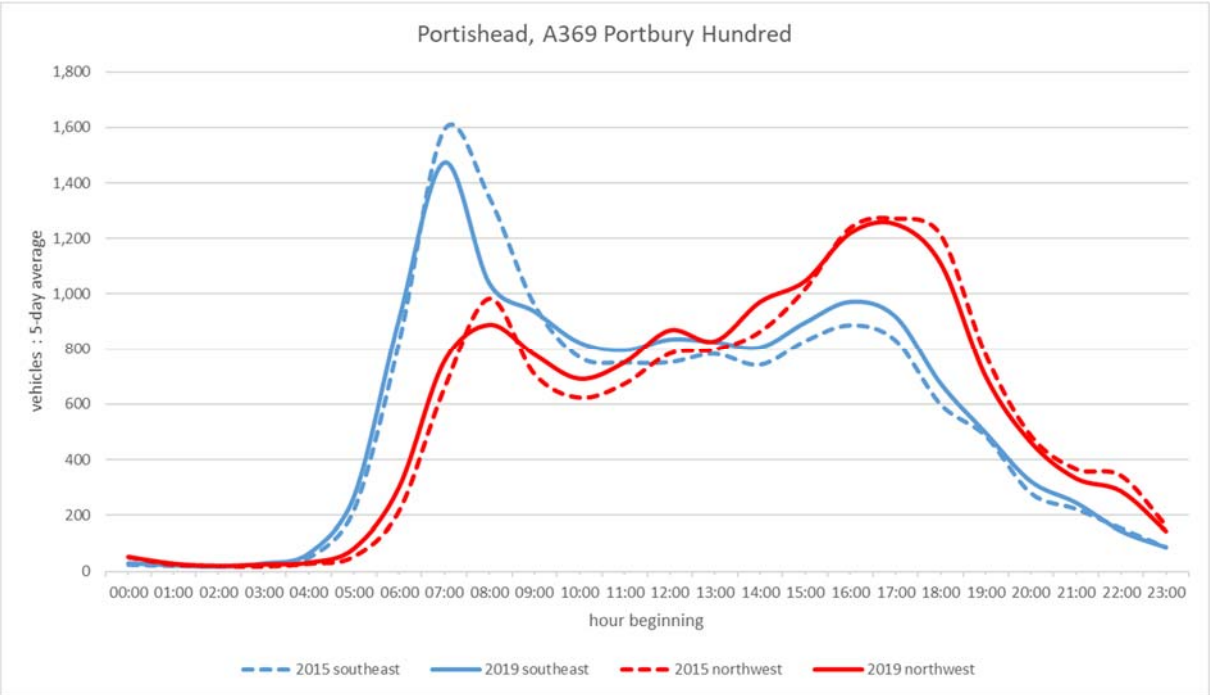

Figure 4-36: Comparison of counts – A369 Portbury Hundred (Site 15)

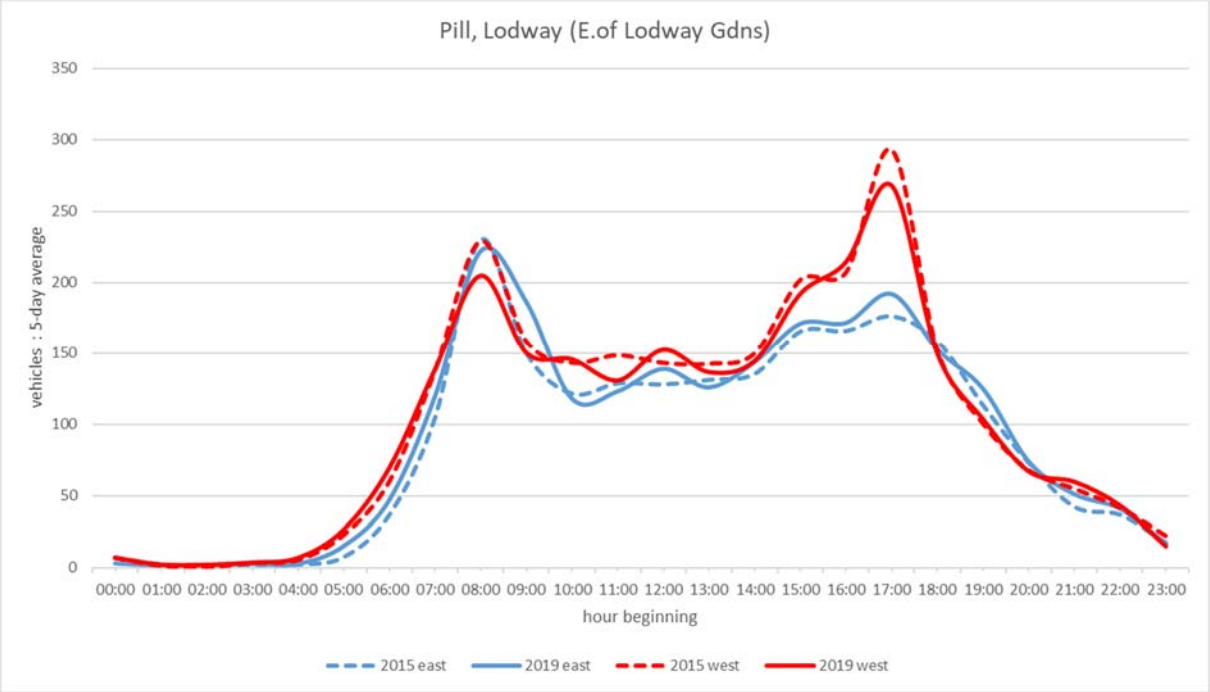

Figure 4-37: Comparison of counts: Lodway (Site 17)

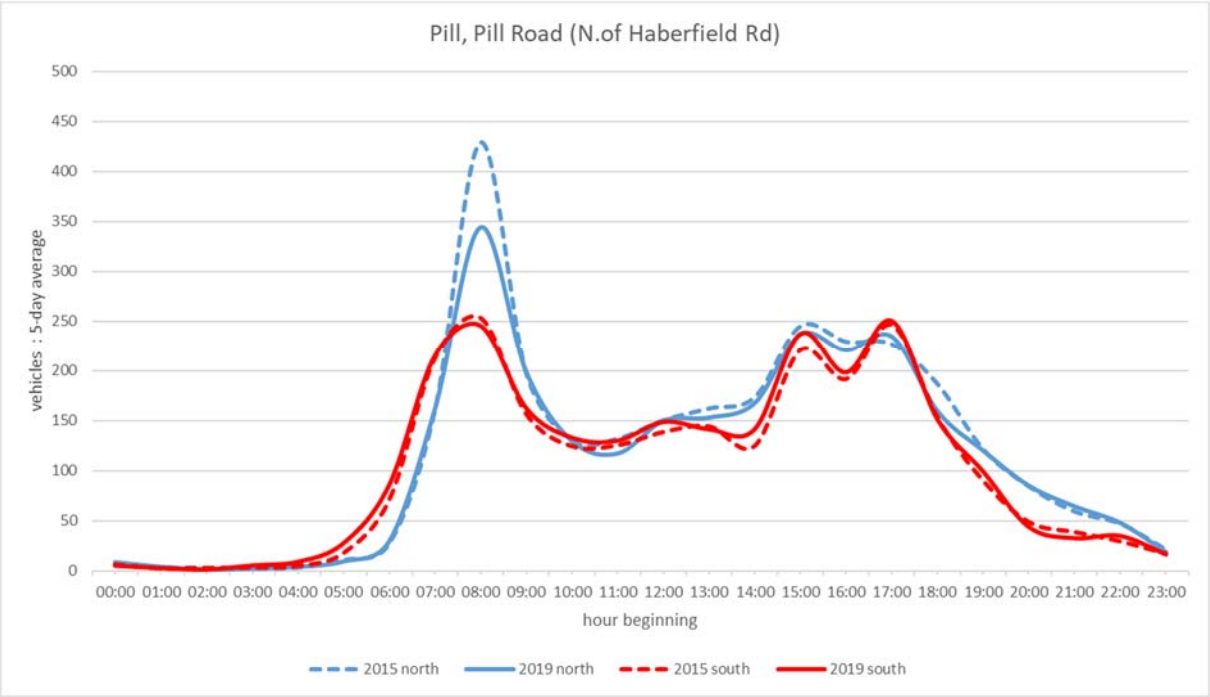

Figure 4-38: Comparison of counts: Pill Road (Site 23)

4.6 Existing parking conditions

Overview

4.6.1 To understand fully the existing parking conditions, parking surveys were undertaken in the vicinity of the proposed stations and also along Ashton Vale Road near the existing level crossing. Further information on these surveys is provided in **Appendix I** of the TA. For each location, a separate approach was undertaken as follows:

- Portishead; surveys of observed parking levels were undertaken in February 2015 and September 2015 given the extent of different land uses and the number of highways involved;
- Pill; a qualitative assessment was undertaken in February 2015. The approach reflects the limited level of on-street parking that is generally available close to the proposed station; and
- Ashton Vale Rd; a bespoke survey undertaken over two days in March 2016. The survey reflects the immediate commercial and industrial land uses along this road with an earlier observation start time in the day.

Portishead

Existing parking supply

4.6.2 In order to provide a context to parking demand in the vicinity of the proposed new Portishead railway station, an assessment was undertaken to ascertain the level of available parking space. Table 4.6 provides an overview of the indicative number of spaces and Figure 4.39 shows the geographical extent of the assessment.

Table 4.6: Indicative no. of on-street parking spaces near Portishead Station

Survey Zone Ref.	Road	Indicative No. Vehicles
Zone A	Marjoram Way	22
	Camomile Walk	15
	Rosemary Crescent	15
	Tansy Lane	3
	Biscay Drive	5
	Malin Parade	17
	Finisterre Parade	14
	Wight Row	8
	Phoenix Way	20
Zone B	Harbour Road	24
	Harbour Industrial Estate	20
	Haven View	13*
Zone C	Serbert Way	8
	Serbert Road	20
	Serbert Close	6

Table 4.6: Indicative no. of on-street parking spaces near Portishead Station

Survey Zone Ref.	Road	Indicative No. Vehicles
Zone D	Quays Avenue	15
	Mulberry Avenue	13
	Conference Avenue	16
	Tydeman Road	6
	Peartree Field	9
	Galingale Way	12
	Mulberry Close	9
	Holmlee	4
Zone E	Car Park 1	92*
	Car Park 2	44
Zone F	Old Mill Road	21*
Zone G	Newfoundland Way	40
	The Anchorage	20
	Martingale Way	15

*Note that some sites have varying indicative parking scenarios e.g. residential streets have homeowners vehicles included in the count.

Located in Part 3 of Appendix 16.1

Figure 4-39: Portishead Station Parking Assessment

4.6.3 This assessment is based on the following assumptions:

- Spaces have been counted where parking would not impede the flow of vehicles or create a hazard;
- A standard vehicle length of 6m was assumed and this was taken from NSDC's Parking Standards Policy;
- Excludes kerb-space serving driveways or private accesses; and
- Where roads are known not to have been adopted by NSDC, the highways have not been included in the above calculation, as the ability to provide measures in these areas is limited. This includes some minor roads within Port Marine and the Serbert Road estate.

4.6.4 Overall, the parking assessment suggests most of the spaces are located within residential areas. The number of parking spaces in the predominately commercial areas are limited by the number of private access points.

Parking count

4.6.5 To assess the baseline parking demand situation in Portishead, surveys were undertaken across seven distinct zones as shown in Figure 4.39 in February and September 2015. The surveys were undertaken between 07:00 and 19:00 and the counts were carried out in 15-minute time

segments. To understand the results, the following analysis is based on the maximum number of vehicles observed for each hour during the day. The full survey data and analysis can be found in **Appendix C.**

Analysis of the Portishead Parking Survey

4.6.6 Analysis of the survey has revealed distinct parking trends in each of the surveyed areas as follows:

- **In Port Marine (Zone A)** parking demand is fairly consistent throughout the day. The exception is Rosemary Crescent which saw a spike in parking levels around 15:00. The main explanation is the close proximity to Trinity Primary School where parking restrictions exist on Marjoram Way outside the school entrance. Phoenix Parade and Marjoram Way also experience some spikes throughout the day also but remain at a constant level through the rest of the survey period. Total capacity is around 120 spaces, and capacity is reached overall around 9am, and exceeded (using restricted areas) at times of maximum demand.
- **Around Harbour Road (Zone B),** parking fluctuated during the day time particularly in the vicinity of the health centre. There was a peak in demand between 12:00 and 13:00 along Harbour Road. Total capacity is around 60 spaces; at maximum demand, some 50 spaces are utlilised, though at 9am this is nearer 40 spaces in use.
- **Within Gordano Gate Business Park (Zone C),** a very low level of on-street parking along Serbert Way and Serbert Close was observed. The main difference is Serbert Road which saw some parking which appears to be associated with the surrounding employment land use. Total capacity is around 35, with less than half utilised (16) at maximum, though a similar number of spaces used all day.
- **Around Galingale Way (Zone D),** the survey showed reduced demand for parking space during the off-peak period. There was one main exception being Galingale Way where the close of the proximity of the road to the school produces a localised spike in demand. The other roads experience some peaks and dips but these are relatively minor. Total capacity is around 85, with peak accumulations of almost 70, and some 50 parked vehicles at 9am.
- **Within the Town Centre (Zone E)** both car parks are well-used throughout the day and are often full to capacity. Accumulations at 9am are around 85% of total capacity.
- **Along Old Mill Road (Zone F)** parking demand reflects the surrounding employment land use with high demand throughout the day. Assessed total capacity is around 21, with more than that number of parked vehicles recorded
- **Towards Portishead Marina (Zone G)** , the survey showed parking demand to be relatively consistent during the day along Newfoundland Way and Martingale Way. The Anchorage had a peak and off-peak fluctuation reflecting surrounding residential land use. Total capacity is around 75, with a peak accumulation noted of 55, of which around half that number (28) were parked at 9am.

4.6.7 These results have been presented in graphical format in **Appendix I** of the TA.

4.6.8 In general, as noted in the assessment of parking supply, most spaces are located in residential areas, and parking spaces on street in the more commercial areas around the station are limited by private access points. Residential areas do not see all available parking spaces utilised across the day, with some capacity available, though some areas are full overnight, reflecting residents' needs. In areas with more commercial land use, there is high utilisation across the business day. As such, there could be some capacity for rail users to park cars in the vicinity of the station in Portishead, in particular perhaps there is more scope in residential areas.

Pill

4.6.9 In assessing and reviewing existing car parking demand in Pill, surrounding streets within a 200m parallel strip were assessed (note that the approximate walking distance between the station forecourt and car park). This is shown in Figure 4.40. Table 4.7 provides a summary of existing parking provision and the outcome of observed parking levels.

Located in Part 3 of Appendix 16.1

Figure 4-40: Pill Station Parking Assessment

Table 4.7: Summary of observed parking provision and conditions in Pill

Road	Land Use	Highway Layout	Likely walking	On street parking	Off street parking	Parking controls	Observed parking levels
Avon Road	Residential	Wide – footway on either side	Yes	Yes	Yes	None	None
Back Lane	Mainly residential	Narrow – limited footway	Yes	None	Yes	None	None
Chapel Row	Residential	Narrow – limited footway	No	Yes	Yes	None	Low
Church Walk	Residential	Narrow – limited footway	Yes	None	None	None	Med
Crusty Lane	Residential	Narrow – footway on either side	No	Yes	Yes	None	Low
Hardwick Road	Residential	Standard – footway on either side	Yes	Yes	Yes	None	Med
Heywood Terrace	Residential	Narrow – footway on either side	Yes	Yes	None	None	Med

Table 4.7: Summary of observed parking provision and conditions in Pill

Road	Land Use	Highway Layout	Likely walking	On street parking	Off street parking	Parking controls	Observed parking levels
Lodway Close	Residential	Standard – footway on either side	Yes	Yes	Yes	None	Low
Mariners Way	Residential	Standard – footway on either side	Yes	Yes	Yes	None	Med
Monmouth Court	Residential on one side	Narrow – footway on one side	Yes	Yes	Yes	None	High
Monmouth Road	Residential on one site	Narrow – footway on one side	Yes	Yes	Yes	None	High
Newport Road	Residential	Standard – footway on one side	No	Yes	Yes	None	Med
Sambourne Lane	Mixed	Standard – footway on either side	Yes	Yes	Yes	None	High
Severn Road	Residential on one side	Narrow – no footway	Yes	Yes	Yes	None	Low
Station Road	Mixed	Narrow – limited footway	Yes	Yes	Yes	Yes	High
Upper Myrtle Way	Residential	Narrow – no footway	Yes	No	Yes	None	Low

Ashton Vale

4.6.10 A parking survey was conducted along Ashton Vale Road for two weekdays in March 2016.. To understand more fully the impact of the immediate land uses on demand for on-street parking, Ashton Vale Road was split into five small zones. Table 4.8 provides an overview of the indicative number of spaces and Figure 4.41 shows the geographical extent of the assessment.

Table 4.8: Indicative on-street parking spaces on Ashton Vale Road

Survey Zone Reference	Road	Indicative Number of Vehicles
Zone 1	All zones on Ashton Vale Road	1
Zone 2		12
Zone 3		9
Zone 4		9
Zone 5		15

4.6.11 The survey identified different levels of parking demand along the highway as follows:

- **In Zone 1,** located close to the existing level crossing, there was a variation between the two days – the first day saw the total number of parked vehicles exceeding the number of spaces whereas on the second day, apart from a small spike in the morning, no vehicles were observed.
- **In Zone 2,** the number of vehicles apart from one time segment did not exceed the total number of spaces available on the road.
- **In Zone 3,** there was some fluctuation during both days – the morning period saw more vehicles parked than available spaces but there were spare places in the afternoon period;
- **In Zone 4,** apart from one small spike on one of the surveyed days, there were available spaces along this stretch of the road.
- **In Zone 5,** demand exceeded the number of on-street parking spaces available.

4.6.12 These results have been presented in graphical format in **Appendix I** of the TA.

Located in Part 3 of Appendix 16.1

Figure 4-41: Ashton Vale Road Parking Assessment

4.7 Existing accident data

Portishead

4.7.1 In Portishead, for the period between 1st January 2011 and 30th June 2016, there was a total of 46 accidents resulting in 51 casualties. Further details of each accidents are presented in **Appendix D** of the TA. The data and mapping does not indicate any particular accident cluster with the junction of Harbour Road and Newfoundland Way having the largest number of accidents at three over the assessment period. It is also noted that four accidents occurred along the B3124 High Street between its junctions with Roath Road and Church Road North. Table 4.9 summarises the total accidents and casualties in Portishead during the period being assessed.

4.7.2 Three serious accidents occurred during the period being assessed. The first of these occurred in March 2011 on the High Street where a vehicle collided with an elderly pedestrian on a zebra crossing. The second serious accident occurred in April 2012 at the roundabout junction between Portbury Hundred and Sheepway which involved a cyclist and a vehicle. The latest serious accident occurred along Wyndham Way in June 2013 and involved the accident of a vehicle with a child after they failed to look properly before crossing at a point without a specified pedestrian crossing.

Table 4.9: Summary of accident data in Portishead

Link/Junction	Accidents				Casualties			
	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
LINK								
B3124 High Street	0	1	5	6	0	1	6	7
Harbour Road	0	0	3	3	0	0	4	4
A369 Wyndham Way	0	1	4	5	0	1	4	5
Bristol Road	0	0	1	1	0	0	1	1
Nore Road	0	0	2	2	0	0	2	2
Brampton Way	0	0	1	1	0	0	1	1
St. Marys Road	0	0	1	1	0	0	1	1
Station Road	0	0	1	1	0	0	1	1
The Portbury Hundred	0	0	1	1	0	0	2	2
JUNCTION								
Nore Road /Battery Road	0	0	2	2	0	0	2	2
Harbour Rd /Martingale Wy	0	0	1	1	0	0	1	1
B3124 High Street/Albert Rd	0	0	1	1	0	0	1	1
Slade Road/Avon Way	0	0	1	1	0	0	2	2
A369 Wyndham Way/Co-op carpark	0	0	2	2	0	0	2	2
A369 Wyndham Way/B3124 High St	0	0	1	1	0	0	1	1
A369 Portbury Hundred/Sheepway Rbt	0	1	3	4	0	1	4	3
Slade Road/Coombe Road	0	0	1	1	0	0	1	1
Brompton Road/Cadbury Rd	0	0	1	1	0	0	1	1
Phoenix Way/Redpoll Drive	0	0	1	1	0	0	1	1
B3124/Bristol Road Roundabout	0	0	1	1	0	0	1	1
Harbour Rd /Newf'ndland Wy	0	0	3	3	0	0	4	4
Bristol Rd /Clevedon Rd Rbt	0	0	1	1	0	0	1	1
B3124 High St /St.Peters Rd	0	0	2	2	0	0	2	2
B3124 Portbury Common/ Heron Gdns	0	0	1	1	0	0	1	1
B3124 High Street/Stoke Rd	0	0	1	1	0	0	1	1
Bristol Road /Cadbury Road	0	0	1	1	0	0	1	1

4.7.3 One feature that has to be noted is the number of accidents involving pedestrians or cyclists. Out of the 46 accidents assessed, 20 involved vulnerable users with three of these being classified as serious (as described above). Table 4.10 provides a summary of the contributory factors which shows no common trend apparent.

Table 4.10: Contributory factors for all accidents in Portishead

Contributory factors for all accidents including those involving vulnerable users

Link/Junction	Involving pedestrian or cyclist	Loss of Control	Failed to look properly/mis-judgement	Travelling too fast	Reckless Driving	Weather	Other
LINK							
B3124 High Street	4	0	0	0	0	0	2
Harbour Road	2	0	0	0	0	0	1
A369 Wyndham Way	3	0	1	0	0	1	0
Bristol Road	0	0	0	1	0	0	0
Nore Road	0	0	0	0	0	0	2
Brompton Way	0	1	0	0	0	0	0
St. Marys Road	1	0	0	0	0	0	0
Station Road	1	0	0	0	0	0	0
The Portbury Hundred	0	0	0	0	0	0	1
JUNCTION							
Nore Road/Battery Road	1	0	1	0	0	0	0
Harbour Rd/Martingale Wy	0	0	1	0	0	0	0
B3124 High St/Albert Rd	1	0	0	0	0	0	0
Slade Road/Avon Way	0	0	0	1	0	0	0
A369 Wyndham Way/ Co-op carpark	0	0	2	0	0	0	0
A369 Wyndham Way/ B3124 High St	1	0	0	0	0	0	0
A369 Portbury Hundred/Sheepway Rbt	2	0	2	0	0	0	0
Slade Road/Coombe Road	0	0	0	0	1	0	0
Brampton Rd/Cadbury Rd	1	0	0	0	0	0	0
Phoenix Way/Redpoll Dr	1	0	0	0	0	0	0
B3124/Bristol Road Rbt	0	0	1	0	0	0	0
Harbour Rd/Newf'ndland Wy	0	0	3	0	0	0	0
Bristol Road/Clevedon Road Rbt	0	0	1	0	0	0	0
B3124 High St/St.Peters Rd	1	0	1	0	0	0	0

Table 4.10: Contributory factors for all accidents in Portishead

Contributory factors for all accidents including those involving vulnerable users

Link/Junction	Involving pedestrian or cyclist	Loss of Control	Failed to look properly/mis-judgement	Travelling too fast	Reckless Driving	Weather	Other
B3124 Portbury Common/Heron Gdns	0	0	1	0	0	0	0
B3124 High St/Stoke Rd	1	0	0	0	0	0	0
Bristol Rd/Cadbury Rd	0	0	0	0	0	0	1

Pill

4.7.4 In Pill, a total of 27 accidents took place over the period being assessed (1st January 2011 to 30th June 2016). A further 40 accidents occurred at J19 of the M5 during this period. Further details of each accidents are presented in **Appendix D** of the TA.

4.7.5 Table 4.11 summarises the total accidents and casualties by street in Pill village, with Table 4.12 providing a review of all the contributory factors for accidents in Pill village. Table 4.13 summarises the total accidents and casualties surrounding M5 Junction 19, and Table 4.14 the corresponding contributory factors.

4.7.6 In Pill, there have been 9 accidents along the A369 Martcombe Road, with further 8 accidents occurring at the various junctions along its length between M5 Junction 19 and its junction with Happerton Lane. There have been further accidents on Ham Green leading north to Heywood Road during the period being assessed. There have been no fatal accidents during this period but a total of two serious accidents have been recorded; one along Martcombe Road and another on Westward Drive. The first accident occurred in October 2011 when a vehicle collided with a pedestrian who ran out onto Westwood Drive between two parked cars. A second accident occurred in May 2012 where a vehicle and motorcycle collided along the A369 Martcombe Road. This accident occurred as a result of reckless overtaking by the motorcyclist.

4.7.7 A review of all the contributory factors for accidents in Pill Village shows that there is a mixture of reasons with failure to look properly/misjudgment being the most common cause.

Table 4.11: Summary of accident data in Pill village

Link/Junction	Accidents				Casualties			
	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
LINK								
A369 Martcombe Road	0	1	8	9	0	1	14	15
A369 Haberfield Road	0	0	1	1	0	0	2	2
Pill Road	0	0	1	1	0	0	1	1
Macrae Road	0	0	1	1	0	0	1	1
Ham Green	0	0	3	3	0	0	3	3
Heywood Road	0	0	1	1	0	0	1	1
Westward Drive	0	1	0	1	0	1	0	1
JUNCTION								
A369 Martcombe Road/St Georges Hill	0	0	2	2	0	0	3	3
A369 Martcombe Rd/Rectory Rd	0	0	2	2	0	0	2	2
A369 Mrtcmbe Rd/Happerton La	0	0	2	2	0	0	2	2
A369 Martcombe Rd/Pill Rd	0	0	2	2	0	0	2	2
Rudgeleigh Road/Cross Lanes	0	0	1	1	0	0	1	1
Priory Road/Court Hay	0	0	1	1	0	0	1	1

Table 4.12: Contributory factors for all accidents in Pill village

Contributory factors for all accidents including those involving vulnerable users

Link/Junction	Involving pedestrian or cyclist	Loss of Control	Failed to look properly/mis-judgement	Travelling too fast	Reckless Driving	Weather	Other
LINK							
A369 Martcombe Road	0	1	5	0	3	0	0
A369 Haberfield Road	0	0	0	1	0	0	0
Pill Road	1	0	0	0	0	0	0
Macrae Road	1	0	0	0	0	0	0
Ham Green	2	0	1	0	0	0	0
Heywood Road	0	0	1	0	0	0	0
Westward Drive	1	0	0	0	0	0	0

Table 4.12: Contributory factors for all accidents in Pill village

Contributory factors for all accidents including those involving vulnerable users

Link/Junction	Involving pedestrian or cyclist	Loss of Control	Failed to look properly/mis-judgement	Travelling too fast	Reckless Driving	Weather	Other
JUNCTION							
A369 Martcombe Road/St Georges Hill	0	0	1	1	0	0	O
A369 Martcombe Road/ Rectory Road	1	0	1	0	0	0	O
A369 Martcombe Road/ Happerton La	0	1	1	0	0	0	O
A369 Martcombe Road/ Pill Road	0	0	1	0	0	1	O
Rudgeleigh Road/Cross Lanes	0	0	1	0	0	0	O
Priory Road/Court Hay	1	0	0	0	0	0	O

4.7.8 The data and mapping provided for the highways surrounding Junction 19 of the M5 indicates that there have been more accidents on the southbound carriageway than the northbound carriageway on the approach to the junction. Furthermore, a greater number of accidents have occurred on the M5 southbound off-slip than on the northbound off-slip.

4.7.9 There are a number of accident clusters on the roundabout itself particularly at the exits onto The Portbury Hundred A369, Martcombe Road A369 and M5 southbound on- and off-slip roads.

4.7.10 In August 2014, there was a serious accident at the A369 Martcombe/J19 roundabout traffic lights which involved the accident of two vehicles as a result of a lane crossing at the junction. The review of all the contributory factors for accidents surrounding J19 shows that there is a variety of reasons with the majority of accidents having been caused by a driver failing to look properly/misjudgment.

Table 4.13: Summary of accident data surrounding J19 of the M5

Link/Junction	Accidents				Casualties			
	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
LINK								
Royal Portbury Dock Road	0	0	1	1	0	0	1	1
A369 The Portbury Hundred	0	0	3	3	0	0	4	4
M5 Northbound	0	0	2	2	0	0	4	4
M5 Southbound	0	0	8	8	0	0	12	12
Gordano Way	0	0	1	1	0	0	1	1
JUNCTION								
Royal Portbury Dock Roundabout	0	0	2	2	0	0	2	2
Junction 19 Roundabout	0	1	24	25	0	1	30	31

Table 4.14: Contributory factors for all accidents surrounding J19 of the M5

Contributory factors for all accidents including those involving vulnerable users

Link/Junction	Involving pedestrian or cyclist	Loss of Control	Failed to look properly/mis-judgement	Travelling too fast	Reckless Driving	Weather	Other
LINK							
Royal Portbury Dock Road	0	0	1	0	0	0	0
A369 The Portbury Hundred	1	0	1	0	0	1	0
M5 Northbound	0	1	1	0	0	0	0
M5 Southbound	0	2	5	0	0	0	1
Gordano Way	0	1	0	0	0	0	0
JUNCTION							
Royal Portbury Dock Roundabout	0	0	2	0	0	0	0
Junction 19 Roundabout	1	3	16	0	5	0	0

Ashton Vale

4.7.11 In the Ashton Vale area, a total of 33 accidents with 40 casualties took place over the period between 1st January 2011 and 30th November 2016. Further details of each accident are presented in **Appendix D** of the TA. Table 4.15 provides a summary of the accidents whereas Table 4.16 provides a breakdown of the contributory factors.

4.7.12 All of the accidents that took place around Ashton Vale received a classification of being 'slight'. Of these 33 accidents, 16 of these took place on A3029 Winterstoke Road with the most common cause (almost 50%) being 'Rear Shunt/side swipe'.

Table 4.15: Summary of accident data for Ashton Vale

Link	Accidents				Casualties			
	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
LINK								
A3029 Winterstoke Road	0	0	16	15	0	0	19	19
A369 Clanage Road	0	0	5	4	0	0	5	5
A3029 Ashton Vale U'pass	0	0	1	1	0	0	2	2
A3029 Brunel Way	0	0	7	6	0	0	10	10
Blackmoors Lane	0	0	2	1	0	0	2	2
A3029 Ashton Road	0	0	1	2	0	0	1	1
Wedlock Way	0	0	1	1	0	0	1	1

Table 4.16: Contributory factors for all accidents for Ashton Vale

Contributory factors for all accidents including those involving vulnerable users

Link	Involving pedestrian or cyclist	Loss of Control	Failed to look properly/mis-judgement	Travelling too fast	Reckless Driving	Weather	Other
LINK							
A3029 Winterstoke Road	3	0	2	2	0	0	9
A369 Clanage Road	4	0	0	0	0	0	1
A3029 Ashton Vale U'pass	0	0	0	0	0	0	1
A3029 Brunel Way	1	0	1	0	0	0	4
Blackmoors Lane	3	0	0	0	0	0	0
A3029 Ashton Road	1	0	0	0	0	0	0
Wedlock Way	0	0	0	0	0	0	1

Conclusions

4.7.13 The accident analysis suggests that there are no particular 'black sites' of note that maybe impacted by the MetroWest Scheme while a large majority of accidents were caused by misjudgment/driver error.

4.7.14 In Portishead, a few small clusters were recorded at a number of junctions in the vicinity. However, no accidents were recorded at the existing roundabout junction at Harbour Road/Phoenix Way/Quay Avenue located immediately adjacent to the proposed station. The primary feature noted in Portishead is the number of accidents involving pedestrians and cyclists where, out of the 46 accidents recorded, 20 involved either pedestrians or cyclists. While the number of NMUs circulating in the vicinity of the station is expected to increase, the proposed works at the roundabout and improvements of facilities for pedestrians and cyclists will help deal with impacts from the Scheme.

4.7.15 The large majority of accidents recorded in Pill occurred along Mortcombe Road with a number of small clusters noted at the various junctions. It is not anticipated that the proposed scheme will have an impact on the number of accidents occurring in the vicinity. No accidents were recorded in the immediate vicinity of the proposed station.

4.7.16 The large majority of accidents that occurred at the M5 J19 occurred at the exit slips onto the Portbury Hundred, Martcombe Road and the M5 southbound on/off slips. Out of the 40 accidents recorded at the junction, 39 were slight while the remining accident was serious. There is no obvious trend regarding the cause of these accidents with the majority resulting from misjudgment/driver error.

4.7.17 Out of the 33 accidents that occurred in Ashton Vale, over 50% of these occurred on Winterstoke Road. All accidents were slight with almost 50% as a result of rear shunts. This suggests a congested area with low traffic speeds. A number of accidents were recorded at the junction between Winterstoke Road and Ashton Vale industrial estate. While the level crossing downtimes will increase, the extension of the left-turn lane on Winterstoke Road and upgrading of the traffic signals to MOVA will help deal with the impact of the scheme on the occurrence of accidents.

4.7.18 Accident data generally does not show any accident clusters or any major causal reasons. The greatest number have occurred in the vicinity of J19 of the M5 – but this has to be seen in the context of the large traffic volumes and relative higher speeds

4.8 Baseline bus service provision

4.8.1 Note that existing bus service information was obtained in April 2019.

Portishead bus services

4.8.2 Portishead is currently well served by a mix of commercially operated and local authority financially supported bus services. The services link the town with Bristol and the main towns nearby as well the main employment, education, retail and leisure centres in North Bristol. Figure 4.42 shows the extent of the current services.

4.8.3 Table 4.17 summarises these services and their frequency. The table reveals that on the main Portishead to Bristol corridor through Pill is served by the frequent X4 and X3a services with both early start and late finish times including at the weekend. Additionally, the X3 service operates between Bristol and Portishead via Abbots Leigh and Easton-in-Gordano. It should be noted that that the X4 service replaced the X2 service from 4th September 2016 plus there have been a number of minor changes to the X3 and X3a routes in order to improve reliability and punctuality (www.firstgroup.com). In addition, single-decker buses have been replaced by double-deckers on all X3/X3a/X4 journeys. This will increase capacity by providing an additional 40 seats per journey (www.firstgroup.com).

4.8.4 This commercial service, until recently, was partially supported by funding from NSDC's Local Sustainable Transport Fund (LSTF) for a set period.

Table 4.17: Portishead Bus Services

No.	Route	Monday to Friday daytime frequency First service Last service	Saturday daytime frequency First service Last service	Sunday & Bank Holiday daytime frequency First service Last service
X3	Bristol to Portishead	Every 30 mins 06:24 19:32	Every 30 mins 05:29 19:22	Every hour 07:56 18:55
X3a	Bristol to Portishead	Every hour 19:35 00:35 (Bristol bus station to Portishead) 20:23 23:23 (Portishead to Bristol) (In addition, 3 buses run from Portishead to Bristol from 05:32 to 05:56)	Every hour 19:35 00:35 (Bristol bus station to Portishead) 20:23 23:23 (Portishead to Bristol)	Every hour 19:35 23:35 (Bristol bus station to Portishead) 20:22 22:22 (Portishead to Bristol)
X4	Bristol to Portishead Via Pill	Every 30 mins 06:15 19:08	Every 30 mins 06:17 19:01	Every hour 08:25 19:33
X5	Weston-Super-Mare to	Every hour	Every hour	Every 2 hours

Table 4.17: Portishead Bus Services

No.	Route	Monday to Friday daytime frequency First service Last service	Saturday daytime frequency First service Last service	Sunday & Bank Holiday daytime frequency First service Last service
	Clevedon-Portishead-Cribbs Causeway	06:25 19:50	07:40 19:50	09:33 17:31
88	Nailsea-Portishead (White Lion-Stop C)-Clevedon	Portishead White Lion Stop C Every 2 hours 08:34 16:34	Portishead White Lion Stop C Every 2 hours 08:34 16:34	No service

Note: unless indicated otherwise, the first and last services are from Portishead, Combe Road

4.8.5 The route taken by the X5 service has also changed since 2016.Buses no longer serve UWE's Frenchay Campus or Parkway Rail Station and now start and terminate at Cribbs Causeway. Further adjustments include changes to the route in Clevedon and additional journeys to and from Portbury Docks at times better suited to working patterns.

4.8.6 The above table confirms there are relatively good links from Portishead to Clevedon, Nailsea and Weston-Super-Mare as well as Cribb's Causeway, Aztec West, and MoD Abbey Wood although it should be noted that services considerably diminish in the evening and weekends. Table 4.18 shows the typical off-peak journey times to a range of destinations from Portishead.

Table 4.18: Indicative off-peak bus journey times from Portishead

Destination	Indicative off peak journey time by direct bus routes	Destination	Indicative off peak journey time by direct bus routes
Bristol City Centre	46 mins	Cribb's Causeway	23 mins
Pill	19 mins	Aztec West	25 mins
Clevedon	21 mins	MoD Abbey Wood	35 mins
Weston-Super-Mare	1 hr 5 mins		
Nailsea	34 mins		

Existing bus service access to the proposed Portishead station site

4.8.7 A review of the existing bus services within Portishead show the routes serving existing stops in the immediate vicinity of Harbour Road – these being theX3a and X3 services.

4.8.8 The X3 and X4 operates half hourly and starts and terminates in the central area of Portishead, the route also serves the Port Marine area before reaching the stops on Quays Avenue. As a result, this means journey times within Portishead itself can be prolonged for the distances covered as shown in Table 4.19.

Table 4.19: Indicative off-peak bus journey times within Portishead

Destination	Indicative off peak journey time by direct bus routes
Nightingale Rise	14 mins
Town Centre (Combe Road)	10 mins

Pill bus services

4.8.9 Pill is currently served by bus services on the Bristol to Portishead corridor. There are two main services, the X3a and X4 as shown in Figure 4.43.

4.8.10 The X4 service provides the principal link through the heart of Pill. This service generally has a 30 minute frequency Monday to Saturdays, with an hourly service on Sunday. The earliest eastbound (Portishead to Bristol) service departs Pill Station Road stop at 06:57 while the earliest westbound service departs at 05:55. The latest eastbound X4 service departs Pill Station Road stop at 19:47 while the last westbound service departs at 19:26. The X3a provides evening bus services through Pill. The earliest eastbound X3a (Portishead to Bristol) service departs Pill Station Road stop on a weekday at 21:05 while the earliest westbound service departs at 19:57. The latest eastbound X3a service departs Pill Station Road stop at 00:06 while the last westbound service departs at 00:57. There are also three buses operating from Pill to Bristol between 06:16 and 06:42 on weekdays.

4.8.11 Typical off-peak bus journey times from Pill to Portishead are 13 to 17 minutes whereas off-peak journeys to Bristol are around 23 minutes. The nearest bus stops to the proposed Pill station are less than 500 metres away but given the general walking distances within Pill, the number of bus and rail related journeys in Pill are expected to be very low.

Located in Part 3 of Appendix 16.1

Figure 4-42: Portishead Bus Services

Located in Part 3 of Appendix 16.1

Figure 4-43: Pill Bus Services

Bus services in the vicinity of the level crossings

4.8.12 No timetabled bus services currently operate across the level crossings that will be impacted by the scheme. However, Long Ashton P&R site is served by buses 505 and M2 with service 505 providing a service from the P&R site to Southmead Hospital via Clifton and Bristol Zoo every 30 mins while service M2 operates to and from the city centre every 10-15 mins. The site opens at 05:30 every day barring Sundays and public holidays and closes at 22:45 from Monday-Saturday.

Survey of bus passengers

4.8.13 NSDC conducted a questionnaire of a limited number of bus passengers on services X2 (now the X4)/X3 in March 2016. The survey asked the passengers a number of questions such as journey purpose, origin/destination, ticket type, access to a car and views on the quality of existing bus services. The survey also sought responses on the likely impact of the rail service on future use.

4.8.14 The main findings of the survey were:

- The main origin and destination flows were between Portishead and Bristol which were in the region of 87% and 88% of those surveyed while flows between Pill and Bristol accounted for less than 10%;
- Employment was the main journey purpose at 57% of all trips followed by education just under 20% and shopping at 12%;
- The majority of bus passengers were regular users – with three quarters saying they used the bus 3 to 5 times a week;
- Approximately 48% said they had access to a car; and
- A total of 61% indicated they could use the rail service.

4.9 Local rail network

4.9.1 Figure 4.44 shows the current local rail network within the West of England.

Passenger services

4.9.2 Whilst the scheme seeks to reintroduce rail passenger services to Portishead and Pill and enhance frequencies to Avonmouth and Bath, the current base pattern services is generally hourly but this is not uniform throughout as follows:

- Stations to Weston-Super-Mare and on the Severn Beach line as far as Avonmouth see one/two trains-per-hour;
- Severn Beach has a less than hourly service to Bristol;
- Stations between Bristol and Bath Spa have one train per hour (with the exception of Keynsham that has an additional service in some hours);

- Filton Abbey Wood has four trains-per-hour to Bristol;
- Stapleton Road and Lawrence Hill have two to three trains-per-hour; and
- Patchway and Yate have one train-per-hour.

4.9.3 The nearest stations serving the wider North Somerset area around Portishead and Pill are Nailsea and Backwell (approximately 11km from the centre of Portishead) and Yatton (approximately 16km from the centre of Portishead). Whilst the majority of services from both stations are local West of England 'stopping' services, there are a number of direct trains to/from London Paddington. The availability of these long distance services will continue unchanged under the scheme proposals, and it is likely a number of those living within the catchments of Portishead and Pill will continue to use Nailsea & Backwell as a railhead for such journeys.

Located in Part 3 of Appendix 16.1

Figure 4-44: West of England Rail network

Existing rail freight movements – Portbury

4.9.4 The Royal Portbury Dock opened in 1977 to cater for bigger vessels than could then be accommodated at Avonmouth Docks. Never originally rail served, the freight spur from the Portishead railway line was opened in 2002. As part of the original planning permission for the new rail link into the Portbury dock area, a limit of 10 trains per day was included as a condition. This was subsequently adjusted to 3650 trains per annum, to reflect that the bulk nature of imports could mean a daily limit would be restrictive, but retaining the same number of trains overall. Within this limit, specific access rights are held by train operators to cover flows between the port and various destinations.

4.9.5 The working timetable for the Portbury branch currently has as many as 26 trains indicated (2-way), but in practice these include paths that are alternatives for each other between the same origin-destination at relatively close timings (partly to take into account variation in shipping access), so would never all be used.

4.9.6 Freight train data for a one month period between February and March 2016 revealed:

- Up to four freight trains ran during weekdays with up to two on weekends;
- Out of the 30 days, there were only freight train movements on 15; and
- Rail freight movements that took place coincided with the off-peak and peak periods on the local highway network with resulting barrier down times at Ashton Vale Road.

4.10 Non-Motorised User Provision

4.10.1 Within this section, the provision for non-motorised users is outlined. The focus is on networks used by the public rather than provision used

exclusively for private use such as private farm crossings. It also includes a short description of the current provision for equestrians.

Portishead

4.10.2 In assessing the extent of the existing walking and cycling networks, thresholds from the Manual for Streets (MfS) have been used. This suggests that a walkable neighbourhood will have a range of services within an 800m or a 10 minute walk. Within Portishead, this includes part of the town centre, Portbury Wharf, Port Marine and the residential areas around Brampton Way as shown in Figure 4.45. **Appendix J** provides further detail about the pedestrian and cycling links in Portishead. A review of the links indicates that the main route and desire line from the station to the town centre is not direct with a number of potential routes all requiring a modest detour. The main pedestrian and routes being:

- Along Harbour Road and past the Waitrose supermarket;
- Along the unadopted path near Sainsbury's and then towards Old Mill Road; and
- Along Quays Avenue towards Wyndham Way.

4.10.3 **Appendix J** identifies a number of other key pedestrian routes that either link with the station or will be impacted directly by the scheme. These being:

- To the residential areas around Brampton Way;
- To the residential area of Port Marine;
- Towards Portishead marina;
- Towards the residential areas south of the station; and
- From Trinity Primary School towards Brampton Way.

4.10.4 With cycling, MfS indicates a 5km threshold. Figure 4.46 suggests that the whole of Portishead would be accessible by bicycle to and from the station. Given this, the plan focuses upon the adequacy of the links within the smaller 800m threshold with particular emphasis on the cycling routes in and around the station area.

4.10.5 The main cycling routes that have been identified are:

- Towards Portishead town centre along Harbour Road (with onward links towards the Marine Lake area and northern Portishead);
- To Portishead town centre along Wyndham Way (with onward links to western Portishead);
- To Brampton Avenue (with links to southern Portishead);
- To Sheepway via National Cycle Network 26; and
- To Port Marine.

Pill

4.10.6 The 800m pedestrian threshold for Pill (Figure 4.47) covers most of the village, with Easton-in-Gordano and Ham Green just outside this threshold.

A 5km cycling threshold for Pill (Figure 4.48) covers the whole of Pill, including Easton-in-Gordano and Ham Green.

4.10.7 It is important to note that the standard of the walking and cycling network in Pill varies quite widely. This reflects both the development of the area over a number of years and the local topography. As a result, the immediate area surrounding the station which is characterised by older and higher density housing means pedestrian provision generally does not meet current standards and cycling infrastructure is even more limited. However, the relative narrow highway widths generally has a conducive effect on reducing traffic speeds which benefits non-motorised users. The area has a number of footpaths between streets which results in a good level of pedestrian permeability.

4.10.8 The walking and cycling network layout is different in other parts of Pill and reflects the period of development. Generally, the pedestrian network is more comprehensive and it is less discontinuous. Conditions, particularly on the quieter roads, are generally more favourable for different types of cyclists.

4.10.9 Key pedestrian routes in Pill include:

- From the station towards Pill Wharf;
- Towards Avon Road;
- To Crosslanes through Station Road;
- To Brookside via Station Road and Heywood Road;
- To Ham Green via Underbanks;
- To Easton-in-Gordano via Stoneyfields; and
- To Lodway via Station Road.

Portishead to Pill

4.10.10 The walking and cycling network between Portishead and Pill, as expected, is limited but provides important links between the two settlements and also Royal Portbury Dock. Figure 4.49 shows the extent of PRoWs. The most significant link is LA 15/21/20 which is not only a bridleway in parts but also forms part of NCN route 26.

4.10.11 The Figure shows a number of PRoWs directly to the north of the scheme alignment but it is important to note that the M5 generally severs the area and the number of segregated crossing areas is limited.

Located in Part 3 of Appendix 16.1

Figure 4-45: 800m Walking threshold for Portishead

Located in Part 3 of Appendix 16.1

Figure 4-46: 5km Cycling threshold for Portishead

Located in Part 3 of Appendix 16.1

Figure 4-47: 800m Walking threshold for Pill

Located in Part 3 of Appendix 16.1

Figure 4-48: 5km Cycling threshold for Pill
(excludes routes north of the River Avon where there is existing access from existing railway stations)

Located in Part 3 of Appendix 16.1

Figure 4-49: PRoWs between Portishead and Pill

Ashton Vale

4.10.12 Given the predominately commercial and industrial land use together with heavily trafficked roads, the pedestrian and cycling network is limited in the Ashton Vale Road area. The scheme will intersect the network at two particular locations i.e. Ashton Vale Road level crossing and the pedestrian crossing at Barons Close. The operation of Ashton Vale Road level crossing equally applies to all pedestrians and cyclists with no immediate alternative route other than the Barons Close crossing.

4.10.13 The Barons Close pedestrian crossing is located approximately 200 metres south of the Ashton Vale Road level crossing, and temporarily closed, as part of implementing the AVTM MetroBus m2 scheme. This link will run parallel to the railway line at this location and will cross over on a viaduct.

4.10.14 The nearest other crossing points over the railway are on the A370 Ashton Road 140m north but there is no direct access to the industrial estate. An indirect pedestrian route is available off the B3128 around 1km further west. The other crossing point is around 630m south of Barons Close. A pedestrian route through Ashton Drive is available, though indirect access through a recreation field is not advisable on personal safety grounds.

4.10.15 One of the main concerns is the impact of the scheme on pedestrians during match days and other events at the Ashton Gate Stadium. This is assessed in further detail in **Appendix L**.

NMU counts

4.10.16 NMU counts have been undertaken at three specific locations at different periods along the Scheme alignment as follows:

- Within Portishead;
- On NCN Route 26 to and from Pill; and
- Ashton Vale Road.

4.10.17 Further detail about the surveys and data collected are in **Appendix C**.

Portishead

4.10.18 Table 4.20 summaries the flows captured in Portishead. The data captured confirms the importance of the permissive route across the disused line between Trinity Primary School to the north and the residential area (Galingale Way) to the south with over 150 NMU two-way movements recorded in the school morning peak and over 200 two-way movements during school afternoon/evening peaks. The scheme would result in pedestrians having to make a 700m diversion during the construction phase, via Tansey Lane and Quays Avenue. An alternative means of access has therefore been proposed as part of the overall scheme in the form of a bridge over the railway linking Trinity Primary School and Galingale Way.

4.10.19 The high volume of NMUs recorded crossing the line at Trinity Primary School contrasts with the lower number of pedestrians and cyclists recorded along Quays Avenue itself.

4.10.20 The table also shows the importance of NCN route 26 between Portishead and Pill with in the region of 89 to 126 cyclists recorded during the survey period.

Table 4.20: Summary of NMU count data in and around Portishead

Date	Location	Direction	Time period	Pedes-trians	Cycl-ist	Eques-trians
02/05/2014	Towards Galingale Way	Towards Trinity School	7am-10am	109	13	0
02/05/2014	Towards Galingale Way	Towards Trinity School	2pm-6pm	106	17	0
02/05/2014	Trinity School, Portishead	Towards Galingale Way	7am-10am	52	3	0
02/05/2014	Trinity School, Portishead	Towards Galingale Way	2pm-6pm	128	16	0
09/2014	Trinity School, Portishead	Two way	7am-10am	220	45	0
09/2014	Trinity School, Portishead	Two way	2pm-6pm	249	36	0
02/05/2014	Quays Ave, Portishead	Towards Quays Ave	12pm-1pm	10	0	0
02/05/2014	Quays Ave, Portishead	Towards Phoenix Wy/ Harbour Road Rbt	12pm-1pm	14	3	0

Table 4.20: Summary of NMU count data in and around Portishead

Date	Location	Direction	Time period	Pedes-trians	Cycl-ist	Eques-trians
09/2014	Quays Ave, Portishead	Two way	12pm-1pm	26	8	0
04/05/2014	NCN Route 26, Portbury	Towards Marsh Lane	10am-3pm	12	89	4
04/05/2014	NCN Route 26, Portbury	Towards M5 Cycle Underpass	10am-3pm	14	126	0
04/05/2014	Sheepway, Route 26, Portbury	Towards Sheepway Gate Farm	3:30pm-4:30pm	12	19	1
04/05/2014	Sheepway, Route 26, Portbury	Towards Portbury Hundred Roundabout	3:30pm-4:30pm	16	26	0

Pill

4.10.21 In the Pill area, data has been collected over a 5-year period of the cycle flows on NCN route 26. Figures 4.44 and 4.45 show the extent of flows over a typical day for each year from 2010 to 2014.

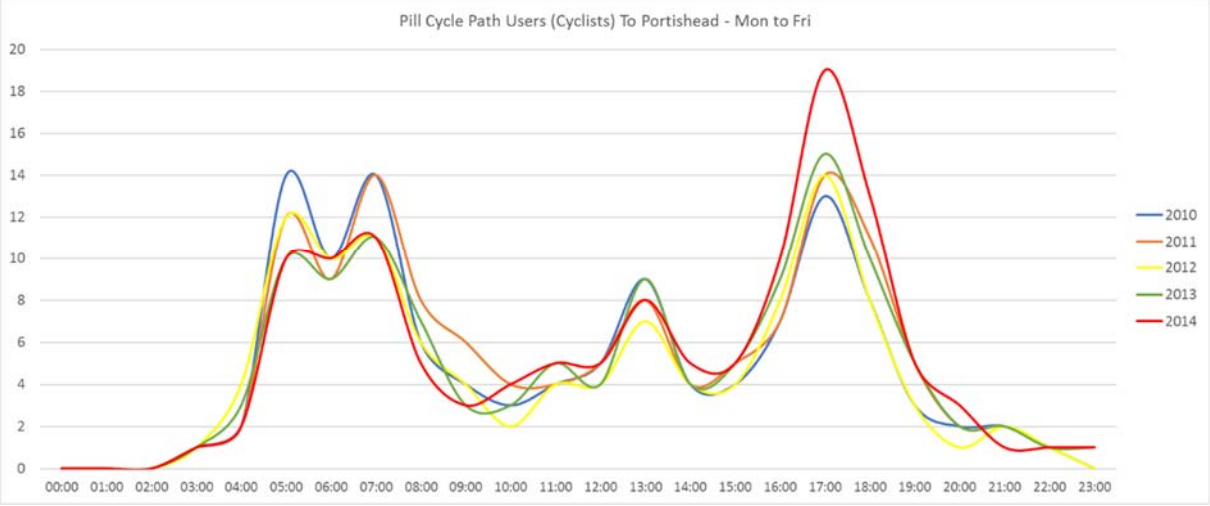

Figure 4-50: Pill to Portishead Cycle Path Users

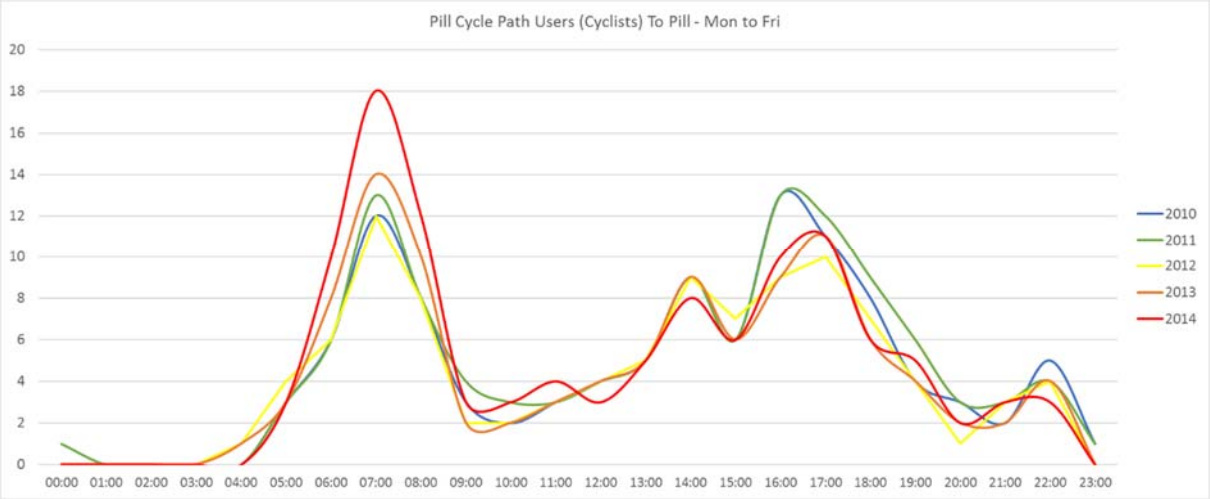

Figure 4-51: Portishead to Pill Cycle Path Users

4.10.22 This shows that between 2010 and 2014, cyclists using the Pill cycle path to Pill remain at a relatively consistent level throughout the day with trends sticking to the AM and PM peak periods. The only year that does break this trend is 2014 where the number of users on the path are lower in the AM peak period.

Ashton Vale Road

4.10.23 Pedestrian and cyclist flows have also been recorded at Ashton Vale Road in the vicinity of the level crossing. Figures 4.46 and 4.47 show the peak flows into Ashton Vale Estate occur at 09:00 and 12:00 whereas flows out of the area occur at 12:00 and 16:00.

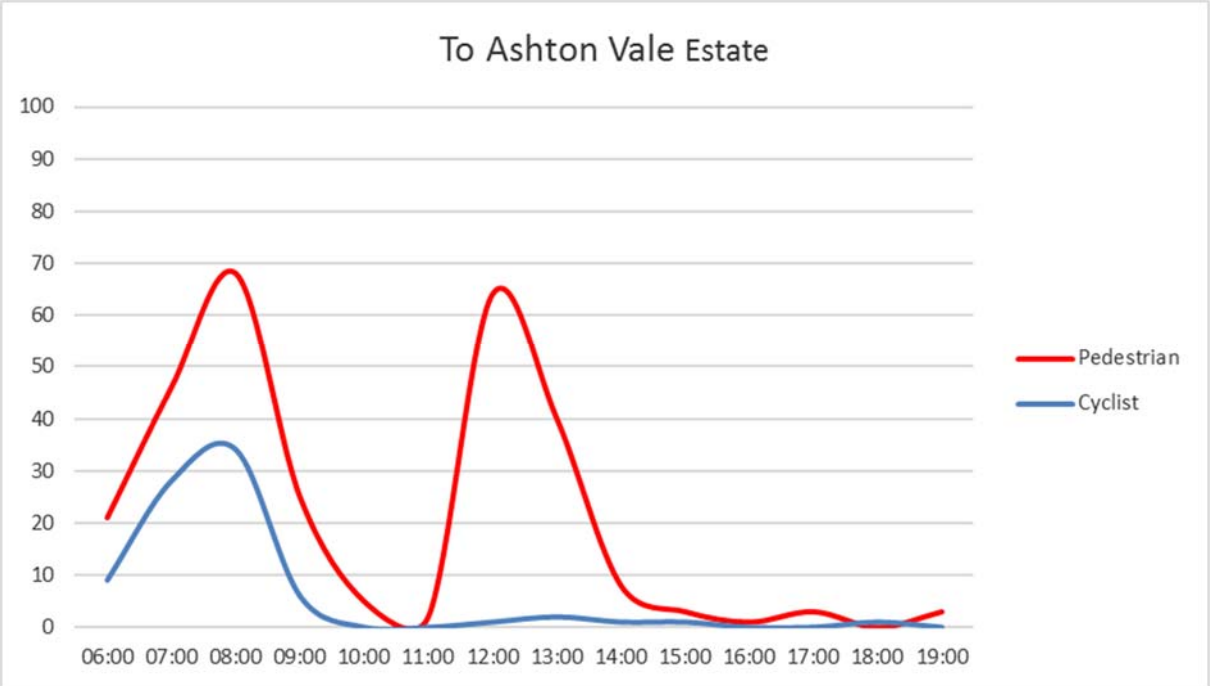

Figure 4-52: Ashton Vale Road Level Crossing NMU movements – to Ashton Vale Estate

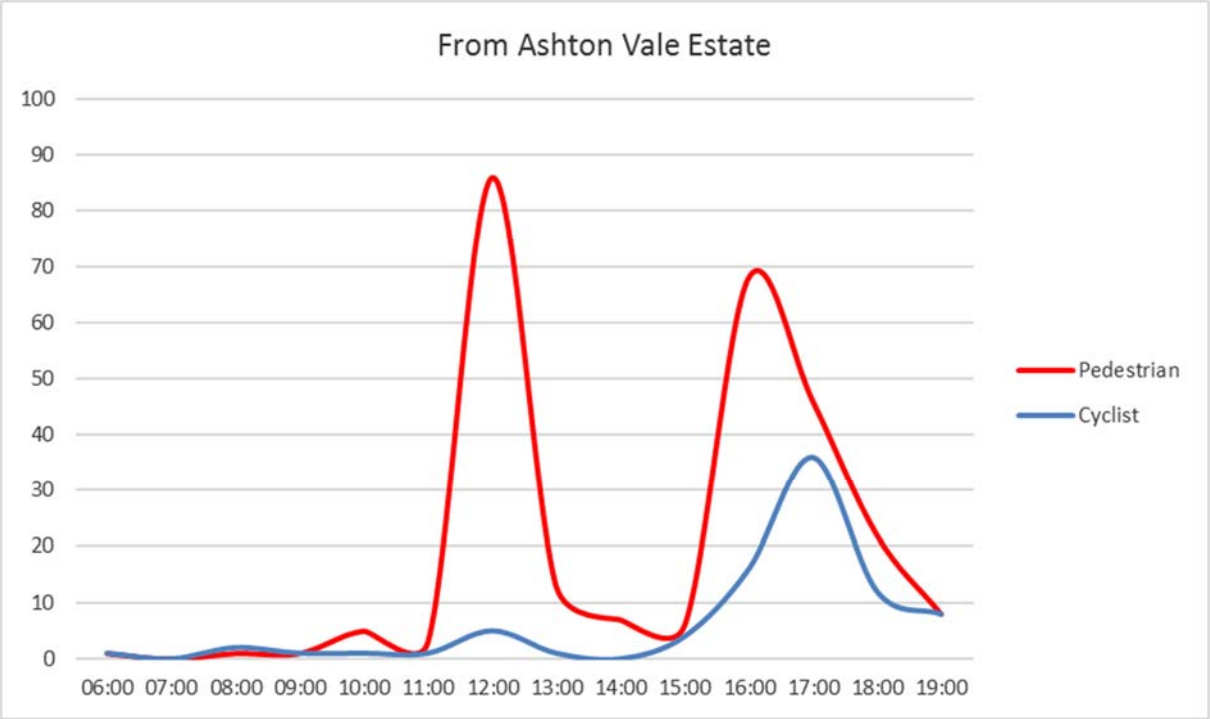

Figure 4-53: Ashton Vale Road Level Crossing NMU movements – from Ashton Vale Estate

4.11 Level crossings

4.11.1 A number of level crossings will be impacted by the introduction of the scheme. These are:

- Ashton Vale Road within the City of Bristol and on the current Parson Street to Portbury freight line – note that this is a Manned Crossing Barrier, supervised by CCTV from TVSC (Thames Valley Signalling Centre) 'A Desk'. The level crossing is interlocked with road traffic lights controlling the adjacent road junction at Ashton Vale Road;
- West Town Gate level crossing near Portway within the City of Bristol on the Severn Beach line;
- Avonmouth Station level crossing within the City of Bristol on the Severn Beach line; and
- King Road Avenue level crossing within the City of Bristol on the Severn Beach line.

4.11.2 Assessments of these level crossings have been undertaken and are included in **Appendix H** and **Appendix N** of the TA.

4.12 Summary of the key issues

4.12.1 This section of the TA aimed to present a comprehensive overview of the baseline conditions. Whilst there are many considerations, the pertinent issues are:

- Portishead and Pill have distinctive land uses – the former has seen considerable recent development particularly in the vicinity of the station and the latter comprising older and mature development;
- This is reflected in the function and layout of principal and local links. Much of the highways around Portishead station have been designed to recent standards whereas Pill is characterised by older and limited highways;
- An analysis of flows show the role and function of each highway. The A369 provides a principal and strategic link between Portishead, Pill and Bristol. Despite this, the flows in each direction are similar in the morning and evening peaks in Portishead;
- Parking surveys reflect demand from immediate land uses and as a result, variations emerge in different areas;
- Accident data generally does not show any accident clusters or any major causal reasons. The greatest number have occurred in the vicinity of J19 of the M5 – but this has to be seen in the context of the large traffic volumes and relative higher speeds;
- Portishead and Pill currently have a good network of bus services which are largely provided on a commercial basis although some public funding has been made available;
- Both settlements have a comprehensive footway network with a more limited cycling network. Pedestrian and cycling links to Portishead town centre are not direct whilst the use of a permissive path to Trinity Primary School plays an important role; and
- A total of four level crossings will be impacted by the scheme. The Ashton Vale Road crossing will be impacted by the scheme as it converts from freight only movements to passenger and freight movements. The other three level crossings will be impacted to a lesser degree, as they already see regular passenger services.

SECTION 5

Impact Methodology and Assumptions

5.1 Introduction

5.1.1 This part of the TA outlines the methodology that used to determine the likely demand for the scheme. Due to the complexity of the scheme, the modelling process applied is over and beyond what is typically undertaken for a TA where analytical tools have been developed to understand rail timetabling, strategic transport impacts and economic performance.

5.1.2 This chapter provides a description of the modelling tools used to inform trip generation, assignment and distribution as well as the tools used to replicate future scenarios on the transport network. A number of assumptions have been applied to the models and these are outlined here together with their rationale.

5.1.3 The assessments outlined are based on a 1 train per hour service pattern.

5.2 Trip generation – Rail Demand Model

5.2.1 To inform the trip generation, assignment and distribution, outputs from the Rail Demand Model (RDM) have been used and applied to the traffic count data. The RDM is a combination of bespoke spreadsheet models and MOIRA (the rail industry's timetable-based demand modelling software [3]) to assess rail enhancements offered by MetroWest Phase 1. There are three main elements to the RDM:

- Trips at new stations (on existing and re-opened lines);
- Diversion of existing trips to new stations; and
- Changes in demand at existing stations from new or amended services (including suppression of demand by extra station calls).

5.2.2 The Outline Business Case (OBC, December 2017) documentation specifies the methodology and sensitivity testing within the RDM. The methodology makes use of rail industry data and derived techniques to forecast demand at new stations broadly based on relationships at existing stations elsewhere. As no data has been specifically collected, forecasts have therefore employed existing data sources. These include:

- The National Rail Travel Survey (NRTS);
- Office of Rail and Road (ORR) Statistics;
- West of England annual station survey;

[3] MOIRA is the rail industry's main timetable-based demand modelling tool. It is based on the most recently available prior year of ticket sales data and comprehensive corresponding timetable of rail services. It uses this data, along with of relationships between demand and features of service set out in the Passenger Demand Forecasting Handbook (PDFH) such as journey times and frequencies, to assess the impact of changing services. MOIRA is used to analys the effect of changes such as stopping patterns, new/altered infrastructure and rolling stock on the passenger numbers carried and hence the revenue impact, though it cannot be used to model demand at new stations. Both MOIRA and PDFH are commercially confidential.

- MOIRA; and
- The Passenger Demand Forecasting Handbook (PDFH).

New station total demand

5.2.3 The demand forecasts for new stations at Portishead and Pill were refreshed for the OBC from those previously prepared for the MetroWest Phase 1 Preliminary Business Case (PBC). In the first instance, this has updated the models used in the PBC with more recent station usage data and extracts from MOIRA, of 2016 journeys and revenue. In addition, a secondary modelling exercise has been incorporated, making use of a trip-end demand model.

5.2.4 The new stations demand model is applied to Portishead and Pill for MetroWest Phase 1, and the resulting total station demand forecast is a combination of the two models' outputs.

Refreshed PBC model

5.2.5 The refreshed PBC model uses a simple regression technique, which takes into account the relationship between journeys and catchments at a number of similar stations. Regression has been used to identify a series of demand/catchment relationships for several types of movements, including journeys made using full price tickets, reduced price tickets and season tickets. Information used in the regression is drawn from MOIRA extracts (trips and generalised journey times, GJT) and 2011 Census (population and employment). MOIRA information used is for trips between all stations in the MetroWest area and the rest of the national rail network. The new stations model is calibrated to existing stations in the locality.

5.2.6 For the new stations, the models estimate total demand using the catchment at a new station in conjunction with catchments at potential destination stations and journey times between the two, as well as service factors such frequency. Potential destination stations are based on those observed for nearby existing stations, with journey times calculated for the new station. This generates demand for each movement and ticket type, for which a simple gravity model is used to distribute trips. Note that the demand forecasts implicitly assume that the new stations would charge for parking at a similar rate to the charges at comparator stations in the area (such as Nailsea & Backwell and Yatton).

Trip end model

5.2.7 An amended version of the trip-end demand model used for new stations in Gloucestershire ('Gloucestershire Rail Study'[4]) and the potential extension of MetroWest Phase 2 to Gloucester ('MetroWest Phase 2, Gloucestershire Extension Study'[5]) has also been used in the demand forecasts for the new

[4] 'Gloucestershire Rail Study, Rail Study Report', prepared by Amey for Gloucestershire County Council, September 2015: http://glostext.gloucestershire.gov.uk/documents/s26092/7.%20Background%20document%20Study%20Report%20May%202015.pdf

[5] 'MetroWest Phase 2, Gloucestershire Extension Study', CH2M, December 2016: https://s3-eu-west-1.amazonaws.com/travelwest/wp-content/uploads/2015/09/MW2-GlosCC-extension-report_2016-12-16.pdf

stations. The original model was based on earlier research at the University of Southampton[6] updated using recent station usage data (2015) and further calibrated for this study to generate 2016 demand commensurate to that at stations in the West of England.

5.2.8 The trip-end models produce a high-level forecast of the total passengers per year at a new station on any site, to provide a quick check of the likely viability of a station in a particular site rather than a detailed prediction of travel patterns following station opening. The forecasts from the trip end models do not take into account trip destination or the specific routeing of rail from a station.

Diversions of existing trips to new station

5.2.9 An estimate of how many trips are new to the railway or transferring from other stations has been made using a station access logit model, with generalised costs calculated for journeys from origin (usually home) to existing stations, compared with a similar trip using a new station. This is based on true origin to station trips in the WoE rail survey and NRTS for stations in the MetroWest area, calibrated to recent ORR station usage figures. Both the WoE survey and NRTS identify true origin and destination of rail users, as well as the time taken and distance from true origin to the station.

5.2.10 The diversions model calculates propensity to change stations based on proximity of other stations in the area. WoE survey and NRTS figures for time and distance between origins and stations are adjusted using factors derived from straight-line distances calculated from true origin to existing station versus the distance from origin to new station. A forecast 'station share' is calculated based on the new station versus existing station. The station shift has been calibrated using behaviour at existing stations, the main principle being that unrealistic transfers are eliminated. For example, care has been taken to consider longer distance railhead movements that use major stations such as Bristol Parkway or Bristol Temple Meads.

Demand at existing stations

5.2.11 The MOIRA model is based on the full network timetable, with demand drawn from real ticket sales. It is used to forecast the impact of service related changes on passenger demand and revenue. Impacts are calculated using a series of elasticity relationships, set out in the PDFH. MOIRA has been used to assess the impacts of MetroWest Phase on existing stations in the WoE as well as the wider rail network. In addition, generalised journey time, demand and revenue figures have been extracted from MOIRA for stations in the MetroWest area to use in the forecasts of the new stations.

5.3 Variable Demand Model

5.3.1 A Variable Demand Model has been developed utilising EMME (public transport) and SATURN (highway) transportation software. The 'variable demand model' (VDM) seeks to replicate likely actual future situations on the transport network. The methodology was developed as a result of

[6] Blainey SP (2010) Trip End Models of Local Rail Demand in England and Wales, *Journal of Transport Geography*, 18(1):153-165

concerns that traditional fixed trip matrix models did not replicate actual behaviour in congested network environments. In such environments, people decide to change mode, decide to travel to alternative destinations or as a last resort not travel at all. The VDM allows all these choices. For this reason, the analysis of impacts of schemes using the GBATS4 model must consider the following:

- Changes in the amount of travel;
- Changes in the travel patterns (O-D);
- Changes in highway use; and
- Changes in bus use.

5.3.2 These impacts are considered in turn.

Model adjustments

5.3.3 A key feature of the type of model represented by GBATS4 is that they are mostly driven by demographic changes such as population and employment. However, when forecasting rail demand, it is acknowledged that these sorts of models can struggle to reflect changes in such a 'minority modes'; that is, a mode that has a comparatively small proportion of total demand, and/or geographical coverage in a modelled area. As intimated in WebTAG (Units M1.1 and M4), rail demand is more commonly assessed using trip rate and elasticity approaches; these approaches form the basis of the RDM that has been used to develop rail demand forecasts for MetroWest Phase 1. Hence it has always been anticipated that a degree of adjustment would have to be made to GBATS4 outputs to align GBATS4 forecasts with RDM forecasts.

5.3.4 The principal reason that GBATS4 has been employed in assessing MetroWest Phase 1 is to consider potential highway benefits that the rail scheme could generate, to feed into the cost benefit analysis. As such, highway trip matrices from GBATS4 models have been adjusted. This has been done by first amending the rail demand trip matrices in GBATS4 so that their assignment to the network results in station-by-station demand that is close to that generated by the RDM. The proportion of the resulting (adjusted) rail demand that are former car trips has been identified, and removed from highway matrices. Overall modal changes, and hence car transfers, have been derived from GBATS4 results.

5.4 Assumptions

5.4.1 In addition to the calculation of demand, a number of assumptions have been applied.

Opening year and horizon year assessment

5.4.2 Following scoping discussion, it was agreed that the opening year of 2021 and the 10-year period of 2031 would be assessed. [7]

[7] It is acknowldeged that, while the opening year is currently assumed to be 2021, and has thus been assumed to be the case for the purposes of the transport assessment, this will be late in 2021 at the earliest, and could be later. Note also that changing the opening year would make little, if any, difference to the transport assessment.

5.4.3 Traffic growth rates have been calculated using TEMPRO (Trip End Model Presentation Program) version 7.2 [8]. Whilst the intention was to use the outputs from the GBATS4, the model does not provide sufficient flows and detail for the immediate roads surrounding the station. Table 5.1 shows the respective growth rates that have been applied in this TA.

Table 5.1: TEMPRO growth rates

Area	2015 to 2021 Origin	2015 to 2021 Destination	2015 to 2031 Origin	2015 to 2031 Destination
E02003067 Portishead				
AM	1.0392	1.0317	1.1212	1.0934
PM	1.0355	1.0385	1.1135	1.13
E02003068 Pill				
AM	1.0423	1.0413	1.132	1.1058
PM	1.04	1.0401	1.1149	1.1325

Peak period assessment

5.4.4 Throughout the focus has been on the morning daytime peak period of 08:00 to 09:00 and the evening peak period of 17:00 to 18:00 where the greatest demand on transport networks can be expected.

Timetabled services

5.4.5 The following services have been assumed for each station as follows as shown in Table 5.2.

Table 5.2: Train services at new stations

Station	Mon-Fri daytime	Mon-Fri eve	Sat & Public Holidays	Sun
Portishead	Hourly	Hourly	Hourly	Hourly daytime only
Pill	Hourly	Hourly	Hourly	Hourly daytime only

Level crossings

5.4.6 The scheme will also result in changes to existing timetabled passenger services through level crossings on the Severn Beach Line, as set out in Table 5.3. Details of the assessments are shown in **Appendix H**.

5.4.7 The Ashton Vale Road level crossing has been considered in more detail, as set out in **Appendix N**.

[8] TEMPRO is a DfT software package that is used for transport planning purposes. It includes forecast data on population, employment, households by car ownership, trip ends and traffic growth factors. Traffic growth factors have been extracted from the software for North Somerset and Bristol for the assessment year periods.

Table 5.3: Assumed passenger rail services at level crossings

Station	Mon-Fri daytime	Mon-Fri eve	Sat & Public Holidays	Sun
East Town Rd	2tph to Avonmouth 2 tph to Shirehampton	1tph to Avonmouth 1 tph to Shirehampton	DAY 2tph to Avonmouth 2 tph to Shirehampton EVENING 1tph to Avonmouth 1 tph to Shirehampton	1tph to Avonmouth 1 tph to Shirehampton
Avonmouth Gloucester Rd	1 tph to Severn Beach 1 tph to Avonmouth	1 tph to Severn Beach 1 tph to Avonmouth	1 tph to Severn Beach 1 tph to Avonmouth	1 tph to Severn Beach 1 tph to Avonmouth
King Road	1 tph to Severn Beach 1 tph to Avonmouth	1 tph to Severn Beach 1 tph to Avonmouth	1 tph to Severn Beach 1 tph to Avonmouth	1 tph to Severn Beach 1 tph to Avonmouth

Parking assumptions

5.4.8 The calculation of parking spaces has been based on the requirements in the North Somerset Parking Standards. For on-street parking, a 6m long parallel space has been assumed. Where parking controls are in place, these have been taken into account. For certain sections where parking would impede the flow of traffic and the operation of the highway, additional assumptions about parking spaces being constrained to one side of the street have been made. These are documented at the appropriate point.

5.4.9 In order to calculate a typical week day accumulation at the car parks at Portishead and Pill station, a number of assumptions have been made. It was recognised that in applying MOIRA factors from annual figures the demand profile in the peaks are not modelled. In order to achieve a more tidal peak profile, figures from the West of England Rail Survey which has counts of boarding and alighting at other stations have been applied and weighted to the peak.

5.4.10 A split of ‘origin’ and ‘destination’ trips by time of day, drawn from NRTS data has also been undertaken. This splits the station entries into trips that are departing at the origin end of their trip in Portishead/Pill (potentially parking their car) or returning to another origin with the destination end of their trip at Portishead/Pill (unlikely to be parking). Vice versa for station exits (arriving destination trips and returning origin trips).

5.4.11 The parking accumulation also assumes differences in the vehicle occupancy passenger rates. Between 05:00 and 10:00 and 16:00 to 23:00, 1 passenger is assumed for each car whereas this rises to 1.6 between 10:00 and 16:00 during the day. This has the effect of increasing the level of demand for car parking particularly during the peak period.

5.4.12 One final assumption underpinning the accumulation is the extent of overnight car parking. For this exercise, it has been assumed that 10 vehicles will be left in Portishead and 5 vehicles left in Pill overnight.

Passenger car unit (PCU)

5.4.13 In this TA, a value of 2.5 has been applied to flows relating to HGVs (all sizes) and buses. This value is taken from GBATS4 modelling assumptions for the West of England area.

5.5 Distribution and assignment of traffic

5.5.1 The distribution and assignment of traffic to and from the stations has been informed by the outputs from the Rail Demand Model and the GBATS4 strategic model for the West of England area. Output Areas (OAs) from GBATS4 have been used as shown in Figure 5.1.

5.5.2 **Appendix G** provides the breakdown of distribution and assignment from each OA to and from the stations. However, the following assumptions have been made:

- All vehicle trips in the immediate vicinity of the stations at Portishead and Pill are regarded as additional to the network. No allowance has been made to reassign existing journeys on the network;
- The most direct route to and from the stations has been assumed where possible. For example, OA area 32,705 covering effectively Portishead marina, traffic is assumed to use Harbour Road with 50% turning into Newfoundland Way and 50% into Station Road;
- For Portishead station, 78% of all vehicle traffic will turn into Harbour Road to access the larger of the two car parks with 22% of traffic entering Phoenix Way (the percentages reflect the respective capacities of the two car parks of the overall number of spaces);
- With drop off and pick up trips, in Portishead 50% are assumed to return to the origin of the journey with 25% towards Portishead town centre via Harbour Road and Cabstand with the remaining 25% towards J19 of the M5. There is limited published information on linked trips such as these – most research relates to retail related trips and so has limited applicability. On this basis, given the volume of drop-off and pick-up trips are likely to be more limited, the percentages are based on an assessment of likely routes to and from each station;
- Sensitivity test undertaken on these percentages to show the extent of potential variation on different routes; and
- In Pill, a similar 50% are assumed to return to the origin with 25% heading towards J19 of the M5 and 25% along the A369 towards Bristol.

5.5.3 Figures 5.2 to 5.5 show the respective distribution of traffic to and from Portishead and Pill stations respectively.

Located in Part 4 of Appendix 16.1

Figure 5-1: Station catchments (GBATS4 Zones)

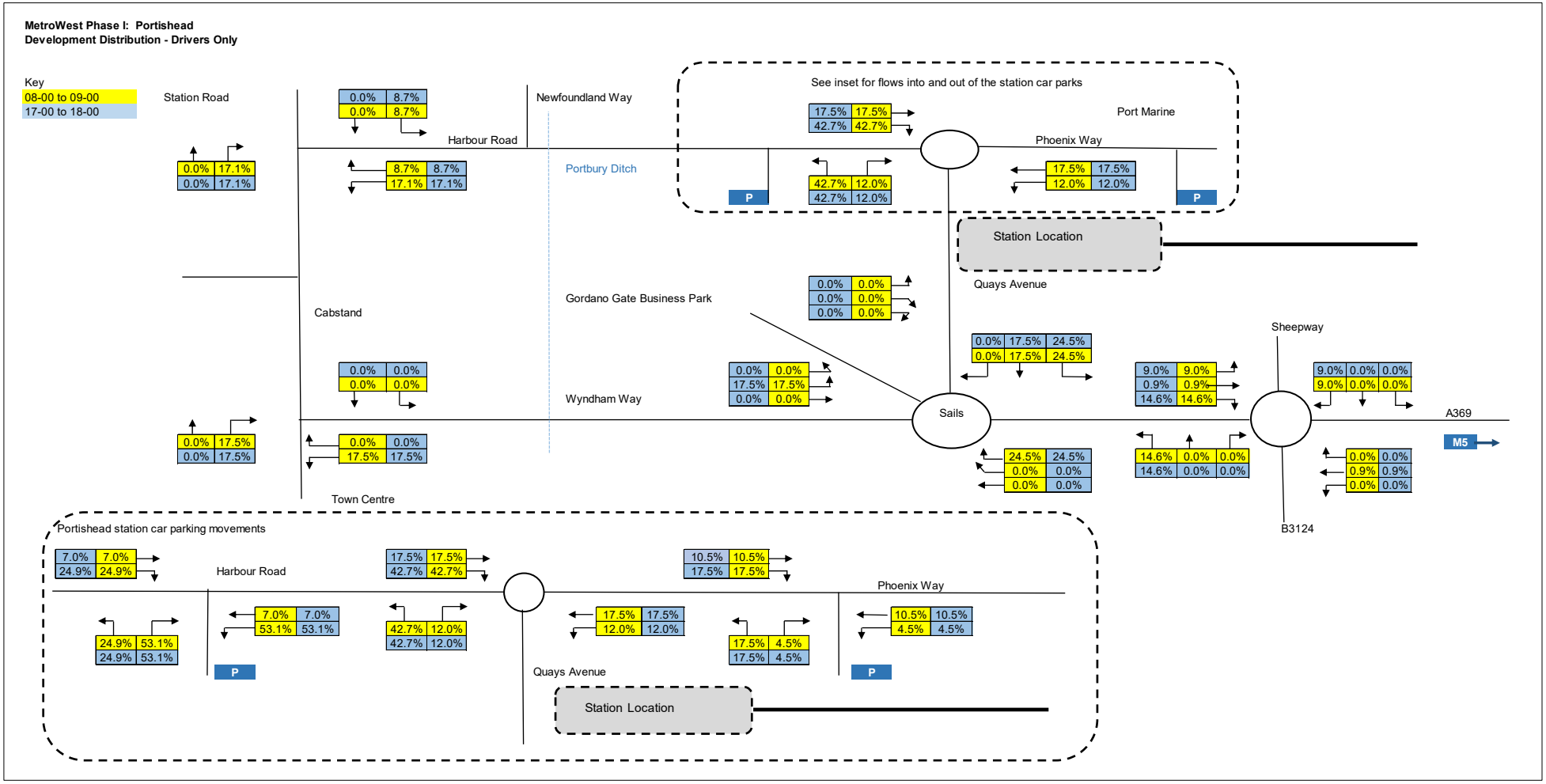

Figure 5-2: Distribution of one-way trips to Portishead Station

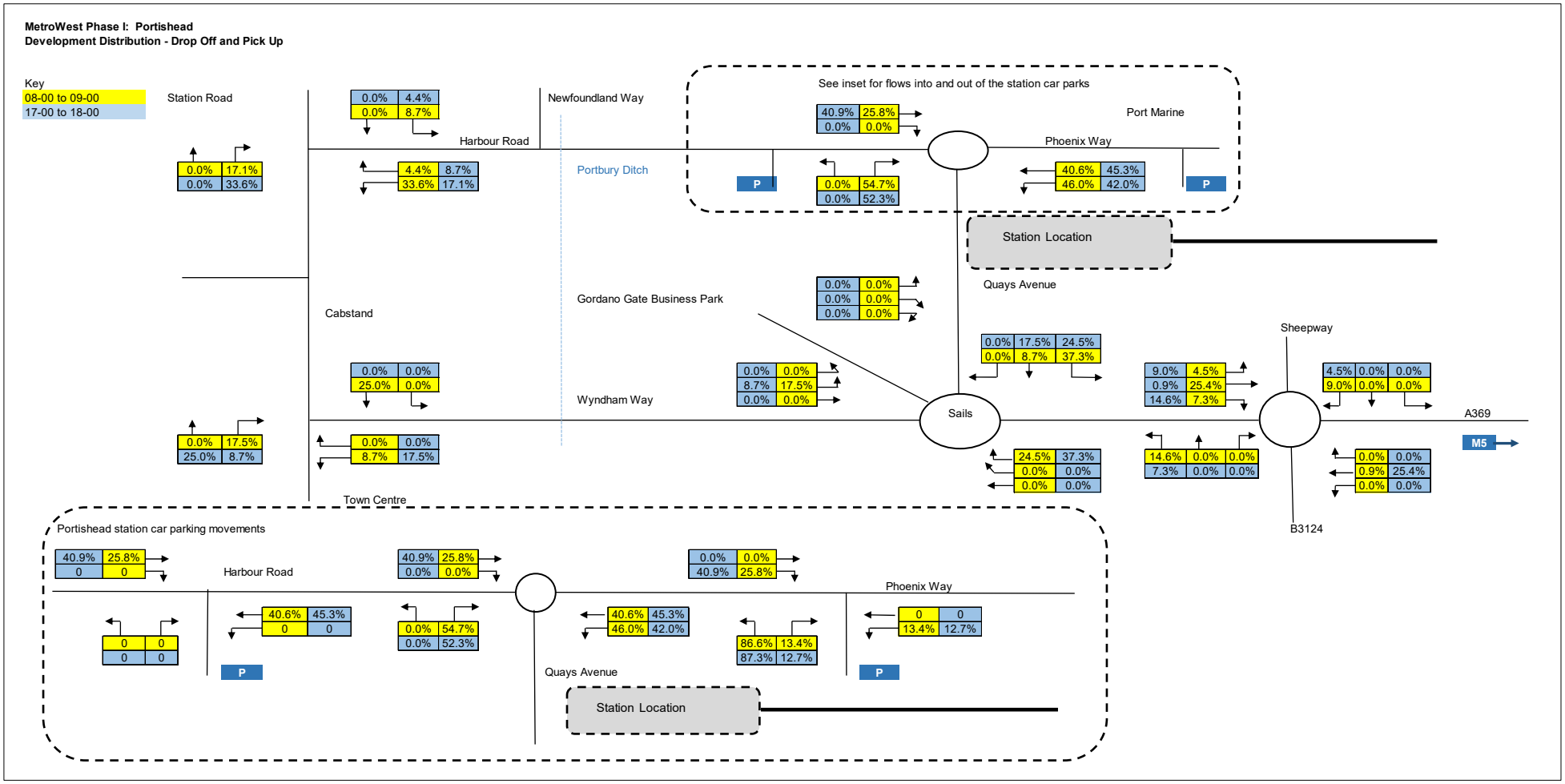

Figure 5-3: Distribution of drop off and pick up trips to Portishead Station

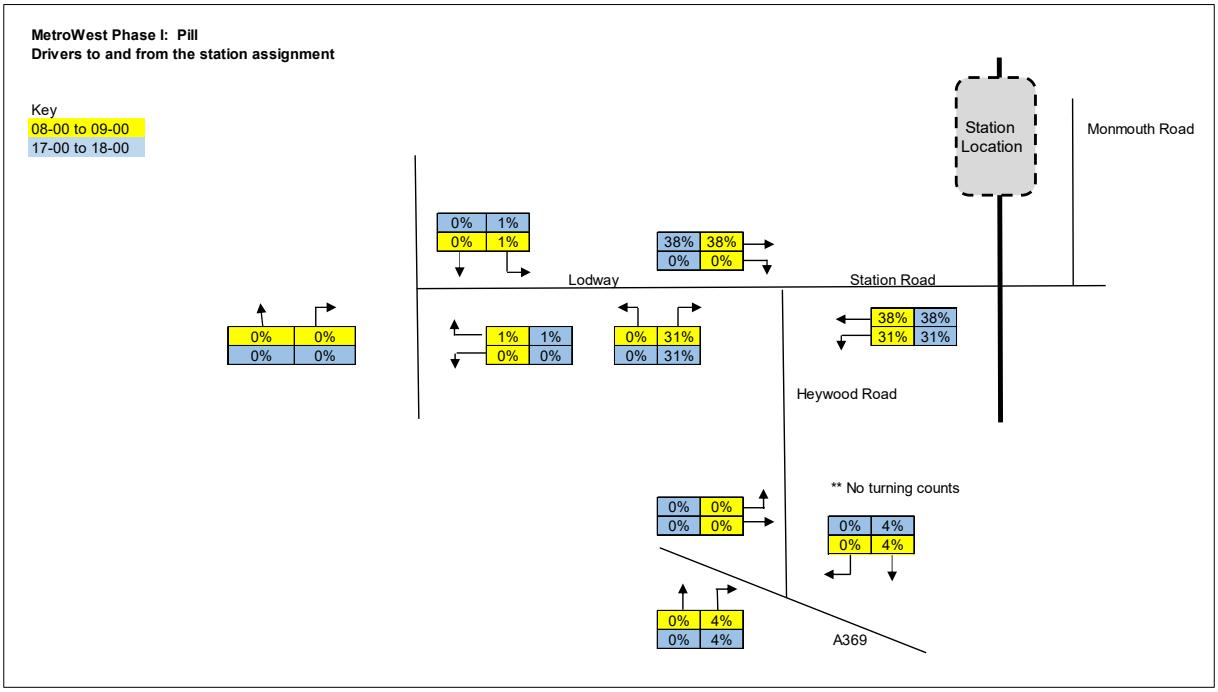

Figure 5-4: Distribution of one-way trips to Pill Station

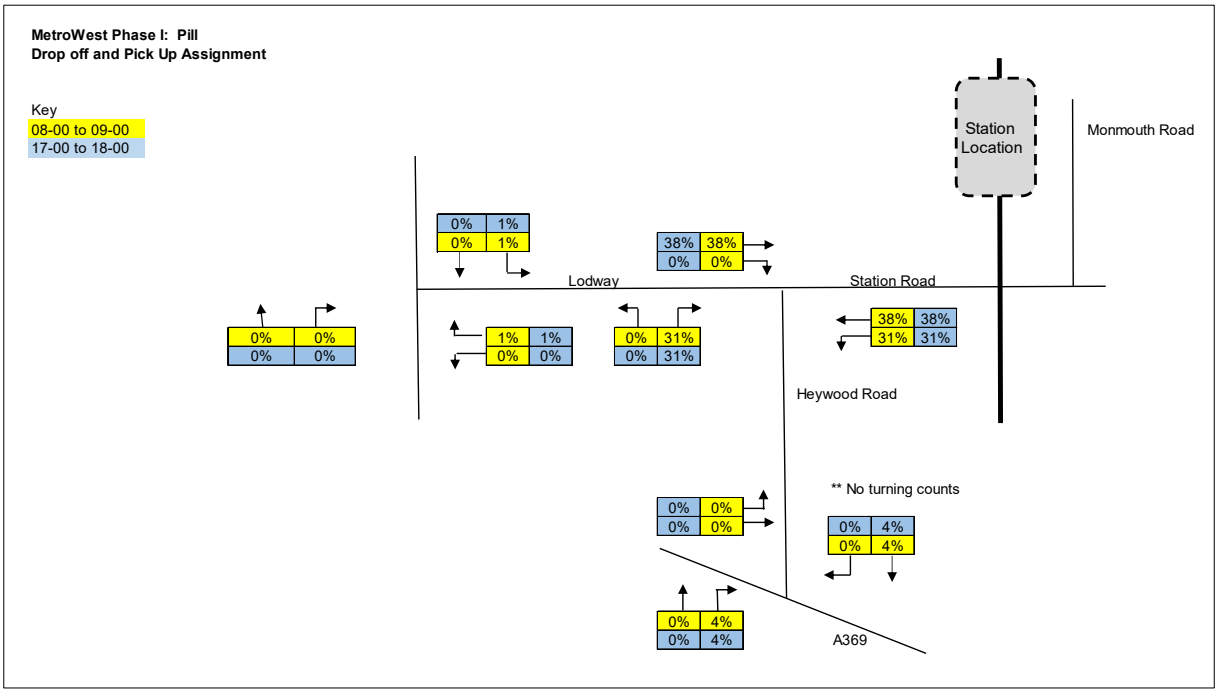

Figure 5-5: Distribution of drop off and pick up trips to Pill Station

SECTION 6

Strategic Operational Impact Assessment

6.1 Introduction

6.1.1 This section sets out the strategic operational impacts of the scheme. The impacts reported in this section include:

- Strategic case for the scheme;
- Passenger rail demand;
- Strategic highway and bus impacts; and
- Rail freight.

6.2 Strategic Case

Overview

6.2.1 The Outline Business Case (OBC) provides detailed information about he benefits of the scheme. This section draws on information presented in the OBC, and sets the strategic benefits of the scheme. The aspects of change associated with the scheme are:

- Economic growth;
- Congestion and transport resilience;
- Accessibility; and
- Environment and social wellbeing.

Economic growth

6.2.2 The West of England is a dynamic city region, with a population of more than 1.1 million people, over 43,000 businesses and an economy worth over £31 billion a year. It is a highly productive economy, with GVA per capita higher than the national average. The city region is one of the few areas of the UK that is a net contributor to the Treasury.

6.2.3 Recent economic growth has been driven by a diverse sectoral base with strengths in aerospace, creative and environmental industries, IT and microelectronics, finance and tourism. A high proportion of local employment is, therefore, in high-value knowledge intensive industries. The area is also home to four universities producing cutting-edge research. Economic growth over the last decade has been driven by these sector strengths and the availability of high quality business space with good access to the transport networks, particularly in the North Fringe area close to the M4 and M5. There has also been rapid growth recently seen in Bristol city centre as businesses are attracted by the large skilled workforce, dynamic local business community and availability of appropriate workspaces.

6.2.4 The West of England Local Enterprise Partnership Strategic Economic Plan 2015 to 2030 (March 2014) draws on these sectoral and locational strengths, with strong ambitions for growth. Temple Quarter is one of the UK's strongest performing Enterprise Zones, and new Enterprise Zones were designated in Bath Riverside and the Somer Valley in 2017. Enterprise Areas have also been allocated at Weston-super-Mare, Filton, Emersons Green and Avonmouth / Severnside. South Bristol is also a priority for urban regeneration. Figure 6.1, shows the Enterprise Zones and Enterprise Areas along with high priority transport proposals, extracted from the 2014 Strategic Economic Plan. Note the job creation numbers have since be revised.

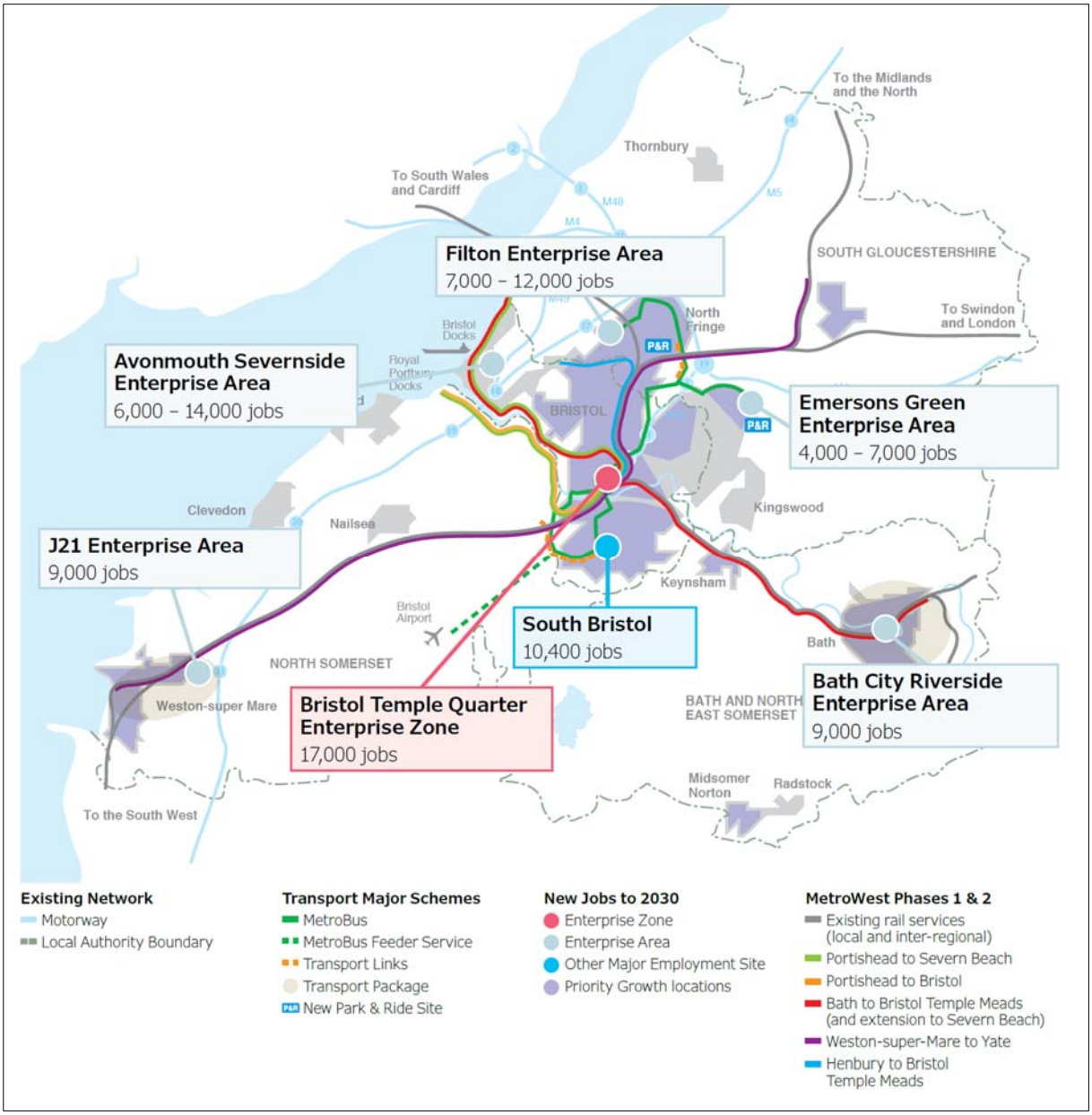

Figure 6-1: Strategic Economic Plan 2014 – Priority Transport Investment Map (source SEP)

6.2.5 However, the West of England faces serious transport challenges and these will become more acute with the anticipated scale of growth in the area. The forecast numbers of people living and working in the area will increase

demands on the transport system, which will have significant economic, social and environmental impacts. Whilst the West of England has benefited from a strong economy over the last decade, the sub-region's economic prosperity is beginning to be constrained by its transport network. As demand on the transport network increases as a result of **economic and population growth**, further investment is needed to ensure the transport network is **sufficiently accessible** and has **sufficient capacity and resilience** to continue to meet the sub region's needs. Longer-term problems of **sustained traffic growth and car dependency** also need to be tackled, in addition to wider **long-term issues of carbon emissions** and **social wellbeing**.

Supporting Economic Growth & Job Creation

6.2.6 MetroWest Phase 1 is a strategic intervention across three rail corridors that will play a key role in enhancing access to major growth areas including Temple Quarter Enterprise Zone and five Enterprise Areas across the sub-region. The project will bring these major employment centres closer to the skilled workforce catchment, by simultaneously enhancing access to the local train network and increasing train service frequency. Major employers will have a larger skilled workforce pool to draw on within a 30-minute commute and this will assist in removing barriers to inward investment. Full details of the user and non-user benefits including journey time savings are set out in the OBC Economic Case.

6.2.7 Transport infrastructure can play a key role in regenerating and making an area's economy more productive. Improved infrastruture can lead to improved access to markets and customers, higher mobility anf flexibility of the labour market and more reliable supply of goods and services. These wider economic impacts of the scheme have also been calculated in terms of Gross Value Added to the economy and job creation. Table 6.1 sets out a summary of the regeneration impacts of the scheme.

Table 6.1: Gross Value Added (GVA) and Job Creation Impacts

GVA Element	Temporary / Permanent Impact	GVA Est.Output
GVA Total	Temporary (during construction)	£57.12M
Additional Jobs	Temporary (during construction)	1,441 jobs
GVA Total per annum	Permanent (post scheme opening)	£31.86M
Additional jobs	Permanent (post scheme opening)	514 jobs
Aggregate Impact (first 10 years)	Permanent (post scheme opening)	£264.78M

Notes:

- Calculation of the construction GVA and job creation follows the approach outlined in the West of England LEP's 'Impact Guidance Note'
- Calculation of the permanent GVA and job creation is derived from two sources: operational (directly related to enhanced services and new station provision) and wider impacts (resulting from enhanced connectivity across the West of England)
- All GVA figures are £m in 2017 values
- Temporary impacts are totals for the construction period, both jobs and GVA

Table 6.1: Gross Value Added (GVA) and Job Creation Impacts

- Permanent impacts are quoted as permanent jobs and GVA per annum post opening
- Aggregate GVA impact is for the construction period plus the first 10 years of operation, discounted to 2017 values

Supporting Delivery of New Housing

6.2.8 The WoE Joint Transport Study (October 2017) together with the emerging WoE Joint Spatial Plan is informing the infrastructure priorities for delivery of 105,000 new homes and creation of 82,500 new jobs up to 2036. MetroWest Phase 1 & Phase 2 are included in the base case as committed schemes for the WoE Joint Transport Study and the emerging WoE Joint Spatial Plan (to be adopted in 2018). This effectively means for land use and transport planning purposes, the sub-region is assuming that MetroWest Phase 1 and 2 will be delivered early in the planning horizon.

6.2.9 The JSP Strategic Priorities are:

- **Economic**: To identify and meet the need for housing and accommodate the economic growth objectives of the LEP Strategic Economic Plan
- **Social**: To ensure that the JSP benefits all sections of our communities
- **Environment**: To protect and enhance the sub-region's diverse and high quality environment and ensuring resilience including through protection against flood risk
- **Infrastructure**: To ensure a spatial strategy where new development is properly aligned with infrastructure

Current Planned Growth

6.2.10 The West of England has committed to high levels of housing and employment growth in the short to medium term. Table 6.2 summarises the Core Strategy commitments of each of the four local authorities. These commitments are being reviewed and extended through the emerging Joint Spatial Plan which has a longer planning horizon to 2036.

Table 6.2: Current Planned Growth (Core Strategy Commitments)

Area	Homes	Employment
Bath & North East Somerset (2011-2029)	**12,960**	**10,300 jobs**
Bath	7,020	6,950 jobs
Keynsham	2,150	1,600 jobs
Somer Valley	2,470	900 jobs
Rural areas	1,320	700 jobs
Bristol (2006 – 2026)	**36,600 (min 26,400)**	**21,900 jobs**
City Centre	7,400	
South Bristol	8,000	150,000 m2 office in city centre
Inner East	2,000	10 ha industry + 60,000 m2
Northern Arc	3,000	office in S Bristol.

Table 6.2: Current Planned Growth (Core Strategy Commitments)

Rest of City	6,000	26,000 m2 office across the city
Smaller sites	4,200	
North Somerset (2006 – 2026)	**20,985**	**10,100 jobs**
Weston urban area	6,300	
Weston villages	6,500	Employment focus is town
Clevedon, Nailsea & Portishead	5,100	centre regeneration in Weston
Service villages	2,100	and mixed use employment
Rural areas	985	In Weston villages
South Gloucestershire (2013 – 2027)	**22,545**	
Existing Local Plan allocations	7,060	
Cribbs Patchway New Neighbourhood	5,700	Focus on Enterprise Areas in
East of Harry Stoke New Neighbourhood	2,000	Filton & Science Park in
North Yate New Neighbourhood	2,700	The East Fringe
Thornbury	800	
Other areas and small windfall sites	965 + 2,100	

- Bath & North East Somerset Core Strategy, adopted July 2014
- Bristol Core Strategy, adopted June 2011
- North Somerset Core Strategy, adopted January 2017
- South Gloucestershire Core Strategy, adopted December 2013

Longer Term Growth

6.2.11 The Joint Spatial Plan is intended to meet the needs arising from the West of England housing market areas to 2036 and the plan will provide the framework to deliver 105,000 net additional new homes between 2016 and 2036, including committed growth within the four Core Strategies as set out in the Table 6.2. The four authorities existing Core Strategies currently make provision for around 66,800 new homes. This means there is a requirement for 39,000 additional new homes (to 2036) that need to be accommodated in the emerging Joint Spatial Plan. Figure 6.2 shows the strategic development locations proposed in the emerging Joint Spatial Plan.

6.2.12 Overall, the requirement for 105,000 new homes is equivalent to an increase of more than 20% on current housing provision and represents major growth for the sub-region. This will pose significant challenges in terms ensuring that the locations for new development maximise

opportunities for sustainable modes of transport, reducing reliance on the car. There are significant challenges for the delivery of transport infrastructure to ensure the transport network can accommodate this level of growth. The delivery of MetroWest Phase 1 and Phase 2 early in the planning horizon will provide the foundation for establishing a Metro local rail network, to meet both existing and future needs.

Site Specific Proposals

6.2.13 Figure 6.3 shows the housing and employment allocations used in the GBATS4 modelling work in the scheme catchment and the Joint Spatial Plan allocations.

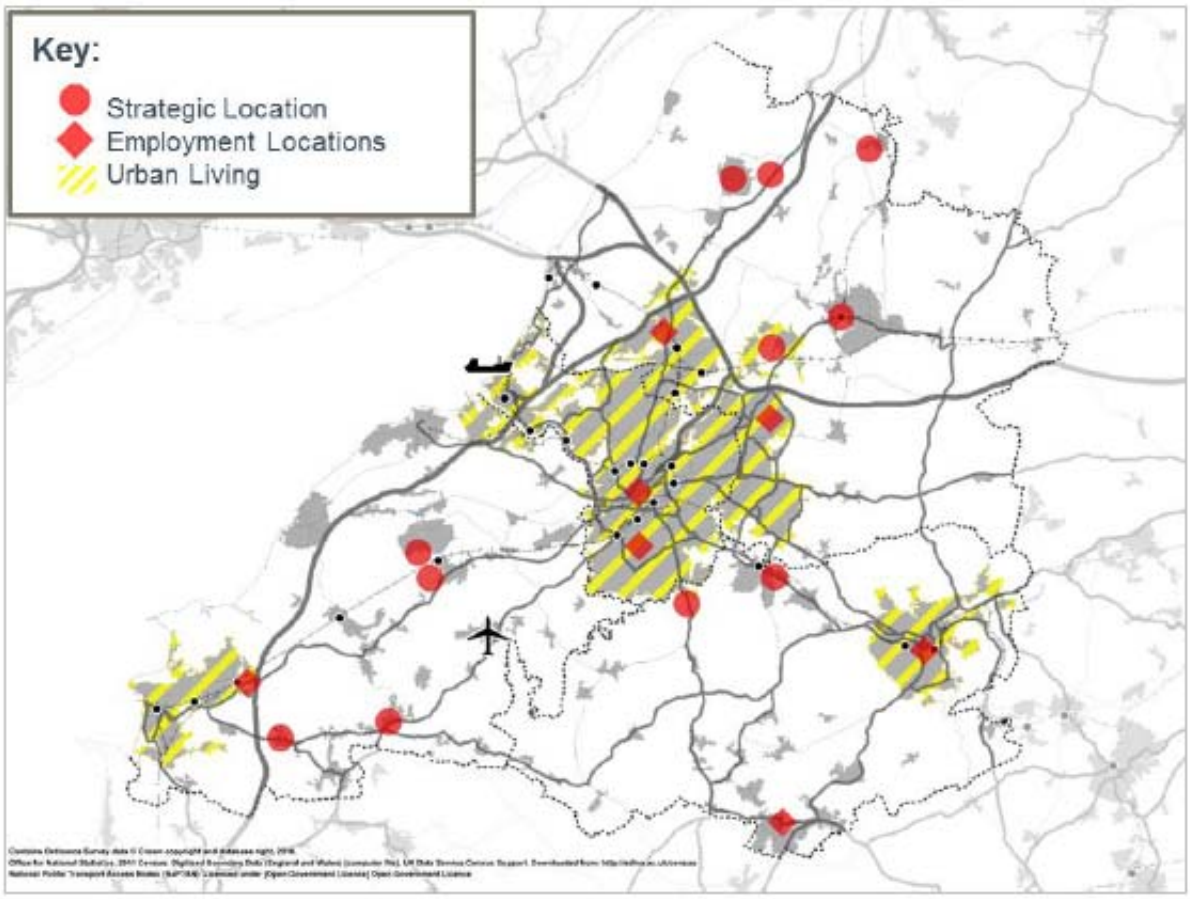

Figure 6-2: Proposed Development Locations in the emerging Joint Spatial Plan (2026-2036)

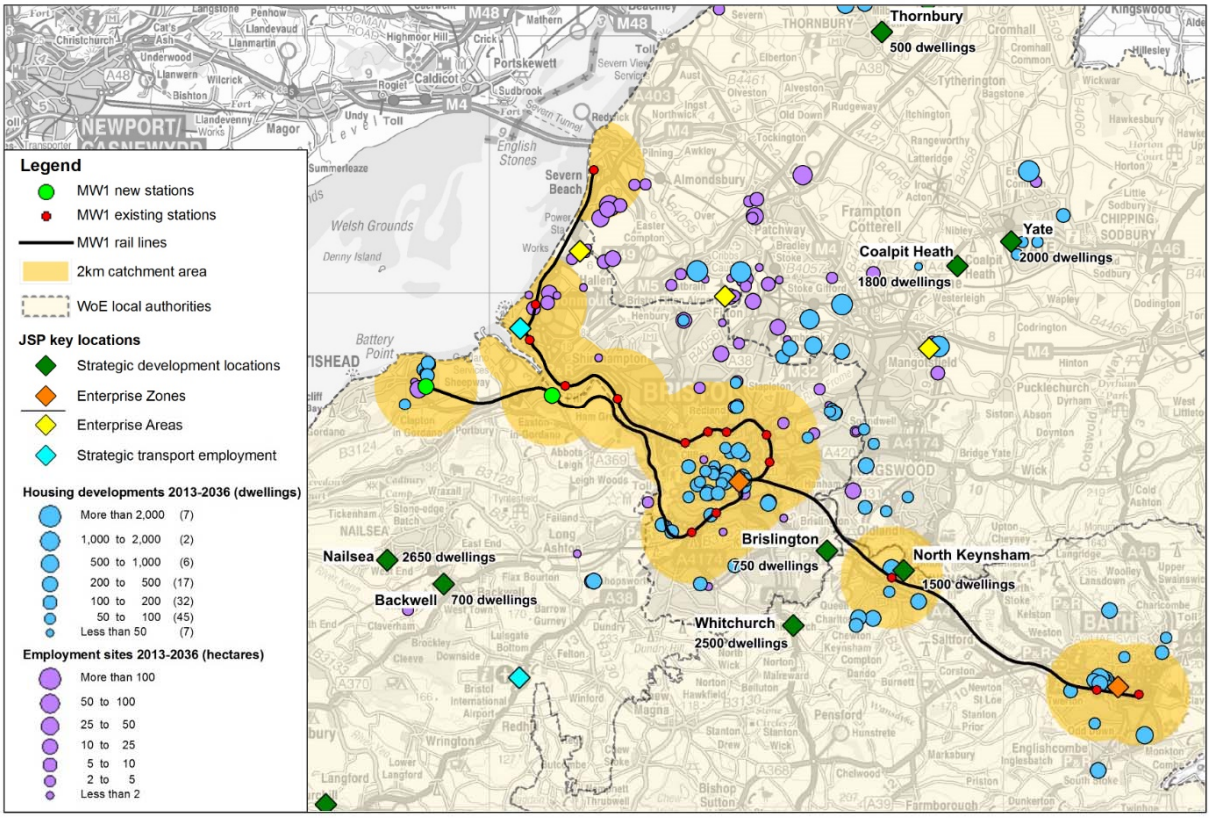

Figure 6-3: Committed housing and employment allocations in the scheme catchment & JSP allocations

Strategic and Local Road Network Performance

West of England road network

6.2.14 Major arterial routes across the road network are congested. There are very heavy traffic volumes on the M4 and M5 motorways, due to longer distance traffic and increased local movements. On the M4 Junction 18 to 20 including the Almondsbury junction with the M5 has particularly heavy volumes and on M5 there are major hot spots between junction 18 and 19 (Avonmouth Bridge) and at junction 21. There is also heavy traffic on the M32, reflecting heavy commuting into Central Bristol, other radial routes (A4 Bath Road, A4 Portway, Cumberland Basin, A37 and A420), the A4174 Ring Road, the A4 and the A36. There are also heavy traffic volumes on roads connecting towns across the sub-region, including the A370, A38, A36, A46 and A432.

6.2.15 Figure 6.4 shows the problems of road congestion across the West of England. This is sourced from traffic count data and transport modal data. It also shows key locations where the resilience of the network is a problem. These locations tend to be particularly vulnerable when traffic accidents or other incidents occur, and cause widespread distruction across the wider network as the local road network quickly becomes satuarated with divereted traffic.

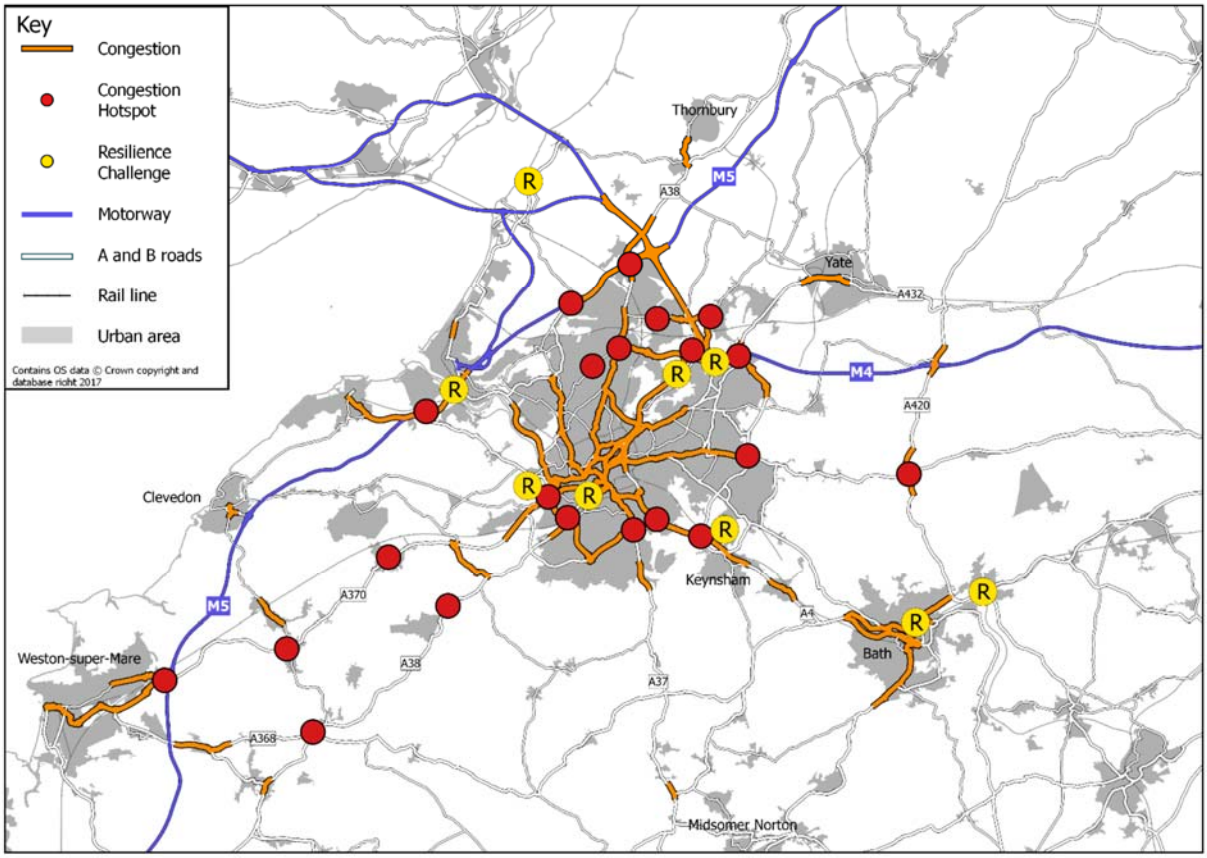

Figure 6-4: Congested Corridors and Hot Spots across the West of England

6.2.16 The heavy traffic volumes reflect high levels of economic activity, the relatively limited travel choices and the high levels of car ownership and car dependency. This results in significant problems with traffic congestion in many parts of the sub-region affecting both the local and strategic road networks. DfT data (2013/14) shows that Bristol has particularly slow traffic, averaging less than 15 mph during the morning peak, slower than Core Cities outside London.

6.2.17 Road journey times on the three corridors served by MetroWest Phase 1 are shown the Table 6.3 below. The table shows that peak hour journey times are generally more than twice the corresponding free flow journey times.

Table 6.3: Free flow vs AM Peak Journey Times on Key Highway Routes

Route	Observed AM Peak (Oct 2013)		Observed AM Peak (May 2013)	
	free flow	net peak hr	free flow	net peak hr
A4 (Keynsham-Bath Bridge)	11.4	29.5	10.2	22.5
A4 Portway (Avonmth-Hotwlls)	10.6	21.4	9.5	17.0
A369 (Portishead-Ashton Gt)	11.8	22.7	11.5	17.6

- All journey times are minutes
- Free Flow JT = minimum journey time recorded in the period 06:00-10:00
- Observed data from Strategis – used in GBATS4 updates

6.2.18 Traffic congestion causes longer and less reliable journey times, reduced resilience in the event of incidents, reduced bus service reliability, rat-running of traffic through residential areas and idling traffic, all of which causes air quality problems and loss of productivity.

6.2.19 There are currently significant challenges with the resilience of the strategic and local road network. For example, in addition to the very heavy traffic volumes on major routes, the occurrences of major incidents on the M5 in particular is increasing. Data published by Inrix shows that the West of England is the sixth most congested city region in the UK, after London, Edinburgh, Glasgow, Birmingham and Manchester (see Inrix Appendix 1.1 for more details). The West of England had a recorded 619 traffic hot spot incidents over 12 months with the worst recorded incident at J20 on the M5 with a 15 hour delays which resulted in traffic problems up to 36 miles away.

6.2.20 These major incidents cause widespread congestion and long traffic delays across the West of England with traffic diverted on local roads, due to the lack of suitable alternative routes. In the future, with increasing traffic demand and congestion on the road network, transport modelling shows incidents will have increasingly serious impacts on the road network. For example, modelling using the GBATS4 model indicates that a full closure of the M5 motorway would result in a doubling of delay on the local road network compared with normal day to day conditions, with serious implications for both strategic and local connectivity.

Portishead corridor

6.2.21 More specifically for MetroWest Phase 1, the Portishead to Bristol corridor (A369) suffers congestion and journey time reliability problems. This not only causes delays and lost productivity for car drivers and goods vehicle operators but also presents a major hurdle for an attractive public transport mode along the corridor. The problems and context of the A369 corridor are summarised as:

- The A369 is the only transport corridor directly linking Portishead with Bristol which is just 10 miles to the east.
- The capacity constraints on the A369 are exacerbated by the fact that it crosses junction 19 of the M5. This is one of the busiest parts of the M5 with the Avonmouth Bridge immediately to the north.
- The A369 continually suffers from the knock-on effects of incidents on the M5 with high volumes of traffic using a constrained local road corridor with few alternative route options.

Car ownership and use

6.2.22 The West of England trend for high rates of private car ownership is magnified in Portishead where only 12% of households (2011 Census) do not have access to a private vehicle. This emphasises the town's over-reliance on private car ownership. These patterns are reflected in the high proportion of residents who travel to work using private vehicles (as car/motorcycle drivers or passengers). At 81%, the proportion of commuters travelling by private vehicle is considerably above both the West of England (69%) and nationwide averages (66%). Less than 1% of commuters locally use rail services (2011 Census), see Table 6.4.

Table 6.4: Mode of Travel to Work (2011 Census)

Mode of Travel to Work	Pill	Portishead	West of England	England
Train	0.5%	0.8%	2.3%	5.6%
Motor Vehicle	72.6%	80.8%	69.2%	66.4%

Accessibility

6.2.23 'Making the Connections' (Social Exclusion Unit, 2003) identified five key barriers to accessibility:

- The **availability** and physical accessibility of transport: there can be limited or no public transport services, services are unreliable, or do not go to the right places at the right times.
- **Cost** of transport: Some people find the costs of transport very high or unaffordable.
- Services and activities located in **inaccessible places**: Developments such as housing, hospitals, business and retail are often located in areas not easily accessible to people without a car.
- **Safety and security**: Some people will not use public transport or walk to key services because of the fear of crime or anti-social behaviour.
- **Travel horizons**: Some people are unwilling to travel long journey times or distances, or may not know about or trust transport services.

6.2.24 Commuting from Portishead to Bristol city centre under typical morning peak hour traffic conditions takes approximately 50 minutes, as congestion can make the journey both longer and unreliable. Given distance is just 10 miles, the resulting average vehicle speed is very low, with peak hour trips taking considerably longer than the same journey in the off-peak. Reducing the travel times will reduce the overall cost of travel. The lack of a rail link between Bristol and Portishead also means that people without access to a car face additional difficulties. Bus journeys can take over an hour in peak periods, and are susceptible to delay due to the overall levels of congestion on this corridor. This length of journey may, in some cases, mean that residents of Portishead are unable to (or discouraged from) seeking employment or education opportunities in the Bristol area.

6.2.25 Severn Beach line stations have different levels of service, from every 40 minutes between Temple Meads and Avonmouth, to every 1 or 2 hours at St Andrew's Road and Severn Beach stations. This results in poor access to the employment opportunities in the Avonmouth area and poor access from the residential areas around the Severn Beach line. The residential areas around the Severn Beach line have a higher proportion of residents claiming Job Seekers Allowance and with no car compared to other parts of the West of England.

6.2.26 Accessibility into Bath suffers from the low level of train services for Keynsham and Oldfield Park.

6.2.27 The provision of the new stations at Portishead and Pill will increase the accessibility of the rail network to residents in North Somerset. In particular, this will benefit the 16,000[9] people who live within a mile of Portishead station and around 2,000 people who live within a mile of Pill station.

6.2.28 Table 6.5 sets out the strategic considerations associated with accessibility.

Table 6.5: MetroWest Phase 1 accessibility summary

Strategic consideration	MetroWest Phase 1
Problem	• Congestion on the roads and the limited existing rail services mean that travel times into Bristol or to key employment centres by bus or car are currently lengthy and costly.
Consequence (impact of not changing)	• Missed work and educational opportunities • Likely growing social inequalities • Increasing reliance on the car • Attractiveness of the bus will decline (will suffer from general congestion and journey time delay)
MetroWest Phase 1 objective	• Business objective – improve accessibility • Supporting objective – ensure that more people have easy access to the rail network • Supporting objective – to reduce the overall generalised cost of travel for commuters, businesses and residents
Outcome	• More people within easy access of a rail station • Increased mode choice • Rail will be a genuinely attractive alternative to the car • Increased range of employment and educational opportunities available

Environment and social well-being

6.2.29 Mapping in the DfT "Carbon Pathway Analysis" 2008 Report shows that the largest CO_2 emissions from transport in the West of England are, not unexpectedly, where traffic levels are greatest. This includes the major urban areas, along the sub-region's motorways and other busy roads. Whilst reducing congestion and managing traffic flow will deliver some carbon benefits, it is recognised that achieving a 40% target for transport will require a reduction in car-based trips within the urban area.

6.2.30 Transport is estimated to account for over 20% of CO_2 emissions nationally and 36% at the local level. Motorway and trunk road traffic is the major source of emissions, accounting for about 55% of total CO_2 emissions in the

[9]The catchment of Portishead station is related to the location of the station site, the catchment of people living within a mile could range from less than 10,000 to 16,000.

West of England, with urban roads responsible for around 30%. Within Bristol's central Air Quality Management Area (AQMA), 97% of NO_2 emissions are from road traffic. CO_2 emissions are expected to rise 19% by 2011, compared to 2004 levels. BCC has declared a single AQMA which covers Bristol city centre and parts of the main radial roads including the M32. This AQMA extends approximately 1 km east of the Portbury Freight Line and includes part of the local railway network within the centre of Bristol. The AQMA has been declared for NO_2 (1-hour mean and annual mean objectives) and PM10 (24-hour mean objective). B&NES has also declared one AQMA in the centre of Bath, which extends along the main roads including Warminster Road and London Road. The Bath AQMA is located approximately 500m from the proposed Bathampton turn-back and has been declared for NO_2 (1hr mean and annual mean objectives).

6.2.31 On average, the carbon emissions for all three local authorities were estimated at 7Kt for diesel railways (0.003% of total CO_2 emissions), with road transport accounting for about 516Kt (25% of total CO_2 emissions) for BCC and NSDC.

6.2.32 The West of England office is committed to promoting healthy lifestyles, and transport has an important part to play in this work. The local transport plan provides information about health and transport including the following statements:

- 67% of adults in Bristol are at an increasing risk of ill health due to low levels of physical activity; physically active people reduce their risk of developing chronic diseases- such as coronary heart disease, stroke and type 2 diabetes—by up to 50%, and the risk of premature death by about 20-30% (National Active Travel Strategy 2010).
- Walking and cycling are an easy ways for many people to increase their physical activity levels.
- Each additional kilometre walked per day is associated with a 4.8% reduction in the likelihood of obesity. Each additional hour spent in a car per day is associated with a 6% increase.
- Increased public transport use contributes to increased physical activity.

6.2.33 Further information about air quality issues are set out in Table 6.6.

6.2.34 Table 6.7 sets out the strategic considerations associated with the environment and social wellbeing.

Table 6.6: Emissions information, BCC, NSDC and B&NES CO2 emissions for 2011 for different economic sectors

Economic Sector	CO_2 (Kt)		
	BCC	NSDC	B&NES
Road Transport (A roads)	149	102	131
Road Transport (motorways)	77	247	0
Road Transport (minor roads)	290	172	108
Diesel railways	6	7	7
Transport other	3	13	1
Land Use, Land-Use Change, and Forestry (LULUCF) Net Emissions	4	27	10
Total for all sectors (non-transport sectors not shown here)	2,036	1,351	897

Table 6.7: MetroWest Phase 1 environment and social wellbeing summary

Strategic consideration	MetroWest Phase 1
Problem	• Worsening air quality, particularly in the Bristol urban area • Health issues – obesity, inactivity which may, in part, be linked to high reliance on the private car
Consequence (impact of not changing)	• Traffic will increasingly be a major contributor to high levels of CO_2 and poor air quality • Deteriorating health of the local population
MetroWest Phase 1 objective	• Business objective – to make a positive contribution to the environment and social wellbeing • Supporting objective – to contribute towards achieving a reduction in CO_2 levels • Supporting objective – to contribute towards improved life opportunities, health and quality of life
Outcome	• Reduced use of the car, leading to lower levels of CO_2 when compared to a 'do minimum' scenario • Increased levels of physical activity (as rail journeys are more likely to include a walking component)

6.3 Passenger rail demand

6.3.1 The calculation of the trips to and from Pill and Portishead stations have been informed by the outputs of the RDM model. Whilst the periods represent the opening year and 10 years after opening year, it is important to note that the GBATS4 strategic multi modal model is based on forecast years of 2021 and 2036. These years being aligned with the dates of the land use planning underpinning the Local Plan Core Strategy.

6.3.2 The access to and from station modal split has been calculated from:

- Survey data from existing West of England railway stations – although it has to be noted the survey numbers are relatively small and there is marked variation between individual stations;
- Generalised costs from origin and destination points by walking, cycling, car and bus; and
- Use of assumptions about the maximum and minimum distances of each mode.

6.3.3 Table 6.8 summarises the demand by mode and distance for the assessment periods of 2021 (opening year) and 2031 (horizon year) for Portishead station.

Table 6.8: Demand by mode and distance to Portishead Station for 2021 and 2031 (rounded)

2021	Walk	Bus	Car	Car drop off	Bicycle	Taxi	Total
Less than 1 km	225	6	77	34	9	1	351
from 1 to 2 km	17	4	45	20	12	-	98
from 2 to 3 km	1	6	16	7	2	-	32
from 3 to 4 km	-	1	11	5	1	-	17
from 4 to 5 km	-	-	6	3	-	-	9
from 5 to 10 km	-	-	4	2	-	-	6
More than 10 km	-	-	12	6	-	-	18
Totals	243	16	171	76	23	2	530

2031	Walk	Bus	Car	Car drop off	Bicycle	Taxi	Total
Less than 1 km	309	8	106	47	13	1	483
from 1 to 2 km	24	5	62	27	16	1	134
from 2 to 3 km	1	8	23	10	2	-	44
from 3 to 4 km	-	1	15	7	1	-	24
from 4 to 5 km	-	-	8	4	-	-	12
from 5 to 10 km	-	-	5	2	-	-	8
More than 10 km	-	-	17	8	-	-	25
Totals	334	22	235	104	32	2	729

6.3.4 These tables give the likely weekday demand at the station. It shows in the 10-year period that demand at the station will ramp up across all modes. It shows the importance of sustainable modes particularly for the shorter distance trips to and from the station with cars for longer distance trips. The number of bus related trips to and from the station remain comparatively low.

6.3.5 Table 6.9 shows the same type of data for Pill station. Again, demand at the station will ramp up over the assessment period.

Table 6.9: Demand by mode and distance to Pill Station for 2021 and 2031 (rounded)

2021	Walk	Bus	Car	Car drop off	Bicycle	Taxi	Total
Less than 1 km	41	1	-	-	2	-	44
from 1 to 2 km	1	-	17	8	-	-	26
from 2 to 3 km	-	-	1	-	-	-	1
from 3 to 4 km	-	-	2	1	-	-	3
from 4 to 5 km	-	-	1	-	-	-	1
from 5 to 10 km	-	-	3	1	-	-	5
More than 10 km	-	-	-	-	-	-	-
Totals	42	1	24	11	3	-	80

2031	Walk	Bus	Car	Car drop off	Bicycle	Taxi	Total
Less than 1 km	62	1	-	-	4	-	66
from 1 to 2 km	1	-	26	12	1	-	40
from 2 to 3 km	-	-	1	1	-	-	2
from 3 to 4 km	-	-	4	2	-	-	5
from 4 to 5 km	-	-	1	-	-	-	1
from 5 to 10 km	-	-	5	2	-	-	7
More than 10 km	-	-	-	-	-	-	-
Totals	63	1	37	16	4	-	123

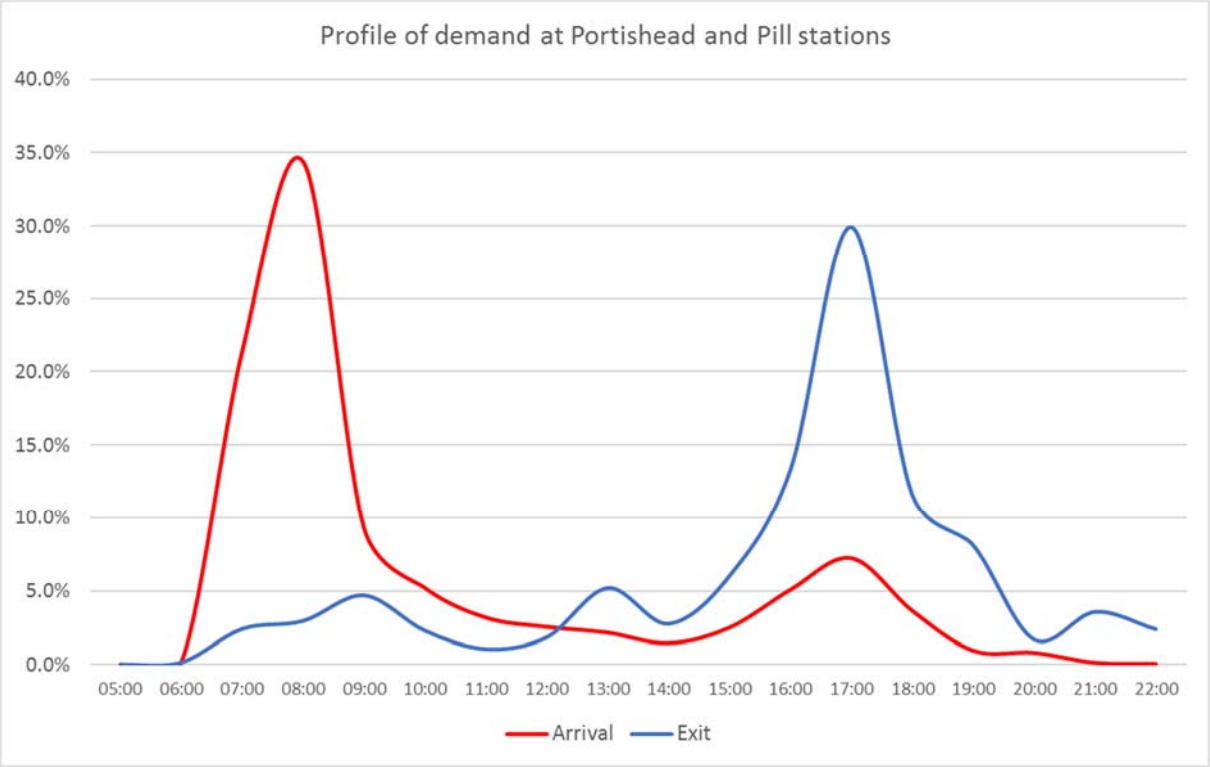

Figure 6-5: Percentage of all day demand arriving and exiting Portishead and Pill stations

6.4 Strategic highway and bus impacts

Variable demand modelling of the scheme

6.4.1 The overall approach of the modelling work is set out in section 5. In summary, the rail demand for the scheme has been undertaken using a rail demand model that considers both new station demand and demand at existing stations (the latter using MOIRA).

6.4.2 The MetroWest Phase 1 scheme has been coded in GBATS4 and the model has been used to assess the possible wider area effects of MetroWest Phase 1, and in doing so to, as much as possible, replicate the level of demand calculated in the rail demand modelling work.

6.4.3 Results in the remainder of this section reflect model results presented are taken directly from GBATS4. This includes changes in the amount of travel and travel patterns. Changes in highway use are based on the amended highway trip matrices.

Changes in the amount of travel

6.4.4 Table 6.10 shows the changes in the modelled number of trips between Do Minimum and Do Something scenarios. These figures are taken directly from GBATS4 outputs.

Table 6.10: Modelled number of trips in Base, Do Minimum and Do Something scenarios

	2013	2021		2036	
	Base	Do Min	Scheme	Do Min	Scheme
AM Peak					
Rail, car, bus	119,700	125,540	125,430	137,290	137,080
Rail	9,140	10,360	10,510	11,940	11,980
Car	98,050	98,870	99,010	108,610	108,870
Bus	12,510	16,310	15,910	16,740	16,230
Inter Peak					
Rail, car, bus	89,030	92,590	92,610	104,160	104,180
Rail	3,220	3,700	3,730	4,640	4,600
Car	76,220	77,030	77,140	86,950	87,150
Bus	9,590	11,860	11,740	12,570	12,430
PM Peak					
Rail, car, bus	127,930	133,950	133,750	146,300	146,550
Rail	10,360	11,760	11,880	13,590	13,510
Car	105,720	106,710	106,850	116,900	117,530
Bus	11,850	15,480	15,020	15,810	15,510

6.4.5 The table shows:

- An aggregate total of rail and bus person trips and car PCUs suggests overall trip increases from base to 2021 Do Minimum (around 5%) and Base to 2036 Do Minimum (around 15%);
- Public transport modes see more significant increases in trip numbers from Base to Do Minimum than car – whereas overall trips increase by around 5% from 2013 Base to 2021 Do Minimum (all time periods), bus trips increase by around a 30% and rail trips by around 13%; and
- The GBATS4 model shows that rail demand rises slightly from Do Minimum to Do Something in 2021, but falls slightly in 2036; note though these changes are much lower than postulated by the RDM, so outputs from the RDM are used to adjust these effects in further analysis.

Changes in the travel patterns (O-D)

6.4.6 As the GBATS4 model allows trips to change destination it is important understand the location of these changes, to understand the impacts to highway, and public transport usage. Table 6.11 shows the model changes to/from the Portishead area as a result of the scheme.

Table 6.11: Changes in the amount of travel to/from Portishead

	2013	2021		2036	
	Base	Do Min	Scheme	Do Min	Scheme
AM	3,330	3,560	3,570	3,790	3,800
Inter Peak (IP)	2,150	2,330	2,340	2,540	2,560
PM	2,910	3,220	3,240	3,350	3,410

6.4.7 Table 6.16 shows that the scheme increases the amount of travel to and from Portishead above the Do Minimum in both 2021 and 2036. However, the scale of increase is lower than the de facto additional transport supply. Increases in trips from Base to Do Minimum to/from Portishead are proportionally slightly higher than overall across the GBATS4 model in 2021, in all time periods, but similar to overall values in 2036. [10]

Changes in highway use

Network wide statistics

6.4.8 The changes in highway demand result in network wide changes set out in Table 6.12. The analysis indicates modest highway benefits from the scheme.

Changes in link flows

6.4.9 The resultant changes in highway demand between future year Do Something, with MetroWest Phase 1, and Do Minimum scenarios are shown in Figures 1 to 27 in **Appendix E**.

6.4.10 In the plots from the GBATS4 SATURN model a green line represents an increase in traffic flow, a blue line represents a reduction in traffic flow and the width of the line is proportional to the size of the change.

6.4.11 The plots showing differences in traffic flow show:

- General increases in traffic from 2013 to 2021, and then further increases to 2036;
- Some local reductions in traffic in future year Do Minimum scenarios associated with changes in highway network, or the effects of developments such as in the St James Barton area and at Temple Circus;
- Comparatively small changes in highway demand resulting from the scheme, albeit widely observed as MetroWest Phase 1 services cover several rail lines across the WoE area. Overall, it is unsurprising that the quantum of highway change is relatively small. Rail demand changes by a few hundred trips in modelled (1 hour) periods, of which a proportion (between 30% and 75%) are former car trips, which is then distributed across the modelled area according to origin and destination;

[10] Outputs from the RDM are used to adjust these effects in further analysis.

- Some more notable reductions to assigned highway trips, such as the M5 Avonmouth Bridge as a result of changes in trip patterns from to/from Portishead;
- Some localised increases in highway trips as a result of re-routeing in a congested network. For example, the Portbury Hundred in the AM peak has increased traffic movement. This is caused by reductions in car trips from Portishead heading towards the M5 (transferring to rail) resulting in the Portbury Hundred becoming a more attractive route than it was. This in turn draws trips back onto the Portbury Hundred that were using alternative (less suitable) routes in the Do Minimum. As such, traffic flows reduce markedly on Clapton Lane and Naish Hill.
- Some other reductions in demand associated with sensitivity of network to changes in demand that are not specifically linked to the scheme, such as St Phillips Causeway and Long Ashton Bypass.

Congestion in future years

6.4.12 All the future year transport modelling considers forecast planned development. This development will change the way the transport behaves. Figures 1 to 27 in **Appendix E** show plans of the congestion hotspots on the network from base, 2021 and 2036 scenarios, for AM, IP and PM models.

6.4.13 The plots showing differences in congestion show increases in the congestion associated with development growth in future years, but little change associated with the scheme.

Table 6.12: Highway Network Wide Statistics [11]

Network Statistics	Units	2013 Base			2021 Do Minimum			2021 Scheme		
		AM	IP	PM	AM	IP	PM	AM	IP	PM
Over-capacity Queues	pcu. hrs/hr	1,283	25	1,125	1,257	23	1,118	1,200	21	1,080
Total Delay	pcu. hrs/hr	704	347	535	590	326	573	582	325	567
Total Travel Time	pcu. hrs/hr	26,992	18,877	26,894	28,183	19,795	28,045	27,957	19,777	27,921
Travel Distance	pcu. kms/hr	1,140,962	917,543	1,171,511	1,196,114	958,784	1,224,145	1,190,073	958,160	1,220,787
Total Trips Loaded	pcus/hr	125,630	106,561	124,898	130,150	111,533	128,777	129,583	111,493	128,517
Overall Average Travel Time	mins	12.9	10.6	12.9	13.0	10.6	13.1	12.9	10.6	13.0
Overall Average Distance	kms	9.1	8.6	9.4	9.2	8.6	9.5	9.2	8.6	9.5
Overall Average Speed	kph	42.3	48.6	43.6	42.4	48.4	43.6	42.6	48.4	43.7

Network Statistics	Units	2036 Do Minimum			2036 Scheme		
		AM	IP	PM	AM	IP	PM
Over-capacity Queues	pcu. hrs/hr	2,432	82	2,192	2,266	76	1,911
Total Delay	pcu. hrs/hr	828	538	840	823	538	838
Total Travel Time	pcu. hrs/hr	33,230	23,431	32,808	32,790	23,399	32,401
Travel Distance	pcu. kms/hr	1,335,710	1,116,169	1,360,629	1,331,212	1,116,161	1,358,683
Total Trips Loaded	pcus/hr	146,821	129,259	144,413	146,360	129,251	144,266
Overall Average Travel Time	mins	13.6	10.9	13.6	13.4	10.9	13.5
Overall Average Distance	kms	9.1	8.6	9.4	9.1	8.6	9.4
Overall Average Speed	kph	40.2	47.6	41.5	40.6	47.7	41.9

[11] Figures in this table are aggregated across the whole of the modelled road network in GBATS4. This network covers the WoE area, as well as some links beyond. Network wide statistics are used to demonstrate overall changes in traffic characteristics, such as total travel time and total delay.

Overview of highway impacts

6.4.14 In summary the transport modelling work shows:

- The GBATS4 model shows that rail demand rises slightly from Do Minimum to Do Something in 2021, but falls slightly in 2036; note though these changes are much lower than postulated by the RDM, so outputs from the RDM are used to adjust these effects in further analysis. These changes have an impact on highway use.
- General increases in highway traffic from 2013 to 2021, and then further increases to 2036 associated with development growth.
- Some local reductions in traffic in future year Do Minimum scenarios associated with changes in highway network, or the effects of developments such as in the St James Barton area and at Temple Circus;
- Reductions in highway demand resulting from the scheme commensurate with increases in rail demand;
- Some specific increases or reductions in traffic as a result of the sensitivity of a congested network to changes in demand, both local to, and slightly away, from the scheme; and
- Increases in highway congestion associated with development growth in future years, but little change associated with the scheme.

Changes in bus use

6.4.15 The impacts of the scheme on bus patronage, are associated with:

- Abstraction from current bus services to the new rail services; and,
- Use of local bus services to access the stations.

6.4.16 These are discussed in turn.

Abstraction from bus current services to the new rail service

6.4.17 Analysis has been undertaken about the volume of passengers who currently use the X3/X4 buses who would transfer to the new rail services. Refer to **Appendix C** where the results of a detailed survey undertaken in March 2016 have been presented.

6.4.18 Data collected for the GBATS model update provided information about the number of existing bus passengers and their origins-destinations. The nearest bus stops and stations to each origin and destination were identified and the generalised costs by rail and bus were calculated. This was used to estimate the percentage of bus passengers who could transfer to rail, which would be between 25% and 40%.

Use of local bus services to access the stations

6.4.19 The analysis presented in Tables 6.13 and 6.14 shows that by 2031 the demand to access Portishead station by bus could be up to 22 passengers per day, and 1-2 passengers per day for Pill.

6.5 Impacts to rail freight

Portbury Dock

6.5.1 The scheme will result in freight trains sharing the line with passenger trains between Parson Street Junction and the proposed new Pill Junction. The scheme has been designed such that there will be no adverse impacts on rail freight operation. Timetabling analysis has been undertaken which illustrates that rail freight paths can be accommodated alongside the proposed scheme, providing as many freight paths as are available (albeit not all used) at present.

SECTION 7

Local Operational Impact Assessment

7.1 Introduction

7.1.1 The section will discuss the impact of the scheme on a local level. This includes highway impacts at a variety of junctions in the vicinity of the scheme, impacts at levels crossings in Ashton Vale and Avonmouth, impacts on on-street parking in the vicinity of Portishead and Pill stations, and impacts on pedestrians and cyclists.

7.2 Traffic Counts

7.2.1 Based upon discussions with the Planning Inspectorate and relevant Officers from NSDC with regards to the scoping report, traffic counts have been undertaken at 9 junctions and one level crossing on the local highway network. The junctions identified are listed below.

- Phoenix Way/Quays Avenue/Harbour Road (Portishead);
- Station Road/Harbour Road (Portishead);
- Quays Avenue/Wyndham Way/Serbert Way (Sails roundabout) (Portishead);
- Cabstand/Wyndham Way/High Street (Portishead);
- Wyndham Way/Sheepway/Portbury Hundred (Portishead);
- M5 Junction 19 (Pill);
- Station Road/Heywood Road/Lodway (Pill);
- A369/St Georges Hill (Pill) ;
- A369/Pill Road (Pill); and
- Ashton Vale Road/Winterstoke Road – (Ashton Vale Level Crossing).

7.2.2 Impacts on these junctions are discussed in the remainder of this chapter.

7.2.3 To determine the baseline traffic situation traffic counts have been undertaken. Details of these counts are identified in section 4. The traffic counts provide details of vehicular movements during the AM and PM peak periods used for the assessments. For each of the junctions a number of scenarios have been tested, these scenarios being:

- Baseline ‘2015’ – Existing Traffic and Transport Conditions;
- 2021– without the scheme;
- 2021 – with the scheme;
- The horizon year 2031 – without scheme; and
- The horizon year 2031 – with the scheme.

7.3 Significance Criteria

7.3.1 Guidelines set out by the Institute of Environmental Management and Assessment (IEMA) and the DfT have been considered in order to identify significance criteria applicable to this assessment. In some instances, additional criteria have been based on local transport conditions. The magnitude of each effect and its significance is largely based on the analysis undertaken as part of the TA. Tables 7.1 and 7.2 outline the criteria that have been used to define "significant" for both the construction and operational phases of the DCO Scheme. They have also been applied at a strategic and local highway network level. This includes the impacts on non-motorised and public transport users.

Table 7.1: Construction Assessment Criteria – Definition of Significant

Heading	Assessment Criteria
Traffic levels and delays	A temporary diversion for more than four weeks in any 12-month period that leads to a maximum increase in trip lengths of 2.5 km A significant delay (5-10 mins) on any route as a result of partial closures Material increase in the level of HGV traffic
Delay to road based public transport	A significant delay (5-10 mins) or disruption affecting existing public transport routes for a period of more than five days
Parking	Loss of more than four weeks in any 12-month period of 20 on street car parking spaces Material impact due to loss of loading facilities for more than 4 weeks
Vulnerable users	A temporary increase in journey length of 250 m for pedestrians and 1.5 km for cyclists

Table 7.2: Operational Assessment Criteria – Definition of Significant

Heading	Assessment Criteria
Traffic levels and delays	A ratio to flow capacity exceeding 85% at junctions Increased queue lengths (related to above) of 10% Permanent increase in journey lengths of more than 1.25 km
Delay to road based public transport	A permanent change in journey distance of more than 400 m

Table 7.2: Operational Assessment Criteria – Definition of Significant

Heading	Assessment Criteria
Parking	A loss of private parking
	Any predicted increase in on-street parking in the vicinity of the station of 20 spaces
Vulnerable users	A predicted permanent increase in journey length of more than 250 m for pedestrians
	A predicted permanent increase in journey length of more than 1.5 km for cyclists

7.4 Highways Impacts

7.4.1 Details of junction impact modelling are contained in **Appendix F**.

Phoenix Way/Quays Avenue/Harbour Road

7.4.2 Phoenix Way/Quays Avenue/Harbour Road is a three-arm roundabout. The re-configured junction has been assessed using Assessment of Roundabout Capacity And Delay ("ARCADY") junction assessment software for both the AM and PM peak periods. The new junction has a number of fundamental differences where the proposed layout consists of a roundabout smaller in diameter and a single lane entry approach on each arm.

7.4.3 Figure 7.1 illustrates the total PCU flow generated by this scheme for 2015 assessment periods while Figures 7.2 and 7.3 show the total PCU flows generated by this scheme for both the 2021 and 2031 assessment periods in the AM and PM peak periods, without the proposed scheme. Figure 7.4 and Figure 7.5 shows the total PCU flows generated by this scheme for both the 2021 and 2031 assessment periods in the AM and PM peak periods, with the proposed scheme in place.

7.4.4 Tables 7.3 to 7.5 identify the maximum Ratio of Flow to Capacity (RFC) for each arm during both peak periods. It is predicted that the junction would operate with adequate spare capacity during both the morning and evening peaks in all scenarios with maximum RFCs of 0.48 on Phoenix Way in the AM and 0.54 on Harbour Road in the PM in 2031 with the proposed scheme in place.

7.4.5 The ARCADY results indicate that the proposed scheme does not have a significant impact on the re-configured junction and works well within capacity.

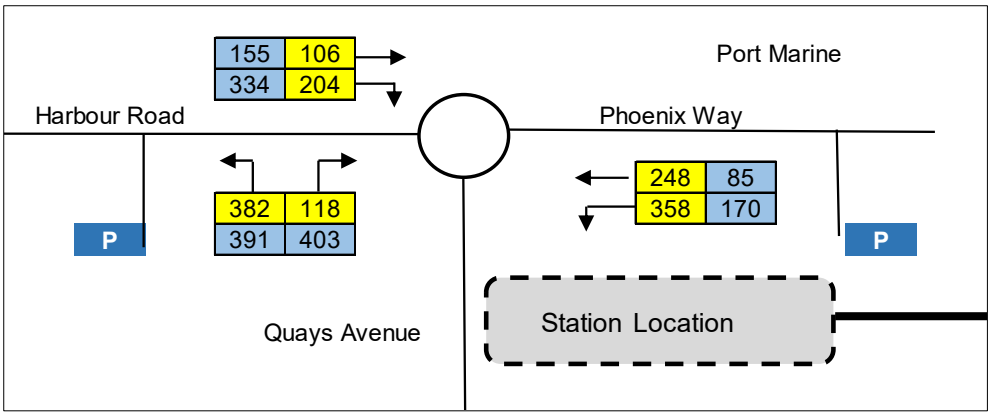

Figure 7-1: 2015 Baseline traffic at Phoenix Way/Quays Avenue/Harbour Road
AM yellow, PM blue

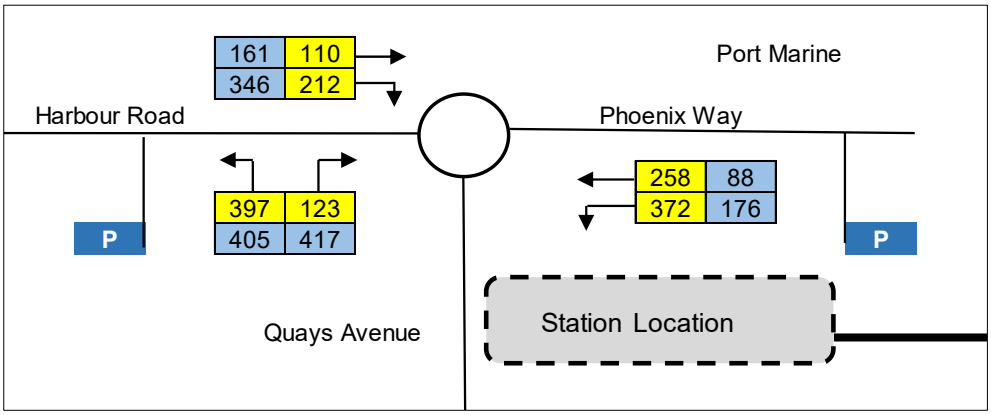

Figure 7-2: Future 2021 traffic flows at Phoenix Way/Quays Avenue/Harbour Road without scheme
AM yellow, PM blue

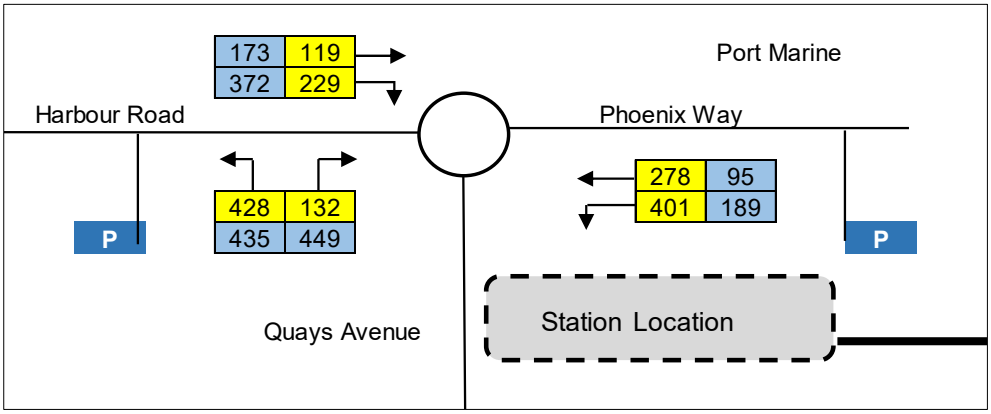

Figure 7-3: Future 2031 traffic flows at Phoenix Way/Quays Avenue/Harbour Road without scheme
AM yellow, PM blue

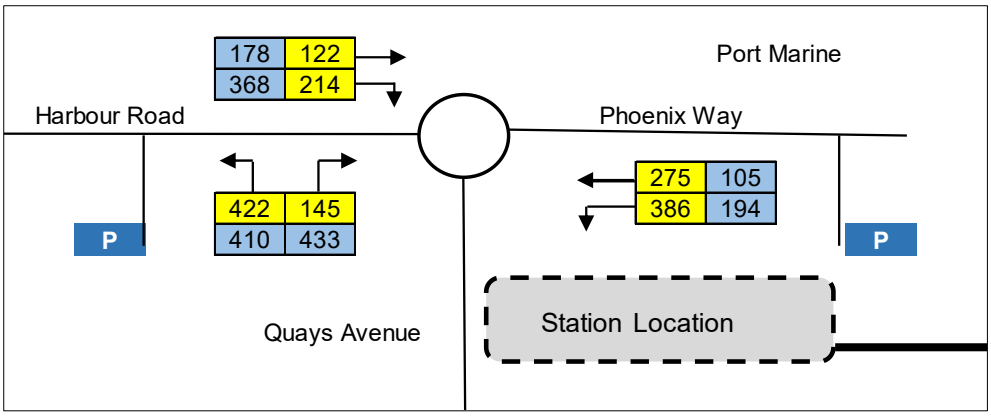

Figure 7-4: Future 2021 traffic flows at Phoenix Way/Quays Avenue/Harbour Road with scheme
AM yellow, PM blue

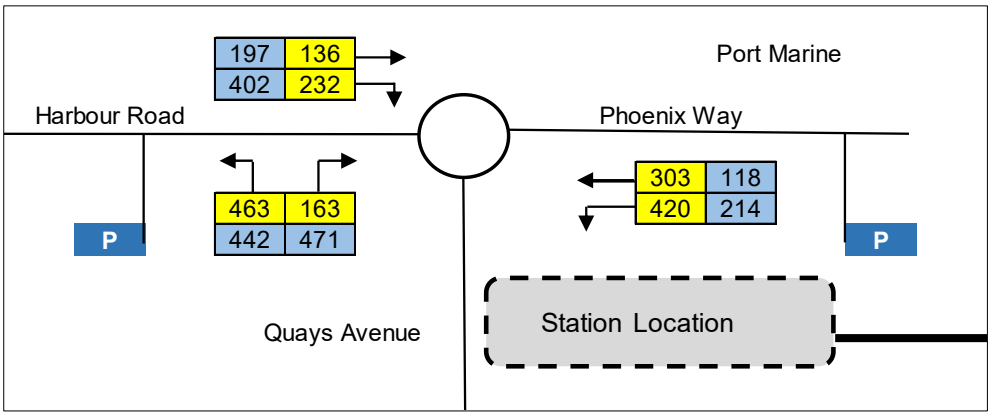

Figure 7-5: Future 2031 traffic flows at Phoenix Way/Quays Avenue/Harbour Road with scheme
AM yellow, PM blue

Table 7.3: Junction Performance at Phoenix Way/Quays Avenue/Harbour Road without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
	2015 AM			**2015 PM**		
Phoenix Way	1	3.61	0.4	0	2.8	0.18
Quays Avenue	0	2.81	0.3	1	3.33	0.45
Harbour Road	0	3.29	0.24	1	5.01	0.43

Table 7.4: Performance at Phoenix Way/Quays Avenue/Harbour Road for opening year 2021

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2021 AM			2021 AM	
Phoenix Way	1	3.73	0.42	1	3.87	0.44
Quays Avenue	1	2.87	0.31	1	3.03	0.34
Harbour Road	0	3.34	0.25	0	3.43	0.26
		2021 PM			2021 PM	
Phoenix Way	0	2.84	0.19	0	2.97	0.21
Quays Avenue	1	3.44	0.46	1	3.56	0.48
Harbour Road	1	5.22	0.45	1	5.65	0.49

Table 7.5: Performance at Phoenix Way/Quays Avenue/Harbour Road for horizon year 2031

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2031 AM			2031 AM	
Phoenix Way	1	4.01	0.45	1	4.25	0.48
Quays Avenue	1	3.02	0.34	1	3.27	0.38
Harbour Road	0	3.45	0.27	0	3.59	0.29
		2031 PM			2031 PM	
Phoenix Way	0	2.93	0.2	0	3.12	0.24
Quays Avenue	1	3.70	0.5	1	3.9	0.52
Harbour Road	1	5.73	0.49	1	6.49	0.54

Station Road/Harbour Road/Cabstand

7.4.6 The junction of Station Road/Harbour Road/Cabstand is currently a priority junction and has been assessed using Priority Intersection Capacity and Delay ("PICADY") junction assessment software for both the AM and PM peak periods. Figure 7.6 illustrates the total PCU flow generated by this scheme for 2015 assessment periods while Figures 7.7 and 7.8 show the total PCU flows generated by this scheme for both the 2021 and 2031 assessment periods in the AM and PM peaks, with and without the proposed scheme respectively.

7.4.7 Tables 7.6 to 7.8 identify the maximum Ratio of Flow to Capacity (RFC) for each arm during both peak periods for each scenario. It is predicted that the junction would operate well within capacity during both the morning and evening peaks in all scenarios with maximum RFCs of 0.45 on Station Road (minor arm) in the AM and 0.35 on Harbour Road in the PM in 2031 with the proposed scheme in place. It should be noted that for the 2021 and 2031 assessment periods, the RFC for the AM peak on Station Road (minor arm) decreases slightly as a result of the scheme.

7.4.8 The PICADY results indicate that the proposed scheme does not have a significant impact on the junction and works well within capacity.

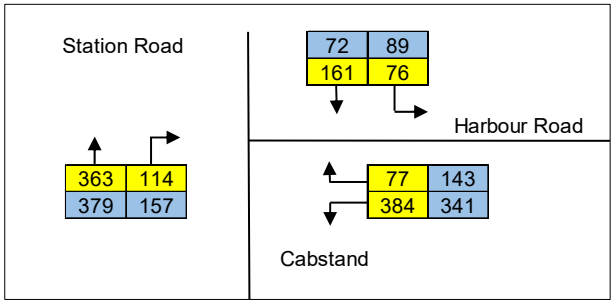

Figure 7-6: 2015 Surveyed traffic at Station Road/Harbour Road/Cabstand
AM yellow, PM blue

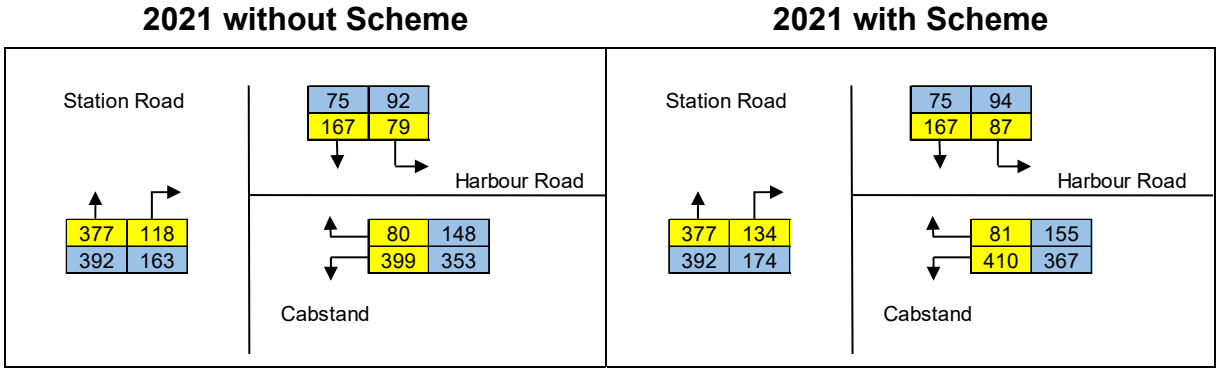

Figure 7-7: Future 2021 traffic at Station Road/Harbour Road/Cabstand without and with Scheme
AM yellow, PM blue

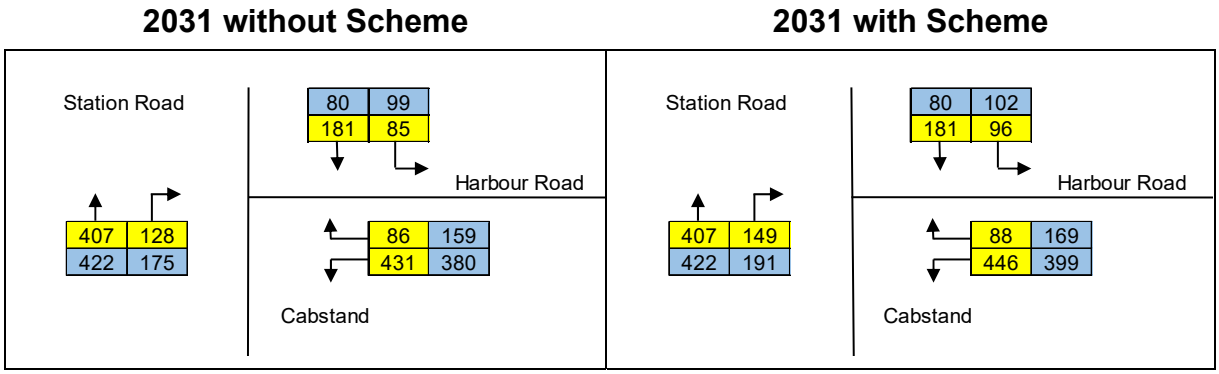

Figure 7-8: Future 2031 traffic at Station Road/Harbour Road/Cabstand without and with Scheme
AM yellow, PM blue

Table 7.6: Junction Performance at Station Road/Harbour Road/Cabstand without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2015 AM			**2015 PM**	
Station Rd (left turn)	0	7.81	0.15	0	6.77	0.16
Station Rd (right turn)	1	13.5	0.4	0	11	0.2
Harbour Road	0	8.21	0.16	1	10.3	0.31

Table 7.7: Performance at Station Road/Harbour Road/Cabstand for opening year 2021

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2021 AM			**2021 AM**	
Station Rd (left turn)	0	8.04	0.16	0	8.14	0.18
Station Rd (right turn)	1	14	0.42	1	13.5	0.41
Harbour Road	0	8.3	0.16	0	8.4	0.17
		2021 PM			**2021 PM**	
Station Rd (left turn)	0	6.89	0.16	0	7	0.17
Station Rd (right turn)	0	11.3	0.21	0	11.6	0.21
Harbour Road	1	10.4	0.31	1	10.8	0.33

Table 7.8: Performance at Station Road/Harbour Road/Cabstand for horizon year 2031

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2031 AM			2031 AM	
Station Rd (left turn)	0	8.6	0.18	0	8.8	0.21
Station Rd (right turn)	1	15.4	0.46	1	15	0.45
Harbour Road	0	8.5	0.17	0	8.7	0.17
		2031 PM			2031 PM	
Station Rd (left turn)	0	7.2	0.18	0	7.3	0.18
Station Rd (right turn)	0	11.7	0.22	0	12.3	0.23
Harbour Road	1	10.8	0.3	1	11.3	0.35

Quays Avenue/Wyndham Way/Serbert Way (Sails roundabout)

7.4.9 Quays Avenue/Wyndham Way/Serbert Way junction is a four-arm roundabout and has been modelled using ARCADY software. The fourth arm is an access to a development situated on the North-West direction from the junction. The area off Serbert Way comprises an office park, a supermarket, hotel and small industrial units.

7.4.10 The result of ARCADY analysis (Figure 7.9) illustrates the total PCU flow generated by this scheme for 2015 assessment period. Figures 7.10 and 7.11 show total PCU flows generated without the proposed scheme for both 2021 and 2031 assessment periods while Figure 7.12 and Figure 7.13 show the total PCU flows generated with the scheme.

7.4.11 Tables 7.9 to 7.11 summarise the results of the operational assessment of the existing roundabout junction in 2015, 2021 and 2031 without the proposed scheme. As would be expected, both the RFC values and queues increase with the addition of traffic growth. The PM period shows to have higher RFC values where values of 0.73 on Wyndham Way (southeast arm) and 0.71 on Serbert Way were recorded during the 2031 assessment period, with minimal queuing recorded on all arms.

7.4.12 With the addition of traffic associated with the proposed scheme for 2031, it can be seen that the highest RFC values are also predicted to occur during the PM peak on Wyndham Way (southeast arm) (0.75) and on Serbert Way (0.73).

7.4.13 While the model demonstrates that there will be an increase in queuing and delay times at the junction, this increase will be negligible. The addition of the proposed scheme will therefore **not have a significant impact on the junction and the junction will have spare capacity in future years**.

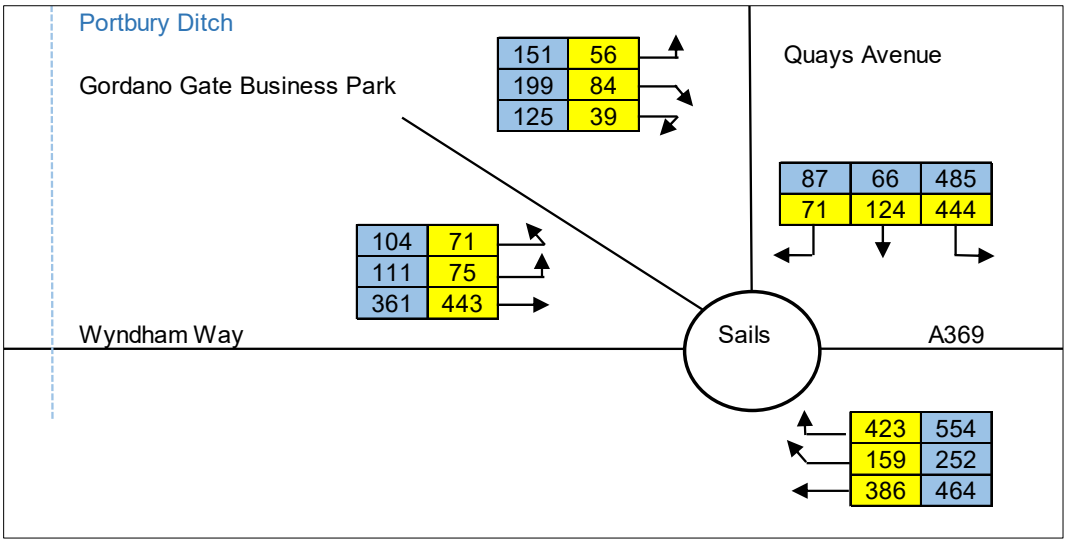

Figure 7-9: 2015 Surveyed traffic at at Quays Avenue/Wyndham Way/Serbert Way
AM yellow, PM blue

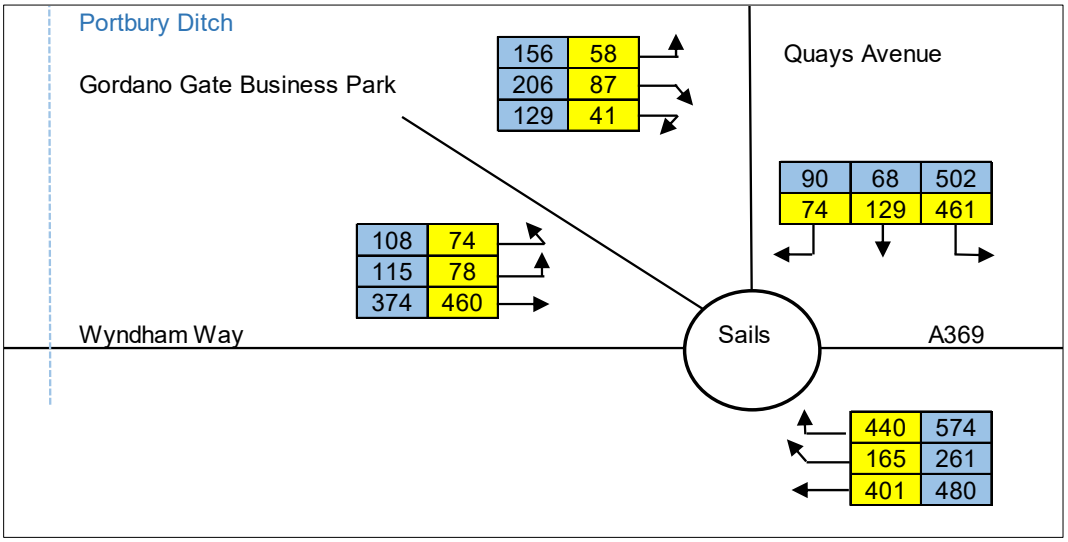

Figure 7-10: Future 2021 traffic at Quays Avenue/Wyndham Way/Serbert Way without Scheme
AM yellow, PM blue

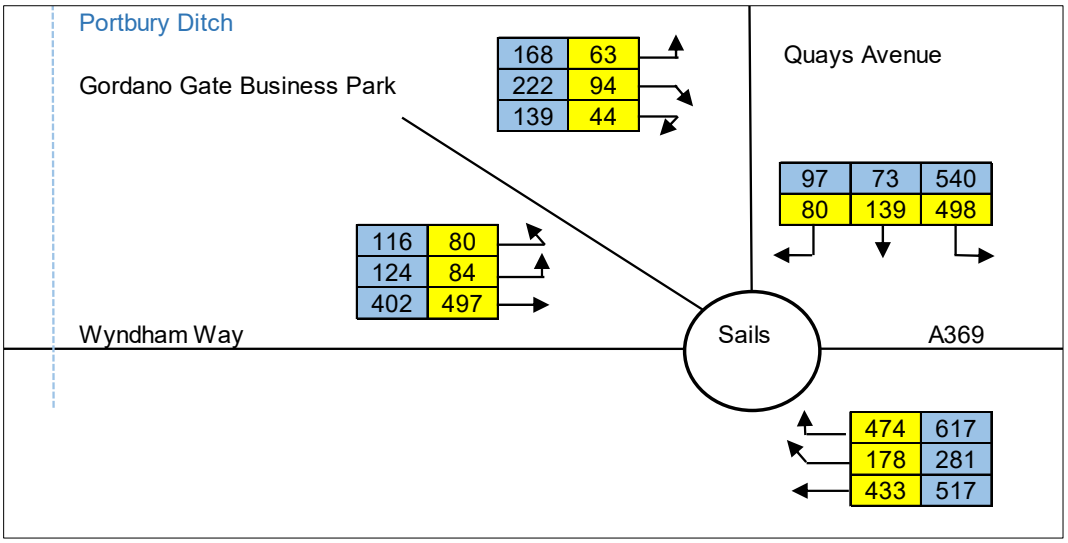

Figure 7-11: Future 2031 traffic at Quays Avenue/Wyndham Way/Serbert Way without Scheme
AM yellow, PM blue

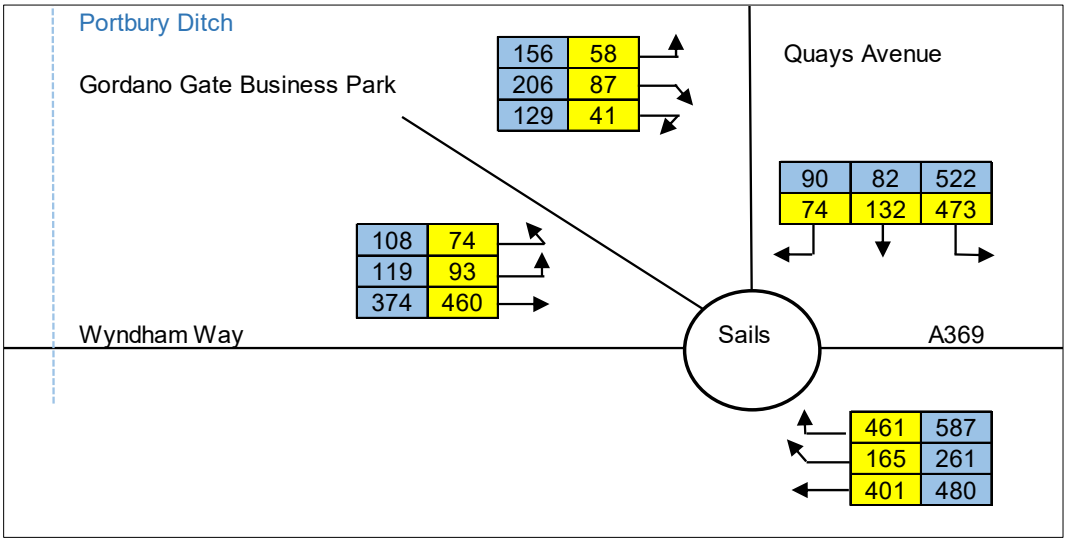

Figure 7-12: Future 2021 traffic at Quays Avenue/Wyndham Way/Serbert Way with Scheme
AM yellow, PM blue

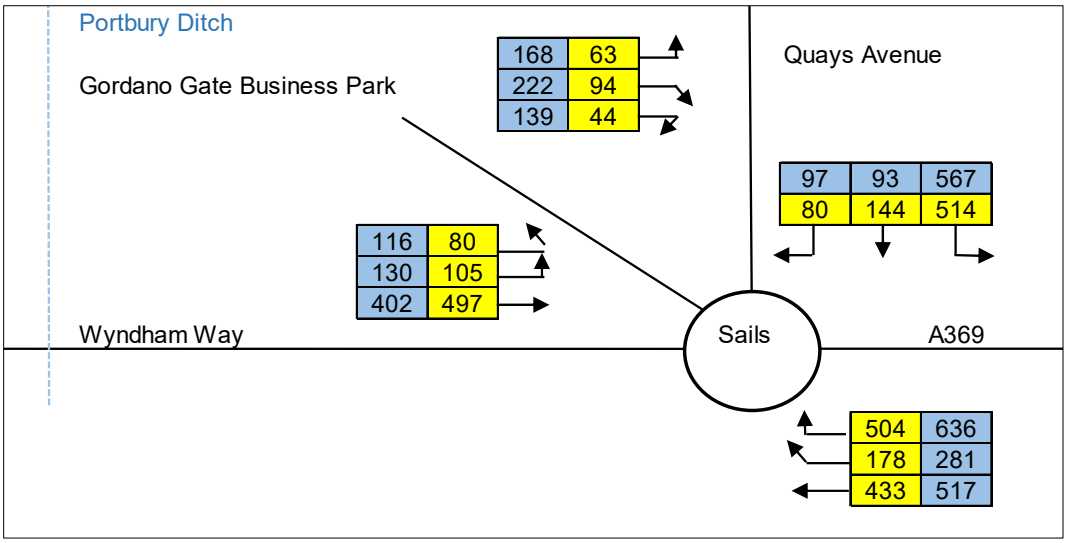

Figure 7-13: Future 2031 traffic at Quays Avenue/Wyndham Way/Serbert Way with Scheme
AM yellow, PM blue

Table 7.9: Junction Performance at Quays Avenue/Wyndham Way/Serbert Way without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2015 AM			**2015 PM**	
Quays Avenue	1	4.06	0.44	1	4.88	0.47
Wyndham Way (South)	1	3.2	0.49	2	4.75	0.65
Wyndham Way (West)	1	4.88	0.47	1	6.14	0.52
Serbert Way	0	4.86	0.21	1	9.9	0.59

Table 7.10: Performance at Quays Avenue/Wyndham Way/Serbert Way for opening year 2021

	without Scheme			**with Scheme**		
	Queue (PCU)	**Delay (Sec)**	**RFC**	**Queue (PCU)**	**Delay (Sec)**	**RFC**
		2021 AM			**2021 AM**	
Quays Avenue	1	4.26	0.46	1	4.35	0.47
Wyndham Way (South)	1	3.34	0.51	1	3.43	0.52
Wyndham Way (West)	1	5.18	0.49	1	5.42	0.51
Serbert Way	0	5.07	0.22	0	5.23	0.23
		2021 PM			**2021 PM**	
Quays Avenue	1	4.73	0.49	1	4.97	0.51
Wyndham Way (South)	2	5.13	0.67	2	5.32	0.68

Table 7.10: Performance at Quays Avenue/Wyndham Way/Serbert Way for opening year 2021

Wyndham Way (West)	1	6.66	0.55	1	6.83	0.56
Serbert Way	2	11.1	0.63	2	11.5	0.63

Table 7.11: Performance at Quays Avenue/Wyndham Way/Serbert Way for horizon year 2031

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2031 AM			2031 AM	
Quays Avenue	1	4.79	0.51	1	4.94	0.53
Wyndham Way (South)	1	3.7	0.55	1	3.84	0.57
Wyndham Way (West)	1	5.96	0.55	1	6.43	0.57
Serbert Way	0	5.56	0.25	0	5.83	0.26
		2031 PM			2031 PM	
Quays Avenue	1	5.39	0.54	1	5.84	0.58
Wyndham Way (South)	3	6.27	0.73	3	6.7	0.75
Wyndham Way (West)	2	8.13	0.62	2	8.51	0.63
Serbert Way	2	15.34	0.71	3	16.4	0.73

Cabstand/Wyndham Way/High Street

7.4.14 Cabstand/Wyndham Way/High Street junction is currently operating as a three-arm mini roundabout. Cabstand and Wyndham Way have multiple traffic lane approaches to the mini roundabout while High Street has a single lane approach. This roundabout was recently modified with the removal of traffic signals from all three approaches to the junction.

7.4.15 Cabstand/Wyndham Way/High Street mini roundabout has been modelled using ARCADY software. Figure 7.14 illustrates the total PCU flow generated by this scheme for 2015 assessment periods while Figures 7.15 and 7.16 show the total PCU flows generated by this scheme for both the 2021 and 2031 assessment periods in the AM and PM peaks, with and without the proposed scheme respectively.

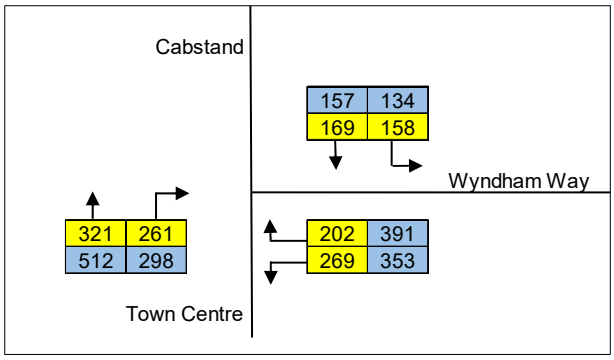

Figure 7-14: 2015 Surveyed traffic at Cabstand/Wyndham Way/High Street
AM yellow, PM blue

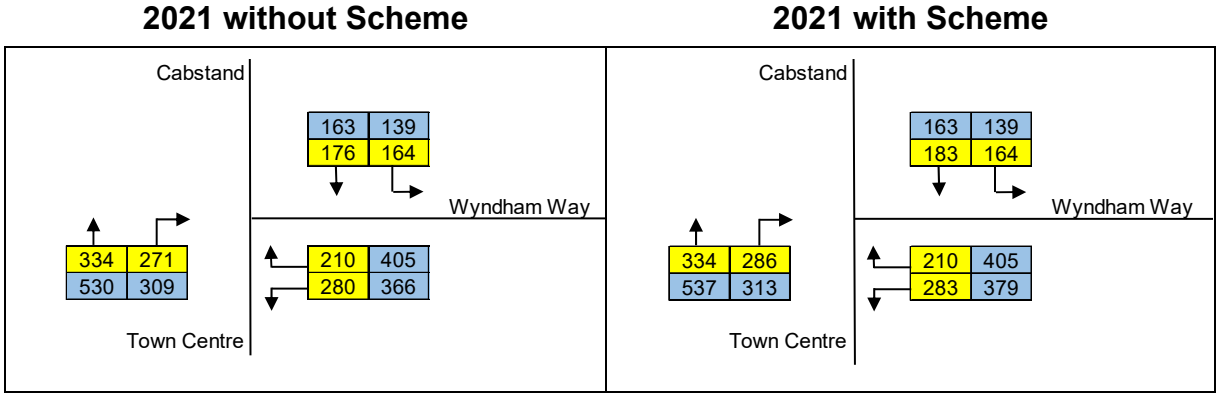

Figure 7-15: Future 2021 traffic at Cabstand/Wyndham Way/High Street without and with Scheme
AM yellow, PM blue

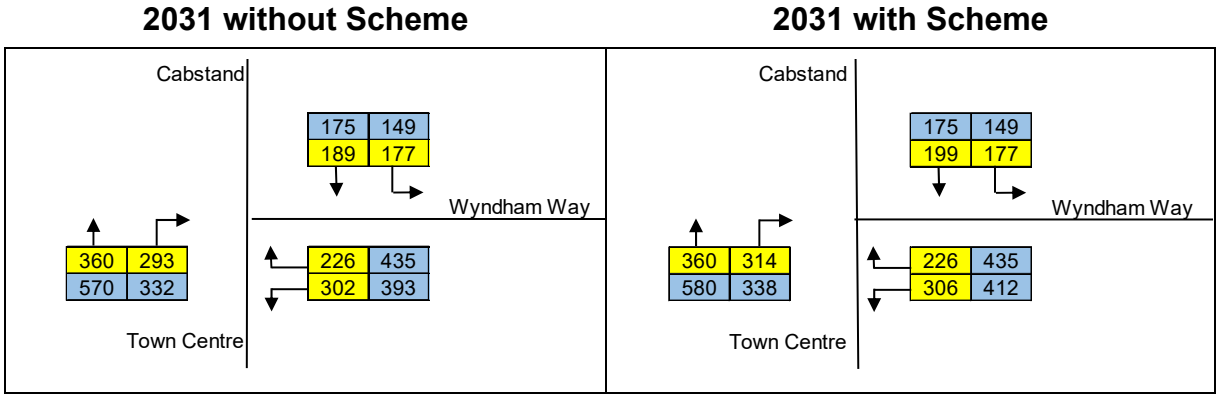

Figure 7-16: Future 2031 traffic at Cabstand/Wyndham Way/High Street without and with Scheme
AM yellow, PM blue

7.4.16 The results of the operational assessment of Cabstand/Wyndham Way/High Street priority junction for the existing base year 2015 traffic scenario are presented in Table 7.12 and show that the junction is operating at capacity in both the AM and PM peak periods with RFC vales for the High Street (south arm) exceeding the 0.85 RFC threshold.

7.4.17 Tables 7.13 and 7.14 provide an overview of the capacity of the junction for the 2021 opening year and 2031 horizon year, without and with the Scheme. The model suggests that the junction will continue to operate above capacity

with RFC values in excess of the 0.85 threshold predicted on the High Street (south arm) for all scenarios tested.

7.4.18 Queue lengths will increase from the 2015 Baseline as a result of both the scheme and future growth for both the AM and PM peaks. While the volume of traffic (and queue lengths) are forecast to be significantly greater during the PM peak, the most significant increases are predicted to occur during the AM peak. For the High Street (south arm), where the RFC threshold will be exceeded for all scenarios tested, the models suggest that queue lengths will increase by around 46 PCUs (from 15 to 61) for the 2031 'with scheme' scenario (from the 2015 baseline). However, comparing this with the 2031 'without scheme' scenario, the increase will be 34 PCUs, suggesting the increase in traffic will be generated mainly by future growth as opposed to the scheme.

7.4.19 The impact of the scheme on the operation of the remaining arms is shown to be minimal. Although this junction is at capacity even before future growth has been added, **the proposed scheme will not have significant impact on the junction**.

Table 7.12: Junction Performance at Cabstand/Wyndham Way/High Street without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2015 AM			2015 PM	
Wyndham Way (Left turn)	1	10.84	0.47	2	14.63	0.61
Wyndham Way (Rt turn)	0	3.77	0.19	1	4.73	0.36
High Street	15	86.51	0.98	257	1507	1.64
Cabstand	1	4.75	0.32	0	4.22	0.27

Table 7.13: Performance at Cabstand/Wyndham Way/High Street for opening year 2021

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2021 AM			2021 AM	
Wyndham Way (Left turn)	1	11.4	0.49	1	11.5	0.5
Wyndham Way (Rt turn)	0	3.84	0.2	0	3.9	0.2
High Street	23	123	1.03	29	147.8	1.05
Cabstand	1	4.86	0.34	1	5	0.35

Table 7.13: Performance at Cabstand/Wyndham Way/High Street for opening year 2021

		2021 PM			2021 PM	
Wyndham Way (Left turn)	1.72	15.7	0.64	2	16.7	0.66
Wyndham Way (Rt turn)	0.6	4.87	0.38	1	4.9	0.38
High Street	302	1775	1.72	317	1853	1.75
Cabstand	0	4.27	0.28	0.4	4.3	0.28

Table 7.14: Performance at Cabstand/Wyndham Way/High Street for horizon year 2031

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2031 AM			2031 AM	
Wyndham Way (Left turn)	1	12.5	0.54	1	12.83	0.55
Wyndham Way (Rt turn)	0	3.98	0.22	0	4.03	0.22
High Street	49	232	1.12	61	302.4	1.16
Cabstand	1	5.1	0.36	1	5.2	0.37
		2031 PM			2031 PM	
Wyndham Way (Left turn)	2	18.4	0.69	3	20.58	0.72
Wyndham Way (Rt turn)	1	5.21	0.41	1	5.21	0.41
High Street	406	2391	1.91	428	2512	1.95
Cabstand	0	4.37	0.3	0	4.37	0.3

Wyndham Way/Sheepway/Portbury Hundred

7.4.20 Wyndham Way/Sheepway/Portbury Hundred is a four-arm roundabout and has been modelled using ARCADY software. Figure 7.17 illustrates the total PCUs generated for the 2015 baseline.

7.4.21 The results of the operational assessment of the priority junction for the existing base year 2015 traffic scenario are presented in Table 7.15 and show that the junction is operating at capacity during the PM peak period with the RFC value for the Portbury Hundred arm exceeding the 0.85 RFC threshold.

7.4.22 Figure 7.18 and Figure 7.19 show the total PCUs generated for the 2021 assessment period without and with the Scheme while Figure 7.20 and Figure 7.21 show the PCUs for the 2031 assessment period without and with the Scheme.

7.4.23 Tables 7.15 to 7.17 identify the maximum Ratio of Flow to Capacity (RFC) for each arm during both peak periods for each scenario. The model suggests that the junction currently operates at capacity during the PM peak with RFC values in excess of the 0.85 threshold predicted on the A369 arm for all scenarios tested. The junction currently operates at near capacity during the AM peak and will continue to do so for the 2021 opening year for both the 'with scheme' and 'without scheme' scenarios. The junction is however predicted to operate above capacity for both the 2031 scenarios during the AM peak where the RFC values on the A369 arm will exceed the 0.85 threshold.

7.4.24 Queue lengths will increase from the 2015 Baseline as a result of both the scheme and future growth. The most significant increase is predicted to occur in the PM peak where queues in excess of 80 PCUs have been estimated on the A369 arm for the 2031 'with scheme' scenario. This represents an increase of 68 PCUs from the 2015 baseline assessment. However, comparing this with the 2031 'without scheme' scenario, the increase will be approx. 56 PCUs, thus suggesting the increase in traffic will be generated mainly by future growth as opposed to the scheme.

7.4.25 Although this junction is at capacity even before future growth has been added, **the proposed scheme will not have significant impact on the junction**.

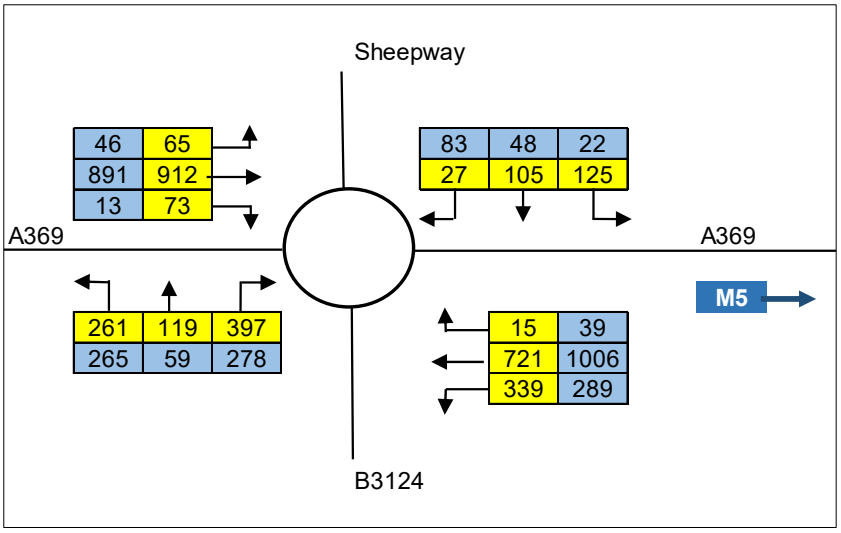

Figure 7-17: 2015 Surveyed traffic at Wyndham Way/Sheepway/Portbury Hundred
AM yellow, PM blue

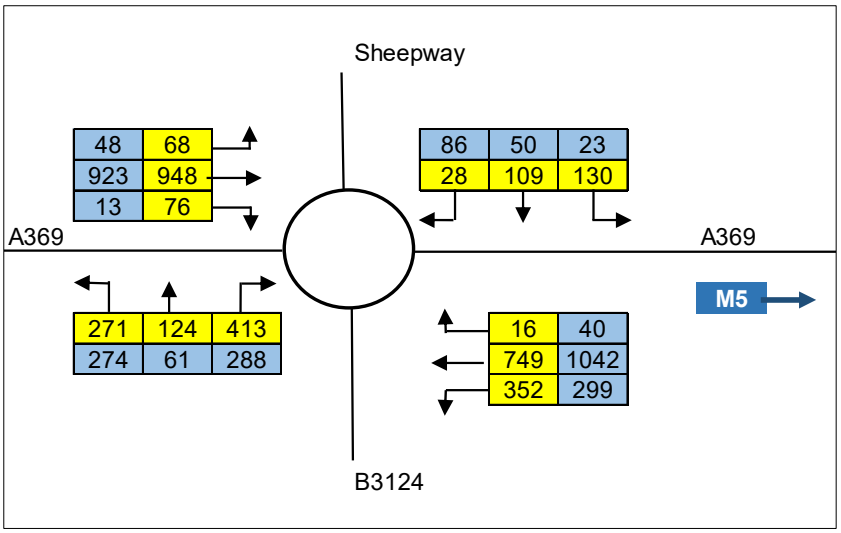

Figure 7-18: Future 2021 traffic at Wyndham Way/Sheepway/Portbury Hundred without Scheme
AM yellow, PM blue

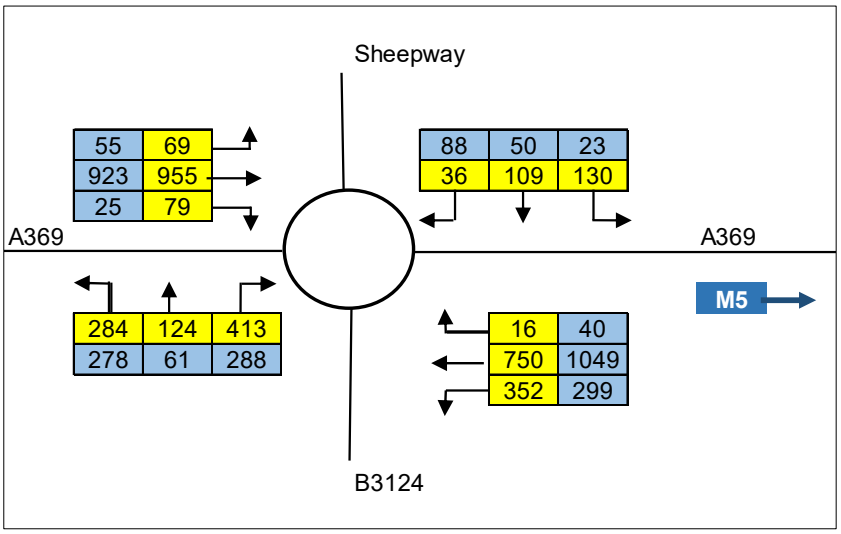

Figure 7-19: Future 2021 traffic at Wyndham Way/Sheepway/Portbury Hundred with Scheme
AM yellow, PM blue

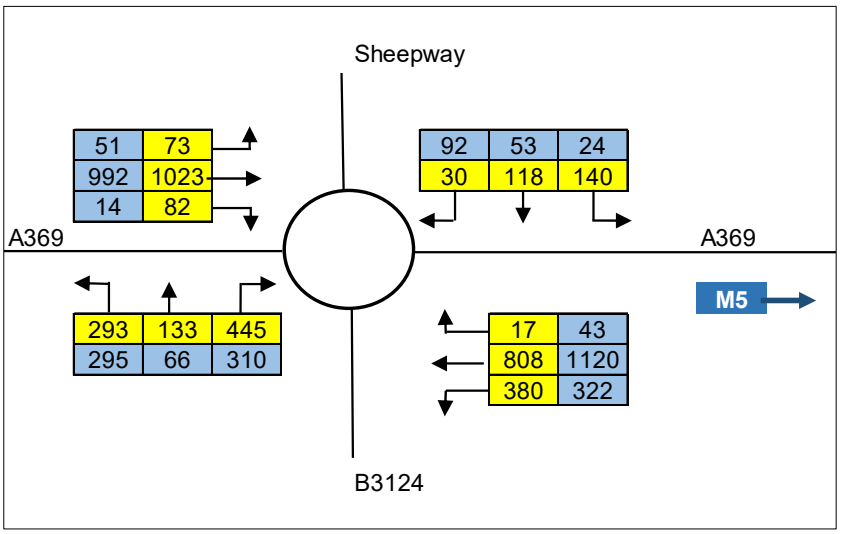

Figure 7-20: 2031 traffic at Wyndham Way/Sheepway/Portbury Hundred without Scheme
AM yellow, PM blue

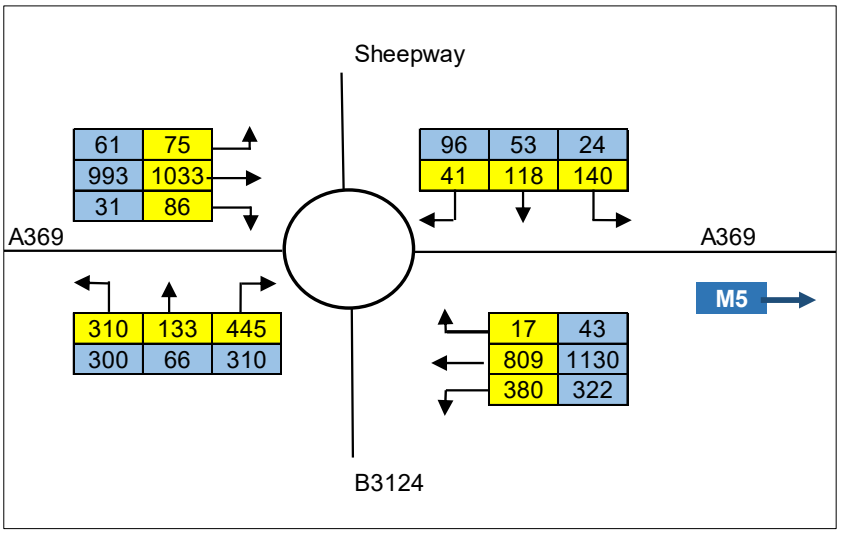

Figure 7-21: 2031 traffic at Wyndham Way/Sheepway/Portbury Hundred with Scheme
AM yellow, PM blue

Table 7.15: Junction Performance at Wyndham Way/Sheepway/Portbury Hundred without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2015 AM			2015 PM	
Sheepway	0	4.72	0.27	0	3.49	0.14
Portbury Hundred A369	7	11.85	0.8	16	41.77	0.96
Portbury Common B3124	1	3.69	0.47	0	4.17	0.43
Wyndham Way	2	7.02	0.69	1	4.86	0.59

Table 7.16: Performance at Wyndham Way/Sheepway/Portbury Hundred for opening year 2021

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2021 AM			2021 AM	
Sheepway	0	5.08	0.29	0	5.2	0.3
Portbury Hundred A369	5	14.22	0.83	5	14.7	0.84
Portbury Common B3124	1	3.93	0.49	1	4.03	0.5
Wyndham Way	3	7.99	0.73	3	8.21	0.74

Table 7.16: Performance at Wyndham Way/Sheepway/Portbury Hundred for opening year 2021

		2021 PM			2021 PM	
Sheepway	0	3.62	0.15	0	3.67	0.15
Portbury Hundred A369	27	63.58	1	31	72.5	1.01
Portbury Common B3124	1	4.4	1.46	1	4.44	0.46
Wyndham Way	2	5.19	0.61	2	5.35	0.62

Table 7.17: Performance at Wyndham Way/Sheepway/Portbury Hundred for horizon year 2031

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
	2031 AM			2031 AM		
Sheepway	1	6.03	0.35	1	6.27	0.36
Portbury Hundred A369	8	23.75	0.9	9	25.39	0.91
Portbury Common B3124	1	4.53	0.55	1	4.7	0.56
Wyndham Way	4	11.08	0.8	4	11.74	0.81
	2031 PM			2031 PM		
Sheepway	0	3.95	0.17	0	4.03	0.18
Portbury Hundred A369	72	142.81	1.08	84	164.16	1.1
Portbury Common B3124	1	4.82	0.5	1	4.84	0.5
Wyndham Way	2	6.07	0.66	2	6.4	0.68

M5 Junction 19

7.4.26 Section 6 of the Strategic Operational Impact Assessment examines the impact of the scheme on the strategic highway network. This includes the impact on Junction 19 of the M5. The modelling predicts increases in congestion at this junction associated with development growth in future years, but little change associated with the scheme.

Station Road/Heywood Road/Lodway

7.4.27 The existing junction is a priority junction and has been modelled using PICADY software. Figure 7.22 illustrates the total PCUs generated for the 2015 assessment periods taken from the surveys conducted while Figures 7.23 and 7.24 show the total PCU flows generated by this scheme for both the 2021 and 2031 assessment periods in the AM and PM peaks, with and without the proposed scheme respectively.

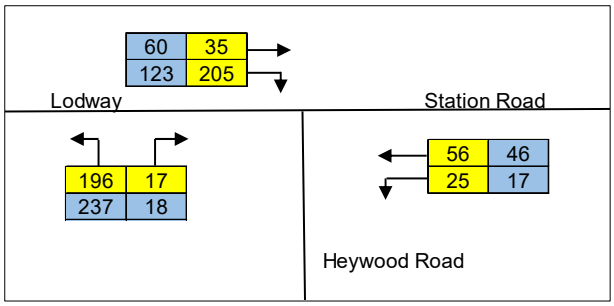

Figure 7-22: 2015 Surveyed traffic at Station Road/Heywood Road/Lodway
AM yellow, PM blue

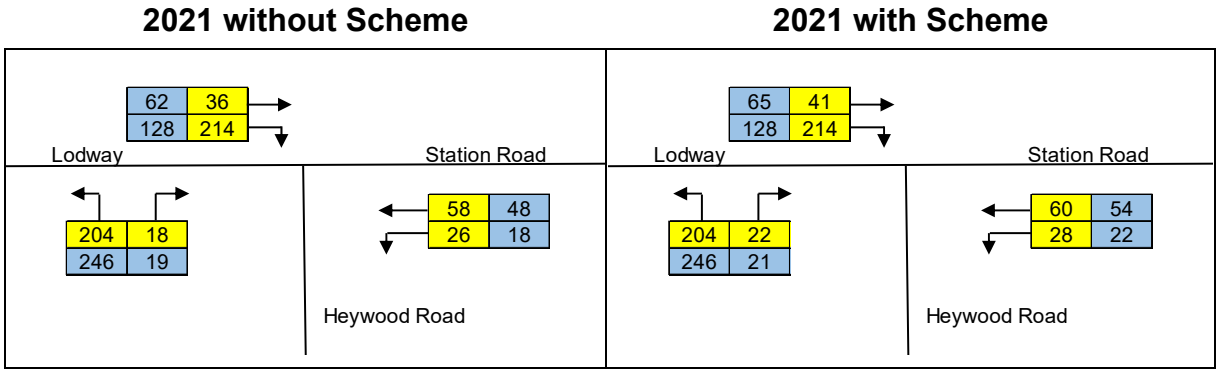

Figure 7-23: Future 2021 traffic at Station Road/Heywood Road/Lodway without and with Scheme
AM yellow, PM blue

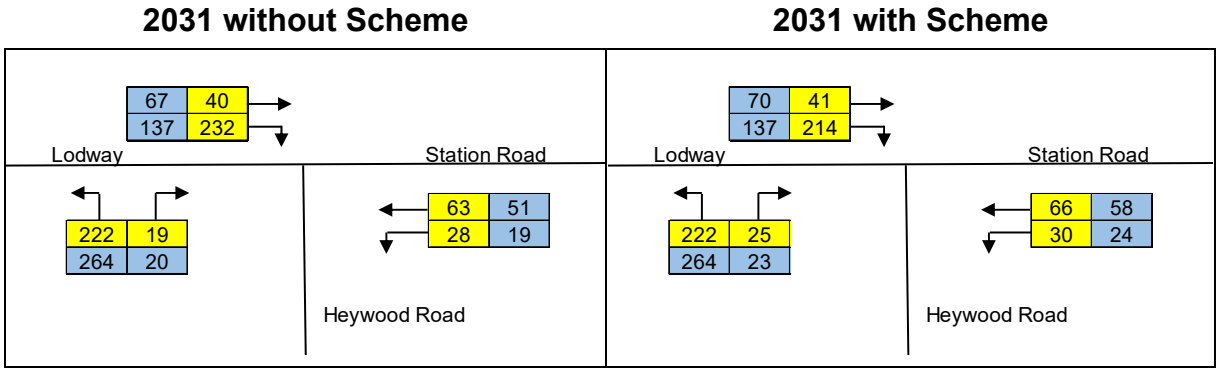

Figure 7-24: Future 2031 traffic at Station Road/Heywood Road/Lodway without and with Scheme
AM yellow, PM blue

7.4.28 Tables 7.18 to 7.20 provides an overview of the capacity of the junction for the 2015 baseline, 2021 opening years and 2031 horizon year periods. The results presented below show the junction to be operating well below capacity in 2021 and 2031 without the scheme with the highest RFC of 0.15 in the AM peak on the Station Road (north) arm in 2031. When the additional flow is added to include the proposed scheme, the impact of the scheme on the junction for both the 2021 and 2031 scenarios remain insignificant.

7.4.29 The PICADY results indicate that the proposed scheme does not have a significant impact on the junction and works well within capacity.

Table 7.18: Junction Performance at Station Rd/Heywood Rd/Lodway without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2015 AM			**2015 PM**	
Station Road (South)	0	5.99	0.04	0	5.67	0.03
Station Road (North)	0	8.45	0.13	0	7.99	0.10
Heywood Road	0	7.06	0.04	0	6.89	0.04

Table 7.19: Performance at Station Rd/Heywood Rd/Lodway for 2021

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2021 AM			**2021 AM**	
Station Road (South)	0	6.04	0.05	0	6.08	0.05
Station Road (North)	0	8.59	0.13	0	8.69	0.14
Heywood Road	0	7.12	0.04	0	7.2	0.05
		2021 PM			**2021 PM**	
Station Road (South)	0	5.7	0.03	0	5.76	0.04
Station Road (North)	0	8.1	0.11	0	8.25	0.12
Heywood Road	0	6.92	0.04	0	6.96	0.04

Table 7.20: Performance at Station Rd/Heywood Rd/Lodway for 2031

	without Scheme			with Scheme		
	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2031 AM			**2031 AM**	
Station Road (South)	0	6.15	0.05	0	6.13	0.05
Station Road (North)	0	8.92	0.15	0	8.93	0.15
Heywood Road	0	7.21	0.04	0	7.24	0.05
		2031 PM			**2031 PM**	
Station Road (South)	0	5.75	0.03	0	5.83	0.04
Station Road (North)	0	8.3	0.11	0	8.48	0.13
Heywood Road	0	6.99	0.04	0	7.04	0.05

A369/St Georges Hill

7.4.30 A369/Georges Hill is at present a priority junction and has been modelled using PICADY software. Figure 7.25 illustrates the total PCUs generated by the surveys undertaken for the 2015 baseline while Table 7.21 provides an overview of the capacity of the junction for this scenario.

7.4.31 Figures 7.26 and 7.27 shows the total PCUs for the junction without and with the Scheme for 2021 and 2031 assessments respectively.

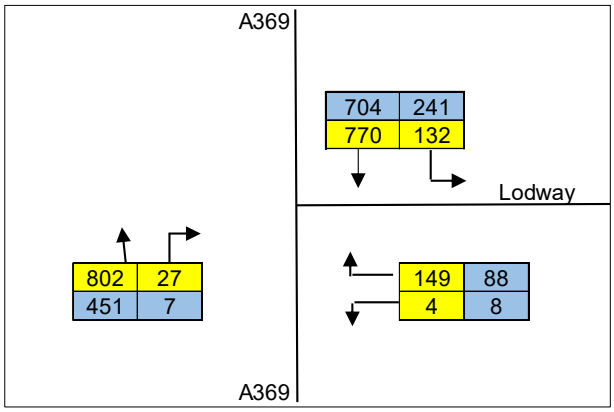

Figure 7-25: 2015 Surveyed traffic at A369/St Georges Hill
AM yellow, PM blue

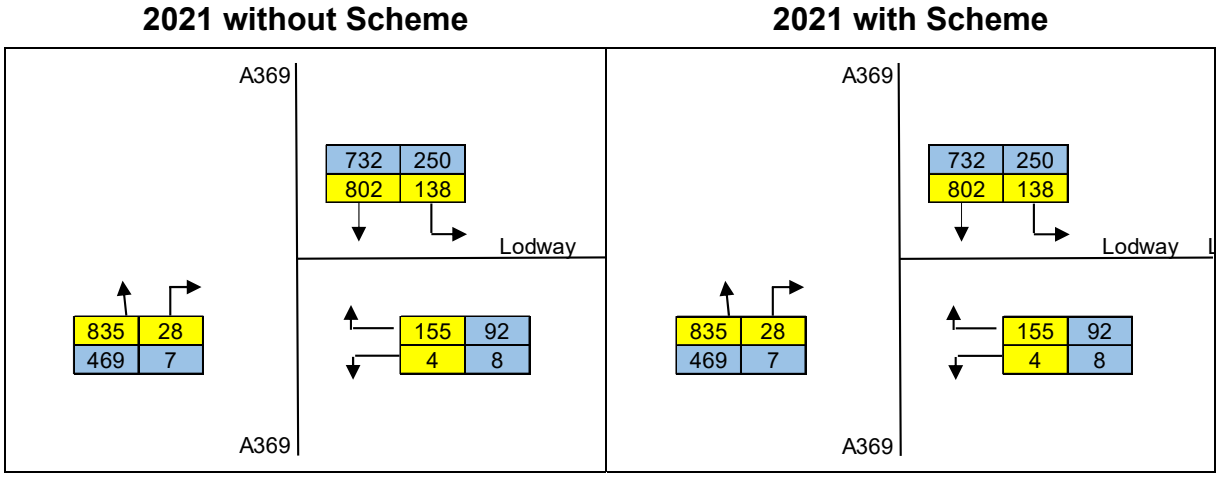

Figure 7-26: Future 2021 traffic at A369/St Georges Hill without and with Scheme
AM yellow, PM blue

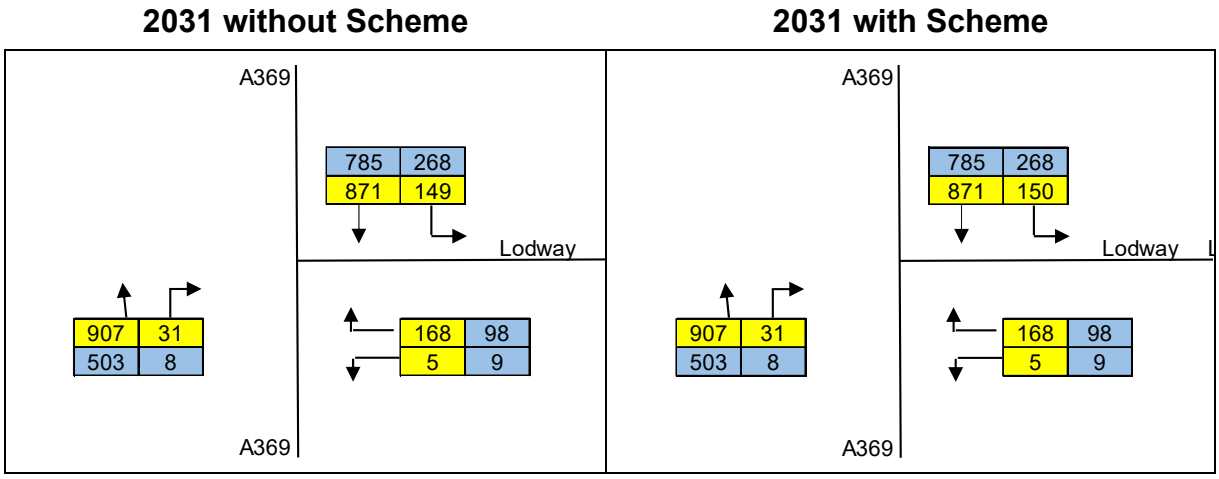

Figure 7-27: Future 2031 traffic at A369/St Georges Hill without and with Scheme
AM yellow, PM blue

7.4.32 The assignment and distribution of vehicle traffic at this particular location indicates that this junction is likely to experience a minimal change in vehicle flows. The figures suggest that there will be little or no change to flows as a result of future growth and/or the scheme. Given this, no further junction modelling has been undertaken.

7.4.33 The model suggests that the junction will operate well within capacity and the proposed scheme **will not have a significant impact on the junction**.

Table 7.21: Junction Performance at A369/St Georges Hill without scheme 2015

	Queue (PCU)	Delay (Sec)	RFC	Queue (PCU)	Delay (Sec)	RFC
		2015 AM			2015 PM	
St George Hill (Left turn)	0	10.1	0	0.02	8.93	0.02
St George Hill (Right turn)	1	23.7	1	0.33	12.5	0.25
A369	0	7.1	0	0.01	6.95	0.01

A369/Pill Road

7.4.34 The assignment and distribution of vehicle traffic to and from Pill Station indicates that this junction is likely to experience a minimal change in vehicle flows. In the opening year of 2021 and horizon year of 2031 shows just under one vehicle (rounding) arising from the scheme. This reflects the 4% assignment of total traffic to and from the station at this junction. Given the low level of the flows, no further junction modelling has been undertaken.

2019 traffic counts

7.4.35 A series of traffic counts were undertaken for selected sites in Portishead and Pill in April 2019, to consider whether the traffic situation has changed significantly since the main (2015) counts were carried out. The counts undertaken and their results in comparison with 2015 counts, are discussed in section 4 (including relevant tables and figures).

7.4.36 The key conclusion of investigating comparison between the counts was that traffic flows have not increased significantly, though the biggest increases are on Quays Avenue. However, while daily totals of traffic flow have increased, comparison of peak time traffic (both AM and PM peaks) indicates little change at most locations. Indeed, higher AM peak time flows were actually recorded in 2015 at many of the sites re-counted in 2019. On Quays Avenue, the figures for peak flows in 2015 and 2019 are virtually identical for peak flows at the southern end (near the A369) as well as for outbound AM and inbound PM flows at the northern end (near Phoenix Way). Opposing flows at this point were counted as higher in 2019, but these are the less dominant directions in terms of flows.

7.4.37 It should also be noted that traffic growth has been included in the assessments of the scheme, with assessments carried out in 2021 and 2031 based on background traffic increasing in line with TEMPRO figures. Using this technique would would add at least 2% to 2015 counts in order to estimate 2019 figures, bringing the comparison even closer. As noted, the actual transport assessments take place using 2021 and 2031 traffic and demand values (which add some 4% and 12%, respectively, to 2015 traffic levels).

7.4.38 Recognising that traffic flows have increased on Quays Avenue overall (though most movements have not changed much in the peaks), it is apposite to consider the assessed junctions that include Quays Avenue in a little more detail.

7.4.39 In essence, the Phoenix Way/Quays Avenue/Harbour Road junction has significant spare capacity, with RFC <0.5 on all arms in all assessed scenarios (with and without scheme in 2021 and 2031). The Quays Avenue/ Wyndham Way/Serbert Way (Sails roundabout) junction caters for more traffic, thought he dominant movements are associated with Wyndham Way, but still has significant capacity, with the highest modelled RFC modelled for Quays Avenue <0.6 (and the maximum of 0.75 modelled on any arm).

7.4.40 As such, it is considered that the traffic impacts carried out provide robust assessments, as the level of increased traffic noted in 2019 (compared to 2015) is not significant overall, and moreover the level of capacity available at key junctions is more than sufficient to cope with the scheme with any increased background traffic.

7.5 Severn Beach Line level crossing impacts

7.5.1 The scheme will result in changes to existing timetabled passenger services passing through three level crossings on the Severn Beach Line, located in the Avonmouth area, including at:

- East Town Rd;
- Avonmouth Gloucester Rd; and
- King Road.

7.5.2 The impact on the level crossings has been assessed using LinSIG. At all level crossings noted above, the impact is not considered significant. Details of the assessments are shown in **Appendix H**.

7.6 Ashton Vale Road Junction and Level Crossing

Modelling Approach

7.6.1 The impact of the scheme on the operation of the Winterstoke Road/Ashton Vale Road junction and the adjacent level crossing has been assessed using a combination of modelling the junction using LinSIG and VISSIM models. Full details of the modelling approaches and methodologies can be found in **Appendix N** (Ashton Vale Road Junction Assessments).

LinSIG model

7.6.2 The approach taken by the LinSIG modelling was to initially consider how the existing Method of Control at the junction works now, going on to presents assessment results for the existing layout as a base situation. Then a typical ‘closure’ scenario with a train passing through the junction is assessed, incorporating the proposed junction improvement measures (extension of the left turning lane into Ashton Vale Road on the Winterstoke Road northbound approach and introduction of MOVA control).

7.6.3 Unlike the base-line scenario which considers a recurrent stage sequence over the full duration of each weekday peak hour, these analyses focus attention on a shorter period covering the level crossing barrier ‘down’ time and the following one to two signal cycles. This approach allows conclusions to be drawn concerning the likely impact of a closure on the overall junction capacity and operating conditions on Ashton Vale Road.

VISSIM model

7.6.4 The assessment has been carried out using the Winterstoke Road/Ashton Vale Road VISSIM model, developed for MetroWest Phase 1 assessments. The model network includes the Winterstoke Road/Ashton Vale Road junction and its approach arms comprising the A3029 Winterstoke Road, Marsh Road and Ashton Vale Road, as well as the Ashton Vale level crossing and railway line.

7.6.5 The VISSIM model has been calibrated and validated for use in assessing the impact of the MetroWest Phase 1 scheme and for testing measures aimed at alleviating the impact of longer and more frequent level crossing closures.

7.6.6 Model calibration has been achieved through comparison of observed and modelled turning movements for every hour modelled. The calibration results achieved by the model not only confirmed the accuracy in the input of observed traffic flows into the model, but also confirm that the modelling of signals, saturation flows, gap acceptances and reduced speed areas offer a realistic representation of reality and replicate operational conditions within the modelled network.

7.6.7 The models have been validated through comparison of observed (floating car observer) and modelled journey times on the approaches to the junction. These checks have shown that the models validate to TfL and DMRB acceptability criteria. Together with the calibration results, the validation checks confirm that the model is fit for purpose for assessing the impact of the MetroWest Phase 1 scheme and for testing measures aimed at alleviating the impact of longer and more frequent level crossing closures.

Scenarios considered

7.6.8 A range of potential rail scenarios involving movements of both MetroWest Phase 1 passenger trains and freight trains that currently use the railway that passes through the level crossing. NRIL has carried out operational analysis of these rail scenarios in RailSys which has informed the frequency and duration level crossing closures assumed in the VISSIM model. Key features of the scenarios tested in the models include:

- Base year – with and without level crossing closures;
- Future year – freight trains only and no passenger service; and
- Future year – with MetroWest services and freight trains.

7.6.9 Individual scenarios consider different combinations of passenger and freight trains movements trough the level crossing, and whether the proposed highway measures are assumed to be in place or not. In addition, sensitivity tests considered the situation where there are passenger trains and no freight trains and potential additional peak period only ‘infill’ passenger services (giving a broadly 45 minute interval service to Portishead).

7.6.10 Details of rail assumptions and scenarios tested are set out in **Appendix N**.

Results and conclusions of modelling

7.6.11 The modelling results obtained from both LinSIG and VISSIM exhibit a high degree of correlation in predicting the additional delay and level of queuing expected on Ashton Vale Road following a level crossing closure during the critical weekday PM peak period. Both confirm that any expected impact would not be severe, whilst recovery to normal operating conditions on this side road is likely to be achievable in only one or two signal cycles following the lifting of the barrier. The main reasons for what is expected to be broadly a ‘neutral’ impact, and certainly not a severe one, are as follows:

- The expected barrier down-time is no longer than the typical cycle times needed now in the weekday AM and PM peak hours. As such, drivers arriving on the Ashton Vale Road approach would, at worst, have the appearance of the stage controlling this arm curtailed only once;

- Lost green time to Ashton Vale Road incumbent on a closure is capable of being compensated for fully in the first 'normal' cycle following the event, or at worst two cycles;
- The expected closure frequency with two passenger trains per hour and even an intervening freight service, have sufficient duration between them to ensure full 'compensation' and return to normal traffic operation between successive closures; and
- Whilst additional green (compensation) time is needed to clear the build-up of queuing in Ashton Vale Road post-closure, the critical southbound movement on the A3029 also benefits from less interruptions to its green time during the closure when only a 4-5-6 stage sequence operates. As such, these effects tend to cancel each other out when considering the overall capacity and PRC at the junction over a given hour.

7.7 Parking impacts

Context of North Somerset Parking Standards

7.7.1 The North Somerset Parking Standards Supplementary Planning Document (SPD) defines and outlines the authority's approach to parking for new schemes/developments. The document is used to provide further detail to existing development plan policies, but it cannot create new policy. In this case, the Parking Standards SPD provides further clarification of the Core Strategy Policy CS11 on parking which states:

7.7.2 'Adequate parking must be provided and managed to meet the needs of anticipated users (residents, workers and visitors) in usable spaces. Overall parking provision must ensure a balance between good urban design, highway safety, residential amenity and promoting town centre attractiveness and vitality.

7.7.3 New developments must seek to maximise off street provision, assess where on-street provision may be appropriate, demonstrate that buses, service and emergency vehicles are not restricted, and ensure that the road network is safe for all users.'

7.7.4 The document explains that at non-residential locations, it is essential to manage the demand for car use by ensuring that the availability of car parking spaces does not discourage the use of alternative transport modes whilst ensuring that commuter car parking does not adversely impact on the surrounding local area.

7.7.5 The scheme proposals currently sit outside the non-residential standards for both vehicle and cycle parking. However the document does state that other uses such as this scheme will take account of Policy CS11 above. However, the schedule does outline the requirements of disabled parking and motorcycles.

7.7.6 In terms of disabled parking, non-residential development should provide a minimum of 5% of their total parking space for people with disabilities. With motorcycle parking, this should be at a minimum of 3% of the relevant required parking.

Portishead Station

7.7.7 Figure 7.28 shows the predicted demand for parking at Portishead Station in 2031 together with the number of parking spaces that will be provided by the Scheme.

7.7.8 In light of the particular circumstances where the Harbourside Family Practice at the Marina Healthcare Centre currently relies on on-street parking, a number of measures are proposed. A short stay car parking tariff is proposed, in addition to an all-day tariff; the short stay tariff is likely to be for durations of stay up to two hours and set at an attractive rate for anyone wishing to use the car park. As well, 6 disabled parking spaces will be provided in the car park immediately opposite the Centre, and linked to it by a pedestrian crossing. It is anticipated that these measures will be sufficient. However, should monitoring after opening suggest otherwise, another measure that could be explored is the allocation of a batch of car parking season permits for use by practice staff.

7.7.9 The analysis indicates that in the opening year and 10 years after commencements of operation, the number of parking spaces will be more than sufficient to meet demand even assuming 10 vehicles are parked overnight.

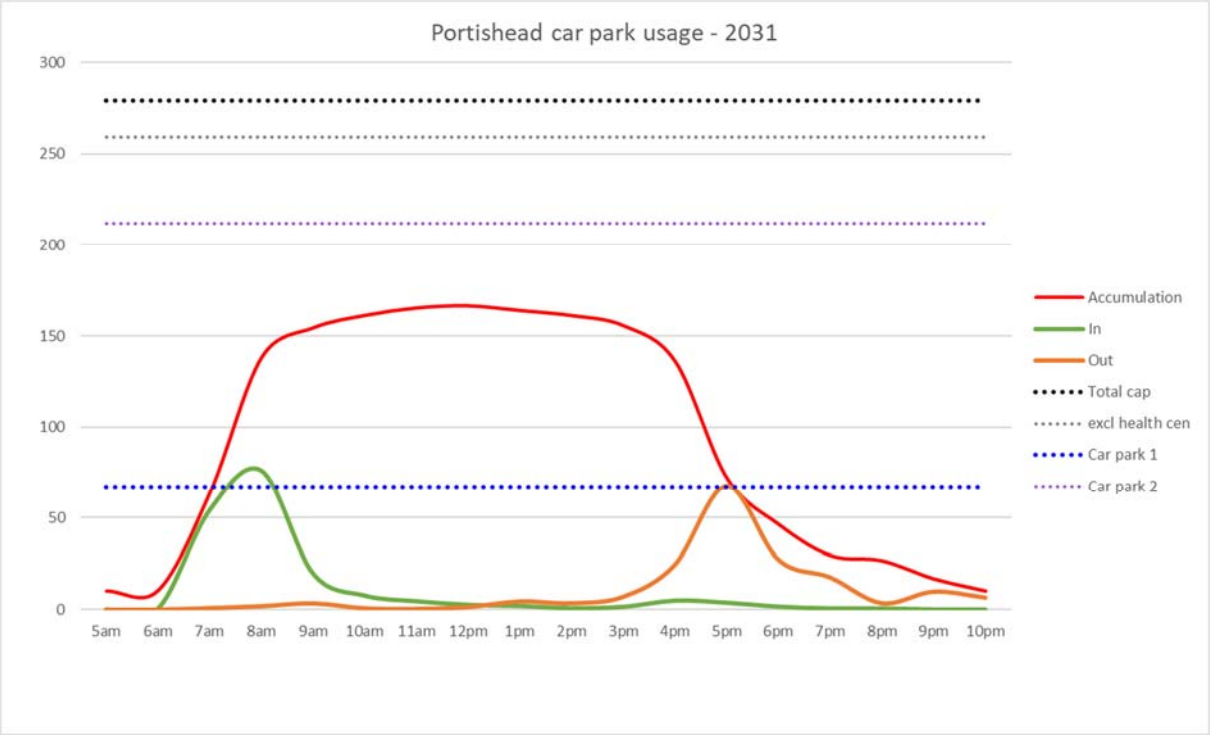

Figure 7-28: Portishead Station Parking Demand 2031

Pill Station

7.7.10 Figure 7.29 shows the projected parking demand at Pill Station in 2031.

7.7.11 The analysis suggests that the car park will be more than sufficient to meet demand at the station for both periods even assuming 5 vehicles are parked overnight.

Car parking impacts on neighbouring streets

7.7.12 The car parking assessment indicates that there should be sufficient spaces to meet rail related demand. Nevertheless on-street parking will remain attractive as follows:

- Some users will want to avoid the proposed parking charges;
- There may be convenient on-street locations close to the stations which may result in opportunistic parking; and
- Some pick up journeys may result in vehicles waiting on nearby streets because of waiting restrictions.

7.7.13 Section 9.3 provides further detail of the development of parking measures.

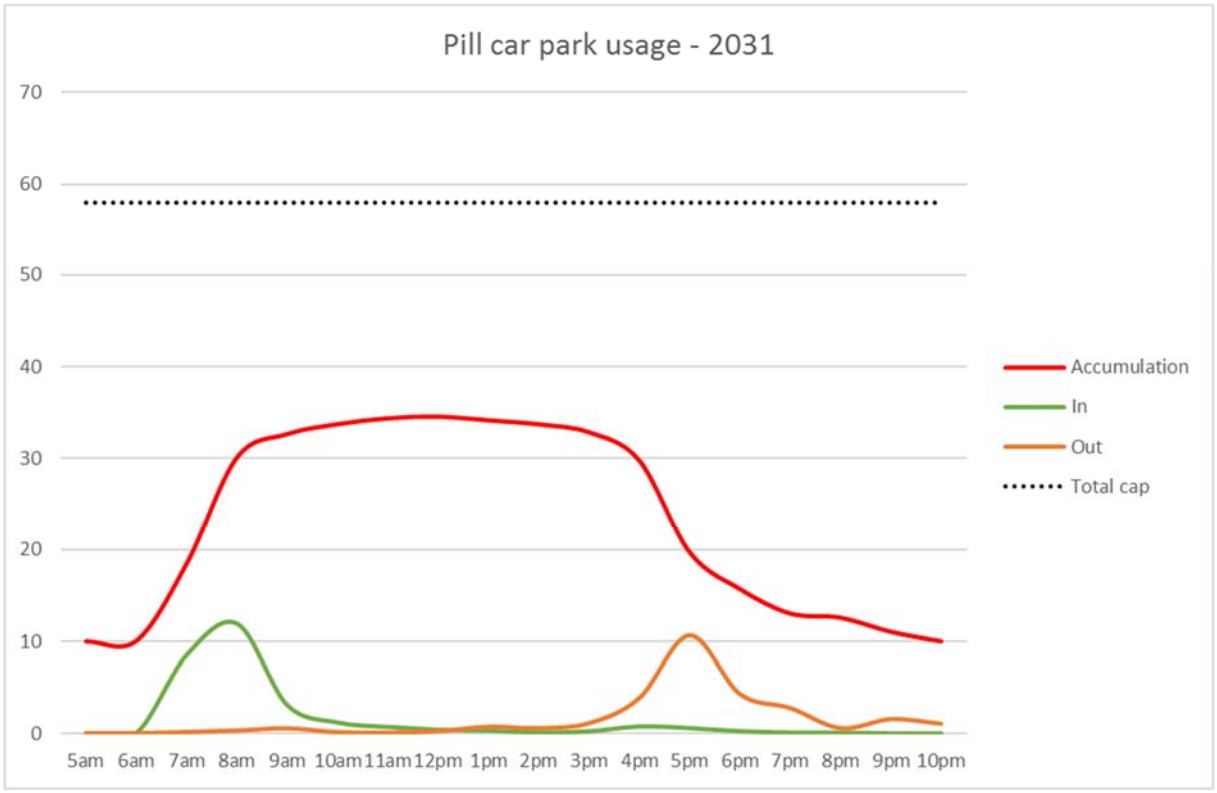

Figure 7-29: Pill Station Parking Demand 2031

7.8 Walking and cycling impacts

Context of North Somerset Highways Design Guide (October 2015)

7.8.1 The North Somerset Highways Design Guide was adopted by the local authority in October 2015. It sets out the standards and approach to design in connection with highways, footways, accesses and a range of other aspects of highway design. The guidance applies to all highways schemes relating to new development within North Somerset including alterations or works to the existing highway and other transport infrastructure and associated works.

7.8.2 The guide outlines a hierarchy system for highways within the area. The authority emphasises the importance of this hierarchy and the need to give it

due consideration at the outset with any new development. This hierarchy outlines the function of each type of highway and the design standards required such as minimum carriageway width.

7.8.3 The guide also states as part of any new development, key pedestrian and cycling routes and destinations must be identified. Reference is made to Local Transport Note Policy LTN 1/04 'Planning and Design for Walking and Cycling' and LTN 2/08 'Cycle Infrastructure Design'. This sets out the common design principles for pedestrian and cycle provision. It notes the road network is the most basic and important cycling facility available, and the preferred way for providing for cyclists is to create conditions on the carriageway where cyclists are content to use it, particularly in urban areas.

7.8.4 The document also refers to PRoWs. The design, specification and construction required for the PRoW will be determined by the rating of the route in the network hierarchy. Where any PRoW shown on the Definitive Map and Statement is affected by proposals, provision should be made for the PRoW including suitable diversion or replacement where necessary.

7.8.5 As a result, the design of the scheme will need to give consideration and conform to these elements within North Somerset.

Audit of Routes

7.8.6 An audit of the walking and cycling routes was undertaken. A range of impacts have been identified and these have been ranked using a high, medium and low system. In terms of the scheme, these are broadly defined as:

- **High –** The impact of the scheme is likely to lead to significant highway safety concerns for pedestrians and cyclists and/or are critical for improving access to and from the stations;
- **Medium –** These are moderate highway related concerns and/or would be beneficial for improving access to and from the stations; and
- **Low –** These concerns would be beneficial in improving the conditions for walking and cycling trips.

7.8.7 Tables 7.22 and 7.23 set out the locations (routes) that have been audited in Portishead and Pill respectively, including the summary impact for the section concerned (L = low; M = medium; H = high). Full results of the audit can be found in **Appendix J**.

Table 7.22: Portishead NMU audit results

	Route and Location	Summary Impact
Route 1 – Quays Avenue towards Brampton Way		
1A	Quays Avenue junction with Phoenix Way/ Harbour Road	H
1B	Quays Avenue towards junction with Wyndham Way	H
1C	East along Wyndham Way and cross at bridge over river to Brampton Way	M

Table 7.22: Portishead NMU audit results

	Route and Location	Summary Impact
Route 2 – Phoenix Way towards Port Marine residential area		
2A	Towards junction of Phoenix Way/Quays Avenue/Harbour Road from Phoenix Way	L
2B	East on Phoenix Way	L
2C	Phoenix Way Port Marine	L
Route 3 – Harbour Road towards Portishead Marina		
3A	Phoenix Way/Quays Avenue/Harbour Road towards Harbour Road	H
3B	Along Newfoundland Way	L
3C	Newfoundland Way towards Portishead Marina	L
Route 4: Harbour Road towards Waitrose		
4A	Continue west towards Waitrose and the town centre	L
Route 5: Harbour Road cut through to Old Mill Road towards Nore Road		
5A	Towards the town centre via Old Mill Road	H
5B	Enter Old Mill Road heading west and join the top of Wyndham Way	M
Route 7: Trinity School towards Brampton Way		
7A	Head south through a permissive route towards Galingale Way and continue through The Vale Park	H
7B	Enter the footpath after Ladymead Road heading south until it reaches the A369	L

Table 7.23: Pill NMU audit results

	Route and Location	Summary Impact
Route 1 – Back Lane through Station Road to Lodway Avenue		
1A	Head southwest on Station Road	M
1B	Station Road/Lodway	H

Table 7.23: Pill NMU audit results

	Route and Location	Summary Impact
Route 2: Sambourne Way through to Stoneyfield		
2A	Head south down Back Lane and turn northwest into Sambourne Way	L
2B	Enter pedestrian path heading west until Oak Grove	M
Route 3: Station Road through Springfield Rd/Ruddleigh to Cross Lanes		
3A	First right enter into Springfield Road and continue south into Ruddleigh Road	L
3B	Enter Cross Lane at the T junction	L
Route 4: Heywood Lane through Wilmots Way/Water Lane to Brookside towards		
4A	Enter Water Lane and continue south through pedestrian walkway to Wilmots Way	M
4B	Turn right onto Westward Drive and immediately cross to enter Anchor Way	L
4D	Continue south on Anchor Way until Brookside	L
Route 5: New Road through Baltic Place/Pill Street to Ham Green		
5A	Enter New Road and continue southeast until Pill Street	M
5B	Continue east on Pill Street and turn into Baltic Place	M
5C	Turn left onto Mount Pleasant and then onto Eirene Terrance	M
5D	Continue south along Ham Green	L
Route 6 – Back Lane towards Marine Parade		
6A	Head north along Back Lane and enter pedestrian route further into Back Lane	H
6B	Turn onto Myrtle Hill	L
Route 7: Monmouth Court towards Avon Road		
7A	Head west along Monmouth Road	H
7B	Continue into Monmouth Court and turn right at Avon Road	H
7C	Continue left onto Avon Road	L

7.9 Summary of benefits and impacts

7.9.1 In general, the above assessment indicates that the impact of the scheme has minimal adverse effect on the operation of junctions. The initial assessment provided an overview of junction performance using the proposed traffic scenario from base year 2015, opening year 2021 and horizon year 2031. A summary of the impacts has been presented in Table 7.24.

Table 7.24: Summary of Impacts

Location	Type of impact	Comment
Junctions		
Phoenix Way/Quays Avenue	Not significant	
Station Road/Harbour Road/Cabstand	Not significant	
Quays Avenue/Wyndham Way/Serbert Way	Not significant	
Cabstand/Wyndham Way/High Street	Not significant	Junction currently at capacity though the scheme will not have a significant impact on its current operation.
Wyndham Way/ Sheepway/Portbury Hundred	Not significant	
M5 Junction 19	Not significant	Congestion predicted to increase as a result of future development growth as opposed to the scheme.
Station Road/Heywood/Road/Lodway	Not significant	
A369/St. Georges Hill	Not significant	
A369/Pill Road	Not significant	
Ashton Vale Road/Winterstoke Road junction (near level crossing)	Not significant	Scheme includes improvements at junction. Refer to Section 7.6 and Appendix N
Parking		
Portishead and Pill station	Streets vulnerable to overspill parking or to vehicles refusing to pay the tariff to park at the station	No. of spaces at station to exceed the demand on year of opening and 10 years after year of opening. Some drivers may refuse to pay parking charges and seek to park on neighbouring streets.

SECTION 8

Construction Impact Assessment

8.1 Introduction

8.1.1 This section of the TA assesses the extent of the construction impacts on transport networks. As a linear development, the construction works will have an extensive effect across the area with specific locations having some greater impacts.

8.2 Construction Works

8.2.1 The Construction Strategy for the Scheme (refer to section 3.2 for scheme description) is being developed by NRIL, but will not be fully detailed until the construction contractor is on board. The outline construction strategy focuses upon the compounds and possible access points from the highway network that will be required. This report seeks to establish an expected construction approach with the information available at the time of writing.

8.2.2 The construction strategy, where possible, will seek to move as much of the construction materials and waste by rail. Where access by road is needed, deliveries and waste removals will avoid the peak traffic periods, where possible. However, the assessment presented in this section does not assume this to be the case, rather a realistic worst case for transport impacts has been considered.

Movement of ballast

8.2.3 This methodology depends on a number of assumptions. The exact methodology will be confirmed by the contractor ahead of construction. A series of options are being considered.

8.2.4 It is currently anticipated that track formation and new ballast materials will be brought into the rail sidings at Avonmouth or Portbury Docks (subject to agreement with the Port Authority). The material could then be transported to site or compound using HGVs. It is assumed that the new materials would be stockpiled at compounds (Portbury Hundred and Lodway) until ready to be transported to site. If the sidings are not available the materials could be brought in from other local sub-regions or a temporary rail head created adjacent to the Lodway compound.

8.2.5 It is anticipated that the old ballast will be transferred via haul roads to the construction compounds (Portbury Hundred and Lodway) to be stockpiled. It will then be transferred via HGV to the rail sidings at Avonmouth or Portbury Docks (subject to agreement with the Port Authority) for removal via rail. Should this not be available materials could be removed off site onto engineering trains once the new line has been constructed.

Assumptions for assessment

8.2.6 The DCO Scheme requires certainty in respect of there being an available location for the rail facility for the transfer of materials. The DCO Scheme must have a rail head facility available for it when construction commences and this certainty can only be provided by securing temporary possession of

the Lodway compound, with sufficient land included for part of that land to be used for a rail transfer facility. It is not practicable for the DCO Scheme to seek to sterilise the Port's use of either of its sidings for an uncertain period of time prior to construction commencing, and without the DCO Scheme significantly impacting on the Port's ability to use its estate.

8.2.7 The options are relatively close together geographically, which contains the highway traffic impacts to a relatively small area. Each proposal would use J19 or J18A (for Avonmouth Docks) of the M5. Given the proximity of the disused railway to each location, impacts on the local highway network are limited to a small geographic area. Each proposal would potentially impact the Portbury Hundred, Royal Portbury Dock Road, Marsh lane, A403 between J18A and St Andrews Road.

8.2.8 The assessment of environmental effects has assumed a worst case, based on noise impacts, which is anticipated to be the impacts on local receptors of a rail-head at Lodway.

8.3 Construction Access and Compounds

8.3.1 A number of temporary construction compounds have been identified as critical to the delivery of the construction phase of the scheme. These are detailed in Tables 8.1 and 8.2 and shown in Figures 8.1 to 8.3. The tables identify the locations, purposes and access to compounds, as well as the extent of HGV movements, on-site parking and the level of material storage.

Table 8.1: Construction Compounds

Ref	Name	Location	Main Purpose	Access
C16	Portishead Station	Portishead on the sites of new station car parks (both A on eastern side of the realigned Quays Avenue and B to the west of Quays Avenue)	For construction of Portishead Station and Trinity bridge. There is potential to use as a laydown area for Trinity bridge, subject to space availability	Access off Portbury Hundred, Wyndham Way and Quays Avenue. The majority of the deliveries will be on standard HGVs
TB	Trinity bridge lay down		As required combined with use of Portishead station compound	As Portishead station compound
C15	Sheepway	North of disused railway and Sheepway (opposite Shipway Gate Farm)	To facilitate works on the disused line	Access via Sheepway Road and haul roads. Access could also be from Portishead via the disused railway line

Table 8.1: Construction Compounds

Ref	Name	Location	Main Purpose	Access
C14	Portbury Hundred	Land between the disused railway and The Portbury Hundred	Main compound for disused line track works	Access off the A369 Portbury Hundred to the west of the junction with Station Road, as well as from haul roads. Junction to be constructed with access restricted to left in/left out only
C13	Lodway Farm	Fields between the M5, the disused railway and The Breaches in Pill	To support works happening through Pill including track works, station, earthworks and other structural works. This compound will also be used to stockpile materials before onward disposal or use by the scheme	Access through Pill is limited due to narrow roads. The access route will be confirmed ahead of construction. Access will be for personal vehicles, small vans, minibuses and HGVs HGV access will be avoided during peak hours where possible to reduce traffic impact on local roads. Traffic management may be necessary; this may include temporary road closures and parking restrictions subject to agreement from NSDC Access into the compound is likely to be via a temporary haul route. A temporary access ramp may be needed from the haul route, across the railway and into the compound. Pedestrian footpaths and cycle routes will need to be redirected to allow this (to be carried out by The MW1 Project Team)
C12	Avon Road	Avon Road, Pill	Construction of Avon Road underbridge and associated earthworks	Access through Pill. Access is narrow and restricted. Cycle path will need to be closed. Garages need to be demolished

Table 8.1: Construction Compounds

Ref	Name	Location	Main Purpose	Access
C11	Monmouth Road	A former goods yard, off Monmouth Road, Pill	To facilitate construction activities through Pill including Pill Station and Pill viaduct. Used to store materials, localised welfare and machinery	Road access to Monmouth Road will be minimised as much as possible due to the narrow roads, which will prevent access by low loaders (to deliver RRVs directly to the compound). Bulk material deliveries should be delivered by rail where possible on the existing freight line. If direct HGV deliveries are required to the compound then additional traffic management may be necessary through Pill (this may include road closures and parking restrictions in agreement with the local authority). The exact access route through Pill will be confirmed ahead of construction Station Road Overbridge at POD 126m 9ch has a 40-tonne limit
C10	Pill Station Top	Station Road, Pill	For construction of top of ramp at Pill Station and demolition of Old Pill Station	Access through Pill
PM	Pill Memorial Club	Pill Memorial Club car park	Bus stops and car park construction	Access through Pill
C9A	Pill Viaduct	Mount Pleasant, Pill	Repairs to Pill viaduct and Mount Pleasant embankment works	Access through Pill
C9	Ham Green Compound	Field off Macrae Road, Ham Green	Works through Pill and works through the gorge. Switch and crossing (S&C) unit and track works through Pill. Works in Pill tunnel. Signalling and telecoms works	Access is very steep and narrow from Chapel Pill Lane, low loaders may be able to access the top of the lane and this will only be suitable for small scale deliveries

Table 8.1: Construction Compounds

Ref	Name	Location	Main Purpose	Access
C8	Chapel Pill Farm	East of Chapel Pill Farm (south of railway line)	S-14 underbridge strengthening works, installation of new pedestrian maintenance access point to be installed, facilitate fencing works	Access off Chapel Pill Lane through Chapel Pill Farm
C7	Miles Dock	Avon Gorge	To support strengthening works to Miles Dock Underbridge and Quarry Underbridge (QUB) number 6, retaining wall/structure works, the installation of pedestrian access and fencing	Pedestrian access is from the cycle path and other access available is from the railway; some vehicles may travel along the tow-path
C6	Quarry UB4	Avon Gorge	To support QUB no.4 and QUB no. 5 strengthening works, works to access points (near QUB no. 5), minor earthworks to retaining structures and fencing installation	Pedestrian access is from the cycle path and other access available is from the railway; some vehicles may travel along the tow-path
C5A	Quarry UB2	Avon Gorge	The compound is required to support strengthening works to QUB no.2, minor earthworks of retaining structures and the installation of telecoms equipment and fencing	Pedestrian access is from the cycle path and other access available is from the railway; some vehicles may travel along the tow-path

Table 8.1: Construction Compounds

Ref	Name	Location	Main Purpose	Access
C5	Quarry UB	Avon Gorge	The compound is required to support strengthening works to Valley UB, works to access points, minor earthworks to retaining structures and fencing installation	Pedestrian access is from the cycle path and other access available is from the railway; some vehicles may travel along the tow-path
C4	Clanage Road access point	Clanage Road, Bower Ashton	Could be used to park a vehicle to support work at Valley UB and QUB2, to facilitate fencing works	Access from A369 Rownham Hill (existing NRIL access point)
C4	Clanage Road	Clanage Road, Bower Ashton	To provide a main compound for construction activities through the Avon Gorge, including track works, earthworks, underbridge strengthening, signalling and telecoms. This site could also be used as a main compound for works through to Parson Street Junction and staff parking	Road access will be from the A369. Deliveries should be managed carefully to mitigate against causing traffic congestion on this route
M5	M5 Compound		To be used for RRV access, and some deliveries	Access will be via Royal Portbury Dock Road and Marsh Lane
Q UB6	Quarry UB 6		Quarry UB 06 strengthening works	Pedestrian access is from the cycle path and other access available is from the railway; some vehicles may travel along the tow-path
LL	Liberty Lane	Within the existing Freightliner Site at Liberty Lane sidings	Will be used as a lay down area and as a main compound for track works in the Parsons Street area.	Access is off South Liberty Lane Bristol

Table 8.1: Construction Compounds

Ref	Name	Location	Main Purpose	Access
			A reduced size may be retained to provide welfare for works on the POD and into the Avon Gorge	
WR	Winter-stoke Rd	Adjacent to highway	Used for highway works at Winterstoke Road, Ashton Vale Road junction	Access off Winterstoke Road and Ashton Vale Road

Located in Part 4 of Appendix 16.1

Figure 8-1: Portishead Construction Compounds

Located in Part 4 of Appendix 16.1

Figure 8-2: Pill and Avon Gorge Construction Compounds

Located in Part 4 of Appendix 16.1

Figure 8-3: Avon Gorge and Ashton Vale Construction Compounds

Table 8.2: Construction Compound facilities, working hours and timescales

No.	Name	Car Parking	Storage	Welfare facilities	Working hours and Timescales
C16	Portishead Station Site Compound	Main compound to provide parking	Material storage	Welfare facilities and site offices	There is likely to be a construction presence here for the duration of the project, from the outset of the construction due to works at Quays Avenue through to completion of Portishead Station and Trinity bridge Mainly daytime working 6am to 6pm, although due to programme constraints some night time working may be necessary

Table 8.2: Construction Compound facilities, working hours and timescales

No.	Name	Car Parking	Storage	Welfare facilities	Working hours and Timescales
TB	Trinity bridge lay down	None	Lay down area		Similar to Portishead main station compound
C15	Sheepway	Small amount of parking	Materials storage	Localised welfare facilities	For the duration of the works on the disused line. A smaller permanent maintenance compound will be retained after the project
C14	Portbury Hundred	Parking for staff vehicles. Site could also be used as an overflow for short periods of high activity elsewhere with a minibus taking staff to other sites	Materials storage	Welfare facilities and site offices	Primarily daytime working from 6am to 6pm (not including time to set up and set down), although certain deliveries may need to be outside of these hours. Periods of 24-hour working may be necessary The compound will be used for the duration of the project
C13	Lodway Farm	High level of parking for staff	Materials storage	Welfare facilities and site offices	For the duration of the project. Daytime working will be undertaken where possible from 6am to 6pm (not including periods of set up and set down) but periods of 24-hour working may be necessary
C12	Avon Road	None	Small scale deliveries, storage, lay down area and crane pad	Small welfare unit	For the duration of the works to Avon Underbridge and the earthworks
C11	Monmouth Road	Small amount of parking	Storage of materials, plant and machines will also be required	Localised welfare facilities	The compound will be used for the duration of the works and will predominantly facilitate daytime working, although some night time works may be required

Table 8.2: Construction Compound facilities, working hours and timescales

No.	Name	Car Parking	Storage	Welfare facilities	Working hours and Timescales
			(and permanent RRAP access point)		
C10	Pill Station Top	None	Small scale deliveries, storage and lay down area	Small welfare unit	Old Pill Station demolition is to be completed before construction works. The compound is required for the duration of the works to Pill Station
PM	Pill Memorial Club	Small amount of parking	Small scale deliveries, storage and work area	Small welfare unit	Duration of works to Memorial Club car park and bus stops on Lodway / Heywood Road
C9A	Pill Viaduct	Pill library car park to be used for parking	Small scale deliveries and storage facilities	Small welfare unit	The compound is required for the duration of the works to Pill Viaduct
C9	Ham Green	Small amount of parking	Materials storage	Small site cabin, welfare facilities	For the duration of the construction works
C8	Chapel Pill Farm	None	Small scale deliveries and storage facilities	Small welfare unit	For the duration of the S-14 Underbridge works
C7	Miles Dock	None	Materials & equipment storage	Small welfare unit	The compound is required for the duration of works to Miles Dock and associated works through the Avon Gorge
C6	Quarry UB4	None	Materials & equipment storage	Small welfare unit	The compound is required for the duration of works to QUB no.4 and QUB no. 5 and associated works through the Avon Gorge
C5A	Quarry UB2	None	Materials & equipment storage	Small welfare unit	For the duration of works to QUB no. 2 and associated works through the Avon Gorge

Table 8.2: Construction Compound facilities, working hours and timescales

No.	Name	Car Parking	Storage	Welfare facilities	Working hours and Timescales
C5	Quarry UB	None	Materials & equipment storage	Small welfare unit	For the duration of works to Valley UB and associated works through the Avon Gorge
C4	Clanage Road Access Point	Parking for welfare van or works vehicle			For the duration of the construction works
C4	Clanage Road	Medium sized parking area. Site could be used for staff parking	Material Storage. There will be a RRAP installed to allow RRVs access into the Avon Gorge	Welfare facilities and site offices	The compound will be used for the duration of the construction works
M5	M5 Compound	Parking may be required under M5	RRAP & small storage area	Space for welfare van or small welfare unit under the M5	For the duration of the construction works. Materials may be brought in at night
Q UB6	Quarry UB 6	None	Materials & equipment storage	Small welfare unit	For the duration of the works to QUB no. 6 and associated works through the Avon Gorge
LL	Liberty Lane	Main Compound for track works in Parsons St area, to provide some car parking	Materials storage	Welfare facilities and site offices (likely to be stacked)	Mainly daytime working 6am to 6pm, although due to rail access significant night time working may be necessary
WR	Winter-stoke Rd	Parking for welfare van or works vehicle	Materials storage	Small welfare unit	Duration of highway works

8.4 Traffic Generation and Impacts

Approach to the assessment

8.4.1 The initial process was to look at the materials required and assess what could be brought in by rail and what would be transported by road. The road deliveries were then looked at to assess the volumes, vehicle size required and trip numbers required to bring the volume to site.

8.4.2 The construction programme was then assessed to establish the period over which the deliveries would be made on order to give the trips per day with the trips then evenly distributed across each of the main compounds.

8.4.3 Secondly facilities and personnel requirements were assessed to establish the trips generated by buildings being brought to site and maintained and site managers and operatives attending site every day during the period of construction. This was looked at on a compound by compound basis with the total number of trips required at each location distributed evenly across the length of the programme.

8.4.4 Finally, the routes to each of the compounds were assessed to establish the key links that would be used by construction traffic and those attending site.

8.4.5 To complete the assessment the material delivery trips and facilities and personnel trips were attributed to each of the links to attain the total trips on each of the links per day. The trips were then evenly distributed across a 12-hour period to establish the trips generated per hour. Issues encountered on the highway network as a result of construction traffic associated with the scheme have been outlined below.

Traffic routeing

8.4.6 The Contractor will consult with relevant highway authorities regarding access routes that may be used by the Contractor to access the construction sites. Construction traffic will use the principal highway network wherever possible and designated routes to and from the compounds and access points will be identified in the final CTMP. The suggested routes to be used by construction traffic are discussed further in section 9, and presented in Figures 9.1-9.3.

Portishead

8.4.7 HGV deliveries to the compounds at Portishead Station will have a slight impact on the operation of the local highways network, in the vicinity of Quays Avenue, Harbour Road and Phoenix Way.

8.4.8 Access to the proposed Trinity bridge is through a residential area, so will need to take into account on-street parking and the potential presence of pedestrians (particularly children associated with the adjacent primary school). The increase in traffic volumes is likely to result in some level of inconvenience for residents.

Sheepway

8.4.9 While HGV movements will be limited to and from the Sheepway compound, there will be an increase in traffic volumes on Sheepway from its junction

with The Portbury Hundred. This will have a slight impact to existing users of Sheepway.

Portbury Docks

8.4.10 The presence of HGVs associated with the scheme combined with the existing volume of HGVs associated with the port will have an impact on the operation of The Royal Portbury Dock Road, Gordano Way and Marsh Lane.

Pill

Lodway Farm

8.4.11 Access through Pill is limited due to narrow roads.

Pill Station and Avon Road

8.4.12 Access to compounds at Pill Station and Avon Road routes through residential areas, and is also likely to be impeded by the narrow and constrained nature of the road network from Martcombe Road through East-in-Gordano into Pill. It should be noted that the crane delivery route at the Avon Bridge site will require temporary parking controls on Marine Parade due to the limited space of the road. This is to avoid any conflict with parked cars on this route. It will also be necessary to demolish part of a garden wall at the corner of Myrtle Hill and Marine Parade in Pill. Powers are sought to demolish a row of garages at Avon Road in Pill to accommodate the crane. The garages will be replaced by new build garages at the completion of the relevant works. The delivery route for the crane is shown in Figure 9.2.

Pill tunnel

8.4.13 HGVs and other construction vehicles may encounter difficulties while accessing the compound associated with Pill Tunnel; Ham Green. Geometry of the highway leading to the site. coupled with the presence of on-street parking in Macrae Road and Chapel Pill Lane, is likely to restrict movement of traffic to and from the site. To accommodate the safe movement of HGV vehicles during construction, minor highway modifications are required; at the existing traffic island at the T-junction on Ham Green/Macrae Road (replace with a flush island and removable reflective signs); footpath strengthened on the traffic island between Macrae Road and Chapel Pill Lane to allow potential run-over by heavy vehicles; and new access off Chapel Pill Lane to accommodate turning movements of a HGVs onto the new access lane/track to the compound.

Winterstoke Road / Ashton Vale Road / Clanage Road

8.4.14 The compound at Ashton Vale industrial estate is unlikely to impact on the operation of A3029 Winterstoke Road and its junction with Ashton Vale Road. Clanage Road compound will be accessed off the A369 near Ashton Gate; this section of highway is particularly busy at peak times.

8.5 Walking and Cycling Impacts

8.5.1 The scheme will have an impact on a number of local and designated pedestrian and cycling paths in the vicinity of the scheme. This will result in a number of these routes requiring a temporary diversion for a period of time during the construction phase at the following locations:

- Trinity bridge: The construction of the footbridge will result in pedestrians having to make a diversion during the construction phase, crossing the railway line at a point close to the east of the current route, shown in Figure 8.4.
- Sheepway: Diversion of the permissive cycle path that forms part of National Cycle Route No. 26 to accommodate the construction of the new maintenance compound and access road on the northern side of the railway. The existing route is to be diverted further north away from the railway as shown in Figure 8.5. Note that this diversion will be permanent (refer to section 3.6.2). There will also be the permanent closure of the at-grade level crossing to the south-west of Tarragon Place.
- Royal Portbury Dock Road: Diversion of NCN 26 onto Bridleway LA8/66/10 crossing Royal Portbury Dock Road further north away from the railway as shown in Figure 8.6.
- Marsh Lane: Temporary closure of NCN26 between the Marsh Lane underpass to a point south of the railway underpass to avoid conflict with construction traffic associated with the temporary construction compound at Lodway. The diverted route will continue south on Marsh Lane, under the M5 then turn left onto Church Road. The diversion will continue onto Debecca Lane and Lodway where it will link up with the Avon Cycleway as well as along Hardwick Road. When the path under Avon Road Rail Bridge is open, a diversion route along Church Road, Stoneyfields and Lodway Close can be used. Further designated routes can be accessed from here including NCN41 (Avon Road/Marine Parade). This diversion is shown in Figures 8.7 and 8.8.
- Pill: Further diversions will be implemented with the temporary closures of part of Avon Road and Star Lane (footpath closure) as shown on Figures 8.7 and 8.8.
- Avon Gorge Tow Path: Temporary closures will be implemented along the length of Avon Gorge during the construction phase for a few hours' or days at a time; diversions are shown in Figures 8-10-8.14.
- Winterstoke Road area: Works in the Winterstoke Road area associated with Ashton Vale Road and level crossing will result in some temporary closures and diversions, as shown on Figure 8.15.

8.6 Summary of impacts

8.6.1 Whilst much of the detail relating to the construction works is still evolving and subject to further discussion, the works will involve the need for a number of compounds and different access points.

8.6.2 The assessment shows the impact on the roads surrounding the sites and compounds to be minimal.

8.6.3 Since the DCO submission, additional analysis about the impacts of construction traffic on the Stratgetic Road Network has been undertaken and reported in the CTMP. The CTMP now sets out a number of scenarios of construction operations, traffic and timings and illustrates that related movements will be at their greatest if construction is taking place with a single shift operating, where the concentration of staff members entering the site prior to the start of the shift has the most significant impact on traffic. At other times of the day, and with two-shift site operation, construction related traffic movements are found to be relatively small.

8.6.4 Specific consideration of potential movements through M5 junction 19 suggests that construction traffic does not generally represent a significant proportional increase in movements. Also, DCO Requirement 30 states that no construction related traffic is to travel via M5 J19 between 7.30am and 9am.

Located in Part 4 of Appendix 16.1

Figure 8-4: Diversion at Trinity bridge

Located in Part 4 of Appendix 16.1

Figure 8-5: Diversion at Sheepway

Located in Part 4 of Appendix 16.1

Figure 8-6: Diversion at Royal Portbury Dock Road

Located in Part 4 of Appendix 16.1

Figure 8-7: Diversion at Marsh Lane

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Located in Part 4 of Appendix 16.1

Figure 8-8: Diversions through Pill

Located in Part 4 of Appendix 16.1

Figure 8-9: Diversions relating to temporary closure of Avon Gorge tow path (Drawing 1)

Located in Part 4 of Appendix 16.1

Figure 8-10: Diversions relating to temporary closure of Avon Gorge tow path (Drawing 2)

Located in Part 4 of Appendix 16.1

Figure 8-11: Diversions relating to temporary closure of Avon Gorge tow path (Drawing 3)

Located in Part 4 of Appendix 16.1

Figure 8-12: Diversions relating to temporary closure of Avon Gorge tow path (Drawing 4)

Located in Part 4 of Appendix 16.1

Figure 8-13: Diversions relating to temporary closure of Avon Gorge tow path (Drawing 5)

Located in Part 4 of Appendix 16.1

Figure 8-14: Diversions relating to temporary closure of Avon Gorge tow path (Drawing 6)

Located in Part 4 of Appendix 16.1

Figure 8-15: Diversions in the Winterstoke Road area

SECTION 9

Development of Mitigation Measures

9.1 Introduction

9.1.1 The previous section assessed the potential impact of the scheme on the local highway network and sustainable journeys and identified certain issues at specific locations. This part of the TA examines the effectiveness of the measures to deal with the identified concerns.

9.2 Highways

Junctions

9.2.1 Previous sections in the TA identified that the impact of the scheme is unlikely to have a major detrimental impact on the capacity and operation of the assessed junctions. This is a reflection that most origin and destination journeys to and from the stations will be spread across the local highway network and will not be concentrated at specific locations. On this basis, mitigation is not proposed.

Severn Beach Line Level Crossings

9.2.2 Scheme impacts are insignificant and do not require mitigation.

Ashton Vale Road

9.2.3 The scheme includes measures that result in impacts that are reasonable, and further mitigation is not proposed.

Links

9.2.4 The assessment also indicates that there will not be a detrimental impact to local highways other than the potential for increased levels of on-street parking. Section 9.4 outlines the recommended parking control mitigation which should ensure the operation of the highways surrounding the station sites will not be impeded by increased on-street parking levels.

9.3 Parking control

9.3.1 The analysis of likely parking demand indicates that there will be sufficient spaces 10 years after the stations have opened. The car parks will be managed by the North Somerset Council Parking Services Team. It is likely that parking charges would be introduced at both stations, at similar levels to other car parks, although the amounts are to be determined. For comparison, parking charges at Worle station are £2 per day and are £2.40 per day at Nailsea & Backwell station. It is recognised though, that a number of users will be reluctant to pay the minimum level of parking charges and will seek opportunistic parking spaces on neighbouring streets. Vehicles waiting to pick up passengers could also result in an additional impact.

Evolution of mitigation options

9.3.2 The level of parking control related to proposed has evolved through scheme development, and has been informed by consultation responses, as described further below.

Stage 1 Consultation 2015

9.3.3 The Stage 1 consultation took place between 22nd June and 3rd August 2015, on the initial proposals for MetroWest Phase 1.

9.3.4 The consultation recorded that 61% of all respondents from Portishead and 45% of all respondents from Pill were concerned about parking on nearby roads as a consequence of rail station users seeking to avoid paying car park charges. This proportion of concerned residents is higher nearer to the proposed rail station sites.

9.3.5 The consultation feedback was fed into the next iteration of the MetroWest Phase 1 scheme design. The transport assessment identified that parking restrictions would deter rail station users from parking on nearby roads.

9.3.6 The assessment about car park usage suggests that the parking provision will be able to accommodate demand. Nevertheless, on-street parking will remain attractive as:

- There are more convenient on-street parking locations as the furthest car park spaces are upto 400m away and in Pill the car park is situated 190m away from the rail station; and
- Free on street parking may be more attractive than the pay to stay car parks.

9.3.7 Even with a low (£1.50 per day) car park charge, the equivalent walking distance would be approximately 300m based on the DfT WebTAG value of time assumptions.

9.3.8 In Portishead the proposed restrictions included:

- Double yellow lines on key routes to the station:
  - Phoenix Way;
  - Harbour Road; and
  - Quays Avenue.
- Single yellow lines were proposed with limited parking restrictions (1 hour a day between 12-1pm for example) in residential areas and other roads near the station. These restrictions were intended to deter rail station users from parking for the day, while allowing residents to park during the mornings and evenings.

9.3.9 The health centre at Haven View has limited parking at their site for staff and patients. Consequently, staff or patients routinely park on-street on Haven View and Harbour Road. The staff have raised concerns about the impact of parking restrictions on the staff and visitors to the health centre.

9.3.10 To address these concerns and the anticipated loss of on-street parking due to the proposed parking restrictions on Harbour Road and Haven View, North Somerset Council will ensure that there are short-stay parking options

in the station car park immediately opposite the health centre. In addition, 6 disabled parking spaces will also be provided in the area of the carpark closest to the health centre. North Somerset Council will also provide discounted parking permits to the health centre staff.

9.3.11 In Pill, parking restrictions comprised single yellow lines in a limited number of locations, adjacent to the station primarily for road safety reasons at narrow points in the road and at junctions. These restrictions were developed in consultation with Pill and Easton-in-Gordano Parish Council.

Stage 2 Consultation 2017

9.3.12 The MetroWest Phase 1 Stage 2 consultation was undertaken between 23rd October and 4th December 2017.

Portishead

9.3.13 In Portishead, parking was a key issue for those responding to the consultation. A total of 91 respondents supported parking restrictions and 87 respondents opposed parking restrictions. However, this split of opinion tended to focus on the different elements of parking restriction opposed. For example, those that supported parking restrictions made comments that highlighted the issues of navigating the main roads of Harbour Road, Pheonix Avenue and Quays Avenue. By contrast, there was limited opposition to parking restrictions on these roads.

9.3.14 A sample of collated comments include:

- No parking on Harbour Road and Phoenix Way will make it safer and ease driver frustrations.
- Parking restrictions around the station will aid smoother traffic flow at peak times.
- Parking restrictions are needed to ensure emergency services and refuse lorries can have access at all times and need to be well policed.
- Harbour Road is at present very difficult to negotiate with constant on road parking related to health centre and local businesses.

9.3.15 While there were some comments relating to support for residential parking restrictions, the majority of comments opposed them.

9.3.16 A number of respondents stated that off-street parking is limited, so they park on-street and that parking restrictions would penalise them.

9.3.17 A sample of collated comments include:

- If we cannot leave our cars outside our homes during the day (which is the only parking option we have), it strongly encourages people to drive their cars to work - the opposite of what you are trying to achieve by reinstating the railway.
- Family houses were built here which included one parking space. For the many families with more than 1 car, this means parking on the roads.
- Residents who don't use their car everyday (pensioners, workers at home etc.) will be forced to move their car when the restrictions are in place, increasing trips

9.3.18 A total of 80 Portishead respondents stated that they had a preference for residents only parking permits and visitors permits in The Vale and Village Quarter. These respondents felt that parking was already an issue and would be exacerbated by the opening of Portishead Station. The respondents had mixed views on charging for permits.

9.3.19 Staff at the Haven View health centre requested permits or spaces be allocated to them from the rail station car park.

Pill

9.3.20 In Pill, the response to the proposed parking restrictions was muted with just 10 responses to the consultation that expressed concerns about parking issues encompassing a variety of perceived issues, of which parking restrictions was one.

9.3.21 Collated comments included:

- Concerns station users will park for free in residential streets;
- Restrictions must be adequately policed, particularly short term for Co-op customers.
- Residents need somewhere new to park if restrictions are put in place

9.3.22 There were also comments in support of residents parking permits, which has the support of Pill and Easton-in-Gordano Parish Council, which responded to the consultation as follows:

9.3.23 The Parish Council believes that consideration should be given to a residents only parking zone in many of the roads surrounding the station (subject to detailed consultation) and that the spaces identified near to the Co-op should be limited to short term parking only. We would like to discuss the viability of taking on the administration of the resident parking scheme as there might be significant advantages in having local oversight of this potentially difficult operation.

Consideration of options

9.3.24 The Stage 1 and Stage 2 consultations support the TA's analysis that there is a risk that a proportion of station users will choose to avoid using the rail station car parks and will instead park on the nearby roads.

9.3.25 A range of options have been considered to manage these potential parking issues, some of which will be implemented through the MetroWest Phase 1 project as part of the DCO Scheme, while others will be reviewed and potentially implemented by NSDC at a later date. Table 9.1 sets out the parking options considered.

Table 9.1: Parking options

Option	Assessment
Car park capacity.	The transport assessment forecasts that the car parks at Pill and Portishead have substantial excess capacity for at least 10 years after opening and is future proofed against a higher frequency service or increased demand and the use of higher capacity train sets.

Option	Assessment
Car park charges	The car parks will be managed by NSDC and the car parking charges will be periodically reviewed to respond to issues of on-street parking. Lower car parking charges would incentivise use of the car parks, particularly in the 1st year to encourage and habituate use of the car parks. The use of discounted season passes (for example 6 monthly or annual passes) would reduce parking costs to commuters while incentivising them to use the car parks.
Parking restrictions.	Parking restrictions would prevent on-street parking by rail station users on main roads in proximity to the rail stations. This will ease congestion at peak times and improve visibility and safety at junctions and crossings. In Pill the parking restrictions would allow access for emergency vehicles to the Station, through the narrow roads. Following the Stage 2 consultation, parking restrictions were scaled back so that there are no proposed parking restrictions in residential areas in Portishead. Parking restrictions are still proposed for sections of the main roads closest to Portishead Station (Harbour Road, Phoenix Way and Quays Avenue). The proposed restrictions on these roads will be reduced in scope from the original proposals shared at the Stage 2 consultation, so that they are mainly focused in the region of 200m from the station. This reduced scope is designed to balance the needs of those who currently park on street on Harbour Road and Phoenix Way with the need to manage the impact of commuter parking once Portishead Station is open and for safe visibility at key junctions and crossings near the Station and its car parks. Parking restrictions will be periodically reviewed by NSDC, with the possibility that they may be changed to reflect any parking issues that may develop following the opening of Portishead and Pill Stations. Currently there is no policy or mechanism for a parking permit scheme to be run by NSDC. However, this may be reviewed in the future. A parking permit scheme requires funding to set-up and administer and the costs of this would have to be met those taking part in the permit scheme. Although there were residents that supported parking permits, there was less support for having to pay the cost of the permits
Haven View health centre, Portishead	NSDC Parking Services Team have agreed that discounted parking permits could be provided to staff at the health centre and that short-stay parking (which would primarily be used by visitors) would incur a reduced charge. The main car park design at Portishead was changed to add 6 disabled parking spaces immediately opposite the health centre and the controlled crossing point connecting the car park side of the road with the health centre.

Portishead

9.3.26 Table 9.2 summarises the recommended level of parking control for Portishead station. In addition, the provision of keep clear H bars could be provided for private access to properties and businesses where requested.

Table 9.1: Recommended parking measures for Portishead

Street	Likely Parking Demand	Measure
Harbour Road (from Quays Avenue to the Trading Estate)	Existing significant demand for on-street parking from local businesses and health centre	Double yellow line on Harbour Road and junctions with minor roads
Quays Avenue (from Harbour Road to Galingale Way)	Close proximity to the station will result in a significant level of on-street parking	Double yellow line
Quays Avenue (from Conference Avenue to Wyndham Road)	Close proximity to the station will result in a significant level of on-street parking	Partial double yellow line
Phoenix Way (from Quays Avenue to Marjoram Way)	Close proximity to the station will result in a significant level of on-street parking. It is noted that the number of parking bays along Phoenix Way provides a restraint on the level of on-street parking	Double yellow line (except designated parking bays)

Pill

9.3.27 Table 9.3 shows the recommended parking measures for Pill.. In addition, the provision of keep clear H bars could be provided for private access to properties and businesses where requested.

Table 9.2: Recommended parking measures for Pill

Street	Likely Parking Demand	Measure
Monmouth Road (from Crusty Lane to Station Road)	Close proximity to the station will result in a significant level of on-street car parking.	Partial double yellow lines
Station Road (Monmouth Road to Sambourne Lane)	Close proximity to the station will result in a significant level of on-street car parking.	Partial double yellow lines
Station Road (Sambourne Lane to Heywood Road)	Retain visibility from development site on Station Road	Partial double yellow line
Station Road (New Road to Church Walk)	Close proximity to the station will result in a significant level of on-street car parking.	Partial double yellow lines

Table 9.2: Recommended parking measures for Pill

Street	Likely Parking Demand	Measure
Chapel Road/New Road/Myrtle Hill (gyratory)	Close proximity to the station will result in a significant level of on-street car parking.	Double yellow lines

9.4 Public transport

9.4.1 There are currently no proposals in place to amend existing bus services outlined in section 3. It is the responsibility of NSDC to liaise with the relevant bus operators to ensure that the various bus services meet the strategic needs of the authority.

9.5 Walking and cycling

9.5.1 The scheme proposes measures that would enhance the walking and cycling environment, particularly along desire lines, in the vicinity of the stations. These are included in the scheme, and summarised in Table 9.3.

Table 9.3: Walking and cycling measures

Location	Measure	Rationale
Phoenix Way/Quays Avenue/Harbour Road	Realignment of Quays Avenue and construction of new roundabout which also includes controlled parallel crossings on the Harbour Road and Phoenix Way arms.	This would address the severance impact currently created by constant traffic flows at Phoenix Way/Quays Avenue/Harbour Road junction
Trinity Primary School	Provision of a bridge compliant with the Equalities Act 2010	The current permissive path will be severed by the scheme. The construction of a disabled compliant bridge would formalise this main pedestrian and cycling route to and from Trinity Primary School
Quays Avenue (between the station and Serbert Way)	Extension and widening of the shared footway and cycleway on the west side of Quays Avenue	The audit identified the pedestrian and cycle route is discontinuous along Quays Avenue and would require users to use an informal crossing point closer to Wyndham Way. This measure would mean pedestrians and cyclists are 'funnelled' through the toucan crossing near the station.

Table 9.3: Walking and cycling measures

Location	Measure	Rationale
Quays Avenue (between the station and Serbert Way)	Existing traffic island to be replaced with a pedestrian island	This measure represents an improvement in the crossing point across Quays Avenue and reflects the increase in NMU movements likely to take place.
Royal Portbury Dock Road	Improvements to existing bridleway uncontrolled crossing point	Improvements would have beneficial impacts for pedestrians and cyclists (as well as equestrians)

9.6 Construction Impacts

9.6.1 The CTMP in Appendix K (DCO Document Reference 8.13) considers:

- Delivery routes;
- Management of abnormal loads;
- Phasing of construction and operating periods;
- Traffic management measures within compounds including parking; and
- Local traffic management measures relating to temporary or partial local highway network closures.

9.6.2 The Contractor will prepare the Final CTMP which will describe measures and procedures proposed to address these issues during construction of the Project.

Delivery routes

9.6.3 Table 9.4 and Figures 9.1 to 9.3 outline the recommended routes for the delivery of materials. These routes are indicative at this stage, but as they take account of weight restrictions, capacity of the highway network to accommodate HGV movements where required and the need to minimise the impacts on residential neighbourhoods, local businesses, local schools and other services, the use of other routes will generally be discouraged or prohibited.

Table 9.4: Main vehicle routes during construction

Delivery Route	Description
1	Exit Junction 19 of the M5 then follow the Portbury Hundred (A369), crossing over the B3124/Sheepway roundabout and then turning right at the A369/Quays Avenue roundabout. The route ends at a site just to the south of the Harbour Road/Phoenix Way roundabout.

Table 9.4: Main vehicle routes during construction

Delivery Route	Description
2	Exit Junction 19 of the M5 then follow the Portbury Hundred (A369) until turning right onto Sheepway at the roundabout with the B3124/Sheepway. Follow Sheepway until the bridge heading over the railway line. Access to compound C3 will be off the Portbury Hundred. A right turn into the site compound could be difficult to the volume of traffic and increased congestion. Traffic would be directed to Sheepway roundabout, back up the Portbury Hundred, to turn left into the compound to ease congestion. Traffic leaving the site would be permitted to turn left onto the Portbury Hundred only.
3	Exit Junction 19 of the M5 then travel northbound on the Royal Portbury Dock road. Then turn right onto Gordano Way at the roundabout, and then turn right onto Marsh Lane. The entrance of the site is then accessed at the second lane on the left.
4	Exit Junction 19 of the M5 then travel southbound on Martcombe Road (A369) and take the first left onto Priory Road. Travel on Priory Road which leads onto Lodway, and then follow until it turns onto Heywood Road. Continue along Heywood Road and turn left onto Mount Pleasant. Continue along Mt. Pleasant, followed by Underbanks (going under the railway underpass) and then onto Myrtle Hill and Marine Parade. Continue on Marine Parade until reaching the junction with Avon Road. At this junction turn right onto Avon Road and then left onto Severn Road. It should be noted that the roads in the latter half of this journey are narrow and thus may cause an issue for large vehicles.
5	Exit Junction 19 of the M5 then travel southbound on Martcombe Road (A369) until turning left at the junction with Pill Road. Travel northbound along Pill Road until it leads onto Ham Green. Turn right at the roundabout onto Macrae Road. Travel along Macrae Road until turning right onto Hart Close followed by a left onto Chapel Pill Lane. The site can then be accessed by taking the first right off Chapel Pill Lane onto a track.
6	Leave Junction 18 of the M5 and then proceed along the Portway (A4) until taking the A3029. Leave the A3029 and turn right to go underneath Ashton Road (A370) and turn right. Continue onto Clanage Road.
7	Leave Junction 18 of the M5 and then travel along the Portway (A4) until taking the A3029 (Brunel Way over the Cumberland Basin). Follow the A3029 southbound until turning right at the Barons Close roundabout onto the A369.

Table 9.4: Main vehicle routes during construction

Delivery Route	Description
Avon Bridge Crane Route	Leave Junction 19 of the M5 and travel south east along Martcombe Road. Turn left onto Pill Road which leads onto Ham Green. Continue until turning left at Mt. Pleasant which leads onto Underbanks. Follow this around until it joins Marine Parade followed by Avon Road.

Located in Part 4 of Appendix 16.1

Figure 9-1: Recommended Construction Delivery Routes – Portishead

Located in Part 4 of Appendix 16.1

Figure 9-2: Recommended Construction Delivery Routes – Pill

Located in Part 4 of Appendix 16.1

Figure 9-3: Recommended Construction Delivery Routes – Ashton Vale

Abnormal Loads

9.6.4 The construction works will involve the delivery of a number of abnormal loads and the movement of high volume materials. The extent and volume of these loads is currently not known but as the construction strategy is finalised, this information will become clearer.

9.6.5 Nevertheless, the following principles will apply to abnormal loads:

- To minimise disruption to traffic, abnormal loads will be grouped together and travel in convoy wherever possible;
- Careful consideration will be given to whether the highway network can accommodate abnormal loads. This may require, in some instances, loads being broken into smaller blocks to minimise impacts;
- Prior to transportation of the first abnormal load, an access route survey feasibility report will be undertaken;
- The transport of abnormal loads will be timed to be moved outside peak traffic hours to minimise disruption. These deliveries will be pre-arranged and will meet the requirements of the Police, the Local Highway Authority and Highways England; and

- Information will be provided to local residents, businesses and services about the delivery of abnormal loads. The most effective way of communicating this information will be agreed at the appropriate time.

Traffic Management Measures in Compounds

9.6.6 The following principles will apply:

- Preparation and submission of a construction compound transport plan. This will include a block plan, indication of access points and connections to the highway network, surrounding land uses, detail of security fencing and health and safety signage, and internal layout and parking;
- The construction site will be managed so that vehicles and pedestrians using site routes can move around safely. This will include separate entry and exit gateways and clearly marked crossings. Where access onto the highway is required, an assessment of a safe visibility splay will be undertaken;
- Vehicle movement on site will be controlled through designated parking areas and the location of storage areas so that delivery vehicles do not have to cross the site. Provision will be made for turning movement within each site so that, where possible, vehicles can leave and enter in forward gear; and,
- Additional control measures such as banksmen who will be responsible to control manoeuvres and gatekeepers will be in place. Internal speed limits will be restricted to 5mph.

Traffic Management Measures on the Highway Network

9.6.7 The final measure will be a requirement to produce traffic management plans for the impacts on the highway network. The traffic management plans will provide an assessment of the following:

- Existing conditions. This includes all users of the highway including non-motorised users, key trip generators such as local schools and local services such as public transport;
- An assessment of the impacts. This may include a full temporary closure or a partial closure such as the use of temporary signals. Diverting pedestrian routes taking into account the importance of desire lines and the needs of those with physical or visual impairment;
- A review of the measures required. This should include any additional control measures that may be required such as manning of signals, notification and enforcement by local police; and
- The need for Travel Demand Management (TDM) measures. This includes the communication and dissemination of information to the public, businesses and local services. There may be a requirement to promote alternative routes or modes or recommendation not to travel at specific times.

SECTION 10

Transport Implementation Strategy

10.1 Introduction

10.1.1 This final part of the TA brings together possible measures that are being considered for implementation in support of the scheme. Some of the possible measures would be implemented prior to the opening of the scheme, whereas others would be undertaken post opening. Note though that the inclusion of individual measures, and their detailed implementation, is currently being reviewed and finalised.

10.2 Infrastructure related measures

10.2.1 Table 10.1 provides a summary of the possible infrastructure related measures that are being reviewed for their potential implementation, the results of which will be finalised in due course. For ease of reference, these have been described by geographical area.

Table 10.1: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Rationale	Timescale	Responsible
1	Portishead	Phoenix Way/Quays Avenue/Harbour Road	Realignment of Quays Avenue and construction of new roundabout which also includes controlled parallel crossings on the Harbour Road and Phoenix Way arms	Integral part of scheme	Level crossings not permitted by ORR	Prior to opening	Scheme Promoter
2	Portishead	Quays Avenue	Provision of a Toucan crossing on Quays Avenue west of the station site (entrance).	Integral part of scheme	To meet a pedestrian and cycle desire line from west of the station	Prior to opening	Scheme Promoter
3	Portishead	Quays Avenue	Provision of two bus stops (east bound and west bound) closer to the railway station	Integral part of scheme	To enable easier transfer between bus and rail services	Prior to opening	Scheme Promoter
4	Portishead	Quays Avenue (between the station and Serbert Way)	Extension and widening of the shared footway and cycleway on the west side of Quays Avenue	Integral part of scheme	To meet a pedestrian and cycle desire line from west of the station	Prior to opening	Scheme Promoter
5	Portishead	Quays Avenue (between the station and Serbert Way)	Existing traffic island to be replaced with a pedestrian island	Integral part of scheme	To meet a pedestrian and cycle desire line from west of the station	Prior to opening	Scheme Promoter

Table 10.1: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Rationale	Timescale	Responsible
6	Portishead	Trinity Primary School	Provision of a bridge compliant with the Equalities Act 2010	Integral part of scheme	To formalise the crossing point across the railway and to provide access to and from the primary school	Prior to opening	Scheme Promoter
7	Portishead	Harbour Road (Between Quays Avenue and Newfoundland Road)	Double yellow lines	Traffic management measure	To reinforce use of the provided station car parks and minimise detrimental impacts on local businesses	Prior to opening	Highway Authority
8	Portishead	Haven View (From Harbour Road to Haven View)	Waiting restrictions to 2 hours	Traffic management measure	To reinforce use of the provided station car parks and minimise detrimental impacts on local businesses, residents and the health centre	Prior to opening	Highway Authority
9	Portishead	Quays Avenue	Double yellow line	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents	Prior to opening	Highway Authority

Table 10.1: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Rationale	Timescale	Responsible
10	Portishead	Phoenix Way (from Quays Avenue to Marjoram Way)	Double yellow lines (except existing parking bays)	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents	Prior to opening	Highway Authority
12	Sheepway to Pill	National Cycle Network 26	Realignment of existing of NCN 26 and ensure it is constructed to the latest standards	Integral part of scheme	To accommodate railway alignment	Prior to opening	Scheme Promoter
13	Portbury	Royal Portbury Dock Road	Improvements to the existing bridleway uncontrolled crossing point	Integral part of scheme	To improve safety conditions for pedestrians and cyclists	Prior to opening	Scheme Promoter
14	Portbury to Pill	Under the M5 bridge	Closure of existing bridleway and replacement with a new bridleway under the M5	Mitigation	To ensure a safe and appropriate route for horse riders as the existing bridleway will be partially required for the new railway alignment	Prior to opening	Scheme Promoter
15	Pill	Monmouth Road (from Crusty Lane to Station Road)	Double yellow lines	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents and businesses	Prior to opening	Highway Authority

Table 10.1: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Rationale	Timescale	Responsible
16	Pill	Station Road (Monmouth Road to Sambourne Lane)	Double yellow lines	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents, health centre and businesses	Prior to opening	Highway Authority
17	Pill	Sambourne Lane (from Station Road to health centre front entrance)	Double yellow lines	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents, health centre and businesses	Prior to opening	Highway Authority
18	Pill	Station Road (Sambourne Lane to Heywood Road)	Double yellow lines	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents, health centre and businesses	Prior to opening	Highway Authority
19	Pill	Station Road (New Road to Church Walk)	Double yellow lines	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents, health centre and businesses	Prior to opening	Highway Authority

Table 10.1: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Rationale	Timescale	Responsible
20	Pill	Chapel Row/New Road/Myrtle Hill Gyratory	Double yellow lines	Traffic management measure	To reinforce use of provided station car parks and minimise detrimental impacts on local residents, health centre and businesses	Prior to opening	Highway Authority
21	Pill	Ham Green/Macrea Road	Provision of a ghost island	Integral part of scheme	To facilitate HGV movement towards the Pill Tunnel access route	Prior to construction works	Scheme Promoter
22	Ashton Vale	Ashton Vale Road/Winterstoke Road junction	Extension of left-turn lane on Winterstoke Road northbound and upgrade of the mode of control of traffic signals to MOVA.	Integral part of fscheme	To improve access to Ashton Vale industrial estate	Prior to opening	Scheme Promoter
23	Ashton Vale	Barons Close Pedestrian Crossing	Closure of existing pedestrian crossing across the railway line with a replacement route.	Integral part of scheme	To improve safety for pedestrians	Prior to opening	Scheme Promoter
24	Parking (Generally)	In the vicinity of Portishead and Pill Railway Stations	Post implementation monitoring of parking	Monitoring	To measure effectiveness of parking provision	Post implementation for 2 years	Scheme Promoter

10.3 Outline Construction Traffic Management Plan (CTMP)

10.3.1 The Outline CTMP is attached in **Appendix K** of the TA (ES Appendix 16.1, DCO Document Reference 8.13). The aim of the CTMP is to outline the specific transport impacts arising from the construction works and to provide a framework for addressing these impacts. The document sets out the principles that will be followed to manage construction traffic during the works.

10.3.2 The Outline CTMP comprises the following:

- **Overview of the construction works** – This section provides a summary of the main construction activities;
- **Access points and compounds**– The various access points and compounds are detailed;
- **Traffic generation and transport impacts** – The scale of the impact has been assessed for each identified location; and
- **Measures** – to be adopted to minimise the construction impacts on the highway, users and local residents and businesses.

10.4 Outline station travel plans

Overview

10.4.1 To encourage and reinforce sustainable journeys, outline station travel plans have been prepared and are presented in **Appendix M,** these have been prepared to identify a range of measures before, at and after opening. Travel plans are documents that are intended to manage travel to and from key trip generating places and as such are required by NPPF.

10.4.2 The travel plans presented in the appendix have outline status. This means they provide a basis for the detailed travel plans that can be drawn up when the stations open. Nevertheless, the documents provide a framework for managing the travel planning process and the scheduling of specific measures. Both the outline station travel plans for Portishead and Pill comprise:

- **Policy background** – Demonstrates the links between the travel plans and the policy context;
- **Station characteristics** - This outlines the station characteristics in terms of layout and the expected demand levels. It describes the facilities to be provided for the different methods of accessing the station;
- **Aims and objectives** – Provisional aims and objectives are set out for each station and the likely level of use;
- **Action plan**– Outlines the indicative actions required to meet the aims and objectives; and
- **Monitoring and review** – The final section provides an overview of how the travel plan should be monitored and updated.

Main elements of the Action Plan for Portishead Station

10.4.3 Table 10.2 summarises the main actions that have been identified for the outline station plan.

Table 10.2: Recommended actions; Portishead Station Outline Travel Plan

Objective	Action Ref	Action	Timescale	Impact	Cost
48% people walking to the station	A1	Review walking routes to the station and identify infrastructure improvements which could encourage walking.	Before opening	High	High
4% people cycling to the station.	B1	Review cycle access routes in the vicinity of the station to identifying and implementing improvements to cycling infrastructure.	Before opening	High	High
	B2	Ensure good surveillance and lighting for the cycling parking area as part of the station design	Before opening	Low	Medium
	B3	Generate awareness of secure cycle parking through promotion on the station (posters, signage on secure compound).	Station opening	Low	Low
	B4	Make local cycling maps available at the station and other key centres, including online.	Station opening	Low	Low
	B5	Establish a station-based Bicycle User Group (BUG) - possibly linked to an existing group..	Post opening	Medium	Low
Ensure that bus travel to the station is a realistic option for passengers	C1	Liaise with bus operators about the need to connect to with the station and improve services including existing frequency	Before and after opening	Medium	Medium
	C2	Ensure information about bus times is easily available at bus stops, the station and online. Include information on connections with trains	Before and after opening	Medium	Low
	C3	Ensure information about bus times is easily available at bus stops, the station and online. Include information on connections with trains	Before and after opening	Medium	Low

Table 10.2: Recommended actions; Portishead Station Outline Travel Plan

Objective	Action Ref	Action	Timescale	Impact	Cost
30% driving to and from the station	D1	Investigate the feasibility of providing car share priority spaces in a prominent area of car park	Before and after opening	High	Low
	D2	Promotion of Travelwest car sharing scheme	After opening	Low	Low
Maximise awareness and options for using the new rail service	E1	Provide information on new rail services to residents and businesses in Portishead	After opening	Medium	Low
	E2	Provide local residents and businesses with information on travel options to the station, including cycling, bus services and local car sharing schemes.	After opening	Medium	Low

Main elements of the Action Plan for Pill Station

10.4.4 Table 10.3 summarises the main actions that have been identified for the outline station plan.

Table 10.3: Recommended actions; Pill Station Outline Travel Plan

Objective	Action Ref	Action	Timescale	Impact	Cost
46% people walking to the station	A1	Review walking routes to the station and identify infrastructure improvements which could encourage walking.	Before opening	High	High
3% people cycling to the station.	B1	Review cycle access routes in the vicinity of the station to identifying and implementing improvements to cycling infrastructure.	Before opening	High	High
	B2	Ensure good surveillance and lighting for the cycling parking area as part of the station design	Before opening	Low	Medium
	B3	Generate awareness of secure cycle parking through promotion on the station (posters, signage on secure compound).	Station opening	Low	Low
	B4	Make local cycling maps available at the station and other key centres, including online.	Station opening	Low	Low

Table 10.3: Recommended actions; Pill Station Outline Travel Plan

Objective	Action Ref	Action	Timescale	Impact	Cost
	B5	Establish a station-based Bicycle User Group (BUG) - possibly linked to an existing group.	Post opening	Medium	Low
Ensure the route to bus stops is attractive as possible	C1	Linked with A1 above, ensure the route to and from the nearest bus stops to the station is attractive and safe to use.	Before and after opening	Medium	Medium
37% driving to and from the station	D1	Investigate the feasibility of providing car share priority spaces in a prominent area of the car par	Before and after opening	High	Low
	D2	Promotion of Travelwest car sharing scheme	After opening	Low	Low
Maximise awareness and options for using the new rail service	E1	Provide information on new rail services to residents and businesses in Pill	After opening	Medium	Low
	E2	Provide local residents and businesses with information on travel options to the station, including cycling, bus services and local car sharing schemes.	After opening	Medium	Low

10.5 Summary of key issues

10.5.1 In this section, the various measures required to support the transport related impacts of the scheme have been brought together. These identify:

- The range of physical interventions that need to be put in place before the scheme opens. Some of these will facilitate sustainable trips to and from the station. Others will deal with operational impacts on the local highway network;
- There will be specific locations and routes along the scheme alignment which will have a greater level of impacts. Measures in the construction traffic management plan show how the impacts will be dealt with; and
- The outline travel plans provide a framework for promoting sustainable trips to and from the stations and ensured it is maintained.

SECTION 11

Summary and Conclusions

11.1 Summary

Application and TA Coverage

11.1.1 The MetroWest Phase 1 project will entail upgrading the existing freight only line between Parson Street junction and Portbury Dock junction (Pill), reinstatement of the current disused line (Portishead Branch Line) between Portbury Dock junction and Portishead, and various minor works to facilitate the operation of the Phase 1 train services. A new station will be required at Portishead and the former station at Pill will be re-opened.

11.1.2 The Portishead Branch Line (MetroWest Phase 1) Project meets the definition of a Nationally Significant Infrastructure Project ("NSIP") for the purposes of the Planning Act 2008. Under the Act, planning permission for the Project will be sought by North Somerset District Council ("NSDC") as the applicant through a Development Consent Order ("DCO"). Other works required on the Portbury Freight Line will be undertaken by NRIL under their permitted development rights and will not form part of the DCO application.

11.1.3 This TA describes the analyses undertaken to assess the transport effects of the MetroWest Phase 1 DCO scheme where it is proposed to reopen the Portishead Branch Line with stations at Portishead and Pill in North Somerset. This version of the TA has been prepared to support the Environmental Statement ("ES") which is part of the DCO application. The TA has been informed by consultation with local highway authorities and the public. Public consultation on the Portishead Branch Line undertaken in summer 2015. Some 95% of respondents supported the scheme, with the main issues highlighted being related to parking, pedestrian and cycle access to stations, and construction traffic. Further, more localised, consultation work was carried out in 2016 in relation to Pill station and the Ashton Vale Road area. Further consultation work was also undertaken in November/December 2016 in relation to a potential Ashton Vale Road alternative access (though the need for this access has subsequently been removed).

Previous versions of the TA

11.1.4 Note that the assessments in this TA, in support of the DCO Scheme, supersedes any previously published analysis, such as transport assessments issued as part of the DCO's PEIR. In particular, previous assessments assumed a 2-trains per hour service on the Portishead Line, and the impact this had in the Ashton Vale Road area have been substantially re-assessed.

Objectives and strategic case

11.1.5 The MetroWest Phase 1 principal business objectives are:

- To support economic growth, through enhancing the transport links to the TQEZ and into and across Bristol city centre, from the Portishead, Bath and Avonmouth and Severn Beach arterial corridors;

- To deliver a more resilient transport offer, providing more attractive and guaranteed (future-proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath and Avonmouth, and Severn Beach;
- To improve accessibility to the rail network with new and reopened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents; and
- To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors.

11.1.6 In addition, the MetroWest Phase 1 supporting objectives are:

- To contribute to reducing traffic congestion relative to a 'Do Minimum' scenario (as opposed to current levels of congestion) on the Portishead, Bath and Avonmouth, and Severn Beach arterial corridors;
- To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak; and
- To contribute to reducing the overall environmental impact of the transport network.

11.1.7 The scheme is well placed to meet key national and local transport policies by promoting modal shift towards sustainable transport, provide an alternative mode between Portishead and Bristol and would facilitate economic regeneration and growth. MetroWest Phase 1 has been a committed scheme for the WoE authorities for some years and is therefore committed in policies, and has shaped subsequent policies and strategies. There are, however, a certain number of outstanding policy matters for the scheme as follows:

- The scheme currently sits outside the vehicle and cycle parking standards for NSDC and so will take account of NSDC Local Plan policy CS11;
- Within Bristol, the impacts of increased level crossing downtimes, under policy DM23 Transport Development Management of the SADMP, need to be considered; and
- The highway design (including footways, cycleways and right of ways) will need to take account of the requirements of the adopted NSDC Highways Development Design Guidance

Scheme Elements

11.1.8 The MetroWest Phase 1 project comprises the delivery of infrastructure and passenger train operations to provide for a:

- half-hourly service on the Severn Beach line;
- half-hourly service at local stations on the Bath to Bristol line; and
- reopened Portishead Branch Line with stations at Portishead and Pill, initially with an hourly service.

11.1.9 The scheme includes station infrastructure, signalling and service changes, plus other modal shift inducing infrastructure. Key issues for consideration in the TA are:

- New station at Portishead and the reopening of the station at Pill;
- Road alignment on Quays Avenue (Portishead) to accommodate the new station;
- New car parks and cycle parking for both stations;
- Pedestrian and cycling facilities to encourage walking to and from the stations and centres;
- Changes to pedestrian and cycling infrastructure especially to existing crossing points of the railway alignment;
- Junction improvements at Ashton Vale Road/Winterstoke Road;
- Changes to the signals on certain parts of the line; and
- Changes to the service patterns.

11.1.10 Figure 11.1 shows MetroWest Phases 1 and 2. Figure 11.2 shows the location of the MetroWest Phase 1 DCO Scheme (red line).

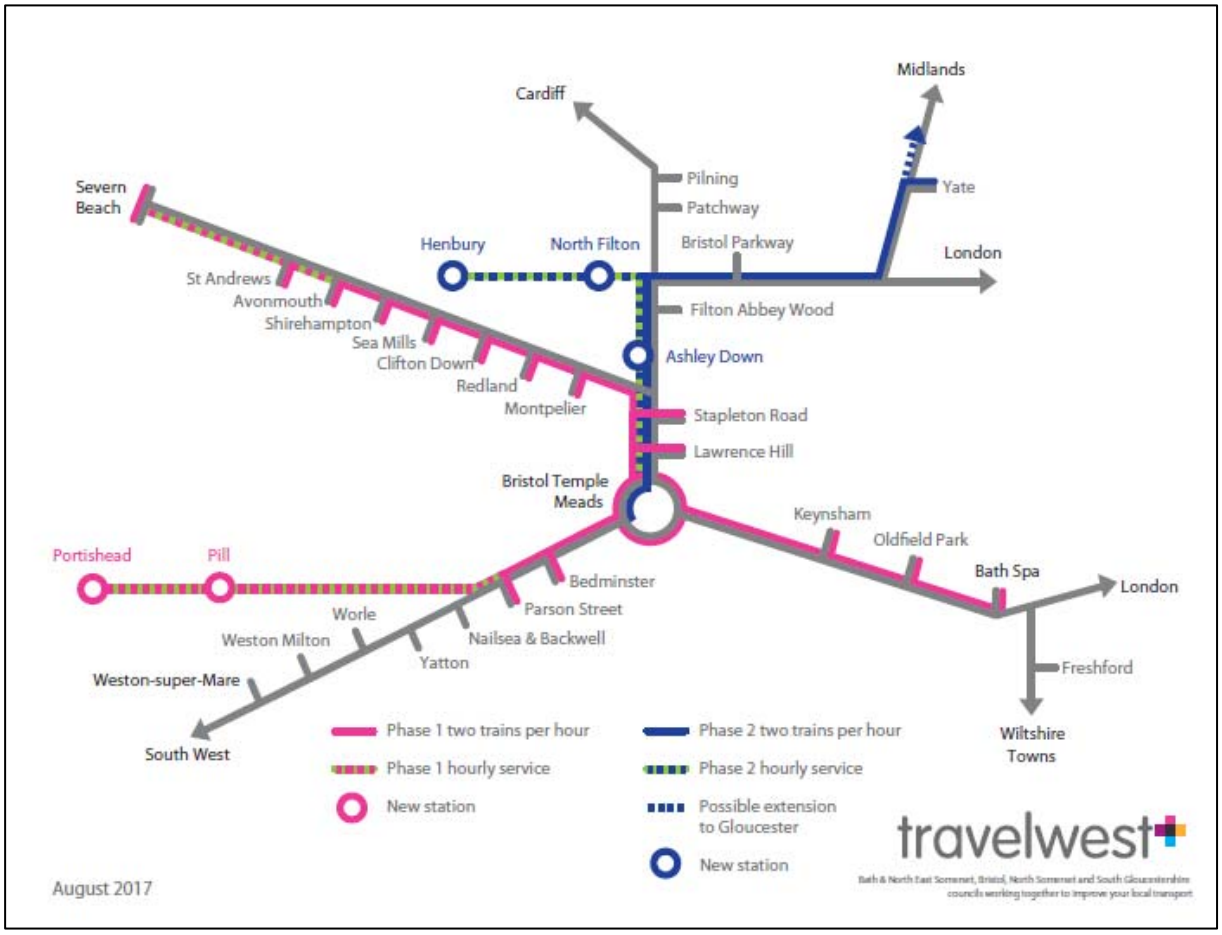

Figure 11-1: MetroWest Phases 1 & 2

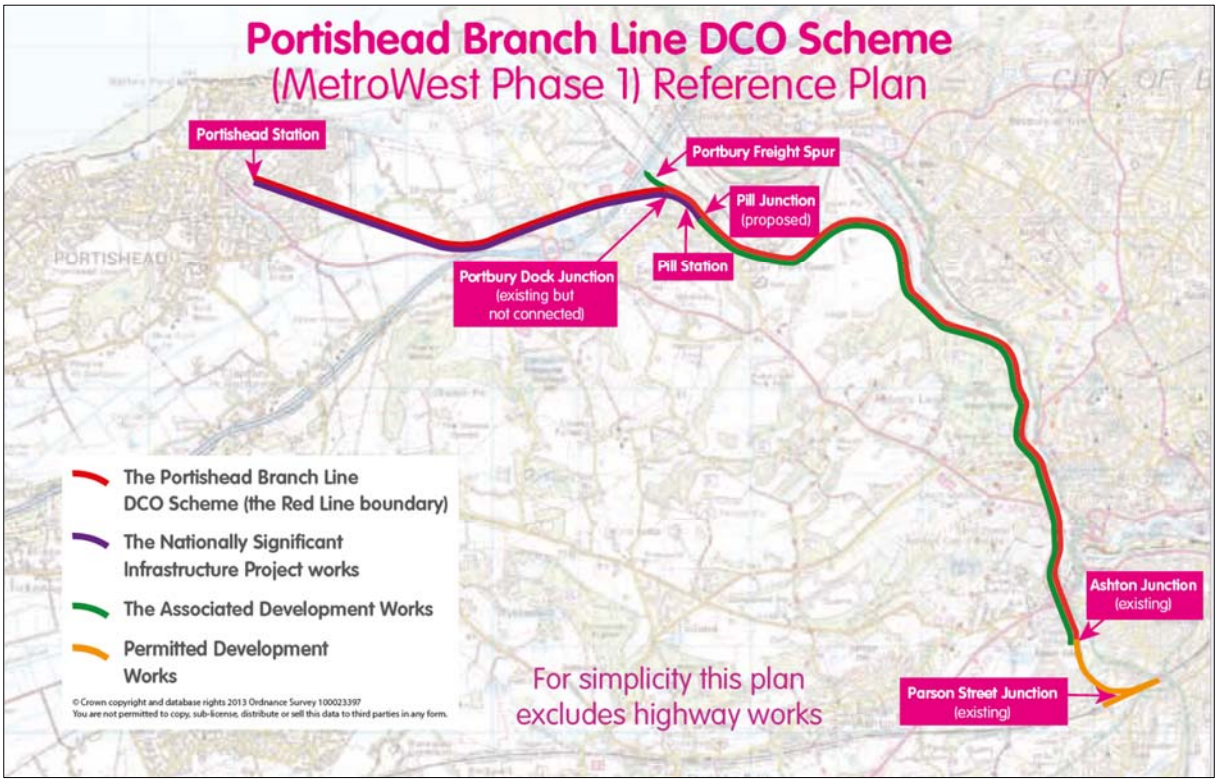

Figure 11-2: Portishead Branch Line DCO scheme (MetroWest Phase 1) – Indicative Red Line Boundary

11.2 Impacts of Scheme

Strategic Operational Impacts

11.2.1 The distribution and assignment of traffic to and from Portishead and Pill stations has been informed by the outputs from the Rail Demand Model (RDM) and the GBATS4 Strategic model covering the study area.

Railway Impact

11.2.2 Calculation of the trips to and from Pill and Portishead stations have been informed by the output of the passenger Rail Demand Model (RDM). For Portishead station, the data shows that, in the 10 year period assessed (2021 to 2031), demand at the station will increase across all modes of transport i.e. walking, bus, car, car drop-off, bicycle and taxi. The data highlights the importance of sustainable modes particularly for the shorter distance trips to and from the station with cars being used for longer trips. The number of bus-related trips remain comparatively low. For Pill station, a similar trend is noted with demand at the station predicted to increase over the 10-year assessment period.

Strategic Highway and Bus Impacts

Changes in amount of travel

11.2.3 The number of trips associated with the scheme have been modelled for “Do Minimum” and “Do Something” scenarios for the years 2021 and 2036.

The model suggests that the aggregate total of rail and bus trips and car PCUs will increase from the Base Year (2013) to 2021 Do minimum (~5% in the AM and PM peaks) and from the Base Year to 2036 Do minimum (~15%). The increase in the number of public transport modes (rail and bus) shows the greatest change from the Base Year to the 2021 Do Minimum and Do Something scenarios where bus trips increase by approximately 25% while train trips increase by approx. 15%. Trips by rail and bus show a further increase from the Base Year to the 2036 Do Minimum and Do Something scenarios with both rail and bus trips increasing by more than 25% for both scenarios, across all three peak periods assessed.

11.2.4 The analysis indicates that car demand will decrease, albeit slightly, from the Do Minimum to Do Something scenarios for both the 2021 and 2036 years and all-time periods assessed. Bus trips also show a slight decrease from the 2021 Do Minimum to Do Something scenarios but show an increase from the 2036 Do Minimum to Do Something scenarios.

Changes in travel patterns

11.2.5 The GBATS4 model has been used to predict trip changes to and from the Portishead area as a result of the scheme. The model suggests that the amount of travel to and from Portishead from the 2013 Base to the 2021 and 2036 Do Minimum scenarios will increase for all time periods, by ~10% and ~15% respectively. The modelling also predicts a slight increase from the Do Minimum to the Do Something scenarios for both assessment years for all three time periods (~0.5%).

Changes in Highway Use

11.2.6 The GBATS4 model predicts a general increase in traffic on the highway from 2013 to 2021 and further increases to 2036. Some notable reductions to assigned highway trips were observed at the M5 Avonmouth Bridge as a result of changes in trip patterns to and from Portishead. Some localised increases in highway trips as a result of re-routing in a congested network has also been predicted. All future year modelling has considered forecast planning development which will have an impact on traffic volumes. The model suggests an increase in congestion levels associated with development growth in future years, but little change associated with the scheme.

Overall Highway Impacts

11.2.7 The increase in railway demand from the Base Year to Do Minimum and Do Something scenarios for both years and all time periods assessed are shown to have an impact on highway use. There will be a general increase in traffic levels from the Base Year to 2021 and further increases to 2036 associated with development growth. Some local reductions in traffic have been predicted for future years Do Minimum scenarios. There will be reductions in highway demand resulting from the scheme which correspond with an increase in rail demand. Overall, the model suggests an increase in highway congestion associated with development growth in future years but little change associated with the scheme.

Impact on Rail Freight

11.2.8 The scheme will result in freight trains sharing the line with regular passenger trains between Parson Street Junction and Pill Junction, and has been designed so that paths exist for freight trains to run; as such there will be no adverse impact on rail freight operation.

Local Operational Impacts

Highway Impacts

11.2.9 Traffic counts have been undertaken at 10 junctions and 4 level crossings on the local highway network in order to obtain a baseline scenario (2015). For each junction and level crossing, a number of scenarios have been tested, including the baseline, opening year 2021 and horizon year 2031 (both 2021 and 2031 for the without and with scheme situations). The assessment of each junction indicates that the impact of the scheme has a minimal impact on the operation of the junctions for all scenarios tested. A summary of the impacts is in Table 11.1.

Table 11.1: Summary of Impacts

Location	Type of impact	Comment
Phoenix Wy/Quays Ave	Not significant	
Station Rd/Harbour Rd/Cabstand	Not significant	
Quays Ave/Wyndham Wy/Serbert Wy	Not significant	
Cabstand/Wyndham Way/High St	Not significant	Junction currently at capacity; scheme will not have a significant impact on its current operation.
Wyndham Wy/Sheepway/Portbury Hundred	Not significant	
M5 Junction 19	Not significant	Congestion predicted to increase as a result of future development growth as opposed to the scheme.
Station Rd /Heywood/Rd/Lodway	Not significant	
A369/St. Georges Hill	Not significant	
A369/Pill Rd	Not significant	

Ashton Vale Road Level Crossing

11.2.10 Testing of the MetroWest Phase 1 operations and junction improvements confirms that an hourly train service can be delivered without detriment to the local highway conditions in the vicinity of the Winterstoke Road /Ashton Vale Road junction. LinSIG and VISSIM testing carried out has shown that the overall impact of the MetroWest scheme on the local highway network is broadly neutral, with the proposed highway measures (extension of the Winterstoke Road left turn flare and introduction of MOVA control to the junction) being effective at alleviating the impact of level crossing closures.

11.2.11 Indeed, it is evident from modelling that level crossing closures can, in fact, benefit the Winterstoke Road southbound approach. This is because the signals don't have to service Ashton Vale Road when the level crossing is down so Winterstoke Road southbound receives more green within the cycle during these periods. VISSIM modelling indicates an improvement in Winterstoke Road southbound queuing and delay for the MetroWest scenarios compared to the Do-Nothing, so it appears that the reallocation of green from Winterstoke Road southbound to Ashton Vale Road needed to recover from a level crossing closure is more than compensated for by the extra green Winterstoke Road southbound receives during closures.

Severn Beach line level crossings

11.2.12 Three level crossings on the Severn Beach line are affected by increased passenger train services (at East Town Rd, Gloucester Rd (Avonmouth) and King Road. The impact on the level crossings has been assessed using LinSIG, and is not considered significant.

Parking Impacts

11.2.13 Parking surveys were undertaken in the vicinity of Pill and Portishead stations. The demand at both locations has been predicted for 2031. The assessment suggests that in 2031 that the number of spaces will be more than sufficient to meet parking demand at both stations. Streets close to the stations may be vulnerable to overspill parking or to users refusing to pay the parking tariff.

11.2.14 Table 11.2 (implementation) sets out some of the key infrastructure elements that the scheme includes to address transport-related impacts. For parking, this includes implementation of restrictions in the vicinities of the stations, principally waiting restrictions and double-yellow lines. Monitoring of impacts will also be a requirement.

Impact on NMUs

11.2.15 An audit of existing walking and cycling routes has been undertaken near the proposed station locations in Portishead and Pill, identifying a range of potential impacts. The scheme includes measures that provide enhancements to NMU access in the vicinity of the stations. Away from the stations, some crossing points and rights of way are affected by the scheme, including permanently and during construction. Alternative (temporary if necessary) facilities are also provided accordingly. Table 11.2 (implementation) sets out some of the key infrastructure elements that the scheme includes to address transport-related impacts.

Public Transport

11.2.16 Existing bus services will be impacted by the Scheme, as routes run that duplicate (in part) the rail service. There are currently no proposals in place to amend existing bus services, which is not the initial responsibility of the local authority in the deregulated bus services environment; NSDC will however liaise with the relevant bus operators to ensure that the services meet the strategic needs of the authority.

Construction Impact

11.2.17 The scheme proposes a number of measures which will help reduce the impact on the highway network during the construction phase. The TA has accounted for the delivery of abnormal loads where a number of measures have been outlined in order to minimise the impact including the following: the division of larger loads to smaller, more manageable loads; undertaking route feasibility reports prior to delivery; delivery of abnormal loads outside peak hours; and the provision of information to local residents, local businesses and other services prior to delivery.

Implementation

11.2.18 This TA brings together measures that are being considered for implementation as part of the scheme that address transport-related issues. Some measures would be implemented prior to the opening of the scheme, whereas others would be undertaken after.

Summary of local infrastructure measures

11.2.19 Table 11.2 provides a summary of the infrastructure measures that are included in the scheme to address transport-related issues. Most are an integral part of the scheme.

Table 11.2: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Responsible
1	Portishead	Phoenix Way/ Quays Avenue/ Harbour Road	Realignment of Quays Avenue and construction of new roundabout which also includes controlled parallel crossings on the Harbour Road and Phoenix Way arms	Integral part of scheme	Scheme Promoter
2	Portishead	Quays Avenue	Provision of a Toucan crossing on Quays Avenue west of the station site (entrance).	Integral part of scheme	Scheme Promoter
3	Portishead	Quays Avenue	Provision of 2 bus stops (east and west bound) closer to the station	Integral part of scheme	Scheme Promoter

Table 11.2: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Responsible
4	Portishead	Quays Ave (btw station and Serbert Way)	Extension and widening of shared footway and cycleway on west side of Quays Ave	Integral part of scheme	Scheme Promoter
5	Portishead	Quays Ave (btw station and Serbert Way)	Existing traffic island to be replaced with a pedestrian island	Integral part of scheme	Scheme Promoter
6	Portishead	Trinity Primary School	Provision of a bridge compliant with the Equalities Act 2010	Integral part of scheme	Scheme Promoter
7	Portishead	Harbour Road (from Quays Avenue to the Trading Estate)	Double yellow line on Harbour Road and junctions with minor roads	Traffic management	Highway Authority
8	Portishead	Quays Avenue (from Harbour Road to Galingale Way)	Double yellow line	Traffic management	Highway Authority
9	Portishead	Quays Avenue (from Conference Avenue to Wyndham Road)	Partial double yellow line	Traffic management	Highway Authority
10	Portishead	Phoenix Way (Quays Ave to Marjoram Way)	Double yellow lines (except existing parking bays)	Traffic management	Highway Authority
12	Sheepway to Pill	National Cycle Network 26	Realignment of existing of NCN 26 and ensure it is constructed to the latest standards	Integral part of scheme	Scheme Promoter
13	Portbury	Royal Portbury Dock Road	Improvements to existing bridleway uncontrolled crossing point	Integral part of scheme	Scheme Promoter
14	Portbury to Pill	Under the M5 bridge	Closure of existing bridleway and replacement with a new bridleway under the M5	Mitigation	Scheme Promoter

Table 11.2: Infrastructure measures to be implemented

Ref	Area	Location	Measure	Type of measure	Responsible
15	Pill	Monmouth Road (Crusty La to Station Rd)	Partial double yellow lines	Traffic management	Highway Authority
16	Pill	Station Rd (Mnmth Rd to Sambourne La)	Partial double yellow lines	Traffic management	Highway Authority
17	Pill	Station Road (Sambourne La to Heywood Rd)	Partial double yellow lines	Traffic management	Highway Authority
18	Pill	Station Road (New Road to Church Walk)	Partial double yellow lines	Traffic management	Highway Authority
19	Pill	Chapel Row/ New Rd/ Myrtle Hill Gyratory	Double yellow lines	Traffic management	Highway Authority
20	Pill	Ham Green/ Macrea Road	Provision of a ghost island	Integral part of scheme	Scheme Promoter
21	Ashton Vale	Ashton Vale Rd/ Winterstoke Rd junction	Extension of left-turn lane on Winterstoke Road northbound and upgrade of the mode of control of traffic signals to MOVA.	Integral part of scheme	Scheme Promoter
22	Ashton Vale	Barons Close Pedestrian Crossing	Closure of existing pedestrian crossing of the railway line with a replacement route available.	Integral part of scheme	Scheme Promoter
23	Parking (generally)	In vicinity of Portishead and Pill Stations	Post implementation monitoring of parking	Monitoring	Scheme Promoter

Outline Construction Transport Management Plan (CTMP)

11.2.20 The Outline CTMP (ES Appendix 16.1, DCO Document Reference 8.13) outlines transport impacts arising from the construction works, and provides a framework for addressing these impacts, by setting out principles that will be followed to manage construction traffic during the works. It includes an overview of the construction works, access points and compounds, construction traffic generation and transport impacts, and measures to be adopted to minimise construction impacts on the highway, users and local residents and businesses.

Station travel plans

11.2.21 To encourage and reinforce sustainable journeys, outline station travel plans have been prepared, to identify a range of measures for the new stations before, at and after opening. Travel plans are intended to manage travel to and from key trip generating places and as such are required by NPPF. Outline station travel plans for Portishead and Pill consider the policy background and proposed station characteristics in terms of layout and the expected demand levels, as well as the facilities to be provided for the different methods of accessing the station. Provisional aims and objectives are set out for each station and the likely level of use and an action plan outlines the indicative actions required to meet the aims and objectives; the plans should be monitored and updated over time.

11.3 Conclusions

11.3.1 The DCO Scheme supports its key objectives, and where transport impacts have been identified for the DCO Scheme, these should be considered against the objectives and need for the DCO Scheme that has been demonstrated. Three overriding factors summarise the effects of the DCO Scheme:

- The DCO Scheme complies with and is supported by the provisions of the NPS NN;
- The DCO Scheme will deliver a sustainable transport solution contributing towards the Government's aspirations for transport, society, the economy and environment; and
- The DCO Scheme is linear in nature, contained within the existing discontinued railway corridor, re-using previously developed land that has been safeguarded specifically for the Project in the applicable local development plans.

11.3.2 Direct strategic and local transport impacts of the DCO Scheme are not significant, and overall can be considered positive. As noted above, strategically, the DCO Scheme is a good fit with its objectives, and its impact on other strategic transport infrastructure is minor. At a local level, there is more noticeable impact in traffic accessing the proposed stations at Portishead and Pill, but the DCO Scheme itself includes a number of measures that deal with transport-related impacts in the station areas.

11.3.3 Ashton Vale Road (level crossing and junction with Winterstoke Road) is a notable location where issues have been considered. Testing of changes to rail operations through the level crossing, along with junction improvements included in the MetroWest Phase 1 scheme, confirms that an hourly train service can be delivered without detriment to the local highway conditions within the vicinity of the Winterstoke Road /Ashton Vale Road junction.

11.3.4 Another notable local issue is parking around the stations. While the DCO Scheme includes car parks for station users that will be charged at a rate commensurate with charges at other stations in the wider area, it is likely that some rail travelers will choose to park in surrounding streets. Parking restrictions are included as part of the DCO Scheme's traffic management measures, but future monitoring will also be required.

11.3.5 Overall, the DCO Scheme is effective in enhancing the transport network and encouraging the use of sustainable modes, with minimal impact on the local or regional road networks; the scheme includes measures around the stations. A combination of a strong level of national and local policy support and compliance, improvements to transport provision through increasing accessibility to the rail network and enhancing rail services across the sub-region, together with manageable and overall neutral transport impacts, summarises the transport impact of the DCO Scheme.

Appendix A: Scoping Report and Meeting Notes

Appendix B:
List of Committed Developments

Appendix C:
Report of Surveys

Appendix D:
Accident Data

Appendix E: Transport Modelling – network plots

Appendix F:
Junction Assessments

Appendix G:
Distribution and Assignment

Appendix H: Avonmouth/Severnside impacts (including level crossings)

Appendix I:
Parking Surveys

Appendix J:
Walking and Cycling

Appendix K: CTMP

Appendix L:
Match Day Pedestrian Impacts

Appendix M:
Outline Station Travel Plans
Portishead and Pill

Appendix N: Ashton Vale Road Junction Assessments