MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council
6.25, Environmental Statement, Volume 4, Appendix Series 14 Socio-economics and Economic Regeneration
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, regulation 5(2)(a)
Planning Act 2008

Author: CH2M
Date: November 2019

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Applicant: North Somerset District Council
6.25, Environmental Statement, Volume 4, Appendix 14.1 Equality Impact Assessment
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Abbreviations

AQMA	Air Quality Management Area
BCC	Bristol City Council
BME	Black and Minority Ethnic
B&NES	Bath and North East Somerset
CoCP	Code of Construction Practice
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DfT	Department for Transport
EIA	Environmental Impact Assessment
EqIA	Equality Impact Assessment
ES	Environmental Statement
HGV	Heavy goods vehicle
HIA	Health Impact Assessment
IMD	Index of Multiple Deprivation
JLTP	Joint Local Transport Plan
JSP	Joint Spatial Plan
JTS	Joint Transport Study
LGB	Lesbian, gay, bisexual
LSOA	Lower Super Output Area
NCN	National Cycle Network
NPSNN	National Policy Statement for National Networks
NSDC	North Somerset District Council
NSIP	Nationally Significant Infrastructure Project
ONS	Office for National Statistics
PSED	Public Sector Equality Duty
SGC	South Gloucestershire Council
SME	Small and medium sized enterprises
WofE LEP	West of England Local Enterprise Partnership

SECTION 1

Introduction

1.1 Introduction

1.1.1 This report identifies the impacts of the Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme ("the DCO Scheme") from an equalities perspective. An equalities impact assessment ("EqIA") is now a legal obligation under the Equality Act 2010, which requires local authorities and public bodies under the public sector equality duty ("PSED") to identify and consider the potential adverse impacts of major developments, strategies and policies. This assessment, along with the transport assessment, environmental impact assessment ("EIA") and health impact assessment ("HIA") forms part of the suite of documents to support the DCO application for the DCO Scheme under the Planning Act 2008.

1.1.2 EqIA is a technique to identify whether the scheme, project, function, service, policy or procedure has a potentially adverse impact on equality of opportunity. It should also seek to identify any unmet needs, on the basis of a person's race, gender, disability, age or faith or in terms of relations between or within those groups, and how these can subsequently be addressed.

1.1.3 An important outcome of the EqIA process is to integrate the needs of equalities groups in the design process. An EqIA has potential to highlight the impact of a proposed design or policy on the equalities groups, with an aim to respond to their specific requirements and to improve their participation in activities that may have been disproportionately low.

1.1.4 This EqIA has been conducted to ensure compliance with legislation as well as to assess and identify mitigation options to help reduce inequality for the equalities group or the protected characteristic group. The Equalities Act 2010 identifies people with certain characteristics as vulnerable and classified them as protected characteristic group, also referred to as the equalities group. The following provides a list of people from this group:

- Age;
- Disability;
- Gender reassignment;
- Pregnancy and maternity;
- Race;
- Religion or belief;
- Sex; and
- Sexual orientation.

1.1.5 The EqIA considers both the construction and operations impacts on the protected characteristic group for the following:

- Transport and accessibility to use the service, including integrated transport and parking;
- Station design – facilities, access and egress;

- Change in transport and accessibility features in the neighbourhood, including footpath closures;
- Safety and security, particular focus on the elderly and on race related crime; and
- Well-being and quality of life.

1.1.6 The assessment has taken into account measures that have already been included in the design process and likely measures included in the Code of Construction Practice ("CoCP") (DCO Document Reference 8.15) and the Master Construction Environmental Management Plan ("CEMP") (DCO Document Reference 8.14) for controls during the construction stage.

SECTION 2

Legal and Policy Framework

2.1 Legislation

2.1.1 The Equality Act 2010 requires public bodies (and others carrying out public functions) to be subject to the public sector equality duty ("PSED"). This involves preventing unlawful discrimination, harassment, victimisation and any other conduct prohibited by the Act, advancing equal opportunities for people with protected characteristics and people without these characteristics, and building good relations between people with protected characteristics and without these characteristics.

2.1.2 The Equality Act 2010 unites several previous Acts, including the Race Relations Act 1976, the Disability Discrimination Act 1995 and the Sex Discrimination Act 1975. These three Acts have been repealed.

2.1.3 People with and without protected characteristics may be unequally affected during the construction and operation of the DCO Scheme. This EqIA aims to identify protected groups and assess the impacts that the DCO Scheme may have on them in order to provide suitable mitigation measures to reduce this inequality. It also proposes reasonable positive outcomes to incorporate into the DCO Scheme which will enhance the equality outcome, thereby supporting the objectives of the Equalities Act and fulfilling the PSED requirement in considering the equalities impact during the decision making process of the proposed development.

2.2 Policy

National Policy

National Policy Statement for National Networks

2.2.1 The National Policy Statement for National Networks ("NPSNN") sets out the Government's vision and strategic objectives for the national networks to meet the country's long-term needs, supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system: "*this means*:

- *Networks with the capacity and connectivity and resilience to support the national and local economic activity and facilitate growth and create jobs.*
- *Networks which support and improve journey quality, reliability and safety.*
- *Networks which support the delivery of environmental goals and the move to a low carbon economy.*
- *Networks which join up our communities and link effectively to each other*" (p9, Department for Transport, 2014).

2.2.2 The NPSNN Section 2.9 emphasises the need to enhance accessibility for non-motorised users. For the DCO Scheme, this will mean improving the links between Portishead and Bristol and ensure the stations are accessible by cyclists and pedestrians (who are likely to include people with reduced mobility).

2.2.3 The NPSNN also highlights the importance of open space and the need to maintain the functionality and connectivity of green infrastructure.

Transport for Everyone

2.2.4 *Transport for Everyone: an Action Plan to Improve Accessibility for All* (Department for Transport, 2012b) sets out the Government's strategy for improving the accessibility of the transport network for people of reduced mobility. Transport schemes should build the accessibility requirements of all transport network users into the scheme design. In addition, improvements to reduce the severance of communities should be considered.

Regional Policy

2.2.5 The four West of England Councils - North Somerset, Bath and North East Somerset, Bristol City and South Gloucestershire - have prepared the West of England Joint Spatial Plan ("JSP"). This emerging plan will be a statutory Development Plan Document once adopted, providing the strategic overarching development framework for the West of England to 2036.

2.2.6 The emerging West of England JSP will establish the housing requirement to be accommodated across the four West of England local authorities for the period from 2016 to 2036. The scope of the plan is limited to the distribution of housing to be accommodated, identification of strategic locations and the infrastructure that is needed. The consultation draft indicates the need for a further 85,000 houses in the wider Bristol Housing Market Area in addition to 30,000 houses already planned, and a total of 102,200 houses across the four West of England authorities, North Somerset, Bristol City Council, South Gloucestershire, and Bath and North East Somerset Council by the year 2036. The plan points to strategic development locations to the south of the study area in Nailsea, Backwell and south Bristol and to the north of Bristol and strategic employment locations in Avonmouth, Bristol and Bath. These requirements point to future trends of increasing urbanisation and the need for improved transport links between the new development and employment centres. The plan is supported by the Joint Transport Strategy which examines the future transport needs of the proposed development.

2.2.7 "*In tandem with the JSP, a Joint Transport Study ("JTS") was undertaken to recommend how to address both current transport challenges, including carbon reduction, and forecast growth. The JTS, developed in partnership with Highways England, identified potential future strategic transport proposals for delivery up to 2036, that address current challenges and inform future development proposals in the JSP. The JTS set out the following approach for transport: Transport in the West of England will be transformed over the next 20 years through a programme of complementary measures designed to address underlying challenges and to enable the sustainable delivery of new housing and employment growth.*" (from the JLTP4, page 6, TravelWest 2019).

2.2.8 The West of England Joint Local Transport Plan 3 ("JLTP3") (West of England Partnership, 2011) was produced by North Somerset District Council ("NSDC"), Bristol City Council ("BCC"), Bath and North East Somerset Council ("B&NES"), and South Gloucestershire Council ("SGC") for the years 2011 – 2026. Among other things, the councils' vision included:

- Supporting economic growth, for example by increasing access to employment from deprived neighbourhoods.
- Contributing to better safety, health and security, for example by designing out crime and fear of crime, encouraging walking and cycling, monitoring air quality and improving it in Air Quality Management Areas ("AQMA").
- Enhancing accessibility, for example access to health services, employment and other local services, and improving disability access.
- Improving quality of life and a healthy natural environment, for example by enhancing the urban environment and increasing access to the countryside.

2.2.9 The plan highlights major transport improvements as a key priority for the local economy and aims to synchronise transport investment with development such as Bristol's Temple Quarter Enterprise Zone. 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 an average of 31%.

2.2.10 The West of England Local Transport Plan 3, last refreshed in 2013 (TravelWest, 2013), will be superseded by the emerging Joint Transport Local Transport Plan 4 2019 – 2036 ("JTLP4"), which has been developed to progress the JTS. Building on *Unlocking Our Potential: The Economic Benefits of Transport Investment in the West of England* (2012), the LTP4 identifies road congestion and other transport issues as key constraints on economic growth. At the same time, the policy documents explicitly emphasise the prominent role that rail investment can play in driving economic development. In accordance with national planning policy, local policy emphasises transport infrastructure investment as an enabler of economic development. The MetroWest Phases, which are identified as early investment schemes to ensure a programme of works can be delivered in the short, medium and longer term of the JLP4 period, are identified as schemes to significantly improve local and suburban rail travel and services across the area.

2.2.11 The draft JTLP4 (TravelWest 2019) includes the objective to enable equality and improve accessibility. Proposed outcomes to demonstrate achievement of the objective are:

- connectivity is increased and transformed, enabling seamless "door-to-door" movements of people and goods,
- access for those with both visible and hidden disabilities is improved,
- access to services for residents in rural or remote areas is improved,

- better information to aid travel decisions is provided,
- low carbon transport and opportunities for reducing the need to travel are maximised, and
- new public transport systems, smarter ticketing and faster payment options are enabled.

2.2.12 The West of England Local Enterprise Partnership ("WofE LEP") sets out its strategic focus of Equality and Diversity in the technical document *Equality and Diversity – Impacts for the West of England Strategic Economic Plan 2013-30* (West of England LEP, 2014). This plan will help to achieve the West of England Vision to have "*closed the gap between disadvantaged and other communities*" and its strategic objective to "*ensure all our communities share in the prosperity, health and well-being and reduce the inequality gap*" by 2030. Equality and Diversity Values and Principles will underpin the Strategic Economic Plan's four "Levers of Growth":

- Skills and People, including increasing opportunities for education and employment for everyone.
- Investment and Promotion, including encouraging innovation through diversity in the workplace.
- Place and Infrastructure, including the promotion of accessibility.
- Small and medium enterprises ("SME") Business Support, including supporting, encouraging and developing women and minority ethnic led businesses.

2.2.13 The plan recommends a delivery action to "*assess all schemes in relation to both the built environment and travel in order to ensure the integration of inclusive design principles*" (p9).

Local Policy

2.2.14 The following key local policies are relevant to the EqIA for the DCO Scheme. These have been extracted from North Somerset's and Bristol City Council's Core Strategies and the Development Management Policies that support them.

North Somerset Council Core Strategy (Adopted, January 2017)

- Policy CS10: Transportation and movement – connectivity will improve and facilities for users, including people with reduced mobility, will be enhanced.
- Policy CS31: Clevedon, Nailsea and Portishead – development proposals that improve transport links to other towns are supported; the re-opening of the Portishead Branch Line (MetroWest Phase 1) is prioritised.
- Policy CS32: Service villages – Public transport proposals will be supported to improve accessibility (includes village of Easton-in-Gordano/Pill).

North Somerset Sites and Policies Plan Part 1: Development Management Policies (Adopted July 2016)

- Policy DM24: Safety, Traffic and Provision of Infrastructure Associated with Development – seeks to protect and enhance the existing public rights of way network and strategic cycle routes and ensure the provision of new and improved multi-user routes connecting with new developments.
- Policy DM25: Public rights of way, pedestrian and cycle access – seeks to protect and enhance the existing public rights of way network and strategic cycle routes and ensure the provision of new and improved multi-user routes connecting with new developments.
- Policy DM68: Protection of sporting, recreation cultural and community facilities – protection of existing land and sites and development only allowed where certain conditions apply. Designated community assets shall be retained in community use.

Bristol City Council Core Strategy (Adopted, June 2011)

- Policy BCS2: Bristol City Centre – acknowledges that major developments should increase social inclusion and community cohesion and severance of communities should be reduced.
- Policy BCS10: Transport and Access Improvements – prioritises the re-opening of the Portishead line to passengers and the need to consider people of reduced mobility in transport developments.

Bristol Site Allocations and Development Management Policies (Adopted, July 2014)

- Policy DM14: The Health Impacts of Development – requires development to contribute towards reducing the causes of ill health, improving health and reducing health inequalities. Developments that will have an unacceptable impact on health and wellbeing will not be permitted.

SECTION 3

Methodology

3.1 Guidance and Good Practice

3.1.1 The methodology employed for this assessment follows the wider guidance frameworks set by the following documentation:

- Equality Act 2010 Technical Guidance on the Public Sector Equality Duty (Equality and Human Rights Commission, 2014);
- Equality Impact assessments: How to do them (Transport for London, 2004), and
- European Regional Development Fund equality impact assessment guidance and forms (Department for Communities and Local Government, 2012a).

3.2 Definition of the Study Area

3.2.1 For purposes of the EqIA, two study areas have been defined to assess the direct and cumulative effects of the Portishead Branch Line (MetroWest Phase 1) DCO Scheme and the wider study area to assess the cumulative effects of the DCO Scheme in combination with other activities associated with MetroWest Phase 1.

3.2.2 For purposes of the EqIA, the local study area comprises a 300 m buffer along the DCO Scheme to be consistent with the air quality and noise and vibration assessments reported in Chapters 7 Air Quality and Greenhouse Gases and 13 Noise and Vibration of the Environmental Statement ("ES") (DCO Document References 6.10 and 6.16).

3.2.3 The EqIA recognises that there might be wider cumulative effects for the DCO Scheme. For this reason, the study area for the cumulative effects covers other nationally significant infrastructure projects ("NSIP") within 10 km of the DCO Scheme, other projects identified from NSDC's and BCC's planning portals within 0.5 km, major applications further away in the Bristol area and other works associated with MetroWest Phase 1, namely:

- Parson Street Junction including Liberty Lane Sidings;
- Parson Street Station;
- Bedminster Down Relief Line;
- Severn Beach / Avonmouth Signalling works, and
- Bathampton turnback.

3.2.4 While the Severn Beach / Avonmouth Signalling works are also part of MetroWest Phase 1, these works have been completed under Network Rail's permitted development rights as part of the Filton Four Track project. However, the new service pattern will not come into force until late 2021.

3.3 Defining the Baseline

3.3.1 The Public Sector Equality Duty requires the public body to have sufficient evidence to provide proper consideration of the impact of a function (the DCO Scheme in this case). This report is based on evidence obtained from

secondary baseline data, feedback from the informal consultations held in summer 2015 and 2016, baseline information gathering meeting with the North Somerset Council Equality officers held in January 2016 and the statutory S42 consultation undertaken in autumn 2017. The Impact Centre at Liverpool University was also consulted upon for the methodology development who supplied information sources, including the *Health Impact Assessment: A Literature Review* (Winters, 1997).

3.3.2 The data sources examined for the EqIA are:

- Census 2001;
- Census 2011;
- Department for Communities and Local Government ("DCLG");
- Office of National Statistics;
- Public Health England;
- National Child Measurement Programme;
- North Somerset Council, Bath and North East Somerset Council and Bristol City Council; and
- Avon and Somerset Constabulary website.

3.3.3 Baseline data for areas close to the works, including the temporary construction compounds, have been obtained from specific Lower Super Output Areas ("LSOA"). LSOAs are used to collect information at the community level. In the 2011 Census, the LSOAs were defined as areas with a minimum population of 1,000 people and a maximum of 3,000 people, with a minimum household number of 400 and a maximum of 1,000 households. Table 3.1 summarises the LSOAs used in the EqIA, the components of the DCO Scheme within each LSOA and the geographic area. The location of the LSOAs are shown in Figure 3.1.

Table 3.1. Location of Lower Super Output Areas within the Study Area

LSOA code	Scheme component	Area
Local Study Area		
North Somerset 001G (part), 003D and 003E	Proposed Portishead Station, Portishead construction compound and proposed bridge to Trinity Primary School	Central Portishead
North Somerset 006F and 004B	Construction of the disused railway line, two temporary construction compounds on The Portbury Hundred and at Lodway Farm, haul roads.	East of Portishead and near Pill
North Somerset 004C and 004D	Avon Road/Lodway Close Underpass, Proposed Pill Station and related construction compound/car park, Ham Green construction compound/maintenance access.	Northern Pill

Table 3.1. Location of Lower Super Output Areas within the Study Area

LSOA code	Scheme component	Area
North Somerset 004A	Minor civils works through the Avon Gorge including new track and ballast, ground works, cliff stabilisation works, new signals and communications masts, structure repairs, and micro welfare compounds.	Avon Gorge/ Abbots Leigh/ Leigh Woods
Bristol 036A	Railway works and Bower Ashton construction / maintenance compound.	Ashton Junction
Bristol 041A and 041D	New pedestrian / cycle ramp and modifications to Winterstoke Road in Ashton Vale, closure of Barons Close Pedestrian Crossing and a construction compound.	Ashton Junction
Wider Study Area (includes works under the Permitted Development Rights and works as part of wider MetroWest Project		
Bristol 046A, 039A	Parson Street Junction and Station	Parson Street Junction
Bristol 039B, 039H	No scheme components	Between Parson Street Junction and Bedminster
Bristol 040B, 040C, 039E	Bedminster Down Relief Line	Bedminster
Bristol 008E, 008F	Severn Beach/Avonmouth Signalling	Avonmouth
Bath and North East Somerset 010E	Bathampton Turnback	Bathampton

3.4 Key Receptors

3.4.1 The following groups have been considered in this EqIA.

- Age: this refers to persons defined by either a particular age or a range of ages. This EqIA considers effects for children (pre-school [0-4] and school age [5-17]); young people [18-25]; older people [60+] and very old people [75+].
- Disability: a disabled person is defined as someone who has a physical or mental impairment that has a substantial and long-term adverse effect on his or her ability to carry out normal day-to-day activities.
- Pregnancy and maternity: Pregnancy is the condition of being pregnant or expecting a baby. Maternity refers to the period after the birth.
- Race: The Equality Act 2010 defines race as encompassing colour, nationality (including citizenship) and ethnic or national origins. This EqIA

considers ethnic group classification as indicated in the Office of National Statistics ("ONS") data.

- Religion or belief: Religion means any religion a person follows. Belief means any religious or philosophical belief, and includes those people who have no formal religion or belief.
- Sex: The term sex refers to a man or to a woman or a group of people of the same sex, while gender refers to the wider social roles and relationships that structure the lives of men and women, boys and girls. This EqIA considers effects for women and men.
- Sexual orientation: Sexual orientation of a person relates to their emotional, physical and/or sexual attraction and the expression of that attraction. This EqIA considers effects for lesbian, gay, and bisexual ("LGB") people.
- Gender reassignment: This refers to people who are proposing to undergo, are undergoing, or have undergone a process for the purpose of reassigning their gender identity.

3.5 Approach

3.5.1 The EqIA assesses the potential effects of the proposed design, its construction and operations on equality. In order to assess this, the EqIA seeks to establish whether people with protected characteristics are disproportionately or differentially affected by the proposed scheme.

3.5.2 A disproportionate equality effect is one that has a proportionately greater effect on members of a protected characteristic group than on other members of the general population at a particular location. For example, near a school, children (age protected characteristic group) may be disproportionately affected compared with the rest of the population.

3.5.3 A differential equality effect is one which affects members of a protected characteristic group differently from the rest of the general population because of specific needs or a recognised sensitivity or vulnerability associated with their protected characteristic. For example, accessing a railway station via steps may not be possible for some people from the age and disability protected characteristic groups.

3.5.4 It is likely that some members of a protected characteristic group are identified as potentially subject to both disproportionate and differential effects.

3.5.5 Where the proposed scheme work is considered relevant to each of the protected characteristic group, the following questions are used as guide to conduct the EqIA:

- Who benefits?
- Who does not benefit and why not?
- Who should be expected to benefit and why don't they?
- Who is affected?
- What is the significance of the impact and can it be altered?

3.5.6 The assessment of effects takes into account measures incorporated into the design of the DCO Scheme, and measures undertaken during the construction and operational phase, to avoid, reduce, or remedy the effects on people. These measures are described in Chapter 6.

3.5.7 The effects of the DCO Scheme on receptors may be major positive, minor positive, major negative, minor negative or neutral. Where the level of information or evidence on the protected characteristic is not sufficient to conclude the effect, this is marked as an uncertain impact.

3.5.8 A traffic light style colour coding has been adopted to highlight the nature of the effects and explanatory text is provided in Chapter 7 to describe whether the predicted effect is disproportionate or differential in nature.

Major positive	**Minor positive**	**Neutral**
Major negative	**Minor negative**	**Uncertain**

3.5.9 This assessment covers the impact of the proposed design and subsequent construction and operations of the DCO Scheme. The assessment does not discuss equality and diversity matters within the construction supply chain or the contractors' equality duty.

SECTION 4

Baseline and Screening

4.1 Community Profiling

4.1.1 This section uses the most recent data available to profile the local and wider study areas. Demographic data for mid-2014 were available from the Office for National Statistics, but for many of the other topics the latest data come from the UK 2011 Census. The Index of Multiple Deprivation data are from 2015 and Public Health England data are from 2014. Although from different years, these data provide an understanding of the present situation that is as accurate and up-to-date as possible.

Ward-Level Overview

4.1.2 A ward level community profile is presented below, covering the area of the DCO Scheme. Unitary Authority figures for NSDC and BCC are also included.

Demography

4.1.3 Mid-year population estimates for 2014 show that the population of North Somerset was roughly half the size of the population of Bristol (Office for National Statistics, 2015a). The wards in the study area with the greatest populations were Bedminster and Southville, near Ashton Junction. Easton-in-Gordano and Pill had the smallest populations (Table 4.1**Error! R eference source not found.**).

4.1.4 North Somerset had a lower percentage of males (48.6%) than Bristol (49.9%). Most wards had an almost equal number of males and females, with less than 1% difference between the populations of the two genders. However, larger differences were recorded in Portishead East, where only 47.7% of the population was male (lower than the NSDC value), and to a lesser extent in Southville, where 51.4% of the population was male.

4.1.5 At a Unitary Authority level, North Somerset had a much lower percentage of its population under the age of 25 than Bristol (27.0% compared to 34.1%), and a much higher percentage of its population aged 65 or older (23.0% compared to 13.3%). However, all wards in North Somerset except Easton-in-Gordano had a higher percentage of under 25 year-olds than the North Somerset as a whole, and a higher percentage than the Bristol wards. The Bristol wards had a lower percentage than Bristol as a whole.

4.1.6 Portishead East had the highest percentage of residents under the age of 25, at 31.9%, while having one of the lowest percentages of residents aged 65 or older (15.4%). Pill followed a similar trend but with slightly more equal percentages. Easton-in-Gordano had the lowest percentage of residents under 25 at 22.7%, but the highest percentage of residents aged 65 or older at 31.1%. Southville, Bedminster and Portishead East had the lowest percentages of residents aged 65 or older (11.3% and 14.7% respectively).

Table 4.1: Demographic characteristics of the study area at ward and Unitary Authority level

Ward/Unitary Authority	Total population	Gender		Age	
		Male (%)	Female (%)	Under 25 (%)	65 or older (%)
North Somerset	208,154	48.6	51.4	27.0	23.0
Portishead East	6,117	47.7	52.3	31.9	15.4
Gordano	4,941	50.8	49.2	27.7	19.8
Easton-in-Gordano	2,671	49.6	50.4	22.7	31.1
Pill	3,583	50.1	49.9	27.3	21.7
Wraxall and Long Ashton	8,158	49.1	50.9	27.6	20.4
Bristol	442,500	49.9	50.1	34.1	13.3
Southville	13,182	51.4	48.6	25.2	11.3
Bedminster	13,229	49.4	50.6	26.0	14.7

Economy and Employment

4.1.7 Figure 4.1: shows that according to the 2011 Census, unemployment among economically active people (aged 16 or older) was much higher in Pill (5.6%) than in Portishead (3.5%). Relatively high percentages were also found in Southville (Ashton Junction area) at 5.7%. The lowest percentage was recorded in Gordano (between Portishead and Pill).

4.1.8 All wards in North Somerset except for Pill had lower unemployment than the Unitary Authority value (4.9%) and the two Bristol wards had lower unemployment than the Unitary Authority value (7.9%).

4.1.9 The unemployment percentage of economically active people (aged 16 or older) at Bedminster is 5.2%.

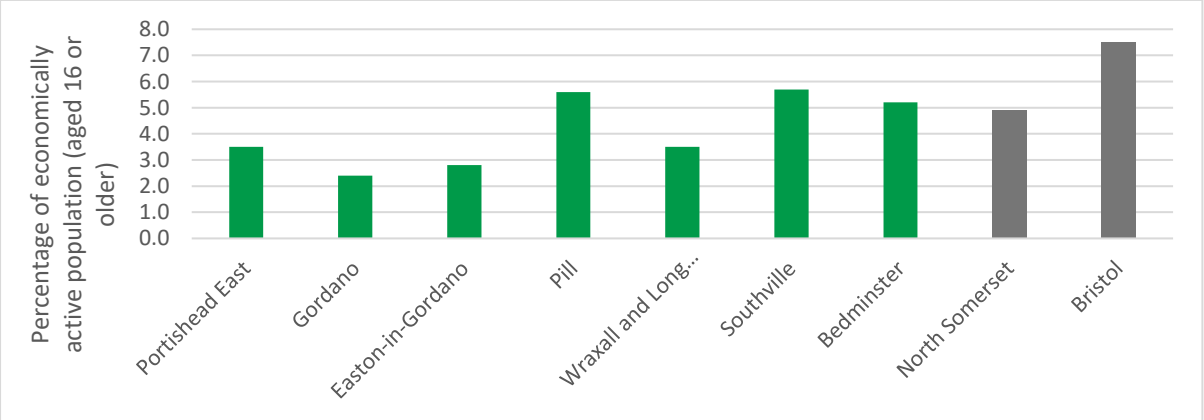

Figure 4.1: Percentage of economically active people (aged 16 or older) who are unemployed

Source: Census (2011)

Ethnicity

4.1.10 The 2011 Census reveals that all wards in North Somerset along the DCO Scheme had a similar distribution of ethnicity across their populations, with around 97% being white, mixed/multiple ethnic groups and Asian/Asian British groups each making up less than 2% and the remaining population being spread between Black/African/Caribbean/Black British and other ethnic groups (less than 0.5% each) (Table 4.2).The two Bristol wards had higher percentages of non-white residents; in Southville the main non-white ethnic group was Black/African/Caribbean/Black British (7.1%) and in Bedminster it was mixed/multiple ethnic groups.

Table 4.2: Ethnicity within the study area and at the Unitary Authority Level

Ward	White (%)	Mixed/ multiple ethnic group (%)	Asian/ Asian British (%)	Black/African /Caribbean /Black British (%)	Other ethnic group (%)
Portishead East	97.4	1.2	1.1	0.2	0.1
Gordano	97.9	1.2	0.8	0.1	0.1
Easton-in-Gordano	97.1	1.4	1.1	0.1	0.4
Pill	97.4	1.0	1.3	0.2	0.2
Wraxall and Long Ashton	96.8	1.6	1.3	0.3	0.1
Southville	82.1	4.2	4.5	7.1	2.1
Bedminster	94.0	2.8	1.3	1.0	0.9
North Somerset	97.3	1.0	1.2	0.3	0.2
Bristol	84.0	3.6	5.5	6.0	0.9

Source: Census (2011)

Disability

4.1.11 According to the 2011 Census, Pill has the highest percentage of its population whose day-to-day activities are limited a lot or a little (9.2% and 10.7%) (Table 4.3). These percentages are above the North Somerset percentages; all other North Somerset wards are below this. Portishead has a more able population with only 5.9% of residents limited a lot in their day-to-day activities and 6.9% limited a little.

4.1.12 The two Bristol wards have relatively high levels of disability, matching the Bristol wide level.

Table 4.3: Disability within the study area at ward and at the Unitary Authority Level

Ward	Day-to-day activities limited a lot	Day-to-day activities limited a little
Portishead East	5.9	6.9
Gordano	5.4	7.5
Easton-in-Gordano	7.5	9.4
Pill	9.2	10.7
Wraxall and Long Ashton	6.6	8.3
Southville	8.0	8.4
Bedminster	8.8	8.7
North Somerset	8.6	10.6
Bristol	8.1	8.7

Source: Census (2011)

Religion or Belief

4.1.13 Table 4.4 shows the religion or belief of the ward populations as recorded by the 2011 Census. In each ward, the majority of the population was found to be Christian, with percentages in North Somerset wards above 58% and the two Bristol wards having slightly lower percentages at 50.4% (Southville) and 48.7% (Bedminster). The majority of the remaining population had no religion or did not state their religion. Percentages for all other religious populations were below 1% for all cases except for Muslims in Southville, who made up 5.0% of the total population.

Table 4.4: Religion / belief within the study area at ward and at the Unitary Authority level

Ward	**Percentage population** (figures do not total to 100 due to rounding)								
	Christian	**Buddhist**	**Hindu**	**Jewish**	**Muslim**	**Sikh**	**Other religion**	**No religion**	**Religion not stated**
Portishead East	60.6	0.3	0.2	0.0	0.3	0.0	0.3	31.7	6.5
Gordano	64.5	0.2	0.1	0.1	0.1	0.0	0.3	28.4	6.2
Easton-in-Gordano	66.0	0.1	0.2	0.1	0.6	0.1	0.2	24.7	8.0
Pill	58.1	0.5	0.4	0.1	0.3	0.0	0.3	32.0	8.4
Wraxall and Long Ashton	60.5	0.4	0.3	0.1	0.4	0.1	0.3	30.7	7.2
Southville	50.4	0.6	0.5	0.1	5.0	0.0	0.7	33.1	8.8
Bedminster	48.7	0.5	0.4	0.2	0.9	0.1	0.5	41.1	7.6
North Somerset	61.0	0.3	0.2	0.1	0.4	0.0	0.5	30.0	7.5
Bristol	46.8	0.6	0.6	0.2	5.1	0.5	0.7	37.4	8.1

Source: Census (2011)

LSOA-Level Overview

4.1.14 This section uses LSOA-level data and, where these are not available, Unitary Authority data to provide a detailed community profile for LSOAs along the DCO Schemes and for the wider study area covering other works for MetroWest Phase 1. For each topic, results are presented for the DCO Scheme study area (Portishead to Ashton Junction) and the wider study area for use in the cumulative effects assessment (Parson Street Junction to the Bedminster Down Relief Line, Severn Beach/Avonmouth Signalling Works and Bathampton Turnback Works). Results are mainly reported for the areas shown in Table 3.1, but where LSOAs within these areas differ significantly, individual LSOA results are discussed.

Population

The DCO Scheme

4.1.15 Mid-2014 population estimates for each section of the route (leading on from Table 3.1) are shown in Figure 4.2. The LSOAs along the DCO Scheme route had a combined population of 19,188 in mid-2014. Portishead LSOAs had a combined population of 4,414 while Pill LSOAs had a combined population of 3,583. The Ashton Junction LSOAs had the largest combined population (5,438).

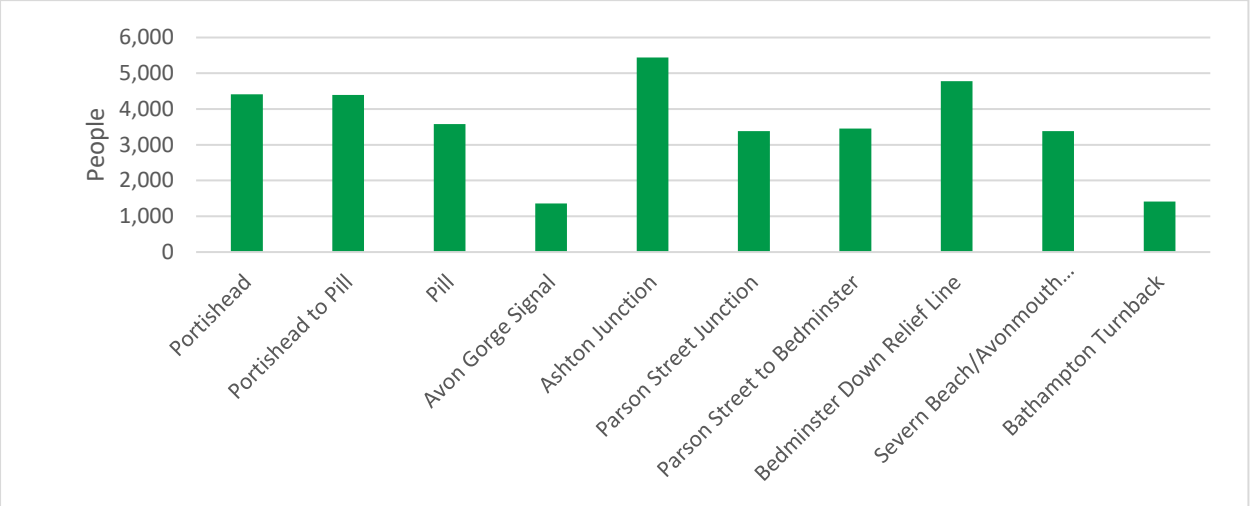

Figure 4.2: Population of LSOAs surrounding the DCO Scheme and wider study area (mid-2014 estimate)

Source: Office for National Statistics (2015a)

The Wider Study Area

4.1.16 The LSOAs between Parson Street Junction and Bedminster Station had a combined population of 11,616 in mid-2014. The combined population around Severn Beach/Avonmouth Signalling works was 3,380 and around the Bathampton Turnback the population was 1,413.

Age

The DCO Scheme

4.1.17 Figure 4.3 shows that LSOAs around the proposed station at Portishead and the east side of the town (North Somerset 003D and 003E) had a high proportion of residents under the age of 25 (35.2 and 38.7 % of the

population respectively) in 2014. These LSOAs had a very low percentage of residents aged 65 or older (7.5 and 6.2 % of the population respectively). In contrast, the LSOA to the west of the proposed Portishead station (North Somerset 001G) had fewer under 25 year-olds (23.7 %) and more residents aged 65 or older (31.3 %).

4.1.18 Between Portishead and Pill, LSOA 006F had a higher proportion of younger people than older people (32.7% of the population under 25 compared to 10.7% aged 65 or older). However, LSOA 004B, further east, had a higher proportion of older people (34.2% aged 65 or older compared to 21.1 % under 25).

4.1.19 The combined population of the two LSOAs covering Pill was found to be more evenly spread between younger and older residents than in Portishead; 27.3 % of the population was under the age of 25 and 21.7 % was aged 65 or older.

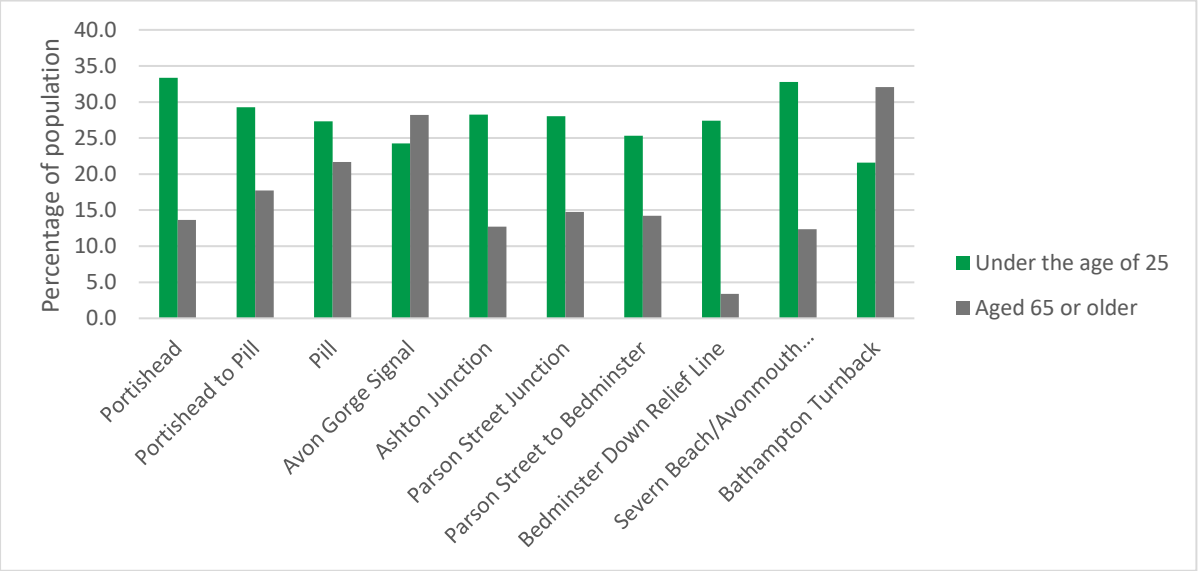

Figure 4.3 Age distribution of the population of LSOAs surrounding scheme components (mid-2014 estimates)

Source: Office for National Statistics (2015a)

4.1.20 The Haven Lodge Care Centre is located on Phoenix Way, facing the proposed Portishead station. It lodges about 108 residents, mainly elderly and may be some with physical and mental illness such as dementia. Marina Health Centre, a GP surgery is located adjacent to the Haven Lodge Care Centre which may be visited by the elderly and young children alike.

4.1.21 The Trinity Primary School is located near the proposed Bridge and a playground is located on The Vale (south of railway line) in Portishead. Busy Bees Nursery is located on Serbert Road in Portishead (south of the proposed station).

4.1.22 The LSOA around the Avon Gorge Signal had a more even proportion of younger and older residents (24.2% and 28.2% respectively), while LSOAs in the Ashton Junction area were populated by many more younger residents than older residents (an average of 28.3% under 25s and 12.7% aged 65 or older over the three LSOAs).

The Wider Study Area

4.1.23 LSOAs between Parson Street Junction and Bedminster Station, around the Bedminster Down Relief Line and around Severn Beach/Avonmouth Signalling works all had much higher proportions of people under the age of 25 than people aged 65 or older in mid-2014 (Figure 4.3). In particular, the population of the Bedminster Down Relief Line area was 27.4% under 25 and only 3.4% aged 65 or older (the lowest proportion of older people out of all LSOAs within the DCO Scheme or wider study area). The population around the Severn Beach/Avonmouth Signalling works had the highest proportion of people under 25 of all LSOAs studied, at 32.8%. In contrast, the LSOA around Bathampton Turnback had the highest proportion of its population aged 65 or older out of all LSOAs studied, at 32.1%. It had a lower proportion of under 25s at 21.6% of the total population.

Gender

The DCO Scheme

4.1.24 Mid-2014 population estimates reveal that the proportion of male and female residents along the DCO Scheme route were quite close when considered in terms of route sections, ranging from 48.5% male in Portishead to 50.3% male at Parson Street Junction (Figure 4.4). However, there was more variation between individual LSOAs. For example, the most westerly LSOA in Portishead (North Somerset 001G) and the central LSOA near the proposed Portishead station (North Somerset 003D) had populations that were only 46.8% and 46.0% male respectively, whereas the easterly Portishead LSOA near the proposed station and Trinity Primary School (North Somerset 003E) had a population that was 51.8% male.

4.1.25 Between Portishead and Pill, North Somerset 006F and 004B had 51.3% and 50.5% male populations respectively. The two Pill LSOAs differed significantly in gender distribution (52.7% male for North Somerset 004C and 48.0% male for North Somerset 004D). The LSOA around the Avon Gorge had a 48.6% male population.

4.1.26 Around Ashton Junction the LSOAs had an overall percentage of males at 48.6%, with Bristol 041D having the lowest male percentage at 47.2%.

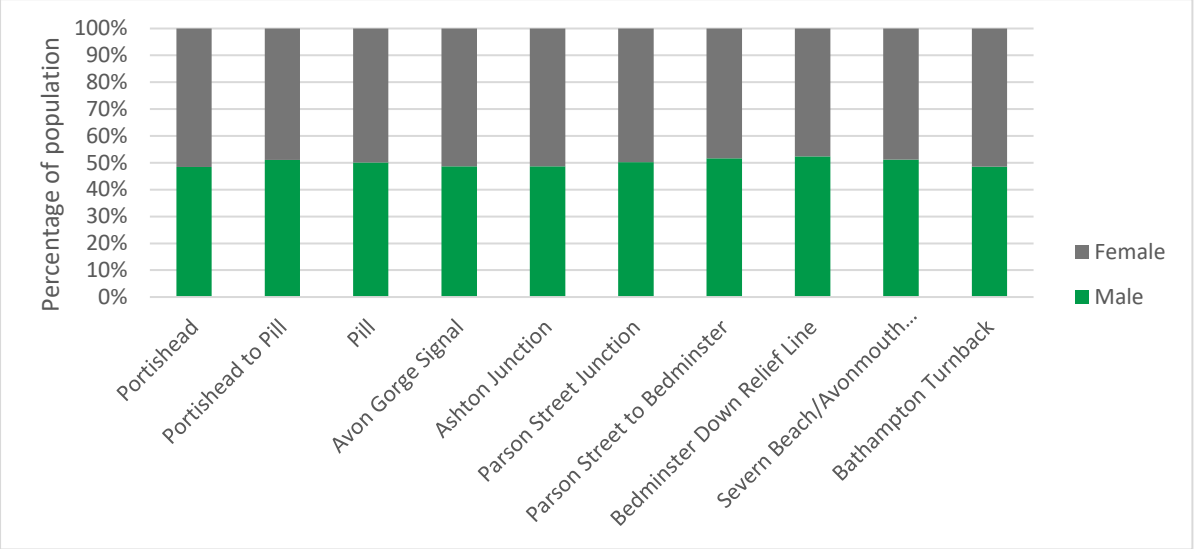

Figure 4.4 Gender distribution of the population of LSOAs surrounding scheme components (mid-2014 estimates)

Source: Office for National Statistics (2015a)

The Wider Study Area

4.1.27 Around Parson Street Junction, Bristol 046A had a 51.6% male population whereas 039A had a 48.9% male population. Between Parson Street Junction and Bedminster the LSOAs had a combined 51.7% male population (both LSOAs had more males than females). Around the Bedminster Down Relief Line, distribution was more varied with the lowest male percentage at 48.8% (Bristol 040C) and the highest male percentage at 56% (Bristol 039E).

4.1.28 Around the Severn Beach/Avonmouth Signalling works, LSOA Bristol 008E had a 53.7% male population whereas Bristol 008F had a 48.4% male population. Around the Bathampton Turnback the LSOA had a 48.5% male population.

Deprivation

The DCO Scheme

4.1.29 Deprivation is measured by the Department for Communities and Local Government using multiple indices, which are combined to form the Index of Multiple Deprivation ("IMD") (Department for Communities and Local Government, 2015). This assessment focuses on the 2015 sub-domains of individual domains – *Geographical Barriers*, *Barriers to Housing and Services* and *Outdoor Living Environment* – that are relevant to this study. The *Geographical Barriers to Services* sub-domain relates to the physical proximity of local services. The *Outdoor Living Environment* contains measures of air quality and road traffic accidents and the *Barriers to Housing* sub-domain measures issues relating to access to housing such as affordability. The above sub-domains are linked to the income deprivation sub-domain represented in Figure 4.5.

4.1.30 The IMD *Geographical Barriers to Services*[1] sub-domain of barriers to housing and services highlights several neighbourhoods which are among the 10% and 20% most deprived neighbourhoods in England in terms of their physical proximity to local services (Figure 4.10). The LSOAs of North Somerset 004A and North Somerset 006F (between Portishead and Pill) are among the 20% most deprived, which may be due to sparse location of the houses and therefore increased distance to all the services identified within the sub-domain (these services may be accessible by cars). It is therefore not a representation of the area being deprived in terms of income but considered deprived in terms of distance to services. All other LSOAs along the DCO Scheme route are less affected.

4.1.31 No LSOAs along the DCO Scheme route are among the 10% or 20% most deprived neighbourhoods in England in relation to financial accessibility to housing and similar issues, under the *Wider Barriers* sub-domain of *Barriers to Housing and Services*.

4.1.32 Bristol 036A (around Ashton Junction) is among the 10% most deprived for *Outdoor Living Environment* sub-domain of *Living Environment* (air quality, road traffic accident occurrence and similar issues). No LSOAs along the DCO Scheme route are among the 10% or 20% most deprived neighbourhoods for the *Indoor Living Environment* (quality of housing) sub-domain (Figure 4.7).

The Wider Study Area

4.1.33 Bath and North East Somerset 010E (around Bathampton Turnback works) is among the 20% most deprived LSOAs in England for the *Geographical Barriers to Services* sub-domain.

4.1.34 Bristol 039E (near the Bedminster Down Relief Line) is among the 20% most deprived neighbourhoods in England for the *Wider Barriers* sub-domain.

4.1.35 Bristol 039E is also identified as being one of the 10% most deprived neighbourhoods in England in relation to both the *Indoor Living Environment* (quality of housing) and *Outdoor Living Environment*. In addition, three neighbourhoods close to Bedminster Down Relief Line (Bristol 040B, 040C and 039H) are among the 20% most deprived for *Indoor* and *Outdoor Living Environment*.

Economy and Employment

The DCO Scheme

4.1.36 The 2011 Census reveals that unemployment rates in the economically active population (aged 16 or older, including full-time students) at the Portishead LSOAs and those between Portishead and Pill were between 1.8% and 4% (Figure 4.8), relatively low compared to the West of England average of 3.5%. The two LSOAs covering Pill had contrasting unemployment levels. North Somerset 004C (where the proposed station will be located) had 7.8 % unemployment, while North Somerset 004D (further east of the proposed station) had 3.8 % unemployment.

[1] The Geographical Barriers to Services sub-domain relates to the physical proximity (mean distance to the closest point) of local services such as post offices, super markets and GP surgeries

4.1.37 In the area surrounding the Avon Gorge the unemployment rate was 3.6%. In the LSOAs around Ashton Junction unemployment was higher than in Portishead with the highest level in Bristol 036A at 7.9%.

The Wider Study Area

4.1.38 Rates of unemployment were mixed in the Parson Street Junction area with Bristol 039A at 4.7 % and Bristol 046A at 7.1 %. Between Parson Street Junction and Bedminster, unemployment rates were 6.0% for Bristol 039B and 5.3% for Bristol 039H.

4.1.39 In the LSOAs around the Bedminster Down Relief Line, unemployment measured between 5.1% and 7.9%, with the highest level in Bristol 039E. The LSOA surrounding the Bathampton Turnback was found to have only 3.1% of the economically active population unemployed, whereas at Avonmouth it was high at 7.3%.

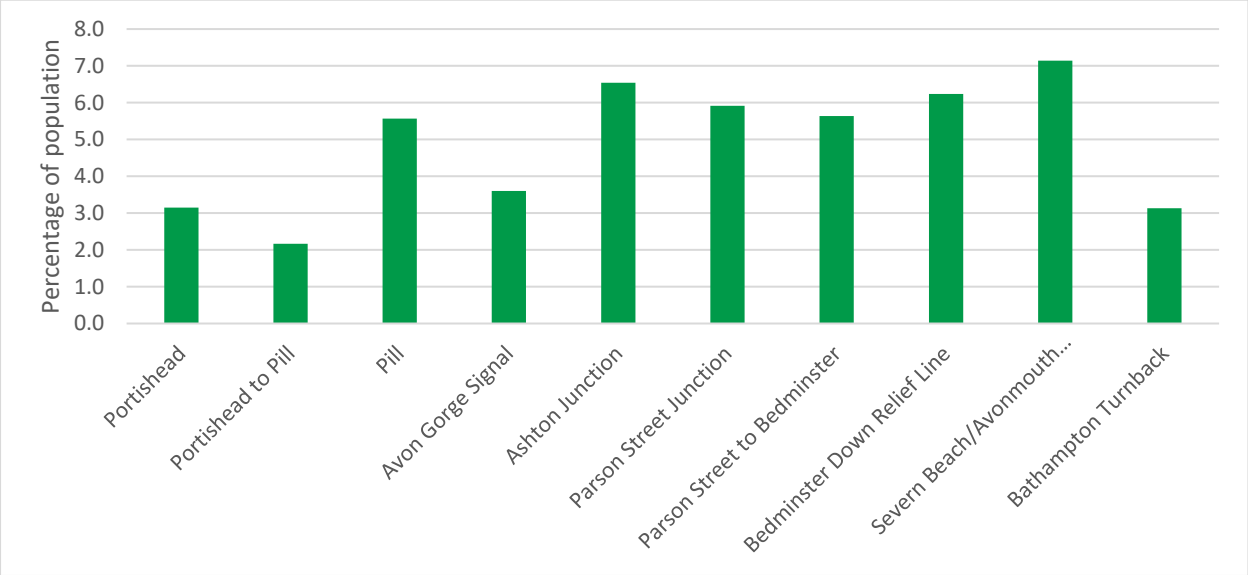

Figure 4.8 Percentage of economically active people who are unemployed in LSOAs surrounding the scheme components (aged 16 or older) (2011)

Source: Census 2011

Race and Ethnicity

The DCO Scheme

4.1.40 Ethnicity data were sourced from the 2011 Census and the results are summarised in Figure 4.9. Overall, the populations of the LSOAs along the DCO Scheme route were predominately made up of white people. The LSOAs around Ashton Junction had lower percentages of white people than North Somerset LSOAs, with the lowest in Bristol 036A (91.9% white). The rest of the LSOAs along the DCO Scheme route had populations that were between 96% and 99% white.

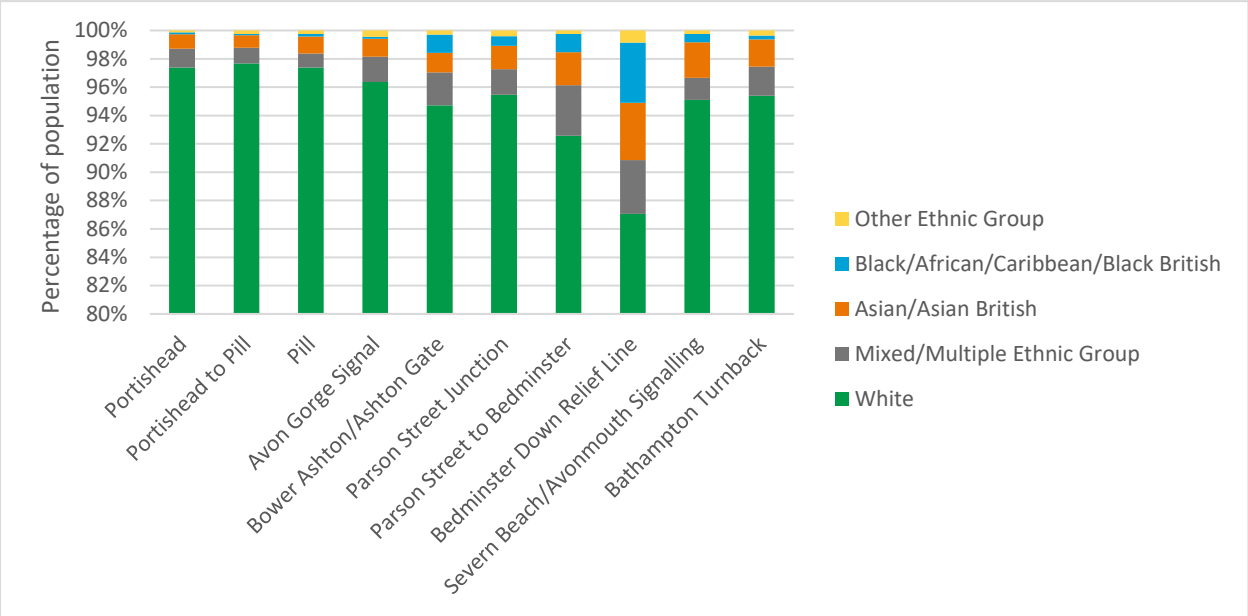

Figure 4.9 Ethnicity distribution in the Wider Study Area

Source: Census 2011

4.1.41 Across the three LSOAs in Portishead, 97.4% of the population was white, with low percentages of mixed/multiple ethnic groups and Asian/Asian British and very low percentages of Black/African/Caribbean/Black British and people of other ethnic origins.

4.1.42 Between Portishead and Pill, 97.7% of the population was found to be white in 2011 and at Pill this was at 97.4% followed by people of mixed ethnicity and Asian/ Asian British and Black, Minority and other Ethnic ("BME") communities, respectively.

4.1.43 In the LSOA surrounding the Avon Gorge, 96.4% of the population was white in 2011. The next largest ethnic group was the mixed/multiple ethnic group (1.8%), followed by the Asian/Asian British group (1.3%). This LSOA had the highest percentage of the population that was non-white out of all North Somerset LSOAs.

4.1.44 Across the three LSOAs located around Ashton Junction, 94.7% of the population was white, 2.3% was of mixed/multiple ethnic origin, 1.4% was Asian/Asian British and 1.3% was Black/African/Caribbean/Black British. Bristol 0036A had the highest percentage of all non-white ethnicities, with mixed/multiple ethnicity being the highest overall at 3.0%.

The Wider Study Area

4.1.45 Around Parson Street Junction, 95.5% of the population was white, and this dropped to 92.6% between Parson Street Junction and Bedminster and lower again to 87.1% near the Bedminster Down Relief Line works, making this area with the highest proportion of minority ethnic groups in the wider study area.

4.1.46 Around the Severn Beach/Avonmouth Signalling works area 95.1% of the population was white, with the second largest ethnic group being Asian/Asian British at 2.5%.

4.1.47 Around the Bathampton Turnback works area 95.4% of the population was white, with the second largest proportion of people being from mixed/multiple ethnic groups (2.1%).

Disability

The DCO Scheme

4.1.48 According to the 2011 Census, the majority of LSOAs in Portishead had a low percentage of the population whose day-to-day activities are limited a lot by long-term health or disability (7% or less). However, in the most westerly Portishead LSOA (North Somerset 001G), which was also characterised by a higher proportion of people over the age of 65, this figure was 9.8%, and a further 11.8% of the population felt that their day-to-day activities were limited a little.

4.1.49 The Haven Lodge Care Centre is located on Phoenix Way, facing the proposed Portishead station. It lodges about 108 residents, mainly elderly and may be some with physical and mental illness such as dementia.

4.1.50 Between Portishead and Pill in North Somerset 006F 3.9% were limited a lot and 5.6% were limited a little, compared to North Somerset 004B where these figures were 6.1% and 11.1%. In Pill, in North Somerset 004C and 004D respectively, 11.0% and 7.7% of the population were limited a lot and 11.9% and 9.7% were limited a little. Around the Avon Gorge Signal, 8.7% of the population were limited a lot and 7.8% were limited a little.

4.1.51 Around Ashton Junction, disability levels seemed to be higher than in many of the North Somerset LSOAs. Overall the LSOAs had combined percentages of 10.5% of the population limited a lot (highest being 14.5% in Bristol 041A) and 10.4% of the population limited a little (highest being 12.0% in Bristol 036A).

4.1.52 The IMD includes the *Health Deprivation and Disability* domain, which assesses the effect of poor physical and mental health, and measures morbidity, disability and premature mortality. No LSOAs in along the DCO Scheme route are among the 10% most deprived neighbourhoods for this IMD domain, but Bristol 036A (the Ashton Junction area) is among the 20% most deprived (Figure 4.10).

The Wider Study Area

4.1.53 The subsequent LSOAs on the route to Bedminster had similar levels of disability, with 9.3% limited a lot and 9.1% limited a little around Parson Street Junction and 9.1% limited a lot and 10.4% limited a little between Parson Street Junction and Bedminster.

4.1.54 However, LSOAs around Bedminster generally had lower disability levels, with 5.5% of the population limited a lot (highest was 8.8% in Bristol 039E) and 6.9% limited a little (highest was 8.6% in Bristol 039E).

4.1.55 Around Severn Beach/Avonmouth Signalling works, 9.8% of the population were limited a lot and 8.0% were limited a little (highest percentages were for Bristol 008F at 12.0% and 9.7% respectively).

4.1.56 Around the Bathampton Turnback Works 7.9% of the population were limited a lot and 11.4% were limited a little.

4.1.57 The IMD *Health Deprivation and Disability* domain reveals that Bristol 039E (Bedminster Down Relief Line) is among the 10% most deprived neighbourhoods in England for this domain. In addition, Bristol 008F (Severn Beach/Avonmouth Signalling works) is among the 20% most deprived.

Childhood Obesity

4.1.58 The National Child Measurement Programme data reveal that for the period 2014-2015, prevalence of overweight (including obese) reception class children (aged 4 to 5 years) was similar to the national value in all three Unitary Authorities of the study area, at between 21.6 and 23.5% (Table 4.5**Error! Reference source not found.**). In contrast, the prevalence of o verweight (including obese) year 6 children (aged 10 to 11) was 'better' or lower than the national value in North Somerset and Bath and North East Somerset and 'worse' or higher in Bristol City. These data are not available at Ward or LSOA level.

Table 4.5: Prevalence of overweight (including obese) children

Region	Percentage of Reception-age children overweight (including obese)	Percentage of Year 6 children overweight (including obese)
England	21.9	33.2
North Somerset UA	21.6	29.4
Bristol City UA	23.0	35.0
Bath and North East Somerset UA	23.5	27.3

Source: National Child Measurement Programme, 2015.

Religion or Belief

4.1.59 Along the route of the DCO Scheme, more than 50% of the population of each neighbourhood were recorded as Christian in the 2011 Census. The majority of the remaining population was not religious (around 25 to 40% of the total population), with around 7 to 8% not stating their religion. In the two most westerly neighbourhoods in Portishead (North Somerset 001G and 003D) 0.9% and 0.7% of the population were Muslim respectively and residents of all other religions accounted for 0.5% of the population or less. Between Portishead and Pill the population had even percentages of Buddhist, Hindu, Jewish, Muslim and Sikh people (at 0.1 or 0.2%). Within the two neighbourhoods covering Pill (North Somerset 004C and 004D), 58% of the population was found to be Christian. The Buddhist and Hindu populations were slightly larger than in Portishead, both at 0.6% of the total population in the neighbourhood covering eastern Pill. Islam was the next most prominent religion at 0.4% in this neighbourhood.

4.1.60 The LSOA around Avon Gorge Signal had slightly higher percentages of Hindus and Muslims, at 0.4% and 0.9% respectively. The Ashton Junction area also had a more diverse mix of religions than around Portishead and Pill, with Bristol 036A having the highest proportion of non-Christian people

with 0.8% of the population being Buddhist and 1.6% of the population being Muslim.

The Wider Study Area

4.1.61 Near Parson Street Junction, between Parson Street Junction and Bedminster and around the Bedminster Down Relief Line the Christian population made up 50% or less or the overall population. Bristol 039E (around Bedminster Down Relief Line) had the highest percentages of other religions, with 4.8% of the population being Muslim and 3.2% being Hindu.

4.1.62 Around Severn Beach/Avonmouth Signalling works 54.5% of the population was Christian, with the next most common religions being Islam and Hinduism, both at 0.5%.

4.1.63 Around Bathampton Turnback Works, 61.5% of the population was Christian, with the next most common religion being Islam at 0.9%.

4.2 Amenities and Services

Access to Services

The DCO Scheme

4.2.1 The *Geographical Barriers to Services* sub-domain of *Barriers to Housing and Services* domain highlights two neighbourhoods which are among the 10% and 20% most deprived neighbourhoods in England in terms of their physical proximity to local services. North Somerset 004A (around Avon Gorge Signal) is one of the 10% most deprived LSOAs in England for this sub-domain, while North Somerset 006F (between Portishead and Pill) is among the 20% most deprived. This might be due to increased mean distance between residential buildings and the various services listed under the IMD Geographical Barriers to Services sub-domain.

4.2.2 The amenities and services (relating to leisure, culture/religion, healthcare and education) within 300 m of the proposed route are outlined below. As the DCO Scheme is mainly bordered by residential properties through Portishead, fewer features were identified than in some of the other areas.

Portishead

- Marina Healthcare Centre on Harbour Road – houses Harbourside Family Practice and North Somerset Community Partnership
- Nursing home adjacent to Health Centre – Haven Lodge Care Centre
- Busy Bees Nursery on Serbert Road in Portishead (south of proposed station)
- Trinity Primary School
- Playground in The Vale (south of railway line)

Pill

- Heywood Family Practice on Lodway south of railway line and Pill Health Clinic on Station Road south of railway line
- Pill Memorial Club on Lodway south of railway line (community events etc.)

- Pill Community Centre on Heywood Terrace south of railway line
- Portishead Sailing Club, Pump Square next to marina east of railway line
- Pill Union Church, east of the railway line
- Pill Library, adjacent to railway line on east side

Ham Green

- Cricket Ground south of the railway line (the railway line is in a tunnel under the cricket ground)
- Playground near Fitzharding Road south of railway line
- Penny Brohn Cancer Care north of railway line on eastern edge of Eden Office Park (located adjacent to a construction compound).

Avon Gorge

- Leigh Woods National Nature Reserve which is open to the public
- Clifton Observatory, east of the railway line on the east side of the Gorge
- Clifton Downs, east of the railway line on the other side of the Gorge
- Avon Gorge House Amitabha Buddhist Centre, North Road west of the railway line
- Clifton Suspension Bridge Visitor Centre, Bridge Road west of the railway line
- Ashton Court Registered Park and Garden

Ashton Junction

- Bedminster Cricket Club and Sports Ground between A369 and railway line on west side
- Teddies Bristol Nursery and Preschool, adjacent to the Sports Ground above
- Ashton Park School
- Bristol Kettlebell Club (fitness) on Blackmoors Lane west of the railway line
- Ashton Gate football stadium east of the railway line
- Gore's Marsh playground east of A3029 (Winterstoke Road) east of railway line

Greenspaces and Open Spaces

The DCO Scheme

4.2.3 The Vale Park in Portishead, bounded by the disused railway line to the north, is designated as Local Green Space in North Somerset Council's *Sites and Policies Plan, Part 2. Site Allocations Plan 2006-2036* (North Somerset Council, April 2018).

4.2.4 Between Portishead and Pill, allotment gardens exist on the eastern side of Sheepway, north of the disused railway line. South of the disused railway line, playing fields are located to the east of Portbury, south of the M5.

4.2.5 Land at Yew Tree Gardens, Crockerne and Watchhouse Hill are designated as Local Green Space in North Somerset's *Sites and Policies Plan, Part 2, Site Allocations Plan 2006-2026*. Common Land and Town or Village Greens exist to the north and east of Pill, including Pump Square off Underbanks, Victoria Park and Waterloo Wharf and The Point, Chapel Pill. Land at Ham Green Hospital is designated an Unregistered Park and Garden in the *Sites and Policies Part 1. Development Management Policies* (North Somerset Council, 2016). In addition to these designated sites, Pill also has a playing field and playground south of the railway line on Hardwick Road and a playground near Water Lane west of the railway line. In Ham Green a Cricket Ground is located south of the railway line at the tunnelled section and there is a playground near Fitzharding Road south of the railway line.

4.2.6 In the Avon Gorge area, the railway passes through the Leigh Court Registered Park on the western side of the gorge. Other designations in this area are Leigh Woods National Nature Reserve, Avon Gorge Woodlands Special Area of Conservation and Avon Gorge Site of Special Scientific Interest.

4.2.7 The Ashton Court Registered Park and Garden is located adjacent to the western side of Clanage Road in Bower Ashton. The proposed temporary construction compound and permanent maintenance compound would be accessed off Clanage Road. In addition, a sports ground and several allotments and Gore's Marsh park and playground are located in close proximity to the railway line between Bower Ashton and Ashton Junction.

4.2.8 North Somerset District Council has drawn up area profiles of current provision of open space within the District, to accompany its Draft Green Infrastructure Supplementary Planning Document (not dated)[2]. In Portishead, there is currently an under supply of conservation sites and woodland, and sufficient supply of formal park and public garden and neighbourhood open space. Pill has an under supply of conservation sites, formal and public garden and woodland but sufficient neighbourhood open space.

The Wider Study Area

4.2.9 Informal and formal green spaces, seasonal and fixed active sports space, natural green space, young persons' space and children's play areas exist close to the operational railway line that runs through the Bristol City Council area and to Parson Street Junction and Bedminster Station. The Bedminster Down Relief Line is located next to Victoria Park, a large area of open space.

4.2.10 In the Bathampton area accessible natural green space, park and recreation ground, outdoor sport pitches and children's play space are found.

[2] Note that no further versions of the Green Infrastructure Supplementary Planning Document has been published or planned for production as per the North Somerset Council Local Development Scheme 2017-2020. This data source is therefore to be considered standalone.

4.3 Crime and Safety

4.3.1 Table 4**Error! Reference source not found.**6 details the incidence of race-motivated hate crime between 2010 and 2014 for the whole of the Avon and Somerset police force area, including the three local authorities relevant to this study as well as Somerset and South Gloucestershire (Avon and Somerset Constabulary, 2015).

Table 4.6: Incidence of race-motivated hate crime in Avon and Somerset police force area between 2010 and 2014

Year	Race-motivated hate crime incidents
2010	1,395
2011	1,288
2012	1,071
2013	1,114
2014	1,366

4.3.2 The number of race-motivated hate crime incidents reported in 2014 were 791 in Bristol, 108 in North Somerset, and 115 in Bath and North East Somerset (Avon and Somerset Constabulary, 2015). As a percentage of the population, these figures indicate levels less than 2%.

4.4 Transport and Accessibility

Overview

4.4.1 The main highway network in the area is dominated by the M5. Junction 18 in Avonmouth connects to the A4 into Bristol along the north side of the River Avon and Junction 19 at Gordano connects with the A369 between Portishead and Bristol along the south side of the River Avon. Junction 18a on the M5 serves the M49 for South Wales. The B3128 from Clevedon and B3130 from Nailsea provide more circuitous routes into Bristol via the A370 from Weston-super-Mare. The Long Ashton Park and Ride lies to the south west of Bristol.

4.4.2 The A370 connects with the A369, Brunel Way and the A3029 Winterstoke Road at a complicated junction in Ashton Gate. Brunel Way links with the western end of the A4 Hotwells Road and Bristol city centre on the northern side of the River Avon while the A3029 Winterstoke Road links to the south with the A38 between Bristol and Taunton in the vicinity of Parson Street railway station.

4.4.3 The main railway network centred on Bristol provides mainline services up to London, to the Midlands, west into Wales and south west to Taunton, Exeter and Plymouth. The local railway network within Bristol comprises the Severn Beach / Avonmouth / Bristol Temple Meads, Henbury to Bristol Temple Meads, and local stations between Bristol Temple Meads and Bath Spa.

4.4.4 There is an operational railway between Royal Portbury Dock and the south west mainline between Bristol Temple Meads and Exeter which currently is only open for freight. There is an existing level crossing over the operational railway on Ashton Vale Road which connects the A3029 Winterstoke Road and the Ashton Vale Industrial Estate. The industrial estate is bounded by the railway to the east, the A370 to the north, a sports centre and the Long Ashton Park and Ride to the west, and allotments and open land to the south.

4.4.5 There are two long distance cycle routes, public rights of way, bridleways and permissive paths that cross or run close to the proposed DCO Scheme. There are two Sustrans National Cycle Network ("NCN") routes crossing or close to the DCO Scheme. NCN 26 uses parts of the disused railway corridor between the M5 overbridge and Royal Portbury Dock Road overbridge under temporary licence from Network Rail. At the Royal Portbury Dock Road overbridge, Marsh Lane overbridge and M5 overbridge the route diverts off the bridleway on to permissive paths to go under the road bridges. NCN 41 crosses the River Avon alongside the southbound carriageway of the M5 motorway bridge and continues through Pill and along the River Avon Tow Path towards Bristol. There are also several footpaths and bridleways criss-crossing the countryside.

4.4.6 A detailed baseline description of transport and accessibility in the study area is presented in the ES Appendix 16 Transport Assessment (DCO Document Reference 6.25). The following sections highlight baseline transport and access issues that have a bearing on the EqIA of the DCO Scheme.

Portishead

4.4.7 There is no operational railway between Portishead and Pill. The original railway remains as a disused corridor, with the ballast, wooden sleepers and rails in situ, and largely overgrown. The station itself was demolished and the site redeveloped. The railway, station and car parks need to be rebuilt in an alternative location for the DCO Scheme.

4.4.8 The site selected incorporates part of the disused railway corridor, highway land and open space. Highway modifications are required to relocate Quays Avenue to provide land for the station. The site is located close to recent residential developments between the marina and the east side of Portishead and close to commercial areas between Harbour Road and Wyndham Way.

4.4.9 On street parking demand is fairly consistent in Port Marine, along Old Mill Road and at Portishead Marina, but fluctuates during the day around Harbour Road and Galingale Way, and is low along Serbert Way and Serbert Close. The Town Centre car parks are well-used throughout the day and are often full.

4.4.10 Portishead (and Pill) is served by a frequent weekday 15-minute bus service linking with the centre of Bristol along the A369 corridor. There are additional services in Portishead linking Clevedon and Weston-Super-Mare and North Bristol. Evening and weekend services are more limited with typically 30 minute or hourly services.

4.4.11 The area surrounding the proposed Portishead station site has relatively good walking and cycling links, although provision is lacking at specific locations. There are many different potential routes to the town centre.

4.4.12 The DCO Scheme will provide a new railway service in Portishead which will need to be designed to create a transport hub interconnecting with other modes of transport and provide safe and clear connectivity with final destinations including the town centre and nearby commercial and residential centres.

Portishead Trinity Primary School Bridge

4.4.13 At present there is a permissive footpath over the disused railway that connects communities on both sides of the railway corridor and provides an informal route to the Trinity Primary School.

4.4.14 The existing informal crossing is an important link for residents living along the north and south side of the railway line and is well used by dog walkers and cyclists (potentially for leisure and physical exercise). The crossing is also used by children going to and from Trinity Primary School. The importance of this crossing was corroborated by pedestrian and cyclist counts. The playground along Tansy Lane may be used by children.

4.4.15 The re-opened railway line will sever this footpath and will be replaced with a new foot and cycle bridge.

Pill Station

4.4.16 The existing Pill Station is located in a cutting on the west side of Station Road. The southern and northern platforms remain in a state of disrepair. The station used to be accessed via Station House which has since been converted into a private residential and commercial property.

4.4.17 The narrow streets and limited off-street parking in the older parts of Pill result in fairly consistent parking demand throughout the day. This is not reflected in more recently developed areas of Pill where provision for off-street parking is greater resulting in greater fluctuating in demand throughout the day.

4.4.18 The older part of Pill has a walking and cycling environment that reflects the street layout and does not meet current standards. However, the environment is conducive to reducing vehicle speeds.

4.4.19 The DCO Scheme will redevelop the existing station site and former railyards as a car park.

Ham Green

4.4.20 The area in the vicinity of the access routes to Pill Tunnel is largely residential, with a commercial area off Macrae Road and the Penny Brohn Cancer Centre (day clinic and non-residential). The majority of the local roads have footways. The western end of Chapel Pill Lane leading to the tunnel currently is a poorly surfaced track. A new access to Pill Tunnel is required to provide maintenance and emergency access.

Ashton Junction

4.4.21 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 DCO Scheme will directly impact the network at two particular locations, the Ashton Vale Road level crossing and the Barons Close pedestrian crossing.

4.4.22 The operation of Ashton Vale Road level crossing equally applies to all pedestrians and cyclists. The Barons Close pedestrian crossing is located approximately 200 m south of the Ashton Vale Road level crossing. The nearest alternative crossing point over the railway line is along the A370 Ashton Rad 140 m north. An indirect pedestrian route is available off the B3128 around 1 km further west. The other crossing point is around 630 m south of Barons Close. A pedestrian route through Ashton Drive is available although an indirect access through a recreation field is not good on personal safety grounds.

4.4.23 The Barons Close pedestrian crossing was closed temporarily during the construction of the Ashton Vale to Temple Meads Bus Rapid Transit Scheme (MetroBus). This scheme has now opened. It is proposed to close Barons Close pedestrian crossing permanently as part of the DCO Scheme. The Ashton Vale level crossing will remain open under the DCO Scheme. A new pedestrian and bicycle ramp will be provided from Ashton Vale Road to the Ashton Road overbridge to provide an alternative route when the level crossing is down.

4.4.24 The pedestrians in the vicinity of Ashton Vale are likely to be employees of establishments in the Ashton Vale Industrial Estate or, on match days, football fans walking to and from the football stadium off Winterstoke Road and informal car parking in the industrial estate or the park and ride. This would suggest that the majority are likely to be of working age and reasonably fit.

SECTION 5

Stakeholder Engagement

5.1.1 Engaging with stakeholders is an important step in collating evidence about the equalities groups. Two types of stakeholders are involved in the process, namely key informants the North Somerset District Council and Bristol City Council Health and Equalities teams, and other stakeholders, including members of the public, non-governmental agencies, community groups and statutory authorities.

5.1.2 A meeting for the key informants was held on 12 January 2016 to inform them about the DCO Scheme and to discuss potential sources of further information, refinement of the assessment methodology as well as further leads on community groups who should be involved in the stakeholder engagement process. The North Somerset Council health and equality officers attended the meeting while the Bristol officers were unable to attend and were consulted after the meeting.

5.1.3 Several statutory and non-statutory consultations have been undertaken to seek opinion of local communities, which included information relating to access and usage of the facilities.

- Public exhibitions were held in Portishead in 2014 to seek opinions on the options for the location of Portishead railway station and in 2015 focusing on initial proposals for the railway between Portishead and pill, including the emerging proposals for Portishead station, the public realm, and the Trinity Primary School Bridge.
- A micro-consultation was held in Pill in March 2016 to seek feedback on options for the arrangement of the station and car park.
- Micro-consultations have been held at the Ashton Vale Industrial Estate during 2016 to seek opinion on alternative routes into the estate for the half hourly passenger service scheme which would have required permanent closure of the Ashton Vale Level Crossing.

5.1.4 This document was presented for wider stakeholder consultation as part of the statutory Section 42 and Section 47 consultation. The responses have been reviewed and addressed in this final version of the EqIA submitted to the Planning Inspectorate with the DCO Application. A summary of the Section 42 and Section 47 consultations is presented below and further details are presented in the Consultation Report in DCO Document Reference 5.1.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
Scoping Opinion Response (August 2015)		
Planning Inspectorate	The Planning Inspectorate did not include any comments regarding equality impact assessment.	N/A
Informal micro-consultation on DCO Scheme Boundary (22 June to 3 August 2015)		
North Somerset Local Access Forum	A bridge between Galingale Way and Trinity Primary School preferred over footpath only option. The length of diversion required for the footpath (c600 m) only option unacceptable for young children. The bridge should also be suitable for cyclists.	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out the proposals for the bridge which will be suitable for pedestrians and cyclists.
Formal Stage 1 Consultation (22 June to 3 August 2015)		
Transport Focus	As the station will be located east of Quays Avenue and some distance from the town centre, accessibility of Portishead station should be inclusive to overcome any problems associated with its location.	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out the proposals for Portishead station and pedestrian and cyclist connections to the town centre.
Transport Focus	The proposals to replace the current unofficial footpath over the disused track may concern some in the local community and careful consideration of this proposal is essential	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out proposals for Trinity Primary School Bridge. The bridge has been designed with low gradient ramps for accessibility and connects into the existing network of paths.
Transport Focus	Concerns over impacts on the National Cycle Network.	Section 16.7 of Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19) outlines the mitigation measures

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
		for the DCO Scheme, including the impacts on cyclists and pedestrians. NMU diversion routes and closures are outlined within the Transport Assessment, including links near to Trinity Primary School and to the cycle network.
Harbourside Family Practice	Concern regarding impact on availability of parking near Harbourside Family Practice for elderly patients and those with small children.	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out car parking arrangements at Portishead Station. Impacts on parking provision are discussed within section 16.6 of Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19) and there will be post-implementation monitoring of parking provision within Portishead and Pill (discussed in Table 16.8).
British Horse Society	A bridge between Galingale Way and Trinity Primary School preferred over footpath only option. The length of diversion required for the footpath (c600 m) only option unacceptable for young children. The bridge should also be suitable for cyclists.	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out the proposals for the bridge which will be suitable for pedestrians and cyclists.
Sustrans	The alignment of the ramps on the proposed bridge between Marjoram Way and Galingale Way adds significantly to the distance for walkers and cyclists. Ramp alignments which run north / south would avoid	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out proposals for Trinity Primary School Bridge. The bridge has been designed with a ramp as well as stairs to prevent

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
	this. As considerable spoil could be generated by the development, perhaps this could be used to build earthwork ramps.	discrimination against people with reduced mobility and is compliant with the Equality Act 2010. The positioning of ramps north / south (rather than east / west along the railway corridor) would require additional permanent land take from “open space” within the residential area which would be more visually intrusive and would in turn require the Council to provide exchange land for the loss of open space.
Sustrans	Opportunities to enhance existing approaches to road bridges at Portbury Docks on NCN 26 and existing cycle and pedestrian access to Portishead Station, and provide cycle/pedestrian access to Portishead Station from Tansy Way should be considered.	Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out the proposals for Portishead station and pedestrian and cyclist connections. Section 16.7 of Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19) outlines the mitigation measures for the DCO Scheme, including the impacts on cyclists and pedestrians. NMU diversion routes and closures are outlined within the Transport Assessment.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
Public	Concerns regarding pedestrian cycling infrastructure within the wider area and opportunities to enhance infrastructure within the general areas, Quays Avenue, Tansy Lane, Galingale Way, Conference Avenue and on routes to Pill.	Sections 16.4 and 16.6 of Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19) outline the existing transport situation and the impacts of the DCO Scheme on the area surrounding the stations. Table 16.8 in Chapter 16 outlines the infrastructure measures to be provided as part of the DCO Scheme including provisions for cyclists/pedestrians. Provision of bicycle parking facilities at the stations is discussed in section 16.7 and a new bridge will connect Tansy Lane to Galingale Way (Section 3.6 of the Transport Assessment).
Informal Stakeholder Consultation		
North Somerset District Council ("NSDC")	A meeting was held with NSDC public health officer on 12 January 2016. Discussions on potential data sources, contacts within the Council and with the Bristol City Council and on developing the assessment methodology (health determinants, assessment criteria etc), potential stakeholders (both for EqIA and HIA) were held.	The assessment approach (Chapter 2) and the baseline (Chapter 3) were developed based on the feedback received at the meeting.
Joint LPA meeting (October 2017)	The attendees were briefed about the findings of the EqIA. The officers acknowledged that there was a lack of response from the equality groups that the LPAs were contacting. This	NSDC undertook targeted consultation with specific equality groups and the feedback is summarised below.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
	led to the conclusion that for further consultations, the LPAs should include targeted questions for the equality groups, and follow-up with phone calls.	
Stage 2 Formal Consultation (23 October to 4 December 2017)		
Bristol City Council	Given that there is no standard methodology for EqIA and HIA, the Council accepts the approach to mirror the methodology for Crossrail and HS2, and use of DMRB significance criteria.	Noted.
North Somerset Council (Access Officer)	The consultation with residents and key equality groups should be a co-ordinated process and move away from only offering a snapshot. People of reduced mobility should be involved in planning and transport services at every level. Some of design decisions should have wider input from local residents eg equality groups etc, achieved through regular area-based meetings or provide information online.	Extensive informal and formal consultations have been undertaken for the scheme. People of reduced mobility were given opportunities to comment on the DCO Scheme and contribute to design. Additional formal consultations were specifically aimed at vulnerable groups, who have not replied to date (see below).
North Somerset Council (Access Officer)	The wider links to the Bristol area service sector with its more specialist activities (not just health related), for non-car users and groups on lower incomes should be considered in the evaluation of the scheme.	Wider links to the Bristol service sector are considered in Chapter 14 Socio-economics and Regeneration (DCO Document Reference 6.17).

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
North Somerset Council (Access Officer)	In assessing the pressure on parking provision, account should be taken of the likely knock-on effects on parking for people of reduced mobility if spaces are not available. Often able drivers will take these unless regular daily enforcement is in place.	Enforcement of parking regulations does not form part of the DCO Scheme.
North Somerset Council (Access Officer)	Why is 250 m chosen as the level at which a distance becomes significant for vulnerable users? (Para.16.3.41). In practice it will be far less for people of reduced mobility, probably nearer 40 m. Paragraph 16.3.42 defines significant but this is very different to the one used in the Equality Act 2010.	The 250 m distance was used in the ES Chapter 16 Transport, Access and Non-Motorised Users (DCO Document Reference 6.19) to distinguish between a slight and moderate impact on journey times for pedestrians. The measure was not aimed at people with mobility issues, for whom a distance has not been assumed in the EqIA. The term “significance” is used in this EIA in relation to the EIA Regulations, not the Equality Act.
North Somerset Council (Access Officer)	The reliance on this section and elsewhere on “professional judgement” to determine adverse or other impacts on equality groups is not wholly acceptable.	The point about making comparisons with the impact on an able person is captured in the assessment as ‘differential’ impact. Given the high level nature of the assessment of the DCO Scheme, in order to capture these ‘differential’ impacts professional judgement has to be applied.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
North Somerset Council (Access Officer)	Cabstand is a very difficult area for many people of reduced mobility and similar congested junctions also show the same characteristics. These implications should also be assessed in looking at the wider area effects. (Table 16.7). In assessing the need for controlled crossings, e.g. zebra crossings, (not necessarily light controlled), there is a need for the views of people of reduced mobility to be taken into account and consideration given as to how people of reduced mobility cross major roads. A simple reliance on formulaic traffic flows assessments is not always sufficient.	Cabstand is outside scheme boundary and has not been considered in the assessment. The location and design of controlled crossings has taken into account the needs of people with reduced mobility.
Department for Transport's Equality Forum	Request for audio and visual announcements and CCTV to cater for different types of users.	Audio and visual information for passengers and CCTV is included in the design, as set out in Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7).
General public	A question was raised concerning accessibility for users of mobility scooters.	Improved or alternative access has been considered and provided where possible throughout the DCO Scheme.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
	Restricted parking (double and single yellows) in Portishead. Questions were raised about access for people of reduced mobility who park on the road close to their house where parking restrictions were proposed.	Following consultation, the proposed Traffic Regulation Orders ("TRO") for the minor roads have been revised by removing the single yellow lines, particularly in the residential streets. The revised Permanent Traffic Regulation Order Plans are provided in DCO Document Reference 2.31.
	Trinity Primary School Bridge. The bridge is required as the walk around the station is too long for people of reduced mobility / elderly / pushchairs, etc.	The DCO Scheme includes a bridge for pedestrians and cyclists to replace the current crossing over the disused railway. This is described in Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) and on the Plan S051 Trinity Footbridge Proposed General Arrangement (Sections) in DCO Document Reference 2.8.3.
Additional Formal Stage 2 Consultation - Extension of Stage 2 Consultation (for Consultees that did not respond to Stage 2 Consultation) (1 February to 3 March 2018)		
Busy Bees Nursery	No response.	
Bristol Women's Voice	No response.	
Bristol disability Equality Forum	No response.	
Bristol BME Voice	No response.	
Bristol Lesbian, Gay and Bisexual and Transgender Forum	No response.	
Bristol Older People's Forum	No response.	

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
North Somerset Black and Minority Ethnic Network	No response.	
North Somerset Partnership	No response.	
Pill churches (4 identified in the EqIA)	No response.	
Additional Formal Stage 2 Consultation on the Red Line Boundary (29 March to 27 April)		
Bright Horizons (formerly Teddies Nursery)	Concerned about the impacts of temporary and permanent land-take on the nursery. During construction, increased dust and rubble, increase construction noise, compromised site security, and possible risk on services. During operation, pattern of service will affect the operation of the nursery by increased traffic and noise, and loss of open space and associated calm adjacent to the nursery with large elevated ramps set within a gravel and tarmac industrial yard surrounded by security fencing. Views towards Clifton Suspension Bridge partially blocked. Consider that there are other more suitable sites for Clanage Road compound.	Measures to control adverse construction-related impacts are set out in the master Construction Environmental Management Plan in the ES Appendix 4.2 (DCO Document Reference 8.14). The proposals include strengthening the planting around the permanent Clanage Road maintenance compound, which are shown on the Clanage Road Compound, Landscaping and Access Plan in DCO Document Reference 2.52. The landscape and visual and noise impacts on the nursery are described in the ES Chapters 11 Landscape and Visual Impacts Assessment and 13 Noise and Vibration (DCO Document References 6.14 and 6.16), and Appendix 11.3 (DCO Document Reference 6.25).

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within ES
		The Clanage Road site was chosen as the main access point to the south of the Avon Gorge as it is the only site adjoining the railway with highway access that would allow an articulated low loader into the site.
Additional Stage 2 Formal Consultation on Clanage Road Compound (2 May to 4 June 2018)		
Bright Horizons (formerly Teddies Nursery)	As above.	As above.

SECTION 6

Mitigation

6.1.1 This section describes the measures incorporated into the design of the DCO Scheme and implemented during construction and operation. These measures aim to avoid, reduce, and remedy the potential adverse impacts of the DCO Scheme on the protected characteristic groups. Further details of the proposed measures incorporated into the DCO Scheme are discussed in the ES Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7).

Measures Embedded in the DCO Scheme Design

Portishead Station and Surrounds

6.1.2 The proposed 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. As a result, the existing roundabout will be relocated to the northwest. The DCO 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 54 spaces of which 13 will be designated for blue park holder users. The car park will also include a small area for drop off movements and for taxis. The second car park is proposed to the west of the station site and will be accessed from Harbour Road. This car park which is linear in shape will comprise 213 standard parking spaces and no blue badge holder parking spaces.

6.1.3 Portishead Station is designed as a step free access building (with ramps for people with reduced mobility and the elderly).

6.1.4 The station building includes one fully accessible toilet, including an accessible baby changing facility. As the toilet will be open for use by all, there could be the risk of anti-social behaviour, so routine checks by the train operating company will need to be carried out. The toilet will be open during station operating times and locked along with the rest of the station out of these hours. There is seating in a waiting area both inside and outside – the outside seating area is protected by a canopy.

6.1.5 The platform will be 4.5 m wide, which is understood to be wide enough for a wheelchair user to use with ease and to have enough room for a ramp on the platform. The ramp will be provided on the train, which staff will use to assist those in need to get onto the train. The edge of the platform will have tactile flooring to highlight the edge of the platform.

6.1.6 There will be an auditory Public Address system which will announce the arrival of trains and provide information. This will be supported by a customer information screen for the hearing impaired. All signs and screens in the station will be contrasted as is Network Rail standard to ensure some visually impaired users can see them more clearly. The signage will be of industry standard in line with the relevant standards and the Department for Transport (“DfT”) code of practice.

6.1.7 There will be a help point that will have braille on the panel so visually impaired users can use the help/information point. They will also be fitted with an induction loop for the hearing impaired. It will also be at a comfortable height for wheelchair users to use.

6.1.8 The station has been designed with personal safety in mind, including in the lighting and CCTV design. The design avoids enclosed spaced to limit the opportunity for criminal activity to be hidden from view.

6.1.9 The Station will be accessible and usable by all members of the community within an inclusive and safe environment. This contributes to the creation of a public space that will be free from discrimination. The station has been designed to eliminate any vulnerable spaces that could foster any anti-social behaviour and make the station a safe place for all users.

6.1.10 The new station will provide the opportunity for the local community to use the station as an interchange, which could be Bus to Train; Train to Bus; Train to Car; and connections with cycling and walking, thus promoting a small transport hub for the local community.

6.1.11 The current limited parking spaces at the Marina Healthcare Centre, near the proposed Portishead Station, causes overspill parking on Harbour Road. The DCO Scheme will restrict parking on Harbour Road, but short stay parking options will be provided in the new Portishead station car park which will be available for use by visitors and patients of the Marina Healthcare Centre with short stay parking options. The new station car parking provision also includes spaces for blue badge holder users close to the station entrance.

6.1.12 Diversions of pedestrian pathways have been designed to ensure that the shared pathways are of sufficient width, gradient and of appropriate surface for use by people with reduced mobility (wheelchair users and mobility buggy users). Where possible, clear delineation of pedestrian, cyclist and wheelchair paths will be provided.

6.1.13 The public realms have been designed to support the movement and circulation of pedestrians and cyclists around the station. There will be a new signalised crossing on the boulevard-main car park-station route and tiger crossings at the Quays Avenue roundabout. A new toucan crossing across Quays Avenue will link the proposed new bus stops on the western side of Quays Avenue with the station. The crossing is also aligned with a new shared use path that will run parallel with Harbour Road and will provide the principal pedestrian and cyclist access from the station towards the town centre.

6.1.14 The station, platform, and routes to the car parks will be lit.

6.1.15 The DCO Scheme includes proposals to restrict on street parking in the vicinity of Portishead stations for traffic flow and safety purposes and to improve the street environment for pedestrians and householders.

Trinity Primary School Bridge

6.1.16 A new cycle and pedestrian bridge will be built over the railway. The bridge has been designed with a ramp as well as stairs to prevent discrimination against people with reduced mobility and is compliant with the Equality Act 2010. The gradient is 1:15 and is 2.5 m wide. There are also landing and turning areas on the ramps and the stairs.

Pill Station

6.1.17 The proposed Pill station will comprise an unstaffed new entrance to the platform off Station Road with a forecourt area with three blue badge holder parking spaces and a drop off point.

6.1.18 Access to the station platform will be provided by stairs and a ramp with a gradient of 1:22, 2 m wide and 109 m long with a chicane and a resting area (4 m x 2 m wide) part way along. The design of the ramp is compliant with the Equality Act 2010. Options for a lift were considered, but not seen as being feasible owing to maintenance requirements, reliability and concerns about anti-social behaviour. In an emergency in the lift it would take longer for assistance to arrive as the station will not be staffed.

6.1.19 The design of the platform will be similar to that described above for Portishead, being 4.5 m wide, with a tactile edge, and a covered outdoor seating area.

6.1.20 There will be a help point to provide information for both the hearing-impaired and visually impaired. The help point will have braille on the panel for visually impaired users and will be at a suitable height for wheelchair users.

6.1.21 There will be train information by the ticket machines so that a passenger does not have to go down the ramp or stairs for relevant information about their train.

6.1.22 All signs and screens in the station will be contrasted as is Network Rail standard to ensure some visually impaired users can see them more clearly. The signage will be of industry standard in line with the relevant standards and the DfT code of practice.

6.1.23 The station has been designed with personal safety in mind, including in the lighting and CCTV design, to avoid enclosed spaces and limit the opportunity for criminal activity to be hidden from view.

6.1.24 The main car park will be located on Monmouth Road and Severn Road and provide 58 able bodied car parking spaces. The station proposal will also include minor enhancements to the pedestrian environment with an informal crossing point added on Monmouth Road. There will be step free access from the car park to the station.

6.1.25 The DCO Scheme includes proposals to restrict on street parking in the vicinity of Pill station for traffic flow and safety purposes and to improve the street environment for pedestrians and householders.

6.1.26 As Pill Station will not be directly accessible by buses, the bus stop at the nearby junction of Heywood Road, Lodway and Station Road will be improved. This will require the demolition and rebuilding of the retaining wall on the boundary of Heywood Road and Pill Memorial Club, local highway widening and an enhanced bus stop. These modifications will also provide step-free access from the station to the bus stop.

Ashton Level Crossing

6.1.27 A new cycle and pedestrian ramp will connect Ashton Vale Road with Ashton Road, to provide an alternative route when the Ashton Vale level crossing barrier is down. The ramp has been designed to comply with the Equality Act 2010, with a 1:21 gradient, 110 m length and 3.5 m width.

Environmental Management During Construction

6.1.28 A range of mitigation measures will be adopted during construction to protect nearby communities from the disruption, discomfort and safety associated with the construction of a major scheme. These are described in detail in the Master CEMP which is included in the Environmental Statement Appendix 4.2 (DCO Document Reference 8.14). Measures include good housekeeping to keep construction sites tidy, temporary lighting for security, and noise and dust control. Where appropriate, the construction compounds will be well lit and monitored with CCTV for safety and security.

6.1.29 There will be on-going discussion with local community groups and stakeholders during construction to address and reduce problems. Appropriate traffic management, the use of safety barriers, and diversion of pedestrians will be put in place to protect vulnerable users. Access for ambulances to the health centre in Portishead will be maintained.

6.1.30 During the construction phase, it is assumed that rail haulage will be used as much as possible, to reduce the need for HGVs to bring in materials and remove waste ballast from the DCO Scheme. This is a particular issue through the Avon Gorge, due to the lack of road access and the environmental sensitivity of the woodlands, but will be adopted elsewhere.

6.1.31 The Construction Traffic Management Plan (“CTMP”) in the ES Appendix 16.1 (DCO Document Reference 8.13) provide over-arching principles on the management of construction traffic. The successful contractor will update the CTMP. This will include identifying and agreeing proposed construction haulage routes with the local councils to minimise disruption to traffic on local roads and as far as possible avoid predominately residential streets and local schools. Special traffic management measures will be required in Pill to reduce potential conflict between construction traffic, local vehicular traffic, and non-motorised users (pedestrians, cyclists, and equestrians).

SECTION 7

Assessment of Effects

7.1 Introduction

7.1.1 This chapter presents an assessment of the effects of the DCO Scheme during the construction and operation phases with the mitigation measures in place on key affected groups. Tables 7.1 and 7.2 summarise the impact of components of the DCO Scheme on these key affected groups using the colour coding described in Chapter 3 to highlight the significance of the effect.

7.1.2 For details of the construction and operation activities, the reader is directed to the ES Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7). Further discussion of the mitigation measures to be put in place to control construction-related impacts is presented in the ES Appendices 4.1 CoCP (DCO Document Reference 8.15) and 4.2 Master CEMP (DCO Document Reference 8.14).

7.2 Construction Phase

7.2.1 Key groups that are most likely to be affected by the construction works are those in the age and disability groups. All along the route, where school children, the elderly and people of reduced mobility come into contact with the construction works, members of these groups are likely to face disruption due to temporary severance, diversions, changes in the quality of ambience along the route and potential risks associated with construction activities, plant and vehicles. These changes are likely to cause stress and may affect orientation, particularly of the elderly and cause additional effort for those with reduced mobility. Sufficient width, clear signage and appropriate gradient / surfacing of temporary footpaths, would limit the negative effect, thus enabling people with reduced mobility (including wheelchair users) to be able to navigate the alternate routes.

7.2.2 Location specific construction impact assessment findings are presented in Table 7.1 below. The significance of residual impacts on the age and disability protected characteristic group is predicted to be neutral in general along the route, except at specific locations discussed in Table 7.1. Construction activities are predicted to have neutral effect on the race protected characteristic group. The only adverse effect on people of religion or belief relates to the potential disturbance to church goers during construction. This is potentially a concern in Pill, where there are a number of religious buildings and activities within 300 m of the railway works. The construction works through Pill are likely to include weekend possessions with continuous 24- hour working over several days. Consequently, there is potential for disruption due to construction noise, movement of workers and construction traffic and general activity during religious services and other uses of religious buildings.

7.3 Operations Phase

7.3.1 The effects of the operations phase on each protected characteristic group, at various locations along the DCO Scheme are summarised in Table 7.2.

7.3.2 The DCO Scheme provides benefits for most of the protected characteristic groups by providing a safe and reliable means of transport. The DCO Scheme would lead to positive effects for age and disability groups resulting from the design of the urban realm around Portishead to facilitate pedestrian movements, the step-free access to the station, and the low gradient of the ramps for Trinity Primary School Bridge, the ramp at Pill station, and the pedestrian and cycle ramp at Ashton Vale.

7.3.3 A new station at Pill provides positive opportunities for all groups to access sites, services and activities by public transport.

7.3.4 The increased barrier cycles at the Ashton Vale Level Crossing and alternative walking and cycling route via a new ramp to Ashton Road may result in longer journey times, affecting older people, the young and people with reduced mobility.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
Portishead Station	The highway works to relocate Quays Avenue, the location of a construction compound in front of the proposed station, HGV traffic along Quays Avenue and Harbour Road, and the relocation of shared footpaths may affect the patients (including the elderly and people of reduced mobility) who access the Marina Health Centre (differential impact) and all the above may disproportionately affect residents of the Haven Lodge Centre. The diversions on Quays Avenue might affect ambulance access to the Marina Healthcare Centre	Relocation of shared footpath / cycleways may affect current arrangements for people with disability who may regularly use facilities near the proposed Portishead station site. Consideration would be given to the location, width and clear signage and appropriate gradient / surfacing of temporary footpaths to enable people with reduced mobility (including wheelchair users) to navigate alternate routes with ease. Minor negative effect in the short term on the disability protected characteristic group is predicted.	No significant effect.	No significant effect.	No significant effect.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	and Haven Lodge Care Centre. Ambulance access will be maintained throughout construction. Short term adverse effect is predicted for users of the facilities discussed above who belong to the age protected characteristic group.				
	Children attending the Busy Bees Nursery on Serbert Way may find their daily routes affected by the highway modification works, as a residual effect taking into account mitigation measures such as traffic management, temporary car parking, the use of safety barriers, and diversions for pedestrians, Minor				

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	negative effect in the short term on the Age protected characteristic group is predicted.				
	Construction noise may affect the elderly who live in the vicinity (differential impact) and visitors to the Marina Healthcare Centre, Haven Lodge Care Centre and Busy Bees Nursery on Serbert Way (disproportionate impact). Measures to mitigate noise are set out in the Master CEMP (DCO Document Reference 8.14) which would result in a short term minor negative (disproportionate and differential) effect on the age protected	Construction noise from various activities and from movement of construction vehicles may affect residents in the vicinity causing disruption, annoyance, sleep disturbance, etc (differential impact). Measures to to mitigate noise are set out in the Master CEMP (DCO Document Reference 8.14), which would result in a short term minor negative (disproportionate and differential) effect on the disability protected characteristic groups resident in the vicinity.	No significant effect.	No significant effect.	No significant effect.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	characteristic groups resident in the vicinity.				
Trinity Primary School Bridge	During construction of the bridge, a temporary crossing will be provided, which may be closed intermittently. During these occasions diversions will route pedestrians and cyclists westwards around the station site and back towards Trinity School (see DCO Document Reference 2.34 Diversion Route for Pedestrians and Cyclists). This may particularly affect school children attending the Trinity Primary School due to increased walking distances and journey times. This is assessed to have a	People with reduced mobility, including those on wheelchairs/mobility cars would also experience longer routes between the north and south side of the railway line during the intermittent closures of the temporary crossing.	No significant effect	No significant effect.	No significant effect.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	short term, intermittent, minor negative (differential) effect for the age protected characteristic group. NSDC and the contractors will liaise with the school before and during the construction works. School children should be informed about the construction proposals and taught about the risks and measures they should take to keep safe.				
Works on the NCN 26 under Royal Portbury Dock Road, Marsh Lane and M5.	The elderly and children (with parents) who access the NCN 26 route for leisure and exercise may find the construction works disrupt their activity - differential negative	People with reduced mobility including visual disability (with support from other cyclists on tandem bikes) who access the NCN 26 route may find the construction works disrupt their activity -	No significant effect.	No significant effect.	No significant effect.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	impact in the short term.	differential negative impact in the short term.			
Lodway bridge / Avon Road bridge	The underpass may be used by elderly or people of reduced mobility pedestrians living on either side of the railway to access the other side of the town and to access the NCN 26. The construction traffic (particularly to access Lodway Farm construction compound) may deter non-motorised users (including the elderly, children and those with reduced mobility) from using the roads during the construction period.	The underpass may be used by elderly or people of reduced mobility pedestrians living on either side of Pill Tunnel to access other side of the town and to access the NCN 26. The construction traffic (particularly to access Lodway Farm construction compound) may deter non-motorised users (including the elderly, children and those with reduced mobility) from using the roads during the construction period	No significant effect.	No significant effect.	No significant effect.
Pill Station	Baseline population data indicate higher percentage of people over the age of 65	The construction works, including HGV movements, diversions and closures, alterations to	No significant effect.	Christ Church, Pill Baptist Church, Pill	No significant effect.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	reside in the LSOAs along the proposed route. A combination of factors i.e., heavy good vehicle ("HGV") traffic near the station construction compound, narrow roads with restrictive parking and traffic movement, need to access amenities near the proposed site, such the Post office, Library, Pill Community Centre, Churches and GP (Heywood Family Practice) may all contribute to difficulty in navigating the area, particularly for the elderly who may choose to limit their movement in such circumstances. The effect is likely to be differential and minor	pedestrian routes (on already narrow streets), construction noise and dust, will all contribute to discomfort for people with reduced mobility wishing to access amenities and services. A short term minor negative differential impact is predicted on the disability protected characteristic group.		Methodist Church and the Salvation Army-Pill Corps are located within a 300 m buffer of the railway through Pill. In addition to Sunday services, these churches also host events such as coffee mornings, toddler groups, kids club, women's group meetings at various times on weekdays. These activities may	

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	negative on the age protected characteristic group. Ongoing consultation with local community groups, including key groups such as the elderly will be required during construction to help address these effects.			be affected by access constraints as a result of construction traffic movements and diversions along the narrow roads in Pill, and activities at construction compounds. Ongoing consultation with the local community will be important. The effect is evaluated to be minor negative.	
Ham Green	Due to the scale of construction works and the relatively minor level of construction traffic expected along this part of the route, no significant effect is predicted across these protected characteristics.				

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
Avon Gorge	Users of the River Avon Tow Path along the Avon, including children with adults, may experience a reduction in the ambience of the route during the construction phase. Short term, minor negative (differential) effect is predicted for the age protected characteristic group.	No significant effect. Current access for people with reduced mobility to the Tow Path is limited and the numbers of people with reduced mobility using the Tow Path is assumed to be very low. During construction, access for mobility scooters, and similar, is likely to be more difficult due to the construction traffic using this route.	No significant effect.	No significant effect.	No significant effect.
Clanage Road Construction Compound	Bright Horizons Nursery and Pre-school building, play area are located 30 m south of the construction compound. There will be vehicle turning movements in and out of the site, construction and traffic noise and change in landscape.	Although the footpath along Clanage Road may be shared by mobility scooters or by wheelchair users, the proposed compound is unlikely to affect this path. Appropriate driving practice is expected from users of the construction compound, failing which it may pose minor negative effect on the health and	No significant impact	No significant impact	No significant impact

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
	Construction noise is unlikely to be significant given the proximity of Clanage Road. Construction traffic will be separated from the Nursery site. Drivers of construction vehicles should be aware of sensitive receptors of people accessing and egressing.	safety of people who belong to the disability protected characteristic.			
Ashton Gate Level Crossing, highways works on Winterstoke Road, pedestrian and cycle ramp, and Barons Close	During the highway works to Winterstoke Road, consideration needs to be given to safety of pupils walking to and from Ashton Park School, secondary school. Minor negative (differential) effect.	During highway works to Winterstoke Road, consideration needs to be given to persons with disabilities using this area. Minor negative (differential) effect.	No significant effect.	No significant effect.	No significant effect.

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
Pedestrian Crossing					
Construction compounds	No significant effect.	No significant effect.	Females experience more safety (perceived) issues when travelling alone than males. Construction sites and compounds may seem intimidating places, especially at night time. The contractors will install standard safety and security measures suitable for the urban and rural locations of the construction compounds. A neutral effect is predicted.	People from ethnic minorities are more likely (actual and perceived) to be targets of hate crime. Construction compounds may be seen as potential locations for assault or bullying, especially at night and at isolated sites. The contractors will install standard safety and security measures suitable for	People with gender reassignment and those with homosexual orientation are more likely (actual and perceived) to be targets of hate crime. Construction compounds may be seen as potential locations for assault or bullying, especially at night and at isolated sites. The contractors will install standard safety and security

Table 7.1: Initial Assessment of the Construction Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Gender reassignment/ sexual orientation
				the urban and rural locations of the construction compounds. A neutral effect is predicted.	measures suitable for the urban and rural locations of the construction compounds. A neutral effect is predicted.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
Portishead Station	Proposals for improvement on Quays Avenue (near Serbert Way) for a pedestrian island and increased shared space for pedestrians near the area, may help parents and children accessing the Busy Bees Nursery on Serbert's Way. Likewise, it may benefit the elderly who will now have a formal and safe pathway along Quays Avenue and along other routes leading to the station. A minor positive differential effect is predicted.	At the existing junction with Phoenix Way and Harbour Road, dropped kerbs and tactile paving are currently provided. The flow of traffic at the junction is relatively constant reducing the opportunities to cross. The DCO Scheme will provide formal crossings on Phoenix Way and Harbour Road, which will improve safety for persons with reduced mobility and the elderly. A minor positive effect).	No significant effect.	The new service could help faith users from other areas to join services at Portishead or enable these faith centre users to access wider network in Bristol or Bath. A positive (differential) effect is predicted.	No significant effect.	No significant effect.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
	The provision of a passenger service could encourage elderly residents in Portishead to travel more to Bristol, Bath and elsewhere. A positive disproportionate effect is predicted.	The proposed station design includes blue badge older parking. The station includes a single unisex toilet suitable for use by people with reduced mobility. The station has step-free access. The passenger service may encourage people of reduced mobility to travel to Bristol, Bath and elsewhere. A positive disproportionate effect is predicted.	No significant effect.	No significant effect.	The station includes a single unisex toilet with baby change facilities. A positive effect.	Although the proportion of homosexual and transgender population in Portishead is not known, the new train service could help people from this group access similar groups in Bristol and Bath, and thus may feel less isolated. A positive effect.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
Trinity Primary School Bridge	The new pedestrian and cycle bridge incorporates a low gradient ramp in additional to stairs. It will provide a safe and accessible path for travel, although the route along the ramps is longer than the existing crossing at grade. A positive differential effect is predicted.	The new pedestrian and cycle bridge incorporates a long gradient ramp in addition to stairs. It will provide a safe and accessible path for travel, although the route along the ramps is longer than the existing crossing at grade. A positive differential effect is predicted.	No significant effect.	No significant effect.	The bridge crossing will be designed with appropriate surfaces, suitable for parents and guardians travelling with buggies and pushchairs.	No significant effect.
NCN 26	No significant effect.	No significant effect.	No significant effect.	No significant effect.	No significant effect.	No significant effect.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
Pill Station	North Somerset 004A (within the DCO boundary, south-east of Pill) is one of the 10% most deprived LSOA in England. The new train connection will improve connectivity for economically active people who are unemployed. The new connection could enable the elderly (higher percentage in Pill LSOAs), to travel further to Bristol, Bath and elsewhere. A positive (differential) effect is predicted.	The station premises include blue badge holder parking in the station forecourt and a low gradient access ramp from the station entrance to the platform. A positive (differential) effect is predicted.	No significant effect.	A number of faith groups (four churches and Bahai and Sikh centres) are located within walking distance from the station. The new service could help faith users from other areas to join services at Pill or enable these faith centre users to access wider network in Portishead, Bristol or Bath. A positive (differential) effect is predicted.	The low gradient ramp from the station entrance to the station platform would ease access for parents and guardians with prams and young children.	Although the proportion of homosexual and transgender population at Pill is not known, the new train service could help people from this group access similar groups in Bristol and Bath, and thus may feel less isolated.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
Clanage Road Permanent Access	Bright Horizons Nursery Pre-school building and play area are located 30 m south of the permanent compound. The compound would be used intermittently, with no permanent buildings or storage. The compound will also be surrounded by planting, given the site is located within the Bower Ashton Conservation Area. Operation of the Network Rail Compound is unlikely to affect the setting of the nursery.	Although the footpath along Clanage Road (the A369) this road may be shared by mobility scooters or by wheelchair users, turning movements into and out of the proposed compound is unlikely to affect users of this path. No significant effect.	No significant effect.	No significant effect.	No significant effect.	No significant effect.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
Ashton Vale Road Level Crossing, cycle and pedestrian ramp.	The Ashton Vale Road level crossing will close more often with the hourly plus service than at present. This may result in slightly longer vehicle journeys into the industrial estate and potentially longer walking / cycling routes between the Long Ashton park and ride and Silbury Road area, employment in the industrial estate, facilities such as the football stadium off Winterstoke Road and Ashton Park School to the north of the A370 and Ashton Road. Minor negative effect (differential) is predicted for school children and the elderly.	The Ashton Vale Road level crossing will close more often with the hourly plus service than at present. This may result in slightly longer walking routes between the Long Ashton park and ride and Silbury Road area, employment in the industrial estate, facilities such as the football stadium off Winterstoke Road and Ashton Park School to the north of the A370 and Ashton Road. Minor negative effect (differential) is predicted for people of reduced mobility.	No significant effect.	No significant effect.	No significant effect.	No significant effect.

Table 7.2: Initial Assessment of the Operational Impacts on the Protected Characteristic Group

Project component	Age	Disability	Gender	Religion/belief	Pregnancy/ maternity	Sexual orientation/ transgender
Barons Close pedestrian crossing	Closure of the Barons Close pedestrian crossing may increase travel time for users, including the elderly and small children but will improve safety; for this reason the closure is considered to have a minor positive impact (differential) on this group.	Closure of the pedestrian access may increase travel time for users, including people with reduced mobility, but will improve safety; for this reason the closure is considered to have a minor positive impact (differential) on this group.	No significant effect.	No significant effect.	No significant effect.	No significant effect.

7.4 Cumulative Effects

Other Projects along the Portishead Branch Line DCO Scheme

7.4.1 This EqIA considers the potential for cumulative effects on access for vulnerable groups. Other proposed developments along the DCO route have the potential to cause cumulative effects in conjunction with the DCO Scheme. The ES Appendix 18.2 (DCO Document Reference 6.25) contains details of other project which may have a cumulative effect on the DCO Scheme, consisting of NSIPs within 10 km and developments proposed through NSDC and BCC within 0.5 km of the Portishead Branch Line.

7.4.2 Mixed-use, residential and employment developments have been proposed along the DCO Scheme. None of the proposed developments is expected to have significant impacts on equality. However, as the number of people living, working and visiting Portishead and Pill is likely to increase over the coming years, beneficial cumulative effects relating to enhanced access between these development sites and the wider West of England region may occur once the DCO Scheme is completed. In particular, an assisted living development for the over 60s has been proposed for a site near the marina and in close proximity to the proposed Portishead Station. Once these apartments are occupied and the Portishead Branch Line is operating, residents would be able to travel easily to Bristol, for example, to visit the proposed Bristol University campus Bristol Temple Quarter proposed developments near Bristol Temple Meads Station.

7.4.3 In addition to the proposed developments above, further beneficial cumulative effects relating to increased access and connectivity across the wider Bristol area may occur between the DCO Scheme and MetroBus schemes and Network Rail infrastructure improvements.

7.4.4 Overall, no significant adverse cumulative effects are likely to occur as a result of the interaction between the DCO Scheme and these proposed developments. The effect is therefore neutral.

Other Works for MetroWest Phase 1

7.4.5 Other elements of MetroWest Phase 1, namely the Parson Street Junction improvements including Liberty Lane Sidings, modifications to Parson Street Station, Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling and Bathampton Turnback comprise small scale works, confined within the existing railway land. These works are to be undertaken by Network Rail under their permitted development rights and do not form part of the DCO Application.

7.4.6 Network Rail undertakes their own environmental appraisals and action plans and environmental risk registers of permitted development works as part of the reporting for their internal Governance for Railway Investment Projects (“GRIP”) process. This process will identify the potential impacts and capture the need for mitigation during design and construction. The results will be carried forward from the present GRIP 3/4 phase into the detailed design phase (GRIP 5) and construction (GRIP 6).

7.4.7 Network Rail has undertaken a diversity impact assessment of the proposed improvements for Parson Street Station. Minor modifications are required to bring a third platform into use. The DCO Scheme will introduce one new train per hour, so only a modest increase in passengers using Parson Street Station is predicted. This station is not a fully accessible station, so the DCO Scheme would not improve the use of this station for people with reduced mobility. However, the works required to accommodate the DCO Scheme would not impact on current passengers using the station.

7.4.8 Given the small scale nature of these works and the fact that they do not involve changes to station layout or reductions in train service frequency, there are unlikely to be any significant cumulative effects arising from these schemes and the Portishead Branch Line (MetroWest Phase 1) DCO Scheme, during the construction and operation phases. This will therefore be a neutral effect.

Other Stations in the Local Network

7.4.9 In order for seamless and easily accessible travel to be experienced by travellers, other stations in the local network should also cater for vulnerable groups. The permitted development works required to improve Parson Street Station will not affect passengers using the station. The additional train per hour may slightly increase the use of the station by passengers. It is expected that people with reduced mobility will not use this station. At Bedminster Station, no works are required for the platforms that passengers use.

7.5 Limitations in Conducting the Assessment

7.5.1 As it is not possible to identify the location of each protected characteristic group member in the residential properties along the DCO Scheme route, a high level prediction has been made. Individual circumstances will be different for the residents and for road users who belong to the protected characteristic groups.

SECTION 8

Conclusions

8.1.1 This equality impact assessment has identified the construction and operation stage impacts across the protected characteristic groups, after taking into account the proposed mitigation measures. Some negative construction impacts predicted, such as noise, temporary diversions, loss of parking, may be addressed through the implementation of the CoCP and CEMP. During operation, the DCO Scheme provides benefits for most of the protected characteristic groups by providing a safe and reliable means of transport.

8.1.2 This document forms part of the DCO Application. People with an interest in the DCO Scheme can review the DCO submission and submit their own comments to The Planning Inspectorate. Further information on how members of the public can engage in the Examination phase of the application is available on the Planning Inspectorate's website.

SECTION 9

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Figures

N

Portishead Railway Station

Pill Railway Station

Bristol

North Somerset 001G

North Somerset 003D

North Somerset 003E

North Somerset 004B

North Somerset 004C

North Somerset 004D

North Somerset 004A

North Somerset 006F

North Somerset

Bristol 036A

Bristol 041A

Bristol 041D

Bristol 039A

Bristol 046A

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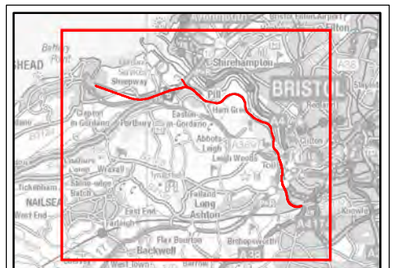
Kilometres



KEY

Local Authority Boundary

Lower Super Output Area (LSOA)

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

ES-A	MPC	LS	CF	14/11/2019	First draft
Rev	By	Chkd	Apprvd	Date	Description

Client

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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 3.1: Study Area

Drawn By : Martin Costello Date: 14/11/2019

Checked By : Lucy Stephenson Date: 14/11/2019

Approved By : Carolyn Francis Date: 14/11/2019

Drawing No. : 674946 -003-001-A

Revision ES-A

Drawing Scale : 1:40,000 @ A3

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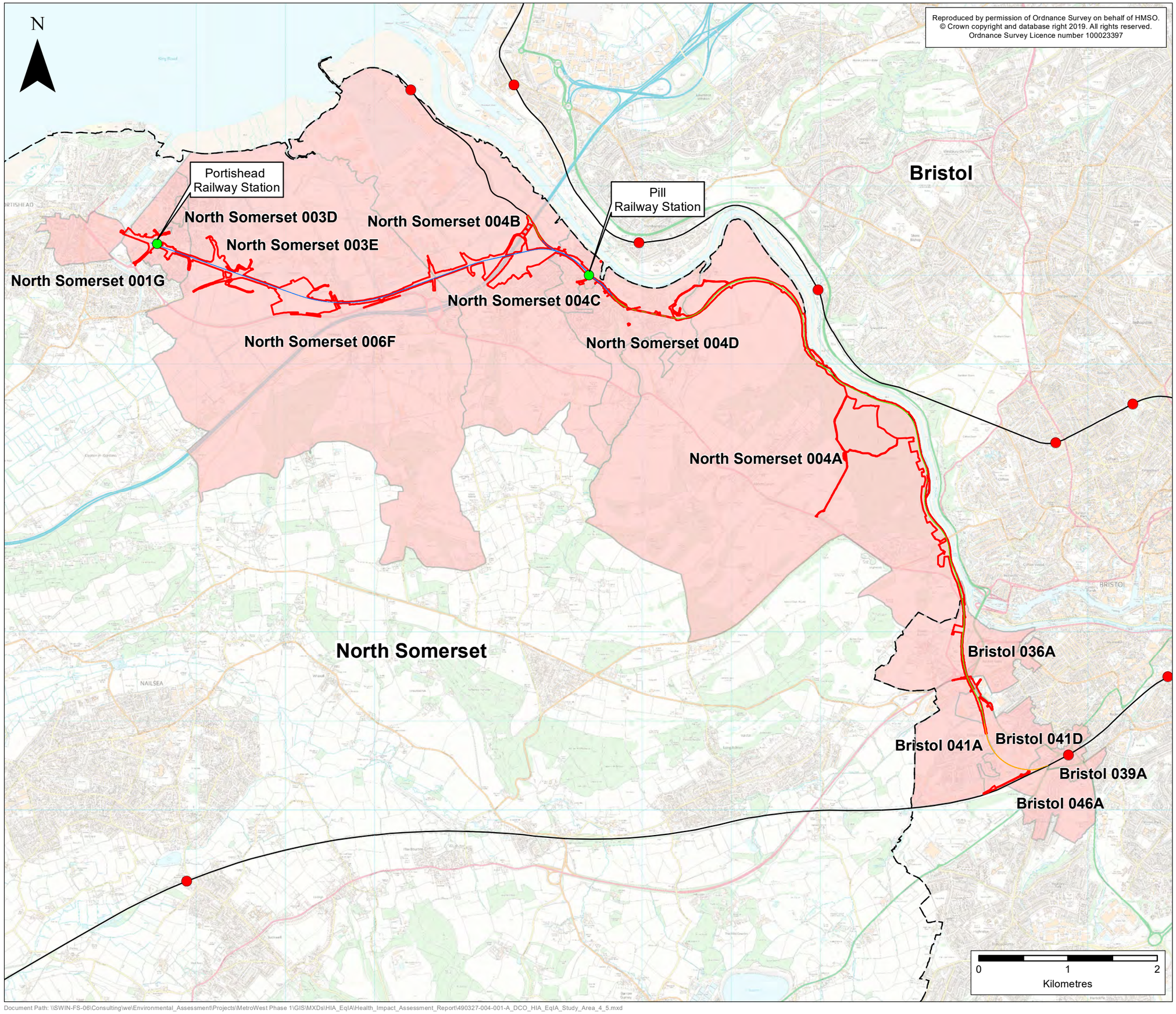

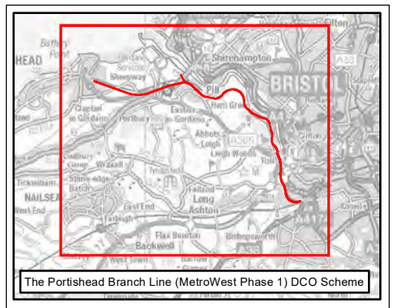

KEY

Local Authority Boundary

IMD (2015) – Income Deprivation

>20%

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

ES-A	MPC	LS	CF	14/11/2019	First draft
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Client

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Project :
Portishead Branch Line (MetroWest Phase 1)

Drawing :
Figure 4.5: Index of Multiple Deprivation - Income Deprivation

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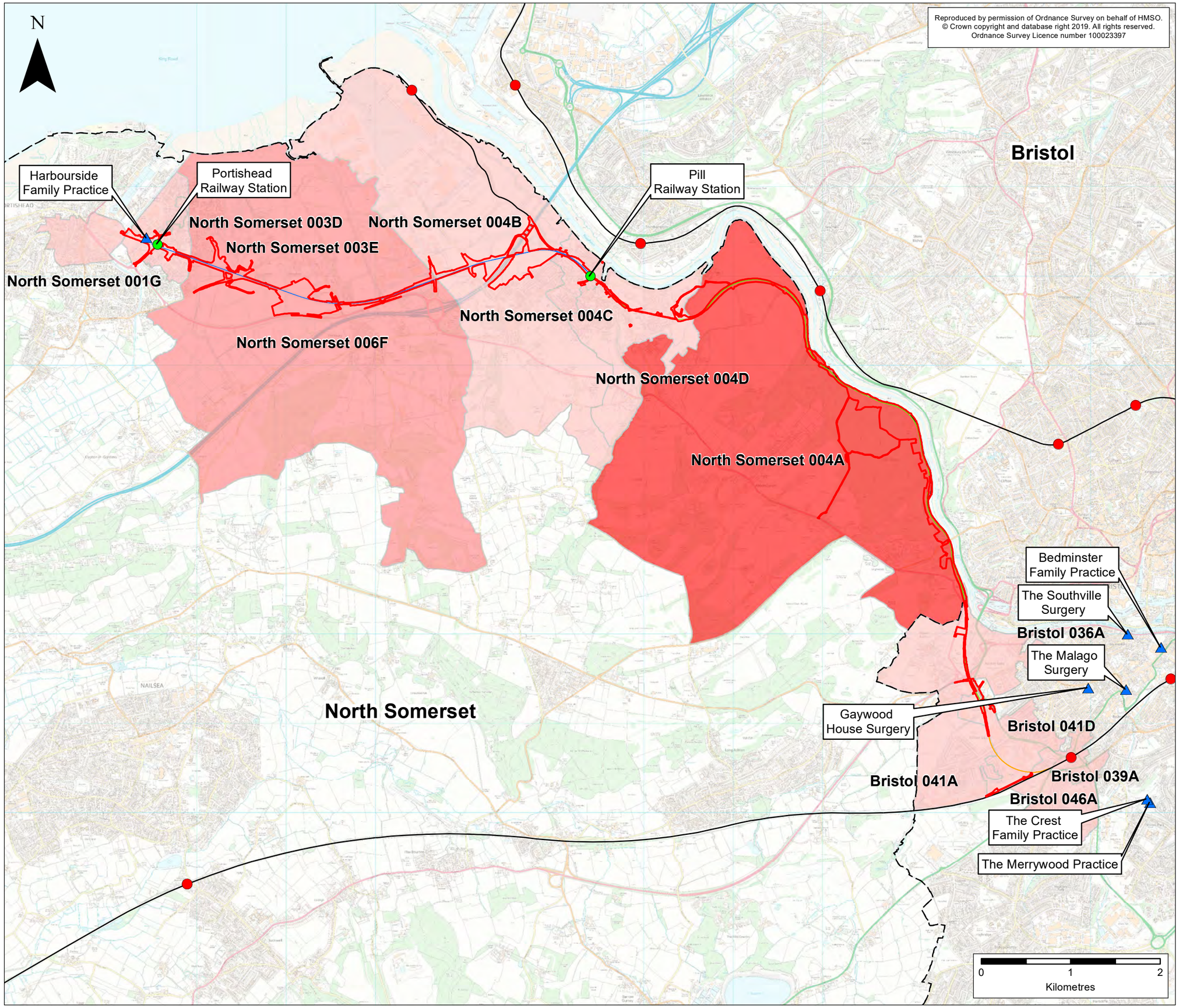

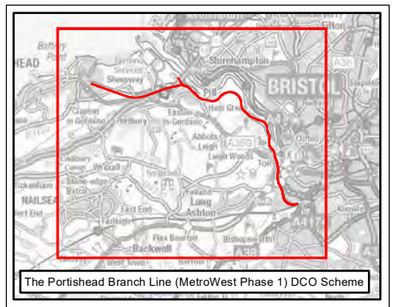

KEY

Local Authority

IMD (2015) – Geographical Barriers to Housing and Services

- >0-5%
- >5-20%
- >20%

Existing Railway

- Existing Railway Line
- Existing Railway Station

Portishead Branch Line

- Order Limits
- The Nationally Significant Infrastructure Project (NSIP) Works
- The Associated Development
- Section in Tunnel
- Proposed Station

Other Works

- Network Rail Permitted Development Rights

ES-A	MPC	LS	CF	14/11/2019	First draft
Rev	By	Chkd	Apprvd	Date	Description

Client

travelwest

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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 4.6: Index of Multiple Deprivation – Geographical Barriers to Housing Services

Drawn By :	Martin Costello	Date: 14/11/2019
Checked By :	Lucy Stephenson	Date: 14/11/2019
Approved By :	Carolyn Francis	Date: 14/11/2019

Drawing No. : 674946 -003-005-A

Revision ES-A

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N

Portishead Railway Station

Pill Railway Station

Bristol

North Somerset 001G

North Somerset 003D

North Somerset 003E

North Somerset 004B

North Somerset 004C

North Somerset 004D

North Somerset 004A

North Somerset 006F

North Somerset

Bristol 036A

Bristol 041D

Bristol 041A

Bristol 039A

Bristol 046A

0 1 2
Kilometres

The Portishead Branch Line (MetroWest Phase 1) DCO Scheme

KEY

Local Authority Boundary

IMD (2015) – Outdoor Living Environment

>5-20%

>20%

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

ES-A	MPC	LS	CF	14/11/2019	First draft
Rev	By	Chkd	Apprvd	Date	Description

Client

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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 4.7: Index of Multiple Deprivation – Outdoor Living Environment

Drawn By : Martin Costello Date: 14/11/2019

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Approved By : Carolyn Francis Date: 14/11/2019

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Revision ES-A

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N

Harbourside Family Practice

Portishead Railway Station

Pill Railway Station

Bristol

North Somerset 001G

North Somerset 003D

North Somerset 003E

North Somerset 004B

North Somerset 004C

North Somerset 004D

North Somerset 006F

North Somerset 004A

North Somerset

Bedminster Family Practice

The Southville Surgery

The Malago Surgery

Bristol 036A

Gaywood House Surgery

Bristol 041D

Bristol 041A

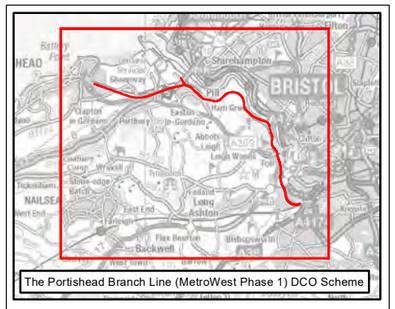
Bristol 039A

Bristol 046A

The Crest Family Practice

The Merrywood Practice

0 1 2
Kilometres



KEY

Local Authority Boundary

IMD (2015) – Health Deprivation and Disability

>5-20%

>20%

GP surgeries with prevalence of depression in adults significantly higher than national value (PHE, 2014)

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

ES-A	MPC	LS	CF	14/11/2019	First draft
Rev	By	Chkd	Apprvd	Date	Description

Client

travelwest

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Project :

Portishead Branch Line (MetroWest Phase 1)

Drawing :

Figure 4.10: Index of Multiple Deprivation - Health Deprivation and Disability

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Revision ES-A

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MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council
6.25, Environmental Statement, Volume 4, Appendix 14.2 Health Impact Assessment
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, regulation 5(2)(a)
Planning Act 2008

Author: CH2M
Date: November 2019

Table of Contents

Tables

Figure(s)

Figures in italics are presented at the end of this report

Abbreviations

AQMA	Air Quality Management Area
BCC	Bristol City Council
BME	Black and Minority Ethnic
B&NES	Bath and North East Somerset
CoCP	Code of Construction Practice
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
Defra	Department of Environment, Food and Rural Affairs
DFLE	Disability-free life expectancy
DfT	Department for Transport
EqIA	Equality Impact Assessment
EU	European Union
HGV	Heavy goods vehicle
HIA	Health Impact Assessment
IMD	Index of Multiple Deprivation
JLTP	Joint Local Transport Plan
JSP	Joint Spatial Plan
JTS	Joint Transport Study
LSOA	Lower Super Output Area
NCN	National Cycle Network
NPSE	Noise Policy Statement for England
NPSNN	National Policy Statement for National Networks
NSC	North Somerset Council
ONS	Office for National Statistics
PEI Report	Preliminary Environmental Information Report
PPG	Planning Policy Guidance
PRoW	Public right of way
PSED	Public Sector Equality Duty
UA	Unitary Authority
WofE LEP	West of England Local Enterprise Partnership

SECTION 1

Introduction

1.1.1 This Health Impact Assessment ("HIA") has been produced as part of the documents to support the Development Consent Order ("DCO") Application for the Portishead Branch Line (MetroWest Phase 1) DCO Scheme ("the DCO Scheme") under the Planning Act 2008 ("PA 2008"). This HIA also fulfils North Somerset District Council's ("NSDC") Core Strategy Policy CS26 requirement for all major developments to produce an HIA and complies with the Scoping Opinion from the Secretary of State for Transport[3] to address the concerns of stakeholders on health and safety matters for the DCO Scheme.

1.1.2 The National Policy Statement for National Networks ("NPSNN") (Department for Transport, December 2014) states that rail networks and freight interchange works can have direct impacts on people's health because of traffic, noise, vibration, air quality and emissions, dust, light pollution, community severance, polluting water, odour, hazardous waste and pests. It also states, "*where the proposed project is likely to have significant environmental impact that would affect the health of the population, the environmental statement should identify and set out the assessment of any likely significant adverse health impacts. The [project] applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health"* (page 44, paragraphs 4.81 and 4.82).

1.1.3 The construction and operation of any major project has potential to affect the health, well-being and quality of life of the people who live and work in the area. This study aims to predict these impacts and to avoid or reduce their occurrence by considering them in the environmental assessment and in the design process. This HIA report presents the results of the study on the potential significant health impacts that may arise as a result of the construction and operation of the DCO Scheme.

1.1.4 This report has been prepared in accordance with established good practice for major infrastructure projects in the UK. The report is intended to provide both the decision makers and other stakeholders, including the affected communities, with information about issues that have potential to affect health and how they will be mitigated.

[3] The Scoping Opinion, which sets out the studies to be undertaken for the environmental impact assessment and reported in the Environmental Statement to be submitted to the Planning Inspectorate with the DCO Application, is available on the Planning Inspectorate's website at: https://infrastructure.planninginspectorate.gov.uk/projects/south-west/portishead-branch-line-metrowest-phase-1/?ipcsection=docs

1.1.5 This chapter should be read in conjunction with the Environmental Statement ("ES") Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7), Chapter 7 Air Quality and Greenhouse Gases (DCO Document Reference 6.10), Chapter 10 Geology, Hydrogeology, Ground Conditions and Contaminated Land (DCO Document Reference 6.13), Chapter 13 Noise and Vibration (DCO Document Reference 6.16), Chapter 14 Socio-Economics and Regeneration (DCO Document Reference 6.17), Chapter 16 Transport, Access and Non Motorised Users (DCO Document Reference 6.19) and Chapter 18 In Combination and Cumulative Effects Assessment (DCO Document Reference 6.21). This report should also be read in conjunction with the Equality Impact Assessment in Appendix 14.1 (DCO Document Reference 6.25) of the ES.

SECTION 2

Methodology

2.1 Aims

2.1.1 The HIA aims to:

- Appraise the potential positive and negative health and well-being impacts of the proposed development on the adjacent existing communities in the development area;
- Highlight any potential differential distribution effects of health impacts among groups within the population by asking 'who is affected?' for the impacts identified; and
- Describe actions and mitigation measures to minimise any potential negative health impacts and maximise potential positive health impacts, referencing where possible the most affected vulnerable group(s).

2.1.2 The HIA methodology has been informed by studies from similar projects and is in line with the NPSNN.

2.2 Consultations

2.2.1 Extensive pre-application consultation has been undertaken, to help define the scope of the HIA and to provide affected parties with an opportunity to comment on the DCO Scheme.

2.2.2 A request for a scoping opinion was sent to the Secretary of State in June 2015 and the Scoping Opinion was received in August 2015. The Scoping Opinion included feedback from the Secretary of State, the Health and Safety Executive ("HSE") and Public Health England ("PHE"). Non-statutory consultation was undertaken with the relevant officers at North Somerset District Council ("NSDC") and Bristol City Council ("BCC") in January 2016 to discuss the methodology.

2.2.3 The applicant NSDC adopted a multi-stage approach to statutory or formal consultation pursuant to Sections 42, 47 and 48 of the Planning Act 2008. This multi-stage approach allowed for the DCO Scheme's proposal to evolve iteratively through the Applicant's consideration and regards for consultee input, in keeping with the DCLG Pre-Application Guidance (2015) so that consultee responses could meaningfully contribute to the DCO Scheme proposals.

2.2.4 The Applicant carried out their formal consultation in three main stages, being:

- **Stage 1 Consultation** from 22 June 2015 to 3 August 2015, compliant with Section 47 of the 2008 Act (as shown in Chapter 8 of the DCO Consultation Report), and was supported by informal consultation (as shown in Chapter 5 of the DCO Consultation Report);

- **Stage 2 Consultation** from 23 October 2017 to 4 December 2017, also compliant with Section 47 of the 2008 Act, and support by informal consultation (as shown in Chapter 5 of the DCO Consultation Report). However, Stage 2 Consultation was the stage of formal consultation at which the Applicant in parallel complied with the requirements of Sections 42 and 48 of the 2008 Act (shown in Chapters 7 and 9 of the DCO Consultation Report); and
- **Additional Stage 2 Consultation**, being several further periods of consultation at different times following Stage 2 consultation. These were compliant with Sections 42 and 47 of the 2008 Act (as shown in Chapters 7 and 8 of the DCO Consultation Report), being further periods of consultation on specific topics.

2.2.5 In addition to statutory or formal consultation under the 2008 Act, the DCLG Pre-Application Guidance (2015) recognises that early consultation engagement with local communities, local authorities and statutory consultees can bring about significant benefits for all parties. Therefore, the Applicant carried out non-statutory or informal consultation up to the end of Stage 2 Consultation on 2 December 2017.

2.2.6 Following the end of Stage 2 consultation activities, the Applicant continued non-statutory or informal engagement. This engagement was held to further explore and seek to overcome some of the issues raised during the formal consultation period, and is detailed in Chapter 13 of the DCO Consultation Report.

2.2.7 Information on the consultation process and summary of consultations undertaken to date as relevant to the HIA are presented in Chapter 5 Stakeholder Consultation. The Consultation Reports on the informal stakeholder consultations undertaken in 2015 and 2016 are available on the project's document store, linked from the MetroWest project website https://travelwest.info/projects/metrowest/metrowest-phase-1. The Consultation Report on the statutory consultation is provided in the DCO Document Reference 5.1.

2.3 Definition of the Study Area

2.3.1 For purposes of the HIA, two study areas have been defined to assess the direct and cumulative effects of the Portishead Branch Line (MetroWest Phase 1) DCO Scheme itself and the wider study area to assess the cumulative effects of the DCO Scheme in combination with other activities associated with MetroWest Phase 1.

2.3.2 For purposes of the HIA, the local study area comprises a 500 m buffer (for operational impact) and 100 m buffer (for construction impact) along the DCO Scheme. These distances were chosen to reflect the distances within which construction and operational activities have the potential to cause adverse effects on health and well-being as reported in the ES Chapters 7 Air Quality and Greenhouse Gases (DCO Document Reference 6.10) and 13 Noise and Vibration (DCO Document Reference 6.16). The effects predicted in these chapters form the basis for assessment of health impact under the air quality and noise impact health determinant, explained in subsequent sections.

2.3.3 The HIA recognises that there might be wider cumulative effects for MetroWest Phase 1 in terms of health and well-being, both positive and negative during construction and operation. For this reason, the study area for the cumulative effects covers:

- Other nationally significant infrastructure projects ("NSIP") within 10 km of the DCO Scheme;
- Projects identified from NSDC's and BCC's planning portals within 0.5 km;
- Major applications further away in the Bristol area;
- Other works required for MetroWest Phase 1, namely:
  - Parson Street Junction;
  - Parson Street Station;
  - Bedminster Down Relief;
  - Severn Beach / Avonmouth Signalling and
  - Bathampton turnback.

2.3.4 Severn Beach / Avonmouth Signalling works have been undertaken by Network Rail under their permitted development rights as part of the Filton Four Track project. The new service will not be introduced until late 2021.

2.3.5 The data sources used were:

- Census 2011;
- Office for National Statistics ("ONS") annual mid-2014 population estimates;
- Department for Communities and Local Government ("DCLG");
- Public Health England;
- Avon and North Somerset Constabulary;
- National Child Measurement Programme; and
- The local plans for North Somerset District Council, Bristol City Council, Bath and North East Somerset Council.

2.4 Approach

2.4.1 The HIA needs to address the following key questions.

- Who are likely to be affected by the proposal? The development might affect different population groups in different ways, for example the health consequences of a scheme may be different for existing residents, workers on site during construction, and vulnerable groups.
- What determinants of health may be affected? Health determinants are the factors that can influence health. For example air quality, noise or access to green spaces and open spaces. The state of the health of individuals and communities is determined by many factors including their circumstances and environment. The HIA aims to forecast changes in health condition as a result of the potential changes to the health determinants due to the proposed scheme. The health determinants include community and economic factors as well as the physical environment. The list of determinants is drawn from existing literature and the local profile and is discussed in Section 2.3 below.

- What is the current health status of the community (baseline information from desktop studies)?
- What are the health concerns for the community, as viewed by the key health stakeholders? (See Section 2.4 below.)
- What are the potential positive and negative impacts of the proposal against each of the categories identified in the determinants of health checklist? And if there are any negative effects, how can they be avoided, reduced or compensated? Impacts often arise in indirect ways or could be unforeseen consequences, and can happen at different stages of a causal pathway.
- Identify whether any further evidence/research is needed to inform the final recommendations of the HIA.

2.4.2 The study has been conducted through the following steps:

- Policy and literature review to provide the evidence base for identifying health determinants as well as to understand evidence available on the link between the health determinants and health effects;
- Determine the study area boundary and identify the health determinants;
- Profiling health characteristics of the population / determinants in the study area;
- Consultation with the client team and key health stakeholders to gather their views on health concerns relating to the affected community; and
- Conduct the impact assessment and identify and incorporate mitigation measures, if any required, into the scheme design, construction activities and operational procedures.

2.4.3 Each of the above steps is elaborated in sections 3 to 7 in this report.

2.4.4 The HIA has been conducted in line with the NPSNN requirements (page 44, paragraphs 4.81 and 4.82) to, a) identify the impact on health of direct and indirect impacts; b) identify and include information on any significant adverse health impact in the Environmental Statement, and c) identify measures to avoid, reduce or compensate adverse health impacts, including cumulative impacts.

2.4.5 The HIA has drawn upon the studies undertaken for the ES including modelling data and potential impacts on the population and the environment, for air quality and noise and vibration and other health determinants. This information has been used to map the causal pathways and impact prediction for this HIA.

2.5 Identifying the Health Determinants

2.5.1 Health determinants are the factors that can influence health. These factors when altered, could result in impacts that might affect the physical and mental health and well-being of an individual, a group of people or that of a community.

2.5.2 The following health determinants have been scoped in to the project based on the information available on the type of works and on operations of the project and the potential links between these works and the health of an individual and affected communities:

- air quality and emissions;
- noise and vibration;
- light pollution;
- access to services such as shops, health or social services;
- access to the DCO Scheme;
- access to green space, open spaces and physical activity;
- townscape and quality of the local environment;
- crime and safety; and
- employment, access to work and local business.

2.5.3 The following determinants have been scoped out.

- **Housing and household wealth**: As the DCO Scheme will not result in relocation of residents, temporary or permanent, this determinant has been scoped out of the study.
- **Construction worker Health and Safety**: This HIA does not include construction worker related health and safety matters. However, the successful contractor(s) will be required to implement a Health and Safety Plan for the project.
- **Electromagnetic field impact**: The DCO Scheme will not be electrified. GSM-R masts will be required and will be installed at a safe minimum distance to the public as required by FTN/GSM-R standards. The impact of electromagnetic fields on health has been scoped out of the HIA.
- **Land contamination:** Some trackbed investigation has been undertaken and further site investigation of contaminated land is being planned. The results will be used to identify protocols for the safe handling and removal of any contaminated land present which the contractor will specific in their Construction Environmental Management Plan (“CEMP”).
- **Ground water quality:** It is not considered likely that groundwater will be needed for construction and the DCO Scheme is unlikely to affect groundwater quality during construction and operation, as discussed in the ES Chapter 17 Water Resources, Drainage, and Flood Risk (DCO Document Reference 6.20) .

2.6 Key Receptors

2.6.1 The following groups have been considered as key receptors for this HIA.

Vulnerable Groups

2.6.2 Vulnerable groups comprise sets of people who are more susceptible to the impact of the project on their health and wellbeing than the wider population.

- Children and young adults are more susceptible than others to air pollution, noise, and other environmental impacts. They are likely to have

less experience and as a result lack judgement when moving around in traffic and other public spaces.

- The elderly and people with physical disabilities are more sensitive than young and middle-aged people. They are likely to have less able visual or other sensory perception and may have physical mobility problems. Changes to access routes may create anxiety, or worry leading to withdrawal or isolation or reduced physical activity such as walking. They may or may not use public transport, depending on accessibility for family or other social visits, which could be affected as a result of the project programme.
- People with physical and mental health problems, such as sleep disturbance, depression, and anxiety, may be more sensitive than others to the changes in their local environment.
- Cyclists, pedestrians, equestrians and public transport users, are likely to be affected by diversions to their travel routes or road and footpath closures, which may change their exposure to health risks, such as safety, air quality and noise.
- People in low income groups (income deprivation) are more likely to live in areas affected by environmental pollution (World Health Organisation, 2010) and face barriers to housing, which may cause stress and anxiety.

Other Target Groups

2.6.3 Other target groups that may face health impacts disproportionately are:

- Population within 500 m of the operational railway;
- Population within 100 m of the construction sites;
- Residents affected by construction-related traffic plying along their roads for a longer period throughout the day;
- Residents affected by other projects that will be built in the area around the same time;
- Employees (in offices or commercial spaces) working within 300 m of the work site; and
- Tourists and visitors.

2.7 Defining the Baseline

2.7.1 In order to provide a detailed commentary on the health impact as a result of the construction works and railway operations along the route, the HIA refers to the census data at the Lower Super Output Area (“LSOA”) level, where possible. In the 2011 Census, the LSOAs were defined by a minimum population of 1,000 people and a maximum of 3,000 people, with minimum household numbers of 400 and a maximum of 1,000 households. The study area includes LSOAs from North Somerset Council and Bristol City Council for local area effects, and in addition Bath and North East Somerset Council for assessing the cumulative impacts.

2.7.2 To enable better understanding of the cause and effect relationship, the impact assessment for the DCO Scheme has been broken down to the

project component level. For example, predicting the impact of operational noise on the residents near the Portishead station or construction vehicles noise on residents located near the proposed construction compounds along the route. Table 2.2 provides the Census LSOA codes that have been mapped against the project components while Figure 2.1 Study Area shows the locations of the LSOAs and project components.

2.7.3 The route along the south west main line from Parson Street Junction to Bedminster Station is included as part of the wider study area, as well as the locations of the Severn Beach/Avonmouth Signalling works and Bathampton Turnback works, for the cumulative impacts assessment.

Table 2.1: Location of Lower Super Output Areas within the Study Area

LSOA code	Scheme component	Area
The DCO Scheme		
North Somerset 001G (part), 003D and 003E	Proposed Portishead Station, Portishead construction compound and proposed bridge to Trinity Primary School.	Central Portishead
North Somerset 006F and 004B	Construction of the disused railway line, two construction compounds on The Portbury Hundred and Lodway Farm, and haul routes.	East of Portishead and near Pill
North Somerset 004C and 004D	Avon Road / Lodway Close Underpass, Proposed Pill Station and related construction compound / car park, Ham Green construction compound / maintenance access.	Northern Pill
North Somerset 004A	Minor civils works through the Avon Gorge including new track and ballast, ground works, cliff stabilisation works, new signals and communications booster mast, structure repairs, and micro welfare compounds.	Avon Gorge/Abbots Leigh/Leigh Woods
Bristol 036A	Railway works and Bower Ashton construction / maintenance compound.	Ashton Junction
Bristol 041A and 041D	New pedestrian / cycle ramp and modifications to Winterstoke Road in Ashton Vale, closure of Barons Close Pedestrian Crossing and a construction compound.	Ashton Junction
Wider Study Area (includes works under permitted development rights and works as part of MetroWest Phase 1)		
Bristol 046A, 039A	Parson Street Junction and Station	Parson Street Junction

Table 2.1: Location of Lower Super Output Areas within the Study Area

LSOA code	Scheme component	Area
Bristol 039B, 039H	No scheme components	Between Parson Street Junction and Bedminster
Bristol 040B, 040C, 039E	Bedminster Down Relief Line	Bedminster
Bristol 008E, 008F	Severn Beach/Avonmouth Signalling	Avonmouth
Bath and North East Somerset 010E	Bathampton Turnback	Bathampton

2.8 Health Determinant Specific Assessment Approach

2.8.1 **Air quality and dust emissions**: This health determinant considers a combination of NOx, SOx, PM10 and dust emissions. The baseline profile, including information on Air Quality Management Areas ("AQMA"), was taken into account. Any change to the baseline, as a result of the proposed works and cumulative effect from other projects executed in parallel with MetroWest, are modelled and assessed in the ES Chapter 7 Air Quality and Greenhouse Gases (DCO Document Reference 6.10). This information has been used to judge how the predicted change is likely to affect the population, including vulnerable groups such as the elderly and children, and people with illness such as asthma or respiratory diseases or any sensitive receptors such as schools, health centres and hospitals. Construction related emissions such as material transport, plant emissions and dust will be attenuated through measures to be implemented by the contractors. A Code of Construction Practice ("CoCP") (DCO Document Reference 8.15) and a Master Construction Environmental Management Plan ("CEMP") (DCO Document Reference 8.14) have been drafted to provide over-arching principles of environmental management and more detailed guidelines. The contractor will be required to prepare and implement their own CEMP, in compliance with the CoCP and Master CEMP, demonstrating how they will manage the adverse environmental effects of construction.

2.8.2 **Noise and vibration**: The combined effect of noise and vibration, as predicted in the ES Chapter 13 Noise and Vibration (DCO Document Reference 6.16), was taken as the basis for this assessment. The impact of the new passenger service as well as construction related-noise have been taken into account to predict the impact on:

- Residents in urban and rural areas;
- Vulnerable groups of people with physical and mental illness;

- Individuals with physical and mental illness, such as cardiovascular disorders or depression;
- Office or factory staff, whose workplace might be located near the construction sites; and
- Vulnerable groups of able people such as the elderly and children (for example near schools, sheltered homes or supported housing).

2.8.3 **Light pollution**: This determinant looks to capture the impact of changes in the night environment as a result of the permanent lighting at the stations and car parks on the residents in the study area based on the information available at this stage on lighting design. During detailed design stage further consideration will be given to lighting for the stations and car parks. The assessment also looks at the temporary changes to night-time lighting, such as light spillage from the construction compounds. The contractor's CEMP will include measures to limit light pollution during the construction stage, which have been taken into account in assessing health impact on the receptors.

2.8.4 **Access to services such as shops, health or social services:** This determinant focuses on the impact of changes on all road users such as motorists, cyclists and pedestrians, to assess accessibility to amenities and services. Information from the Transport Assessment in Appendix 16 of the ES (DCO Document Reference 6.25), including diversions, traffic management, safety and change to road traffic, have been used to predict the impact on access to services.

2.8.5 **Access to the DCO Scheme:** This determinant looks at the experience of local residents and users near the DCO Scheme facilities, such as the stations from the point of view of accessibility, traveller stress and road safety. It looks at whether and how the baseline situation is likely to change with the proposed design, both during the construction and operation stages. The impacts could be either positive or negative and vary across the population depending on the age and physical ability of the population.

2.8.6 **Access to green spaces, open spaces and physical activity:** Physical access and visual access to green spaces and open spaces have been found to have a positive impact on the health of individuals. This determinant looks at the health impact of changes to the spaces that local residents may use for physical activities, such as walking and exercise as well as visual amenity.

2.8.7 **Townscape and quality of the local environment:** Local character and townscape contribute to the visual amenity of an area. This determinant looks at any health related impact as a result of both temporary and permanent changes, if any, at the construction and operations stage.

2.8.8 **Crime and safety:** Crime is an important determinant of health and well-being. This determinant looks at the impact of both construction and operation of the Portishead Branch Line on the local population. Fear of crime may restrict social and cultural activities, or parents may restrict children using public spaces and services. Vulnerable populations, such as the elderly, young men, children, women and people with homosexual orientation may be affected disproportionately or may benefit from improved spaces and services.

2.8.9 **Employment, access to work and local business:** This determinant looks at the impact of changes on local employment and business activities e.g. disruption to business during construction. Adverse impacts such as disruption and relocation may lead to stress, anxiety, lower self-esteem and well-being. Conversely, improved connectivity may increase access to more employment opportunities in the wider sub-region, with beneficial impacts on well-being and mental health. The findings from Chapter 14 Socio-economics and Regeneration (DCO Document Reference 6.17) of the ES have been used to conduct the HIA assessment.

2.9 Assessment Criteria

2.9.1 The HIA seeks to predict change in the health determinant. This involves considering the following points.

- *The aspect of the project causing the change* i.e., construction of the station, or bridge or other components, or the operation of the rail along the route, track lighting during operations, or the presence and operation of construction compounds.
- *The section of the population that might be affected by the change* i.e., dense urban area residents, or rural area residents or businesses and their staff or other vulnerable people such as the elderly, children or people diagnosed with mental illness or people with disabilities.
- The strength of research evidence, to be able to conclude the cause and effect relationship between an identified source of impact, the change in health determinant and the health outcome. The strength of evidence could be weak (few peer reviewed studies available), moderate (range of international, but not national peer reviewed studies indicating health effects or widely accepted by the public health community or debates exist about specific causal factors and the mechanism of effect) and strong evidence (wide range of international and national peer reviewed studies and, or causal effect association widely accepted by the public health community).
- The residual effect, both positive and negative, after taking into account the measures that have been already incorporated in the design and the measures to be covered in the CoCP (DCO Document Reference 8.15) and the Master CEMP (DCO Document Reference 8.14).

2.9.2 Vulnerable groups are more likely to experience health effects as a result of change in a health determinant, than the wider population. The assessment looks for the health effect on particular communities, as well as effects on individual characteristics such as age, physical or mental health conditions or other physical or mental characteristics that make people vulnerable to health effects.

2.9.3 The assessment is qualitative in nature, and the significance of the identified effect and the health impact was carried out based on professional judgement, and taking account of the geographic scope and intensity of exposure.

2.9.4 Geographic scope: This refers to the density of the population and the geographic coverage in the study area. For example, urban areas with many residential units, isolated rural residential or farm buildings with few residents, commercial or office spaces with employees, manufacturing units,

public open spaces, or similar, that have sporadic or regular usage from local residents or travellers.

2.9.5 Intensity of exposure. Intensity refers to the potential change in the health determinant as a result of the project construction or operations. It is expressed in terms of magnitude - low, moderate to high levels. The health impact on the population (receptors) as a result of the change in the health determinant is termed as 'effect', which could be positive or negative. Intensity of an impact is determined taking the following into account:

- duration of the effect (less than a minute to hours during the day or night);
- short term (up to 6 months) to long term (over 5 years); and
- source causing change in the health determinant i.e., point source or moving object (e.g., piling foundation works vs moving train).

2.9.6 Significance of the Effect. The significance of the effect is based on a combination of the scale or magnitude of the impact and the sensitivity of the population. To maintain consistency with the environment assessment definitions, the definition of significance of effects has been adopted from the best practice guidance contained within the Design Manual for Roads and Bridges ("DMRB") Volume 11, Section 2, Part 5: HA 205/08 Assessment and Management of Environmental Effect.

Table 2.2: Significance matrix

	Magnitude of impact or degree of change				
Sensitivity	**No change**	**Negligible**	**Minor**	**Moderate**	**Major**
High	Neutral	Slight	Slight/ Moderate	Moderate/ Large	Large
Medium	Neutral	Slight	Slight	Moderate	Moderate /Large
Low	Neutral	Neutral/ Slight	Neutral/ Slight	Slight	Slight/ Moderate

Table 2.3: Description of magnitude and sensitivity ranges

Magnitude of impact		**Typical criteria descriptors**
Major	Negative	Severe damage to human health.
	Positive	Large scale or major improvement to human health.
Moderate	Negative	Negative impact on human health.
	Positive	Benefit to human health.
Minor	Negative	Minor negative impact on human health.
	Positive	Minor benefit to human health; some beneficial impact or a reduced risk of negative impact occurring.

Sensitivity	Typical criteria descriptors
High	High vulnerability, population groups very sensitive to change.
Medium	Medium vulnerability, population groups sensitive to change.
Low	Low vulnerability, healthy population.

Table 2.4: Definition of Significance of Effects

Significance Category		Typical criteria descriptors
Large	Negative	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
	Positive	
Moderate	Negative	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
	Positive	
Slight	Negative	These beneficial or adverse effects may be raised as local issues. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
	Positive	
Neutral		No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Adapted from DMRB Volume 11, Section 2 Part 5, Table 2.4.

2.9.7 Those residual effects described as having a Moderate or Large effect upon a receptor are considered to be significant in terms of the EIA Regulations and thus are material considerations when determining planning applications. The use of the terms neutral and slight are used to acknowledge that there will be some change from the baseline conditions but that these effects are not significant.

SECTION 3

Policy and Literature Review

3.1 Introduction

3.1.1 The following documents have been reviewed to develop the approach and the scope of the HIA:

- National Policy Statement for National Networks (Department for Transport, December 2014)
- North Somerset District Council's ("NSDC") Core Strategy
- Bristol City Council's ("BCC") Core Strategy
- Bath and North East Somerset's ("B&NES") Core Strategy
- HIA reports of projects of a similar type or scale
- Scientific research literature on the health and well-being impacts of similar infrastructure projects (see the reference list at the end of this report), and
- Health-related topic-specific studies, statistical analyses and other literature that informs about factors affecting health. These studies, along with scientific research literature, form part of the evidence based research that is useful to identify health determinants and health issues relevant for this project.

3.2 Policy Review

National Policy

National Policy Statement for National Networks

3.2.1 The National Policy Statement for National Networks ("NPSNN") sets out the Government's revision and strategic objectives for the national networks to meet the country's long-term needs, supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system: "*this means*:

- *Networks with the capacity and connectivity and resilience to support the national and local economic activity and facilitate growth and create jobs.*
- *Networks which support and improve journey quality, reliability and safety.*
- *Networks which support the delivery of environmental goals and the move to a low carbon economy.*
- *Networks which join up our communities and link effectively to each other*" (p.9, Department for Transport ("DfT"), 2014).

3.2.2 The NPSNN notes that national road and rail networks can affect the population's health, well-being and quality of life both directly (for example due to noise impacts) and indirectly (for example if they affect access to key public services). It states that when a proposed project would result in significant environmental impacts that affect human beings, the project's environmental statement should identify and assess likely significant

adverse health impacts (including cumulative impacts) and identify appropriate mitigation measures.

3.2.3 Regarding projects that may cause noise or vibration impacts, the NPSNN (paragraph 5.195, p85) states that:

"The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development:

- avoid *significant adverse impacts on health and quality of life from noise as a result of the new development;*
- *mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and*
- *contribute to improvements to health and quality of life through the effective mana*gement and control of noise, where possible.

In determining an application, the Secretary of State should consider whether requirements are needed which specify that the mitigation measures put forward by the applicant are put in place to ensure that the noise levels from the project do not exceed those described in the assessment or any other estimates on which the decision was based."

3.2.4 The NPSNN identifies that impacts on air quality are likely to be particularly important for schemes within and near to Air Quality Management Areas ("AQMA") and other areas where ambient pollutant concentrations are close to or exceed EU limits. The NPSNN also highlights the significance of open space and the need to maintain the functionality and connectivity of green infrastructure.

National Planning Policy Framework

3.2.5 The national Planning Policy Framework (NPPF) 2019 sets out the government's planning policies for England and how they should be applied.

3.2.6 Chapter 8 *Promoting healthy and safe communities* paragraph 91 states that planning policies and decision should aim to achieve healthy, inclusive and safe places which promote social interaction, are safe and accessible, and enable and support healthy lifestyles. Paragraph 95 states that planning policy and decisions should promote public safety and take into account wider security and defence requirements by anticipating and addressing possible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate. On open space and recreation, paragraph states that planning policies and decision should protect and enhance public rights of way and access, including taking opportunities to provide better facilities for users.

3.2.7 Chapter 9 *Promoting sustainable transport* state that in assessing sites that may be allocated for development in plans or specific applications for development, consideration should be given to *inter alia* safe and suitable access to the site for all users. Applications for development should include addressing the needs of people with disabilities and reduced mobility in relation to all modes of transport and create places that are safe, secure and attractive.

Transport for Everyone

3.2.8 The NPSNN refers to the paper *Transport for Everyone: an Action Plan to Improve Accessibility for All* (Department for Transport, 2012) for the Government's strategy for improving the accessibility of the transport network for disabled people. This strategy states that transport schemes should build the accessibility requirements of all transport network users into the project design. In addition, improvements to reduce the severance of communities should be considered.

Noise Policy Statement for England

3.2.9 The Noise Policy Statement for England ("NPSE") sets out the Government's approach to noise management. It promotes good health and good quality of life, in line with the Government's principles of sustainable development.

Environment Act 1995

3.2.10 The Environment Act requires local authorities to assess whether air quality standards or objectives are being achieved or are likely to be achieved in their area within the period prescribed by regulations. If an objective is unlikely to be met in an area before the relevant deadline, the local authority must designate the area as an AQMA and take action to achieve the objectives.

Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007

3.2.11 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 explains the Government's air quality objectives and policy to improve air quality in order to improve public health and quality of life and to protect the environment. The objectives to protect human health are presented in Table 3.1 below.

Table 3.1: Air Quality Strategy Objectives to Protect Human Health

Pollutant	EU Limit Value/ UK Objective (pollutant concentration in µg/m^3)	Averaging period	Date for compliance
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
	40 µg/m^3	Annual Mean	31.12.2004

3.2.12 The Strategy recognises that most AQMAs have been designated due to the risk of exceeding, or actual exceedances of NO_2 and PM_{10}, mainly as a result of road transport emissions.

Public Health Outcomes Framework for England (2013-2016)

3.2.13 The Public Health Outcomes Framework for England (2013 – 2016) aims to "*improve and protect the nation's health and well-being, and improve the health of the poorest fastest*." The framework's two high-level outcomes to be achieved are:

- Increased healthy life expectancy
- Reduced differences in life expectancy and healthy life expectancy between communities.

3.2.14 The Department of Health has developed supporting indicators to monitor progress towards achievement of the high level outcomes. These are grouped into four domains:

- Improving the wider determinants of health
- Health improvement
- Health protection
- Health care, public health and preventing premature mortality.

3.2.15 These indicators (among other data) have been used to compile the baseline community profiles for this HIA.

Regional Policy

3.2.16 The four West of England Councils - North Somerset, Bath and North East Somerset, Bristol City and South Gloucestershire - have prepared the West of England Joint Spatial Plan ("JSP"). This emerging plan will be a statutory Development Plan Document once adopted, providing the strategic overarching development framework for the West of England to 2036. "*In tandem with the JSP, a Joint Transport Study ("JTS") was undertaken to recommend how to address both current transport challenges, including carbon reduction, and forecast growth. The JTS, developed in partnership with Highways England, identified potential future strategic transport proposals for delivery up to 2036, that address current challenges and inform future development proposals in the JSP. The JTS set out the following approach for transport: Transport in the West of England will be transformed over the next 20 years through a programme of complementary measures designed to address underlying challenges and to enable the sustainable delivery of new housing and employment growth.*" (quote from TravelWest 2019 page 6.)

3.2.17 The West of England Local Transport Plan 3, last refreshed in 2013, will be superseded by the emerging Joint Transport Local Transport Plan 4 2019 – 2036 ("JTLP4"), which has been developed to progress the JTS. The JLTP4 identifies road congestion and other transport issues as key constraints on economic growth. At the same time, the policy documents explicitly emphasise the prominent role that rail investment can play in driving economic development. In accordance with national planning policy, local policy emphasises transport infrastructure investment as an enabler of economic development. The MetroWest Phases, which are identified as early investment schemes to ensure a programme of works can be delivered in the short, medium and longer term of the JLP4 period, are identified as schemes to significantly improve local and suburban rail travel and services across the area.

3.2.18 The draft JLTP4 (TravelWest 2019) includes the objective to contribute to better health, wellbeing, safety and security. Proposed outcomes to demonstrate achievement of the objective are:

- a step change in the number of health, low carbon walking and cycling trips,
- a continued reduction in the number of road casualties on the transport network,
- road safety for transport users is improved, particularly for those most at risk, and
- personal safety on the transport network is improved and there is less crime and fear of crime.

Local Policy

3.2.19 The following key local policies are relevant to the HIA for the DCO Scheme. These have been extracted from North Somerset Council's and Bristol City Council's Core Strategies and the Development Management Policies that support them.

North Somerset Council Core Strategy (Adopted, January 2017)

- Policy CS3: Environmental impacts and flood risk assessment – Mitigation must be implemented for environmental impacts and impacts on health, safety and amenity resulting from developments.
- Policy CS10: Transportation and movement – Connectivity will improve and facilities will be enhanced for users, including people with reduced mobility.
- Policy CS26: Supporting healthy living and the provision of health care facilities – Developments that increase and improve health services, promote healthier lifestyles and aim to reduce health inequalities will be supported. All large-scale developments require an HIA and physical activity will be encouraged through provision of easily accessible green spaces and sports facilities.
- Policy CS31: Clevedon, Nailsea and Portishead – Development proposals that improve transport links to other towns are supported; the re-opening of the Portishead Branch Line (MetroWest Phase 1) is prioritised.
- Policy CS32: Service villages – Public transport proposals will be supported to improve accessibility (includes village of Easton-in-Gordano/Pill).

North Somerset Sites and Policies Plan Part 1: Development Management Policies (Adopted, July 2016)

- Policy DM24: Safety, traffic and provision of infrastructure, etc. associated with development – Developments must not prejudice highway safety or operation and ensure that they are accessible and integrated with other forms of transport.

- Policy DM25: Public rights of way, pedestrian and cycle access – The use, amenity and safety of public rights of way and other forms of public access must not be compromised by developments. Developments will provide, improve, or contribute to providing or improving multi-user infrastructure appropriate to its size and type.
- Policy DM32: High quality design and place-making – New development designs should contribute to the creation of high quality, distinctive, function and sustainable places where opportunities for physical activity and recreation are maximised.
- Policy DM33: Inclusive access into non-residential buildings and spaces – Building entrances should be designed so that disabled and able-bodied people have equal access to the same buildings and spaces.
- Policy DM68: Protection of sporting, recreation, cultural and community facilities – Protection of existing land and sites and development only allowed where certain conditions apply. Designated community assets shall be retained in community use.

Bristol City Council Core Strategy (Adopted, June 2011)

- Policy BCS1: South Bristol – The regeneration of South Bristol will involve improving transport links (including provision of the South Bristol Link) and creating new jobs, thus increasing accessibility to employment and services. It will also involve a new hospital, leisure facilities and open space, new homes and an academy, helping to address health, environment, housing and education deprivation in the area.
- Policy BCS6: Green Belt – Countryside and other open land around the existing built-up areas of the city will be safeguarded by maintaining the current extent of the Green Belt.
- Policy BCS9: Green Infrastructure – The integrity and connectivity of the strategic green infrastructure network will be maintained, protected and enhanced. BCC will work with adjacent local authorities, Natural England and others to enhance the wider area's strategic green infrastructure network.
- Policy BCS10: Transport and Access Improvements – This policy highlights the need to promote less environmentally damaging modes of transport. The policy supports the DCO Scheme and other rail improvements, as well as new/expanded park and ride schemes and the South Bristol Link, subject to environmental impact assessment. It supports walking and cycling route networks and remodelling existing transport infrastructure to improve accessibility.
- Policy BCS21: Quality Urban Design – New developments are required to promote accessibility, be coherently structured, contribute to a multi-functional, lively and well-maintained public realm that integrates different modes of transport and be adaptable to changing conditions (social, technological, economic and environmental).
- Policy BCS23: Pollution – Developments should take into account potential noise or other pollution impacts on nearby sensitive receptors.

Bristol Site Allocations and Development Management Policies (Adopted, July 2014)

- Policy DM14: The Health Impacts of Development – Requires development to contribute towards reducing the causes of ill health, improving health and reducing health inequalities. Developments that will have an unacceptable impact on health and wellbeing will not be permitted.

3.3 Literature Review

Air Quality, Dust and Emissions

3.3.1 Diesel-powered trains, such as those proposed for the Portishead Branch Line, emit carbon dioxide ("CO_2"), PM_{10} (atmospheric particulate matter less than 10 µm in diameter) and nitrogen oxides ("NO_x"). PM_{10} and NO_x are damaging to human health and also emitted by road traffic. Health and ecosystem-based limits for NO_2 and PM_{10} are set by the European Union ("EU").

3.3.2 PM_{10} and $PM_{2.5}$ (particles less than 2.5 µm in diameter) are emitted by combustion engines and produced during construction. These particles are thought to cause the most damage to human health of all air pollutants (World Health Organisation, 2014). They have been found to cause respiratory and cardiovascular morbidity, exacerbation of asthma in people who already have the condition, respiratory symptoms and increased hospital admissions. In addition, PM inhalation can cause mortality from cardiovascular and respiratory diseases and from lung cancer (World Health Organisation, 2013). $PM_{2.5}$ is associated with a greater risk of mortality than coarser particles of PM_{10}.

3.3.3 There is less certainty surrounding the effects of NO_2 on human health than PM_{10} (World Health Organisation, 2000a). Time-series studies reviewed by Searl (2004) suggest that NO_2 has a small effect on daily mortality, hospital admission for respiratory and cardiovascular illness, emergency hospital and GP visits for respiratory illness and lung function. However, serious effects are generally only seen at concentrations very rarely reached in ambient air (World Health Organisation, 2000a). The magnitude of health effects of NO_2 depends more on the concentration than the exposure duration; short-term peak concentrations seem to have a greater effect than long-term lower concentrations (Searl, 2004).

3.3.4 Overall, ambient air pollution is a major health problem. A report by King's College London, commissioned by the Greater London Authority and Transport for London, estimated that up to 9,416 people die each year from long-term exposure to air pollution (both NO_2 and PM_{10}) (Walton *et al*., 2015).

Noise and Vibration

3.3.5 In 2009, the World Health Organisation report *Night Noise Guidelines for Europe* stated that "*Environmental noise is a threat to public health, having negative impacts on human health and well-being*" (World Health Organisation, 2009, p. VII).

3.3.6 One of the main effects of environmental noise is sleep disturbance; this includes biological effects such as increased heart rate and self-reported disturbance such as insomnia and increased medicine use (World Health Organisation, 2009). Sleep disturbance has also been linked to reduced performance and fatigue, although there is no strong evidence that noise can cause these effects (World Health Organisation, 2009). There are also studies linking night-time noise with mental health problems and cardiovascular illness, but there may not be enough evidence to identify a causal relationship (World Health Organisation, 1995). However the problem with night time noise in residential areas is the low background noise and combinations of noise and vibrations produced by trains or trucks (for example construction vehicles). Low frequency noise may have significant detrimental health effect on people (Leventhall, 2004).

3.3.7 Environmental noise can cause annoyance; the level of annoyance depends on sound level, noise source and frequency among other factors (World Health Organisation, 2000b).

3.3.8 Demographic variables such as age, sex and socio-economic status, are less strongly associated with annoyance. The correlation between noise exposure and general annoyance is much higher at the group level than at an individual level (World Health Organisation, 1999).

3.3.9 Besides annoyance, noise can produce social effects (disengagement, unfriendliness and sometimes aggression) and behavioural effects (closure of windows or not using a balcony) on residents. Noise level exposure over 80 dB(A) is found to be associated with reduced helping behaviour or increased aggression among people (World Health Organisation, 1999). High level continuous levels of noise exposure may increase the susceptibility to a feeling of helplessness among schoolchildren (Evans and Lepore, 1993).

3.3.10 Transport is the main source of noise pollution in Europe (World Health Organisation, 2000b). Studies have found that rail noise generally causes less annoyance than other forms of transport (for example Miedema and Vos, 1998). However, people are still affected by it, especially when rail noise is accompanied by vibration, as this enhances the perception of noise and thus increases annoyance (Oka et al, 2013). Communities near the railway can adapt to noise levels so that they are no longer affected by it (Fenech et al., 2013).

3.3.11 Noise and vibration resulting from the operational phase of a development is likely to be long-term and thus may be associated with long-term effects.

3.3.12 Construction noise and vibration impacts on human health (such as sleep disturbance and annoyance as discussed above) are often short-term and can be effectively managed through the implementation of procedures to control noise at construction sites.

3.3.13 The World Health Organisation *Guidelines for Community Noise* (World Health Organisation, 1999) rightly recognises that most investigative studies are carried out on the general population, typically adults. Vulnerable groups, such as the elderly or children are likely to be under-represented and the report notes that the risk of harmful effects may be higher on these groups by comparison the wider general population. Although noise

pollution is not likely to cause mental illness, children, the elderly, and those with issues of mental illness such as depression may be particularly vulnerable to effects of noise pollution because they may lack adequate coping mechanisms.

3.3.14 In 2018 the World Health Organisation published the Environmental Noise Guidelines for the European Region (World Health Organisation, 2018). Although the 2018 guidelines supersede the 1999 *Guidelines for Community Noise* and the 1999 *Night Noise Guidelines*, it is recommended by the 2018 guidelines that all the previous guideline noise levels not covered by the 2018 guidelines should remain valid.

3.3.15 The guideline levels presented in the *Environmental Noise Guidelines* for the European Region were reviewed for use within the MetroWest Phase 1 DCO Scheme noise criteria for significance of impact but were not adopted, the reasons for this are set out in Appendix 13.2 of the ES (DCO Document Reference 6.25).

Lighting and Pollution

3.3.16 Artificial lighting, especially at night, is thought to have an impact on human health. There is some evidence to suggest that night-time lighting may also be linked to sleep disturbance, gastrointestinal and cardiovascular disorders, and affective disorders (European Commission, 2012). However, it is unclear what the relative roles of sleep and darkness are contributing to some of these disorders (Blask et al., 2012).

3.3.17 Disability (physiological – temporary blindness) and discomfort (psychological) glare can occur from overhead lighting. Older people are especially vulnerable to these effects. Solid state technologies and LED lighting may cause greater glare impact than single source lights if not designed and angled appropriately, as each light has a high luminance (Blask et al., 2012).

Access to Housing and Services

3.3.18 Important community services include shops, post offices, healthcare facilities, schools and leisure facilities. The accessibility of these services can affect the health and well-being of the population. These services can have a positive effect on people's physical, social, emotional and cognitive health (coping, adjustment and diversion). Accessibility can refer to the capacity of the services to serve customers, the distance to the services, public transport connections, communication issues or separation caused by physical infrastructure (Quigley and Thornley, 2011). If services are not accessible, the health and well-being of the population may suffer. A survey in 2011 found that 5% of the adult population of Great Britain felt isolated because of difficulties in accessing local shops and services (Randall, 2012).

3.3.19 A Social Exclusion Unit Report (2003) suggests that accessibility of transport modes and the location of health care affect the capacity of people to reach healthcare services. People of a certain age or with a disability may experience greater barriers to access healthcare services.

3.3.20 People with physical disability, including sensory impairment, are likely to be discouraged from accessing amenities from impacts such as footpath diversions, road or path closures.

Physical Activity

3.3.21 Physical activity is important for maintaining both physical and mental health. Exercise reduces the risk of coronary heart disease, stroke, type 2 diabetes, cancer, obesity and osteoarthritis and also improves psychological well-being, lowering the risk of depression and dementia (NHS, n.d.).

3.3.22 Participation in physical activity is partly determined by the characteristics of the built environment, such as access to green spaces and sports facilities and street connectivity (for example by footpaths or cycle lanes) (Glasgow Centre for Population Health, 2013). Improving the built environment can therefore encourage communities to increase their physical activity and consequently improve their health.

Local Environment

3.3.23 Characteristics of the local environment that can affect health include green spaces, landscape, townscape, aesthetic quality and crime. As well as providing space for physical activity, green spaces can also encourage social interaction, reduce stress and enhance mood, thus improving well-being (O'Brien, Williams, and Stewart, 2010). The Landscape Institute (2013) stresses the importance of providing aesthetically pleasing and safe spaces for communities to enable them to relax and engage with nature.

3.3.24 Green spaces and open spaces are important for many reasons; they can improve people's sense of well-being, bring communities together, encourage physical activity and help improve air quality. They include sports pitches, country parks, linear corridors and open spaces within developments. The Forestry Commission literature review (O'Brien, 2010) lists key health benefits of green spaces. Among other things, it includes attention and cognitive benefits associated with restoration, mood and self-esteem. The Green Space Scotland review (Croucher, Myers, and Bretherton, 2007) also found compelling evidence on the restorative effects of green spaces on mental health.

3.3.25 Crime adversely affects mental well-being on a local scale in urban areas (Dustmann and Fasani, 2012). Research found that in addition to causing physical harm (through crime-related violence), indirect effects such as stress, sleep disturbance, loss of confidence and increase in smoking or alcohol consumption can occur due to fear of crime (perceived crime) (Hirschfield, 2003). Some groups of population, such as the elderly, disabled people, minority ethnic groups, lone parents, asylum seekers and ex-offenders may be at risk of social exclusion and potentially vulnerable to crime (actual and perceived). Crime (perceived and actual) is considered as a factor that affects well-being of individuals.

Employment and Income

3.3.26 Good physical health and social and psychological well-being have been linked to having a secure job (Marmot et al., 2010). Income is also important for health as it partly determines living standards and quality of life (Waddell and Burton, 2007).

3.3.27 Unemployment has been linked to higher mortality, poorer general health, long-term illness, coronary heart disease and poorer mental health (Waddell and Burton, 2007; (Greater London Authority, 2005). The strength of work-health relationships is uncertain as many other closely related variables also affect health. However, overall it is thought that the health benefits of work outweigh the risks (Waddell and Burton, 2007).

Water Pollution

3.3.28 Water pollution decreases the recreational value of the natural environment and can therefore adversely affect the well-being of the population (Defra, 2012). In addition, this pollution may lead to contamination of drinking water supplies and consequent adverse effects on physical human health.

Pests

3.3.29 Many species of birds may be infected by diseases such as psittacosis and salmonella, which can be passed on to humans through inhalation of dust or water droplets containing contaminated bird droppings. Psittacosis causes a flu-like illness and in some cases pneumonia while Salmonella infection causes diarrhoea and vomiting (Health and Safety Executive, n.d.). While pigeons and gulls often inhabit railway stations, people most likely to be at risk work closely with birds such as in the poultry trade or keep birds. Design features, such as pigeon spikes are used in various projects to exclude birds from sites.

3.3.30 Rodents are widespread and also carry disease. In particular Weil's disease is carried by rats and workers likely to be exposed to areas frequented by rats such as wastewater engineers need to be aware of the risks of contracting this disease.

Transport

3.3.31 The principal effects of transport on health are covered in other sections of this report. These effects are related to air quality, noise and vibration, access to services, physical activity and community severance. Other effects on health may be related to accessibility; for example, frustration may be felt by disabled users of public transport if train stations do not accommodate their needs.

3.3.32 The incidence rate of fatal or serious accidents involving heavy goods vehicles ("HGV") is decreasing with time, but increases in the number of HGVs on the road (e.g. for the transportation of construction material) may increase fear of accidents (Department for Transport, 2003).

SECTION 4

Baseline

4.1 Community Profiling

4.1.1 This section provides socio-economic information about the local community covering the population, ethnicity, social grade, employment status, housing (provision), and health related indicators within the DCO Scheme areas and the wider study area for the following:

- population with Long Term Limiting Illness;
- female Health Life Expectancy;
- male Health Life Expectancy;
- Index of Multiple Deprivation – overall, Health and Disability sub-domain and Outdoor Living sub-domain;
- rates and incidence of disease – coronary heart disease, cancer mortality, respiratory mortality, asthma, and circulatory mortality;
- mental health – prevalence of depression.

4.1.2 The following local environment profile related indicators are also included:

- local character, heritage and townscape;
- ambient noise and air quality condition;
- access to services (Index of Multiple Deprivation – barriers to housing and services sub-domain); and
- access to green spaces and open spaces.

4.1.3 Baseline data for community profiling in areas close to the works, including the temporary construction compounds, have been obtained from specific Lower Super Output Areas (“LSOA”). In the 2011 Census, the LSOAs were defined as areas with a minimum population of 1,000 people and a maximum of 3,000 people, with a minimum household number of 400 and a maximum of 1,000 households. The LSOAs are shown in Figure 2.1 Study Area. Where LSOA data are not available, local authority data are used.

4.1.4 The most recent data are from the UK 2011 Census, mid-year population estimates for 2014 from the Office for National Statistics, 2009-2011 data on Disability-Free Life Expectancy from the Office for National Statistics, 2014 disease and mental health data from Public Health England, 2014 asthma mortality data from the Office for National Statistics, 2014-2015 data on child obesity from the National Child Measurement Programme and 2015 data on the Index of Multiple Deprivation (“IMD”). Although from different years, these data provide an understanding of the present situation that is as accurate and up-to-date as possible.

4.2 Demography

4.2.1 This section uses population data for mid-2014 from the Office for National Statistics and data from the 2011 Census for ethnicity. These are the most up-to-date sources available at the LSOA level.

Population

The DCO Scheme

4.2.2 Mid-2014 population estimates for each section of the route are shown in Figure 4.1. The Portishead LSOAs had a combined population of 4,414 while Pill LSOAs had a combined population of 3,583 (Office for National Statistics, 2015). The Ashton Junction LSOAs had the largest combined population (5,438).

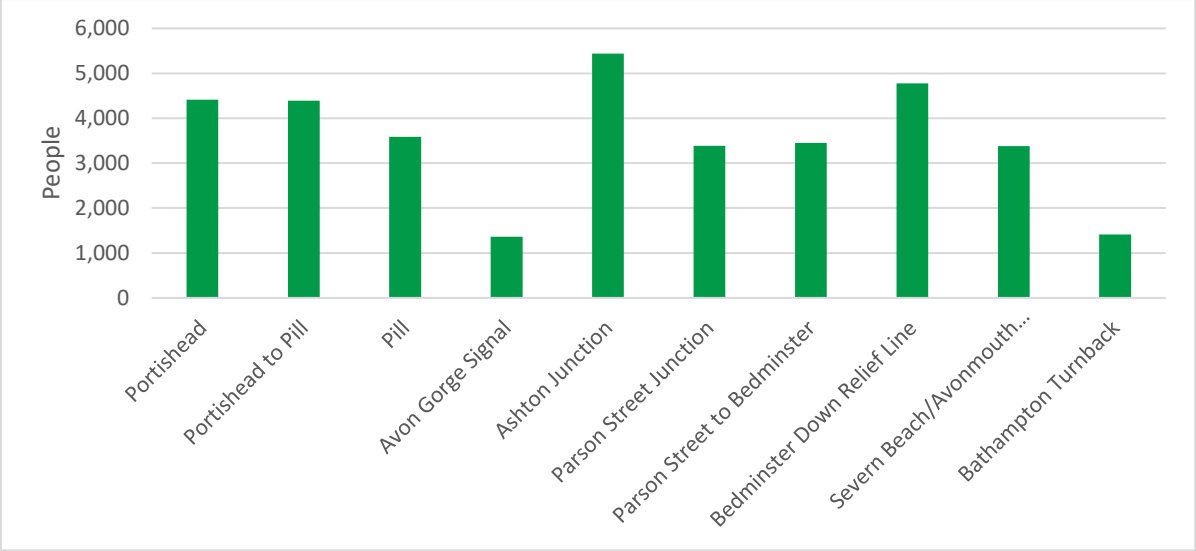

Figure 4.1. Population of LSOAs surrounding MetroWest Phase 1 project components (mid-2014 estimate)

Source: Office for National Statistics (2015)

The Wider Study Area

4.2.3 The LSOAs between Parson Street Junction and Bedminster Station had a combined population of 11,616 in mid-2014. The combined population around the Severn Beach / Avonmouth Signalling works was 3,380 and around the Bathampton Turnback the population was 1,413.

Ethnicity

The DCO Scheme

4.2.4 Ethnicity data were sourced from the 2011 Census (Office for National Statistics, 2013) and the results are summarised in Figure 4.2.

4.2.5 Across the three LSOAs in Portishead, 97.4% of the population was white, with low percentages of mixed/multiple ethnic groups and Asian/Asian British and very low percentages of Black/African/Caribbean/Black British and people of other ethnic origins.

4.2.6 Between Portishead and Pill, 97.7% of the population was found to be white in 2011 and at Pill this was at 97.4% followed by people of mixed ethnicity and Asian/ Asian British and Black, Minority and other Ethnic (“BME”) communities, respectively.

4.2.7 In the LSOA surrounding the Avon Gorge Signal, 96.4 % of the population was white in 2011. The next largest ethnic group was the mixed/multiple ethnic group (1.8 %), followed by the Asian/Asian British group (1.3 %). This LSOA had the highest percentage of the population that was non-white out of all North Somerset LSOAs.

4.2.8 Across the three LSOAs located around Ashton Junction, 94.7% of the population was white, 2.3% was of mixed/multiple ethnic origin, 1.4% was Asian/Asian British and 1.3% was Black/African/Caribbean/Black British. Bristol 0036A had the highest percentage of all non-white ethnicities, with mixed/multiple ethnicity being the highest overall at 3.0%.

The Wider Study Area

4.2.9 Around Parson Street Junction, 95.5% of the population was white, and this dropped to 92.6% between Parson Street Junction and Bedminster and lower again to 87.1% near the Bedminster Down Relief Line works, making this the area with the highest proportion of minority ethnic groups in the wider study area.

4.2.10 Around the Severn Beach/Avonmouth Signalling works area 95.1% of the population was white, with the second largest ethnic group being Asian/Asian British at 2.5%.

4.2.11 Around the Bathampton Turnback works area 95.4% of the population was white, with the second largest proportion of people being from mixed/multiple ethnic groups (2.1%).

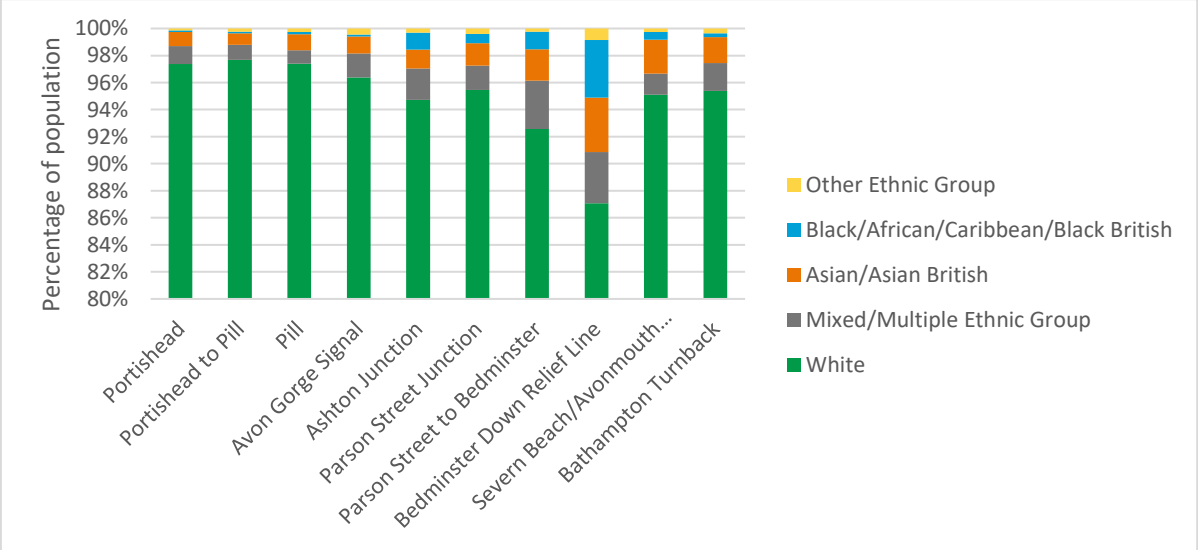

Figure 4.2. Ethnicity in LSOAs surrounding MetroWest Phase 1 project components

Source: Census 2011

4.3 Social Grade

4.3.1 This section uses data from the 2011 Census. Social grade is a socio-economic classification based on employment type Table 4.1. Data refer to residents aged 16 to 64.

Table 4.1. Social grade classifications

Social grade classification	Explanation
AB	Higher and intermediate managerial / administrative / professional occupations
C1	Supervisory, clerical and junior managerial / administrative / professional occupations
C2	Skilled manual occupations
DE	Semi-skilled and unskilled manual occupations / unemployed and lowest grade occupations

Source: 2011 Census

The DCO Scheme

4.3.2 In Portishead, approximately one third of residents aged 16 to 64 were classed as AB, one third as C1 and the remaining third was divided between C2 (which accounted for a slightly larger proportion) and DE (Figure 4.3).

4.3.3 Between Portishead and Pill the percentage of people in AB social grade was higher than in Portishead at around 40%, with around 33% placed in C1 grade.

4.3.4 Pill had contrasting distributions of social grade. The North Somerset LSOA 004C (which includes the proposed Pill Station) classed 11.3% of 16 to 64 year olds as AB, with higher C1 and C2 grade percentages, and 33.8% classed as DE. North Somerset 004D had higher percentage of people classed as C1 (31.7%), followed by AB, C2 and finally DE.

4.3.5 Through the Avon Gorge Signal area, 60.2% of the population was classed as AB social grade, 26.2% as C1 and the small remainder as C2 and DE.

4.3.6 The majority of the area surrounding Ashton Gate had relatively low percentages of 16 to 64 year olds classed as AB social grade (average 14%) and the rest of the population almost evenly spread among the other grades. However one of the LSOA near Ashton Junction (Bristol 036A) had roughly equal percentages of AB and C1 grades (around 30%) and the rest C2 and DE, with slightly more DE grades than C2.

The Wider Study Area

4.3.7 Around Parson Street Junction the percentage of 16 to 64 year olds in AB was lower (13.2 %), with the rest of the population spread quite evenly across the other social grades (although the percentage of people with a DE grade is slightly lower than C1 and C2).

4.3.8 Between Parson Street Junction and Bedminster, the two LSOAs had different distributions of social grade. In Bristol 039B only 16.6% of 16 to 64 year olds were in the AB grade, whereas in Bristol 039H 34.4% were in this band. The remaining population in Bristol 039B was spread across the other grades, whereas 34.4% of 16 to 64 year olds in Bristol 039H were in the C1 grade and around 15% were in each of the other grades.

4.3.9 Around the Bedminster Down Relief Line, the highest percentages of the population were in social grades AB and C1, while 40.5% of the population in Bristol 040C were in AB.

4.3.10 In the LSOA covering the Bathampton Turnback area the highest percentage of AB grade was recorded of all LSOAs in the study area at 51.8%. Social grade DE had a low percentage of 9.1%.

4.3.11 Around the Severn Beach/Avonmouth Signalling works, only 9.7% and 6.6% of 16 to 64 year olds were in grade AB for Bristol 008E and 008F respectively, and the grade with the highest percentage of the population was DE at 34.0% and 42.2% for the LSOAs respectively.

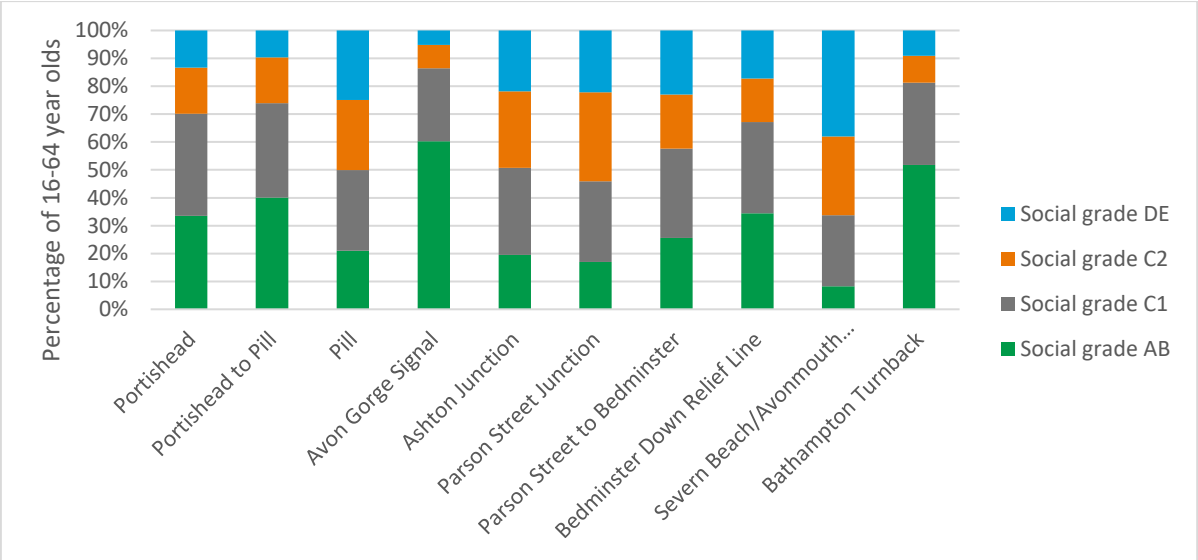

Figure 4.3. Social grade classification of 16 to 64 year olds in LSOAs surrounding MetroWest Phase 1 project components (2011)

Source: 2011 Census

4.4 Economy and Employment

Unemployment

The DCO Scheme

4.4.1 The 2011 Census reveals that unemployment rates in the economically active population (aged 16 to 64, including full-time students) in the Portishead LSOAs and those between Portishead and Pill were between 1.8% and 4%, compared to the West of England average of 3.5%. The two LSOAs covering Pill had contrasting unemployment levels. North Somerset 004C (where the proposed station would be located) had 7.8% unemployment, while North Somerset 004D (further east of the proposed station) had 3.8% unemployment.

4.4.2 In the area surrounding the Avon Gorge Signal the unemployment rate was 3.6%. In the LSOAs around Ashton Junction unemployment was relatively higher than in Portishead with the highest level in Bristol 036A at 7.9%.

The Wider Study Area

4.4.3 Rates of unemployment were mixed in the Parson Street Junction area with Bristol 039A at 4.7% and Bristol 046A at 7.1% (Figure 4.4). Between Parson Street Junction and Bedminster, unemployment rates were 6.0% for Bristol 039B and 5.3% for Bristol 039H.

4.4.4 In the LSOAs around the Bedminster Down Relief Line, unemployment measured between 5.1% and 7.9%, with the highest level in Bristol 039E. The LSOA surrounding the Bathampton Turnback was found to have only 3.1% of the economically active population unemployed, whereas at Avonmouth it was relatively high at 7.3%.

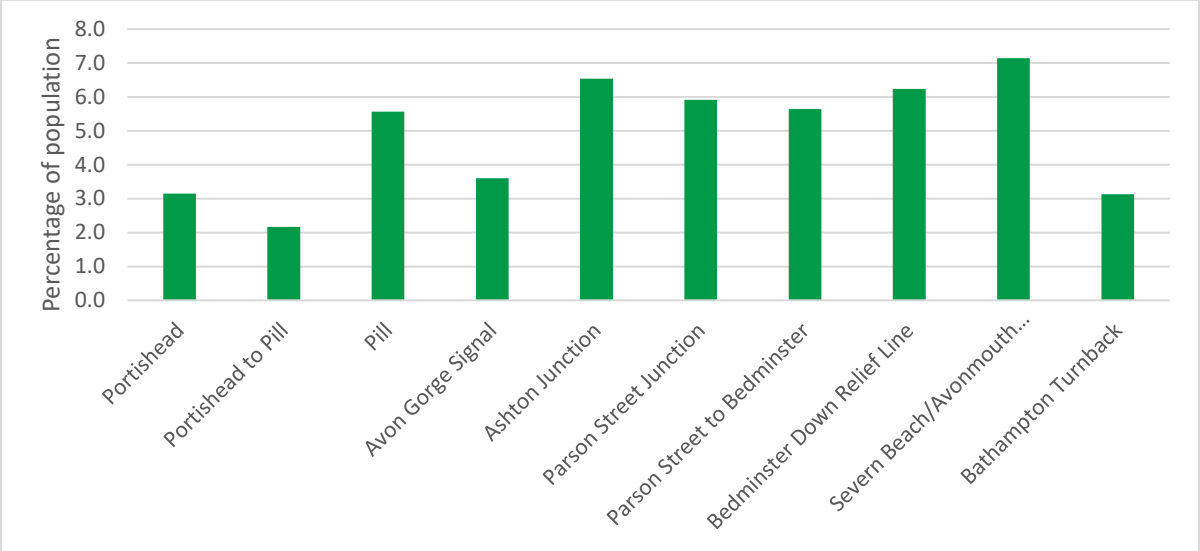

Figure 4.4. Percentage of economically active people who are unemployed in LSOAs surrounding the MetroWest Phase 1 project components (aged 16 and over) (2011)

Source: 2011 Census

Income Deprivation

The DCO Scheme

4.4.5 Income is a sub-domain reported within the IMD. Data are from 2015. No LSOAs along the DCO Scheme are among the 10% or 20% most deprived LSOAs in England. However, North Somerset 004C in Pill and Bristol 041A in Ashton Junction are among the 30% most deprived LSOAs in the country (see Figure 4.5 Index of Multiple Deprivation - Income Deprivation).

The Wider Study Area

4.4.6 There are no LSOAs among the 10% or 20% most deprived in the country within the wider study area. However, Bristol 039B between Parson Street Junction and Bedminster Station, Bristol 039E near the Bedminster Down Relief Line and Bristol 008F near the Severn Beach/Avonmouth Signalling works are among the 30% most deprived LSOAs in the country.

4.5 Physical Health

Index of Multiple Deprivation - Health sub-domain

4.5.1 The IMD also includes the Health Deprivation and Disability domain, which assesses the effect of poor physical and mental health and measures morbidity, disability and premature mortality (Department for Communities and Local Government, 2015).

The DCO Scheme

4.5.2 Only Bristol 036A near Ashton Junction is among the 20% most deprived in the country for the Health Deprivation and Disability domain (Figure 4.6). All other LSOAs along the DCO Scheme route are in the 30% most deprived category or higher, implying the population is generally in good health.

The Wider Study Area

4.5.3 The LSOA Bristol 039E near the Bedminster Down Relief Line is among the 10% most deprived LSOAs in England for this domain, and among the 20% most deprived neighbourhoods is Bristol 008F in Avonmouth. All other LSOAs in the wider study area are less deprived.

Life Expectancy – Male and Female

4.5.4 Disability-Free Life Expectancy ("DFLE") is a measure of the number of years a person is expected to live without a disability (defined as a persistent illness of condition that limits day-to-day activities). Here it is assessed at birth and at the age of 65 at the Unitary Authority level (as lower level data were not available), for the years 2009 to 2011.

4.5.5 In North Somerset the DFLE at birth was 66.4 years for males and 65.9 years for females. At the age of 65 the DFLE was 12.2 years for males and 12.8 years for females (Figure 4.7).

4.5.6 In the Bristol City the DFLE at birth was 63.0 years for males and 64.9 years for females. The DFLE at the age of 65 was 8.9 years for males and 11.3 years for females.

4.5.7 In Bath and North East Somerset the DFLE at birth was 65.9 years for males and 69.7 years for females. At the age of 65 the DFLE was 11.5 years for males and 14.3 years for females.

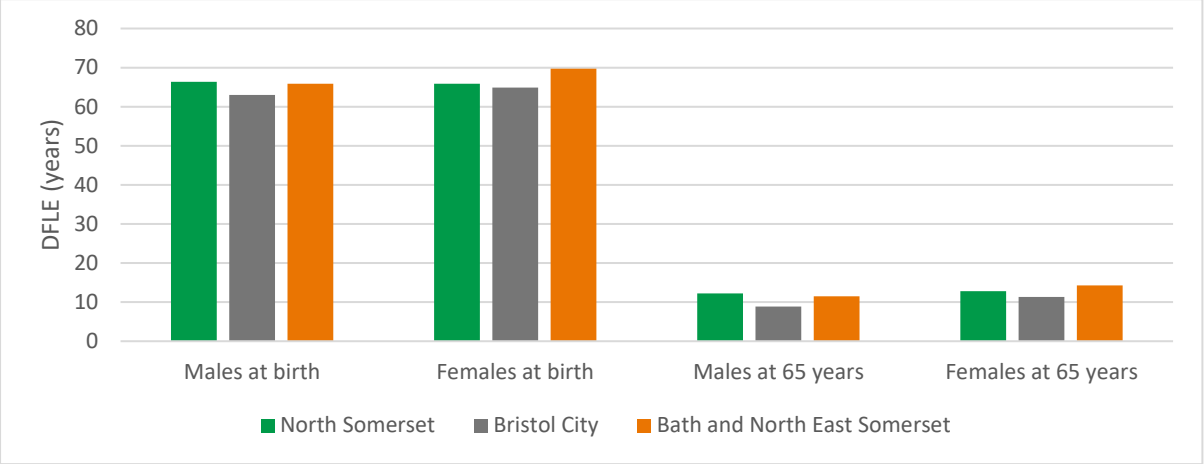

Figure 4.7: Disability-Free Life Expectancy at birth and 65 years of age in for Unitary Authorities in the wider study area (2009-2011)

Source: Office for National Statistics, 2009-2011

Rates of Incidence of Diseases

4.5.8 Public Health England has published data on mortality rates from diseases as part of the Public Health Outcomes Framework (Public Health England, 2014a). The rates are age-standardised mortality rates in people under the age of 75 per 100,000 population for the years 2012 to 2014. LSOA-level data were unavailable so Unitary Authority ("UA") data were used instead. Figure 4.8 suggests that cancer mortality rate was the highest of all three diseases in all UAs, followed by cardiovascular disease. Bristol City had the highest mortality rate for each disease while Bath and North Somerset District Council had the lowest.

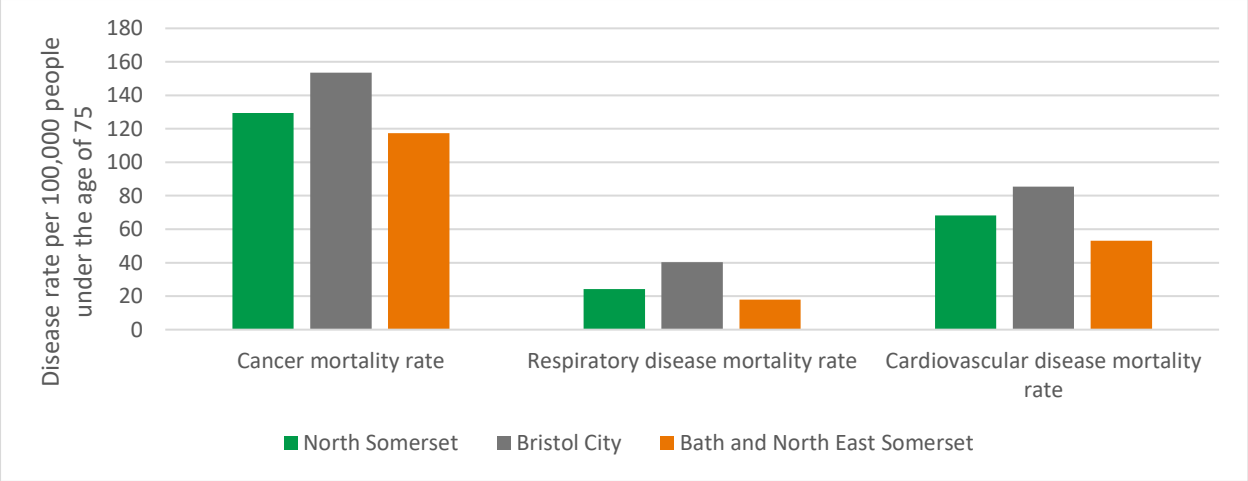

Figure 4.8: Rates of incidence of disease in people under the age of 75 for unitary authorities in the wider study area (2012-2014)

Source: Public Health England, 2014a

4.5.9 Data on asthma mortality on a Clinical Commissioning Group ("CCG") level was gained from the Office for National Statistics. The number of deaths due to asthma in 2014 was much higher in Bristol (6) than in North Somerset (3) and Bath and North East Somerset (1).

Childhood Obesity

4.5.10 The National Child Measurement Programme data reveal that for the period 2014-2015, prevalence of overweight (including obese) reception class children (aged 4 to 5 years) was similar to the national value in all three UAs, at between 21.6 and 23.5% (Table 4.2). In contrast, the prevalence of overweight (including obese) year 6 children (aged 10 to 11) was better or lower than the national value in North Somerset and Bath and North East Somerset and worse or higher in Bristol City.

Table 4.2: Prevalence of overweight (including obese) children in the wider study area

Region	Percentage of Reception-age children overweight (including obese)	Percentage of Year 6 children overweight (including obese)
England	21.9	33.2
North Somerset UA	21.6	29.4
Bristol City UA	23.0	35.0
Bath and North East Somerset UA	23.5	27.3

4.6 Mental Health

The DCO Scheme

4.6.1 According to Public Health England, both North Somerset and Bristol CCGs have a significantly higher prevalence of depression in adults than the national value, while the Bath and North East Somerset CCG has a significantly lower prevalence (Table 4.3) (Public Health England, 2014b).

4.6.2 The Harbourside Family Practice GP surgery in Portishead reported a prevalence of depression of 6.7%, which is classified by Public Health England as significantly higher than the national value of 5.8% from 2012 to 2014 (Public Health England, 2014b). This practice is located very close to the proposed Portishead Station. In contrast, another GP in Portishead (Portishead Medical Practice) reported a prevalence of depression of 5.7%. However, both practices have a lower prevalence than North Somerset CCG as a whole (Table 4.3).

4.6.3 In Bristol, Gaywood House and Merrywood Practice near Ashton Junction reported a significantly higher prevalence of depression than the national value (8.2% and 7.9% respectively). These prevalence levels are both higher than the prevalence for Bristol CCG as a whole (Table 4.3).

The Wider Study Area

4.6.4 Around Bedminster, The Southville Surgery reported the highest prevalence of depression, at 9.8%, while The Malago Surgery and Bedminster Family Practice also reported high prevalences at 8.3% and 8.0% respectively.

4.6.5 Around Bathampton Turnback, Fairfield Park Health Centre reported a significantly higher prevalence than the national value at 9.0%.

4.6.6 The Avonmouth Medical Centre reported a significantly lower prevalence of depression than the national value at 4.6%.

Table 4.3: Indication of mental health in the wider study area

Geography	Prevalence of depression in adults (aged 18 or over)	Comparison with the national value	Percentage of GP practices in CCG reporting depression prevalence significantly higher than the national value
England	5.8%	N/A	N/A
North Somerset	7.0%	Significantly higher	61.5%
Bristol	6.2%	Significantly higher	50.9%
Bath and North East Somerset	5.6%	Significantly lower	22.2%

4.7 Physical Environment

Index of Deprivation - Outdoor Living Environment

The DCO Scheme

4.7.1 The outdoor living environment sub-domain of the IMD measures air quality, road traffic accident occurrence and similar issues (Department for Communities and Local Government, 2015). Bristol 036A (around Ashton Junction) is among the 10% most deprived neighbourhoods for this sub-domain, but all other LSOAs along the DCO Scheme are in the 30% most deprived category or above (Figure 4.9).

The Wider Study Area

4.7.2 Bristol 039E near the Bedminster Down Relief Line is among the 10% most deprived neighbourhoods for this sub-domain and the two other LSOAs near the Bedminster Down Relief Line (Bristol 040B and 040C) are among the 20% most deprived, along with one LSOA between Parson Street Junction and Bedminster Station (Bristol 039H). All other LSOAs within the wider study area were less deprived.

Crime (Actual and Perceived)

4.7.3 The crime domain of the IMD measures personal and material victimisation including violence, burglary, theft and criminal damage (Department for Communities and Local Government, 2015). While the areas along the DCO route appear to have lower risk of crime, areas in Bristol, areas near the Bedminster Down Relief and between Parson Street Junction and Bedminster are among the least 10% and 20% most deprived for the crime sub-domain.

4.7.4 Perceived risk of crime is not recorded by the Census at LSOA or regional level. According to Office for National Statistics data for the year ending March 2015, 59.5% of the population of Avon and Somerset strongly agree or tend to agree that police and the local council are dealing with crime issues (Office for National Statistics, 2015). This is slightly lower than the national average at 62.1% and the average for the South West at 60.6%.

4.7.5 Table 4.4 details the incidence of race-motivated hate crime between 2010 and 2014 for the whole of the Avon and Somerset police force area, including the three local authorities relevant to this study as well as Somerset and South Gloucestershire (Avon and Somerset Constabulary, 2015).

Table 4.4: Incidence of race-motivated hate crime in Avon and Somerset police force area between 2010 and 2014

Year	Race-motivated hate crime incidents
2010	1,395
2011	1,288
2012	1,071
2013	1,114
2014	1,366

4.7.6 Table 4.5 shows how the incidence of different types of hate crime varied by Unitary Authority in 2014 (please note that some crimes may be flagged as being of more than one type, for example a single crime could be related to both faith and disability). Bristol had the highest incidence rate for all hate crime and for each type of hate crime. Race-related hate crime was by far the most common type in each Unitary Authority (Avon and North Somerset Constabulary, data procured via Freedom of Information route).

Table 4.5: Incidence of hate crime across the Unitary Authorities in 2014

Unitary Authority	All Hate	Disability	Faith	Race
North Somerset	136	11	6	108
Bristol	948	46	63	791
Bath and North East Somerset	153	16	2	115

4.7.7 The number of race-motivated hate crime incidents reported in 2014 were 791 in Bristol, 108 in North Somerset, and 115 in Bath and North East Somerset (Avon and Somerset Constabulary, 2015b). As a percentage of the population, these figures indicate levels less than 2%.

Green Spaces and Open Spaces

The DCO Scheme

4.7.8 The Vale Park in Portishead, bounded by the disused railway line to the north, is designated as Local Green Space in North Somerset's *Sites and Policies Plan, Part 2, Site Allocations Plan 2006-2026* (North Somerset Council, April 2018).

4.7.9 Between Portishead and Pill, allotment gardens lie on the eastern side of Sheepway, north of the disused railway line. South of the disused railway line, playing fields are located to the east of Portbury, south of the M5.

4.7.10 The land at Yew Tree Gardens, Crockerne and Watchhouse Hill in Pill/Easton-in-Gordano is designated as Local Green Space in North Somerset's *Sites and Policies Plan, Part 2, Site Allocations Plan 2006-2026*. Common Land and Town or Village Greens exist to the north and east of Pill, including Pump Square off Underbanks, Victoria Park and Waterloo Wharf, and The Point, Chapel Pill. Land at Ham Green Hospital is designated an Unregistered Park and Garden in the *Sites and Policies Part 1. Development Management Policies* (North Somerset Council, 2016). In addition to these designated sites, Pill also has a playing field and playground south of the railway line on Hardwick Road and a playground near Water Lane west of the railway line. In Ham Green a Cricket Ground is located south of Pill Tunnel and there is a playground near Fitzharding Road south of the railway line.

4.7.11 In the Avon Gorge area, Leigh Court Registered Park and Garden is located adjacent to the railway line on the western side and the Leigh Court house is a business venue. Other ecological designations in this area are the Avon Gorge Woodlands Special Area of Conservation ("SAC"), Avon Gorge Site of Special Scientific Interest ("SSSI"), and Leigh Woods National Nature Reserve. Leigh Woods is owned by the National Trust is open to the public, and includes land designated as the Avon Gorge Woodlands SAC and SSSI.

4.7.12 Ashton Court Registered Park and Garden is located adjacent to Clanage Road on the western side of the railway line. A sports ground, several allotment gardens and Gore's Marsh park and playground are located in close proximity to the railway line in the Ashton Junction area.

4.7.13 North Somerset District Council has drawn up area profiles of current provision of open space within the District, to accompany its Developer Contributions Draft Supplementary Planning Document (January 2016). In Portishead, there is currently an under supply of conservation sites and woodland, and sufficient supply of formal park and public garden and neighbourhood open space. Pill has an under supply of conservation sites, formal and public garden and woodland but sufficient neighbourhood open space.

The Wider Study Area

4.7.14 Informal and formal green spaces, seasonal and fixed active sports space, natural green space, young persons' space and children's play areas exist close to the Portbury Freight Line section that runs through the Bristol City Council area and to Parson Street Junction and Bedminster Station.

4.7.15 In the Bathampton area accessible natural green space, park and recreation ground, outdoor sport pitches and children's play space exist.

4.7.16 Bedminster Down Relief Line is located next to Victoria Park, a large area of open space.

Townscape and Local Character

4.7.17 The landscape of the study area is described in detail in the ES Chapter 11 Landscape and Visual Impacts Assessment (DCO Document Reference 6.14) . This section provides an overview of landscape character areas.

4.7.18 Commercial Portishead has a predominantly urban character with commercial 'box' units, modern apartments, car parking areas and managed amenity landscaping of trees and shrubs. Units are quite spread out with little connectivity between them. There are also large areas of undeveloped land with unmanaged grassland and scrub. Views are variable, with open views across the car parks and areas of grassland and scrubland, and constrained by industrial units in places.

4.7.19 Residential Portishead consists of residential estates with occasional amenity landscape features such as The Vale Park and Trinity Primary School and associated playing fields. The residential properties are modern and of brick construction. Views are generally enclosed due to tightly packed properties, narrow streets and small front gardens. Occasional areas of amenity landscape, such as The Vale Park offer more open views.

4.7.20 Sheepway is predominately rural and is characterised by small, regular fields bounded by a mix of fences and hedgerows with occasional mature trees. Settlement is generally limited to small, traditional stone farmsteads and rendered residential properties, which tend to cluster around the Sheepway road. There are a number of listed buildings in the area. To the west, the edge of Portishead is visible, slightly diluting the rural feel, although the Portbury Wharf Nature Reserve is present on the edge of the residential area. To the south, the Portbury Hundred highway and M5 motorway are generally screened by vegetation, however, they are clearly visible to the east of the character area. Footpaths and Sustrans cycle paths provide a recreational facility in this character area. There are patches of woodland identified in the National Forest Inventory to the north and south of the DCO Scheme centreline.

4.7.21 Royal Portbury Dock has a predominantly industrial character, with industrial units and an extensive car store area on the west side of the railway. The units are generally large, box developments. Associated amenity landscape, embankments, as well as poorly managed grassland and woodland/shrub belt contribute to the character. To the east of this character area, the visually intrusive and elevated M5 stretches above the cycle path.

4.7.22 Pill is a village with a compact, enclosed character, resulting from small, traditional properties, undulating landform and narrow roads. The properties tend to be brick and render, with stone detailing. The red brick viaduct is a dominant feature of this character area, which contributes to the sense of history. Adjacent to the viaduct is the village green, with its grass, perennial planting beds and mature trees. Elsewhere, vegetation is limited to front

gardens and woodland and scrub alongside the railway line. The railway line passes through the village, and is overlooked from the two bridges which cross it. To the west of this character area, there are views to the dominant, elevated M5.

4.7.23 The route section between Pill and Ashton Gate is generally rural in character with scattered properties. The railway crosses open farmland between Ham Green and Leigh Court, and then turns southwards to follow the western shore of the Avon Gorge. The landscape of the gorge is characterised by the steeply wooded slopes, the tidal river, and the urban fringe of Bristol and the A4 (Portway) on the eastern shore. The railway passes underneath the Clifton Suspension Bridge, a Grade I listed structure and an iconic landmark in Bristol. The route emerges through the gorge into the more open landscape around Bower Ashton, with recreational grounds, allotments and parkland of Ashton Court.

4.7.24 The railway passes in the outskirts of Bristol in the Ashton Gate area. Here the road network is more developed and the area has a complex urban character with industrial estates, residential areas, and the Alderman Moores allotments. Ashton Vale has a strong urban-fringe feel with wide distributor roads, 'box' units with predominately commercial and office uses and associated metal security fences, lighting and car parks.

Housing and Access to Services

The DCO Scheme

4.7.25 The IMD *Geographical Barriers to Services*[4] sub-domain of barriers to housing and services highlights several neighbourhoods which are among the 10% and 20% most deprived neighbourhoods in England in terms of their physical proximity to local services (Figure 4.10). The LSOAs of North Somerset 004A and North Somerset 006F (between Portishead and Pill) are among the 20% most deprived, which may be due to sparse location of the houses and therefore increased distance to all the services identified in the sub-domain (although the services may be accessible by car). It is therefore not a representation of the area being deprived in terms of income but considered deprived in terms of distance to services. All other LSOAs along the DCO Scheme route are less affected.

4.7.26 In Portishead, the NHS Marina Healthcare Centre and the Haven Lodge Care Centre, lodging about 108 residents with various care categories such as physical disability, dementia, and old age are located adjacent to the proposed new access to Portishead Station forecourt.

The Wider Study Area

4.7.27 In the wider study area, Bath and North East Somerset 010E (Bathampton Turnback) is among the 20% most deprived LSOAs in England for the 'Geographical Barriers to Services' IMD sub-domain and no LSOAs were among the 10% most deprived.

[4] The Geographical Barriers to Services sub-domain relates to the physical proximity (mean distance to the closest point) of local services such as post offices, supermarkets and GP surgeries

4.8 Transport and Accessibility

4.8.1 The main highway network in the area is dominated by the M5. Junction 18 in Avonmouth connects to the A4 into Bristol along the north side of the River Avon and Junction 19 at Gordano connects with the A369 between Portishead and Bristol along the south side of the River Avon. Junction 18a on the M5 serves the M49 for South Wales. The B3128 from Clevedon and B3130 from Nailsea provide more circuitous routes into Bristol via the A370 from Weston-super-Mare. The Long Ashton Park and Ride lies to the south west of Bristol.

4.8.2 The A370 connects with the A369, Brunel Way and the A3029 Winterstoke Road at a complicated junction in Ashton Gate. Brunel Way links with the western end of the A4 Hotwells Road and Bristol city centre on the northern side of the River Avon while the A3029 Winterstoke Road links to the south with the A38 between Bristol and Taunton in the vicinity of Parson Street railway station.

4.8.3 The main railway network centred on Bristol provides mainline services up to London, to the Midlands, west into Wales and south west to Taunton, Exeter and Plymouth. The local railway network within Bristol comprises the Severn Beach / Avonmouth / Bristol Temple Meads, Henbury to Bristol Temple Meads, and local stations between Bristol Temple Meads and Bath Spa.

4.8.4 There is an operational railway between Royal Portbury Dock and the south west mainline between Bristol Temple Meads and Exeter which currently is only open for freight. There is an existing level crossing over the operational railway on Ashton Vale Road which connects the A3029 Winterstoke Road and the Ashton Vale Industrial Estate. The industrial estate is bounded by the railway to the east, the A370 to the north, the Long Ashton Park and Ride to the west, and allotments and open land to the south.

4.8.5 There are two long distance cycle routes, public rights of way, bridleways and permissive paths that cross or run close to the proposed DCO Scheme. There are two Sustrans National Cycle Network (“NCN”) routes crossing or close to the DCO Scheme. NCN 26 uses parts of the disused railway corridor between the M5 overbridge and Royal Portbury Dock Road overbridge under temporary licence from Network Rail. At the Royal Portbury Dock Road overbridge, Marsh Lane overbridge and M5 overbridge the route diverts off the bridleway on to permissive paths to go under the road bridges. NCN 41 crosses the River Avon alongside the southbound carriageway of the M5 motorway bridge and continues through Pill and along the River Avon Tow Path towards Bristol. There are also several footpaths and bridleways criss-crossing the countryside.

SECTION 5

Stakeholder Engagement

5.1.1 The determinants of health are diverse and the assessment of the DCO Scheme on health is by nature qualitative. As part of the assessment, the developer engages with the stakeholders to provide feedback on the study approach, community profiling and baseline analysis, and on project matters that may raise concerns about health.

5.1.2 Two types of stakeholders are involved in the process, (a) key informants, such as the North Somerset Council and Bristol City Council Health and Equalities teams; and, (b) wider stakeholders, including members of the public, non-governmental agencies and community groups and statutory authorities.

5.1.3 A meeting for the key informants was held on 12 January 2016 to inform them about the DCO Scheme and to discuss the potential sources of further information, refinement of the assessment methodology, as well as further leads on community groups who should be involved in the stakeholder engagement process.

5.1.4 The draft HIA was presented for stakeholder consultation as part of the Stage 2 Formal Consultation period undertaken for the DCO Scheme in autumn 2017. The responses have been reviewed and this HIA has been revised in the light of consultations prior to submission to the Planning Inspectorate with the DCO Application. A summary of consultation responses is provided in Table 5.1.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
Scoping Opinion Responses (August 2015)		
Planning Inspectorate	Para. 4.39. It is a matter for the applicant to consider whether they submit a stand-alone Health Impact Assessment but the applicant should have regard to the responses from consultees, the Health and Safety Executive and / or Public Health England.	The applicant has decided to submit this stand-alone HIA. The concerns of the H&S Executive and Public England have been taken into consideration in this HIA.
	Para. 4.40. The methodology for the HIA should be agreed with the relevant statutory consultees and take account of mitigation measures.	The methodology for this HIA was discussed with the local authorities as explained in Chapter 5.
GCT Pipelines	Quadrant Pipelines Ltd, GTC Pipelines Ltd, Independent Pipelines Limited, the Electricity Network Company and Independent Power Networks Ltd had no comments to make in the Scoping Opinion.	Noted.
Health and Safety Executive	The HSE has identified two major accident hazard pipelines (Natural Gas) which cross the proposed railway near Lodway.	Information on utilities has been sought from the utility companies and is being considered in the design and construction of the DCO Scheme. Hazards are discussed in Appendix 4.5 Major Accidents and Disasters (DCO Document Reference 6.25).
	A parcel of permanent land-take near the proposed Portishead station falls within the HSE Outer Consultation Zone of Coleman (UK).	This issue is not addressed in the ES as it is no longer relevant as clarified by HSE.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	HSE clarified that the proposed changes to the road and footpath in Quays Avenue lie within the middle and outer zones of the consultation distance and involve a single carriageway, the sensitivity level (SL) of the proposed development is SL1. As HSE does not advise against SL1 developments within any zone, they would not advise against the granting of planning permission for the proposed development. Furthermore, the hazardous substances consent for the former Coleman UK Ltd site will be formally revoked as part of planning application 16/P/2066/F/ for No. 93 residential apartments on Harbour Crescent, Harbour Road.	
	The presence of hazardous substances on, over or under land at or above set threshold quantities may require Hazardous Substances Consent.	A significant volume of the existing track bed is classified as hazardous waste due to zinc and lead concentrations. This material will be transported off site by train and taken to one of Network Rail's materials management centres that is licensed to handle hazardous waste. During operation, fuels, oils, lubricants and common cleaning products will be the only hazardous substances used e.g. within locomotives, machinery, and generators. These will be handled and stored safely, according to the supplier's method statements and COSHH assessment with spill kits or bunded storage where appropriate.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	The project does not impinge on any licensed explosive sites.	No comment.
	The project involves connections to electrical power distribution systems and impacts on existing generation, transmission, and distribution assets on the UK mainland. The design of electrical components has to comply with the relevant legislation. There is a duty to protect members of the public from the dangers posed by the electrical equipment used.	The project will have electrical works including station electric supplies, signalling power supplies, junction lighting and points heating. All works will be low voltage and comply with the Electricity at Work Regulations, BS 7671 IET Wiring Regulations and the relevant British, Euronorm, Railway Group and Network Rail standards.
Public Health England (“PHE”)	PHE recommends the discussion of health-related issues in a specific section of the Environmental Statement, to summarise key information, risk assessments, proposed mitigation measures, conclusions and residual impacts relating to human health. Compliance with the NPS requirements and relevant guidance and standards should be highlighted. The assessment should be proportionate to the potential impacts. The applicant should confirm whether the proposed development includes or impacts upon any potential sources of Electric and Magnetic Fields (“EMF”), and if so to ensure that adequate assessment of the potential impacts is undertaken.	This report presents the results of the HIA. As the DCO Scheme will not be electrified, no consideration has been given to the potential health risks associated with Electric and Magnetic Fields. GSM-R masts will be installed as per FTN/GSM-R standards which dictate safe minimum distances to the public. Therefore the installation of the masts is not likely to create a public health risk.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	Liaison with other stakeholders: comments should be sought from the Food Standards Agency for matters relating to the impact on human health of pollutants deposited on land used for growing food/crops and the Clinical Commissioning Groups, NHS commissioning boards and Local Planning Authority for matters relating to wider public health.	Bristol City Council and North Somerset District Council have been consulted on the Health Impact Assessment, as detailed below in the table. The Environment Agency has been consulted with regard to the extraction and temporary storage of ballast on site.
	When undertaking a human health risk assessment for chemical pollutants, the following should be considered: including Chemical Abstract Service numbers alongside chemical names, using the most recent UK standards and health-based guideline values when quantifying risk to human health from chemical pollutants, take into account background exposure to the chemical from other sources and when quantitatively assessing the health risk of genotoxic and carcinogenic chemical pollutants, use the Margin of Exposure approach if only animal data is available.	The Environment Agency has been consulted with regard to the extraction and temporary storage of ballast on site.
Informal micro-consultation on DCO scheme boundary (22 June to 3 August 2015)		
Pill and Easton-in-Gordano Parish Council	Concern impact of light pollution on local residents.	The effect of night-time lighting on nearby residents is considered in the ES Chapter 11 Landscape and Visual Impacts Assessment (DCO Document Reference 6.14) and in Appendix 11.3 Visual Impact Assessment (DCO Document Reference 6.25). The effect of night-time lighting on well being is considered in this report in Section 7.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
Formal Stage 1 Consultation (22 June to 3 August 2015)		
Harbourside Family Practice	Concerns regarding access along Harbour Road for emergency vehicles and availability of parking for users of Marina Healthcare Centre.	Access for emergency vehicles will be maintained during construction as set out in the ES Appendix 4.2 Master CEMP (DCO Document Reference 8.14). Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7) sets out car parking arrangements at Portishead Station
Redacted	ES should consider operational effects on residential amenity and on Trinity Primary School.	The operational effects of the DCO Scheme on amenities and Trinity Primary School is considered in Chapter 15 Soils, Agriculture, Land Use and Assets (DCO Document Reference 6.18).
Public	Concerns over the possibility of noise and light during the night which could impact local residents. There is also concern that freight will run overnight in order to avoid timetable clashes with passenger train which could also have an impact on local residents.	The assessment of operational noise is considered in the ES Chapter 13 Noise and Vibration (DCO Document Reference 6.16). The assessment of night-time lighting is provided in Chapter 11 Landscape and Visual Impacts Assessment (DCO Document Reference 6.14). The effects of noise and lighting are considered in this HIA in Section 7.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
Public	Concerns regarding the close proximity of the scheme to Trinity Primary School.	The assessment of the DCO Scheme on vulnerable people such as children is considered in this HIA Section 7.
Public	Concerns over the accessibility of pedestrian routes for those with disabilities (both mental and physical).	The assessment of the DCO Scheme on vulnerable people such as children is considered in this HIA Section 7.
Public	Concerns over access for emergency vehicles to Pill Tunnel.	Safety is the rail industry's first priority and is an integral part of the design of the DCO Scheme. The maintenance and emergency access to Pill Tunnel Eastern Portal is part of the essential infrastructure for the running of the railway.
Informal Stakeholder Consultation		
North Somerset District Council ("NSDC")	A meeting was held with NSDC public health officer on 12 January 2016. Discussions on potential data sources, contacts within the Council and with the Bristol City Council and on developing the assessment methodology (health determinants, assessment criteria etc), potential stakeholders (both for EqIA and HIA) were held.	The assessment approach (Chapter 2), the literature review (Chapter 3), and the baseline (Chapter 4) were developed based on the feedback received at the meeting
Bristol City Council ("BCC")	The public health officer was invited to the meeting on 12 January 2016, but did not attend. However NSDC provided a contact name at the BCC as subject matter expert.	BCC was subsequently contacted via email for health data sources and assessment approaches, which were used to develop the HIA methodology.
Formal Stage 2 Consultation (23 October to 4 December 2017)		

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
Bristol City Council	Given that there is no standard methodology for EqIA and HIA, the Council accepts the approach to mirror the methodology for Crossrail and HS2, and use of DMRB significance criteria.	Noted.
North Somerset Council (Access Officer)	The consultation with residents and key equality groups should be co-ordinated and in the form of an action plan so that the consultation process offers true engagement and moves away from only offering a snapshot. It would support the wider EIA and also the Public Sector Equality Duty role of the two local authorities to consult and involve disabled people in planning and transport services at every level. Professional and technical stakeholders will have more involvement, but some of their decisions should have wider input into them. There is a need to give non-professional stakeholders such as local residents equality groups etc. a clear channel to comment on the project and have access to emerging information and documents. To manage this regular area based meetings could be held or information at least initially provided online with alternative formats offered to anyone requesting them. It is important to ensure there is sufficient value applied to comments from e.g. residents in comparison say to having an overreliance on formal evaluation techniques in DfT or other documents. The wider links to the Bristol area service sector with its more specialist activities (not just health related), for non-car users and groups on lower incomes should be considered in the evaluation of the scheme. In assessing the pressure on parking provision account should be taken of the likely knock-on effects on parking for disabled people if spaces are not available. Often able drivers will take these unless	Extensive informal and formal consultations have been undertaken for the scheme. Disabled people were given opportunities to comment on the scheme and contribute to design. Additional formal consultations were specifically aimed at vulnerable groups, who have not replied to date (see below). Wider links to the Bristol service sector are considered in Chapter 14 Socio-economics and Regeneration (DCO Document Reference 6.17). Enforcement of parking regulations does not form part of this DCO Scheme. The 250 m distance was used in the ES Chapter 16 Transport, Access and Non-motorised Users (DCO Document Reference 6.19) to distinguish between a slight and moderate impact on journey times for pedestrians. The measure was not aimed at people with mobility issues, for whom a distance has not been assumed in the HIA.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
	regular daily enforcement is in place (which I'm assuming will not form a part of the project?). Why is 250m chosen as the level at which a distance becomes significant for vulnerable users? (Para.16.3.41). In practice is will be far less to disabled people, probably nearer 40m. Paragraph 16.3.42 defines "significant. This is very different to the one used in the Equality Act 2010 and which would be applied when looking at whether or not the scheme benefits or has an adverse impact on disabled people in particular. Significant is defined in case law as being at the minor level and does not have a very high threshold. The document needs to reflect this. The reliance on this section and elsewhere on "professional judgement" to determine adverse or other impacts on equality groups is not wholly acceptable. Again, the Equality Act would make comparisons with the impact on an able person and take into account the views of disabled people or the other equality groups. There is a clear methodology for assessing adverse impact. Cabstand is highlighted as a junction currently congested. This is a very difficult area for many disabled people and similar congested junctions also show the same characteristics. These implications should also be assessed in looking at the wider area effects. (Table 16.7). In assessing the need for controlled crossings, e.g. zebra crossings, (not necessarily light controlled), there is a need for the views of disabled people to be taken into account and consideration given as to how disabled people cross major roads. A simple reliance on formulaic traffic flows assessments is not always sufficient.	Significance for the EIA is defined in relation to the EIA Regulations, not the Equality Act. The point about making comparisons with the impact on an able person is captured in the assessment as 'differential' impact. Given the high level nature of the scheme, in order to capture these 'differential' impacts professional judgement has to be applied. Cabstand is outside scheme boundary and has not been considered in the assessment.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
Avon Fire Service	Avon Fire & Rescue Service is fully supportive and in favour of this proposed development as a nationally significant infrastructure project. In September 2017, the headquarters of Avon Fire & Rescue was moved to co-locate with the Avon & Somerset Constabulary at Portishead. Daily commuting and travelling for staff to our new HQ has been challenging due to the lack of adequate and timely public transport provision from other urban areas in the region (Bristol, Bath, Keynsham, Nailsea etc). As such, we would very much welcome the additional commuting option that a branch line would provide for all our staff working at or visiting our HQ.	Noted.
General public	Restricted parking (double and single yellows) in Portishead. What about disabled people or others with health issues? How do they get from their car (parked elsewhere) to their house?	Following consultations, the parking restrictions have been revised. These are shown in the DCO Document Reference 2.31 Permanent Traffic Regulations Order Plans.
	Trinity Primary School Bridge. The bridge is required as the walk around the station is too long for disabled / elderly / pushchairs, etc.	The DCO Scheme includes a bridge to replace the informal crossing over the disused railway. This is described in the ES Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7).
British Transport Police	Crime reduction advisor - will link in with Network Rail as the scheme progresses on station design and line side protection such as fencing.	Noted.

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
South West Ambulance Trust / Air Ambulance Trust	There are no specific concerns other than some potential operational issues around site access/ road closures but so long as these are shared in the usual manner any issues can be resolved.	Noted
Additional Formal Stage 2 Consultation - Extension of Stage 2 Consultation (for Consultees that did not respond to Stage 2 Consultation) (1 February to 3 March 2018)		
Bristol Women's Voice	No response.	
Bristol disability Equality Forum	No response.	
Bristol BME Voice	No response.	
Bristol Lesbian, Gay and Bisexual and Transgender Forum	No response.	
Bristol Older People's Forum	No response.	
Busy Bees Nursery	No response.	
North Somerset Black and Minority Ethnic Network	No response.	

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
North Somerset Partnership	No response.	
Pill churches (4 identified in the EqIA)	No response.	
Additional Formal Stage 2 Consultation on the Red Line Boundary (29 March to 27 April)		
Bright Horizons (formally Teddies Nursery)	Concerned about the impacts of temporary and permanent land-take on the nursery. During construction, increased dust and rubble, increase construction noise, compromised site security, and possible risk on services. During operation, pattern of service will affect the operation of the nursery by increased traffic and noise, and loss of open space and associated calm adjacent to the nursery with large elevated ramps set within a gravel and tarmac industrial yard surrounded by security fencing. Views towards Clifton Suspension Bridge partially blocked. Consider that there are other more suitable sites for Clanage Road compound.	Measures to control adverse construction-related impacts are set out in the master Construction Environmental Management Plan in the ES Appendix 4.2 (DCO Document Reference 8.14). The proposals include strengthening the planting around the permanent Clanage Road maintenance compound, which are shown on the Clanage Road Compound, Landscaping and Access Plan in DCO Document Reference 2.52. The landscape and visual and noise impacts on the nursery are described in the ES Chapters 11 Landscape and Visual Impacts Assessment and 13 Noise and vibration (DCO Document References 6.14 and 6.16), and Appendix 11.3 (DCO Document Reference 6.25).

Table 5.1: Summary of consultation responses

Organisation and date	Summary of response	Consideration within the ES
		The Clanage Road site was chosen as the main access point to the south of the Avon Gorge as it is the only site adjoining the railway with highway access that would allow an articulated low loader into the site.
Additional Stage 2 Formal Consultation on Clanage Road Compound (2 May to 4 June 2018)		
Bright Horizons (formally Teddies Nursery)	As above.	As above.

SECTION 6

Mitigation

6.1.1 An overview of measures incorporated into the DCO Scheme is provided in the ES Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7). Key features that have a bearing on health and well-being are summarised below.

6.1.2 Overarching design objectives incorporated into the DCO Scheme include:

- ensuring that the new stations are accessible by all modes of transport and in particular, facilitates walking, cycling and other public transport trips to and from the stations;
- improving the quality of transport infrastructure along the DCO Scheme to enhance the local environment, quality of life and social well-being; and
- ensuring that any adverse localised transport impacts are minimised through supporting measures.

6.1.3 The public realm in and around Portishead Station has been designed to facilitate multi-modal interchange and minimise conflict between travellers in private cars, public transport by bus and taxi, cyclists and pedestrians. Some of the main features proposed are described below.

- New car park (car park A) with bus and taxi drop off and disabled parking at Portishead Station;
- New overspill car park (car park B) to the west of the new station;
- Provision of crossings at Phoenix Way and Quays Avenue in Portishead;
- Provision of a toucan crossing south west of junction with Newfoundland Way in Portishead and at Quays Avenue;
- Extension of shared footway and cycleway on the west side of Quays Avenue in Portishead;
- Replacement of the traffic island with a pedestrian island at Quays Avenue (between the proposed station and Serbert Way in Portishead); and
- Provision of a raised table with priority for pedestrian and cycling movements at Quays Avenue junction with Conference Avenue in Portishead.

6.1.4 Portishead station has been designed to avoid stepped access from the car park and will include a single unisex toilet suitable for all users, including disabled users.

6.1.5 Minor modifications are proposed to the footpaths and bridleways along the disused section of the railway to avoid the need to divert them.

- Modifications to the existing uncontrolled bridleway crossing point on Royal Portbury Dock Road to improve safety for equestrians crossing the road;

- The NCN26 under the Royal Portbury Dock Road and Marsh Lane will be widened slightly and separated from the railway by security fencing; and
- A new bridleway will be constructed under the M5 between Portbury and Pill to separate equestrians from the railway while the existing NCN26 under the M5 will be maintained and widened for cyclists and pedestrians.

6.1.6 The design of pedestrian and, or cycle ramps have been designed for disabled access under the Equalities Act, (2010), including shallow gradients, ramped access and lighting.

6.1.7 The changes in noise levels due to the operation of the DCO Scheme, including the train movements, idling in the stations, and the noise from the PA systems have been considered and mitigation proposed where required. The DCO Scheme includes a 2 m high noise barrier in Portishead on the south side of the railway corridor between the new station and Trinity Primary School Bridge to reduce the effects of operational noise on residents. The DCO Scheme will follow Network Rail standards on noise levels from public address systems to address noise impact at station platforms (and potentially to lineside neighbours).

6.1.8 The successful contractor(s) will be required to comply with CoCP and the Master CEMP in the ES Appendices 4.1 and 4.2 (DCO Document Reference 8.15 and 8.14) respectively. The CoCP provides an over-arching framework to control adverse effects during construction while the Master CEMP provides further details, for example, to control dust and air quality, ecology, landscape including visual clutter and the protection of amenities near construction sites, noise, the risk of pollution of soils and water resources, and pests and vermin. The CoCP and Master CEMP have been prepared and submitted to the Planning Inspectorate as part of the DCO Application.

6.1.9 The contractor(s) will be required to produce their own CEMP to demonstrate how they will comply with the CoCP and Master CEMP and implement best practicable measures (“BPM”) at all the construction sites and compounds to mitigate the adverse effects of construction on people, communities and the environment.

6.1.10 Works associated with the new railway service will improve safety for pedestrians and cyclists, thus potentially decreasing the chances of road accidents and related injuries.

6.1.11 As indicated in the ES Chapter 7 Air Quality and Greenhouse Gases (DCO Document Reference 6.10), one of the DCO Scheme’s supporting objectives is to contribute to reducing traffic congestion on the Portishead, Bath and Avonmouth, and Severn Beach arterial corridors. The new railway services will reduce emissions per passenger kilometre travelled compared with equivalent road transport through modal shift from car to rail. No additional mitigation is required for air quality or greenhouse gases during the operational phase.

SECTION 7

Assessment of Effects

7.1 Construction Phase

7.1.1 The assessment of the effects of the DCO Scheme during construction is set out in Table 7.1 below. Effects that are significant in relation to the EIA Regulations 2017 are deemed to be moderate or larger, or as indicated in the text. The following significant effects have been identified:

- short term peak construction noise levels, especially when occurring at night,
- potential effect of vibration on humans in residential receptors within 15 m of line works due to vibratory compaction and within 20 m of the works at the Avon Road Bridge piling site,
- safety of pedestrians and cyclists using footpath / cycling diversions during the construction of Trinity Primary School Bridge, and
- access to services and safety of pedestrians and cyclists in Pill during construction.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
Portishead Station Re-alignment of Quays Avenue. Removal of the existing ballast, rails and sleepers and replacement with new. Construction of Portishead station with ground preparation, piling, foundations, erection of steel structure, concrete floors, utilities, blockwork and cladding, roof, platform canopy, station entrance, internal and external fit out.	Noise and vibration	For noise, the Significant Observed Adverse Effect Level (“SOAEL”) is predicted to be exceeded for the noisiest activities – highway pavement works, vegetation clearance and platform construction, and trackbed preparation and tamping – during the day-time at the nearest properties about 15 to 25 m from the construction works. Night-time works are predicted to exceed the Unacceptable Adverse Effect Level (“UAEL”). Increased ambient and peak noise levels may potentially affect a large number of receptors including vulnerable groups such as residents of the Haven Lodge Centre, Marina Healthcare Centre incorporating harbourside Family Practice and North Somerset Community Partnership, and Busy Bees Nursery on Serbert Way. Sensitivity = High Magnitude = Negative Significance = Short term significant adverse effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
		The Master CEMP (DCO Document Reference 8.14) includes measures to control noise and vibration through the application of Best Practical Means. Once the contractor(s) is appointed, they will review the noise assessment based on their construction methodology, plant, and site specific mitigation measures, and will seek S61 agreement with the relevant local authority on construction noise. These measures would be sufficient to reduce the significance to no significant adverse effect. There are no significant adverse effects from vibration.
	Air quality and emissions	Elevated dust levels due to construction works causing an irritant to many people and disproportionately affect the young, the elderly and people with respiratory problems. Mitigation = CEMP to include an Air Quality and Dust Management Plan to reduce construction dust. Sensitivity = High Magnitude = Minor negative Significance = Short term slight negative, but not significant effect.
	Light pollution	Glare from temporary lighting of construction compounds near Portishead Station may affect vulnerable group of people living near the construction site. Mitigation = Temporary lighting to be designed to avoid glare and light spill. Sensitivity = High Magnitude = Minor negative Significance = Short term slight/neutral depending on the intrusion of light into buildings and the sensitivity of residents to light pollution, but not significant effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
	Access to services	Disruption to access and navigating around the construction sites and compounds in the vicinity of the Marina Healthcare Centre and Haven Lodge Care Centre could affect access of emergency vehicles and patients to health services. Mitigation = Access for emergency services to health facilities in and around the construction to be maintained. Footpath closures to be mitigated through diversions (see DCO Document Reference 2.34 Diversion Routes for Pedestrians and Cyclists Plans). CTMP to include requirement for traffic management. Measures such as good housekeeping at construction sites and temporary diversions would help to minimise obstacles to access. Sensitivity = High Magnitude = Minor negative Significance = Short term slight negative but not significant effect.
Trinity Primary School Bridge Enabling works: Close existing crossing, vegetation clearance, utility diversions	Noise and vibration	The SOAEL is predicted to be exceeded for the noisiest activity - piling works – during the day-time at the nearest properties about 25 m from the construction works. Piling noise would exceed the UAEL for night-time works. Sensitivity = High Magnitude = Negative Significance = Short term significant adverse effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
Excavation for piling and foundation works Build up earth bank to north and allow to settle Piling works Pre-fabricate bridge off site and deliver in sections by road or rail, assembly of bridge, Drainage works Lighting Finishing works.		The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect. There are no significant adverse effects from vibration.
	Crime and safety	The presence of large numbers of pedestrians in proximity to the construction site along the railway corridor could pose health and safety risks, particularly for school children who may be less aware of the dangers. Construction traffic on the local highway may pose safety risk to school children who will access Trinity Primary School from various routes near the site. Diversion of pedestrians/cyclists to re-aligned Quays Avenue potentially increasing conflict between construction activities and pedestrians (including children) and cyclists. Mitigation = During construction of the bridge, a temporary crossing will be provided, which may be closed intermittently. During these occasions diversions will route pedestrians and cyclists westwards around the station site and back towards Trinity School (see DCO Document Reference 2.34 Diversion Routes for Pedestrians and Cyclists Plans). The CEMP to include measures for pedestrian and cyclist safety, security of construction sites, and the CTMP. Sensitivity = High Magnitude = Moderate Significance = Short term, slight negative but not significant effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
	Access to green space	During construction, a temporary crossing will be provided close to the informal crossing over the railway, which may be closed intermittently. During these occasions diversions will route pedestrians westwards around the station site and back towards Trinity School (see DCO Document Reference 2.34 Diversion Routes for Pedestrians and Cyclists Plans), which is a short distance to the Portbury Wharf Nature Reserve. Some groups, such as families with young children, the elderly and disabled may be reluctant to use due to the increased length of the route. Some residents along Galingale Way will experience increases in pedestrian movement along their quieter roads. The proposed works will alter current visual character of the area. Sensitivity = Low-high Magnitude = Minor negative Significance = Short term neutral to slight negative but not significant effect
Portishead to Portbury Junction Construction of haul roads and construction compounds (Sheepway and The Portbury Hundred). Enabling works along the railway line - ecological mitigation; vegetation removal; fencing; diversions (utilities, rights of way);	Noise and vibration	Construction noise at Sheepway Compound is not forecast to exceed SOAEL for day-time works, but is forecast to exceed UAEL for night-time works for the noisiest activity (haul route construction) at the nearest property. Construction noise at the Portbury Hundred construction compound would not exceed the SOAEL for day-time works or UAEL for night-time works. Construction works for the railway line is forecast to exceed the SOAEL for day-time works for the noisiest activity (trackbed preparation and tamping) at the nearest property (15 m distant). Sensitivity = High Magnitude = Negative

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
Excavate and remove old ballast, sleepers and rail Repair or replace culverts New track formation and ballast Troughing for cabling New ballast, sleepers and rail Install lineside equipment; access points and fencing; drainage. Repairs to bridges, building replacement of Cattle Creep underbridge deck.		Significance = Most day-time construction works not significant, but the noisiest activities may have a significant adverse effect for householders close to the Sheepway construction compound and railway. Significant adverse effects of night-time construction works at properties close to the construction noise source. The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect. For vibration, vibratory compaction required for the rail line construction would cause the SOAEL to be exceeded at receptors within 15 m of the works, which would be a significant effect in EIA terms. The mitigation measures contained within the CEMP would be sufficient to reduce this to no significant effect.
	Air quality and emissions	Elevated dust levels along the railway corridor, haul route and construction compounds potentially affecting causing soiling at a small number of nearby residences. Mitigation = Implement Air Quality Management Plan in the CEMP to reduce construction dust. Sensitivity = Low Magnitude = Minor negative Significance = short term neutral to slight negative but not significant effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
	Light pollution	Much of the construction work along the disused section will be undertaken during daylight hours. Temporary night-time lighting may be required at construction compounds and during night-time works. Mitigation = Use directional temporary lighting to reduce glare and spill. Additional screening from nearby properties by hedgerows and trees. Sensitivity = Low Magnitude = Minor Significance = Neutral and not significant.
	Access to green space, open space and physical activity	Construction works along Sustrans NCN26 and on bridleways and PRoWs under the Royal Portbury Dock, Marsh Lane and M5 Avon Bridge and activities at construction compounds may locally reduce the amenity value of these routes and may discourage regular users. Mitigation = Diversions will be provided where appropriate. Sensitivity = Low-medium Magnitude = Minor negative Significance = Short term slight negative but not significant effect.
Lodway Farm /Avon Road Underpass Temporary construction compound at Lodway Farm; Activities at the compound include, storage of waste ballast, new ballast;	Noise and vibration	There are a lot of construction activities in a relatively small area, which will temporarily increase noise levels. Noisy activities include: demolition of Avon Road, piling for Avon Road earthworks, and handling of aggregate on / off trains and HGVs. Night-time works may be required. The SOAEL is predicted to be exceeded for the noisiest activities at Lodway construction compound – haul route construction and loading and removal of ballast – during the day-time at the nearest properties about 20 m from the construction works. Night-time works are predicted to exceed the UAEL. Avon Road Bridge and earthworks.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
Potential for a temporary railway spur alongside or into the compound and conveyor belts to load old ballast onto trains; Access via three haulage routes: from Marsh Lane and M5 underbridge, via the Port, via Pill through The Breaches; Demolition and construction of Avon Road Underpass and embankment strengthening, requiring access from gardens off Lodway Close.		Pill has a higher percentage of people over 65 years of age compared with other areas in the vicinity of the DCO Scheme and the elderly are considered to have high sensitivity to health impacts. Construction noise could cause annoyance, stress and sleep disturbance. Sensitivity = High Magnitude = Negative Significance = Short term significant adverse effect. The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect. The vibratory piling required for the reconstruction of the Avon Road Bridge would cause the SOAEL to be exceeded at the closest receptors at 20 m from the works, which would be a significant effect in EIA terms. The mitigation measures contained within the CEMP would be sufficient to reduce this to no significant effect.
	Air quality and emissions	A number of construction activities are likely to cause dust potentially affecting properties off Avon Road, Lodway Close and The Breaches, such as demolition, earthworks, and handling of ballast. Mitigation = Implement an Air Quality and Construction Dust Management Plan in the CEMP. Sensitivity = High Magnitude = Moderate negative

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
		Significance = Short term, moderate negative effect during peak dusty construction activities reducing to slight negative effect. Not significant.
	Light pollution	Construction compound lighting and night time lighting near the Lodway Farm site may affect nearby residents, particularly houses on The Breaches with views towards the compound. Night time lighting may cause sleep disturbance. Mitigation = Design temporary lighting to avoid glare and light-spill for neighbouring properties. Sensitivity = High Magnitude = Moderate negative Significance = Short term neutral to slight negative but not significant effect
	Access to green space, open spaces and physical activity	The construction compound at Lodway Farm and the numerous major activities at this “pinchpoint” on both sides of the railway would significantly alter the landscape, severely limit visual access to green space for local residents. The temporary closure of the Avon Road / Lodway Bridge for pedestrians and cyclists during the construction of the new bridge has the potential to cause some temporary severance and possibly reduce physical activity for users of the NCN26 and Jenny’s Meadow, a field on the north of the railway and west of housing off Avon Road. Mitigation = Provide diversions for public rights of way where possible (see DCO Document Reference 2.34 Diversion Routes for Pedestrians and Cyclists Plans). Sensitivity = Low-high Magnitude = Minor negative Significance = Short term slight negative but not significant effect

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
Pill Station Demolition of Station House, 7 Station Road. Stabilisation of Hardwick Cutting Remove existing platform and rebuild New staircase and ramp from entrance to platform Drainage and utilities. New Pill car park Railway track works to slew existing track over, refresh ballast, rails and sleepers where necessary and build new track. Night-time and weekend working for railway track, due to the need for night-time possessions to reduce impacts on the existing freight train operations.	Noise and vibration	The SOAEL is predicted to be exceeded for the noisiest activities – vegetation clearance and piling at Pill Station (including Hardwick Cutting) and trackbed preparation and tamping for the railway line construction – at the nearest properties between 5 and 15 m from the construction works. Night-time works are predicted to exceed the UAEL, Pill has a higher percentage of people over 65 years of age compared with other areas in the vicinity of the DCO Scheme and the elderly are considered to have high sensitivity to health impacts. Construction noise could cause annoyance, stress and sleep disturbance. Sensitivity = High Magnitude = Negative Significance = Short term significant adverse effect. The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect. There are no significant adverse effects from vibration.
	Air quality and emissions	Construction activities include a number of dust-generating works, e.g. demolition, earthworks, breaking out the existing platform. which are most likely to affect residents to the north of the railway given the topography. Construction dust can cause health problems, such as an irritant if blown into the eyes, or respiratory

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
		Mitigation = Implement an Air Quality and Construction Dust Management Plan in the CEMP. Sensitivity = High Magnitude = Minor negative Significance = Short term slight negative but not significant effect
	Light pollution	Temporary lighting at the construction compounds on the proposed Pill station forecourt and at the proposed Pill station car park, and night-time lighting relating to construction works at Pill station, may cause discomfort to nearby residents due to sleep disturbance. Mitigation = Design temporary lighting to avoid glare and light spill. Sensitivity = Medium Magnitude = Minor negative Significance = Short term slight negative but not significant effect
	Access to services such as shops, health, or social services	The large concentration of construction sites and haulage through Pill could hinder access to local services for residents, especially the elderly and people who are unwell. Mitigation = Implement the CTMP to ease traffic circulation for construction traffic and local traffic including cyclists. Provide diversions for public rights of way (see DCO Document Reference 2.34 Diversion Routes for Pedestrians and Cyclists Plans). Sensitivity = High Magnitude = Moderate Significance = Short term moderate negative significant effect.
	Crime and safety	Increased construction traffic through Pill, including HGVs, potentially increases the risk of accidents for local road users, cyclists and pedestrians.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
		Mitigation = Implement the CTMP to ease traffic circulation for construction traffic and local traffic including cyclists. Provide diversions for public rights of way (see DCO Document Reference 2.34 Diversion Routes for Pedestrians and Cyclists Plans). Sensitivity = High Magnitude = Major Significance = Short term large negative significant effect
Pill Viaduct to Pill Junction Repairs to Pill Viaduct; Widening and stabilization of Mount Pleasant embankment; Slewing of the existing operational railway line; Construction of the new railway line; New Pill Junction. Night-time working likely to avoid disrupting the freight trains	Noise and vibration	The SOAEL is predicted to be exceeded for the noisiest activities – trackbed preparation and tamping for the railway line construction (including Pill Junction) and piling for Mount Pleasant embankment stabilisation – during the day-time at the nearest properties between 5 and 15 m from the construction works. Night-time works are predicted to exceed the UAEL, Sensitivity = High Magnitude = Negative Significance = Short term, significant adverse effect The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
		For vibration, vibratory compaction required for the rail line construction would cause the SOAEL to be exceeded at receptors within 15 m of the works, which would be a significant effect in EIA terms. The mitigation measures contained within the CEMP would be sufficient to reduce this to no significant effect.
	Air quality and emissions	The construction works, especially the Mount Pleasant embankment stabilisation, may cause soiling for a small number of properties. Mitigation = Implement an Air Quality and Construction Dust Management Plan in the CEMP. Sensitivity = High Magnitude = Minor Significance = Short term slight negative but not significant effect
	Light pollution	If required temporary lighting at elevation through this section may increase light pollution, but within the context of an urban setting with existing night-time lighting. Mitigation = Use of directional lighting to avoid glare and light spill. Sensitivity = Low Magnitude = Minor Significance = Neutral
Ham Green New access off Chapel Pill Lane; Temporary construction compound;	Noise and vibration	The SOAEL is predicted to be exceeded for the noisiest activities – vegetation clearance, trackbed preparation, tamping. Sensitivity = High Magnitude = Negative Significance = Short term, significant adverse effect.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
New access to fishing lakes.		The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect. There are no significant adverse effects from vibration.
	Access to green space, open spaces and physical activity	One construction compound is located off Chapel Pill Lane near the Penny Brohn Cancer Centre. Although the centre is unlikely to have in-patients, route diversions and construction activities may change the accessibility and the visual amenity, which in turn could influence the sense of well-being of the receptors in the area. Sensitivity = Low-high Magnitude = Minor negative Significance = Short term slight adverse but not significant effect
Avon Gorge Largely minor works: vegetation removal; replacement of ballast, track and rails; repairs to bridges and retaining walls; geotechnical stabilisation on cliffs; signalling, communication masts and associated trenching, cabling and cabinets.	Access to green space, open spaces and physical activity	The human receptors along this section are the users of the River Avon Tow Path, who are, in the most part, assumed to be in good health. Mitigation = Separation of construction sites and publicly accessible areas by fencing where feasible. Occasional short-term closures of the Tow Path to facilitate construction works with signed diversions and advanced warning signs in place. Controls on the movement of construction vehicles along the Tow Path. Sensitivity = Low Magnitude = Moderate negative Significance = Short term slight negative but not significant effect

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
Bower Ashton to Ashton Vale Temporary construction compound off Clanage Road; Replacement of ballast, rails and sleepers;	Noise and vibration	The main human receptors are likely to be users of outdoor space such as the Bedminster cricket ground and allotment. Low levels of exposure. There are a few residential properties in Bower Ashton, the closest of these around 50 m from the works. The predicted noise level would be below the SOAEL so not significant in EIA terms. Sensitivity = High Magnitude = Negative Significance = Short term, no significant adverse effect. There are no significant adverse effects from vibration.
	Air quality and emissions	The main human receptors are likely to be users of outdoor space such as the Bedminster cricket ground and allotment. Low levels of exposure. There are a few residential properties in Bower Ashton. Mitigation = Implement an Air Quality and Construction Dust Management Plan in the CEMP. Sensitivity = Low Magnitude = Minor negative Significance = Neutral
	Light pollution	The main human receptors are likely to be users of outdoor space such as the Bedminster cricket ground and allotment. Low levels of exposure. There are a few residential properties in Bower Ashton and these are set back from the railway and partially screened by vegetation. Mitigation = Use of directional lighting to avoid glare and light spill. Sensitivity = Low Magnitude = Minor negative Significance = Neutral

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
	Access green space, open spaces and physical activity	The main human receptors are likely to be users of outdoor space such as the Bedminster cricket ground, footpaths, and allotments. While construction of the DCO Scheme may reduce the quality of the ambience, they are unlikely to stop people accessing these facilities. Mitigation = Implement CEMP. Good neighbour policies. Sensitivity = Low Magnitude = Minor negative Significance = Neutral
Ashton Vale to Ashton Junction Replacement of ballast, rails and sleepers; Modification of Winterstoke Road; New pedestrian and access ramp between Ashton Vale Road and Ashton Road; Connect to Ashton Junction.	Noise and vibration	The SOAEL is forecast to be exceeded for the noisiest activities – vegetation clearance, trackbed preparation and tamping for the railway line construction – during the day-time at the nearest properties about 15 m from the construction works. Night-time works are predicted to exceed the UAEL, The land use is mostly commercial / industrial, so construction noise is not expected to affect people's health. Sensitivity = Low Magnitude = Negative Significance = Short term, significant adverse effect The application of Best Practical Means would be expected to reduce the construction noise levels and assist with reducing the predicted temporary significant effects. The contractor will review the construction noise assessment, confirm proposed mitigation and residual noise, and seek a S61 agreement with the local authority. These measures would be sufficient to reduce the significance to no significant adverse effect. There are no significant adverse effects from vibration.

Table 7.1: Summary of construction phase health impacts along the DCO Scheme

Site	Health determinant altered	Significance of the effect
	Air quality and emissions	The works are likely to have a limited effect on construction dust and there are few sensitive receptors in this area. Mitigation = Implement an Air Quality and Construction Dust Management Plan in the CEMP. Sensitivity = Low Magnitude = Minor negative Significance = Neutral
	Light pollution	Temporary lighting may be required, but this is in the context of an urban environment with existing night-time lighting form highways and industrial/commercial areas. Mitigation = Use of directional lighting to avoid glare and light spill. Sensitivity = Low Magnitude = Minor negative Significance = Neutral
	Crime and safety	The industrial / commercial land use is likely to be largely unoccupied at night and may attract anti-social behaviour. Mitigation = Implement site security measures as set out in the CEMP. Sensitivity = Low-high Magnitude = Minor negative Significance = Short term, slight negative but not significant effect
	Employment, education, and access to work and local business	The works to Winterstoke Road and pedestrian/cycle ramp in the Ashton Vale Industrial Estate may disturb local traffic and pedestrians, including pupils attending Ashton Park secondary school. Mitigation = Implement the CTMP. Sensitivity = High Magnitude = No change Significance = Neutral

7.2 Operation Phase

7.2.1 The assessment of the effects of the DCO Scheme during operation is set out in Table 7.2 below. No significant adverse effects were identified in relation to the EIA Regulations 2017 and a significant benefit of the DCO Scheme is to open up access by public transport to a wider range of services and leisure activities in Portishead and Bristol.

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
Portishead Station Hourly service 0600 to 2300 Monday to Saturday and 0900 to 1900 on Sundays. Or, an hourly plus service with a train every 45 minutes during morning and afternoon peak; Traffic circulation; Pedestrian movements to and from the station; New permanent lighting at the car parks, station, and platform.	Noise and vibration	With mitigation the ambient noise levels for lineside neighbours will increase slightly, but with distance and intervening screening by properties, the noise increases fall to negligible levels. The health impact could range from annoyance to sleep disturbance, dependent on the age and health condition of receptors and the noise insulation properties of buildings. Mitigation = Acoustic barrier on south side of the railway between the station and Trinity Primary School Bridge. Sensitivity = High Magnitude = Minor negative Significance = Slight adverse effect, not significant There are no significant adverse effects from vibration.
	Light pollution	Light pollution may cause psychological discomfort to vulnerable groups. Mitigation: The lighting for the station and car parks will be designed to avoid glare and light spill. The station lighting will dim during periods of no activity. Sensitivity = Low-high Magnitude = Minor negative Significance = Slight negative, not significant effect

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
	Access to services	Visitors, including patients to the Marina Healthcare Centre and Haven Lodge Care Centre, will benefit from using short term tariff at the Portishead Station car park. Sensitivity = High Magnitude = Minor positive Significance = Slight positive not significant effect
	Access to the Bristol and surrounds	Access to a new, fast public transport service between Portishead and Bristol will facilitate journeys to a wider range of services (medical, social, and commercial) and leisure activities in Bristol. Sensitivity = High Magnitude = Moderate positive Significance = Moderate positive, significant effect
	Access to green space, open space and physical activity	The proposals are likely to remove trees and greenery along Phoenix Way and alter informal open spaces and green spaces but landscaping proposals are planned along Harbour Road and around the car parks. Sensitivity = High Magnitude = Neutral Significance = Neutral effect
	Townscape and quality of the local environment	For local residents and lineside neighbours the station premises will present a permanent change to the landscape. The loss of visual amenity may affect the sense of well-being for some residents located lineside but this is likely to be limited and potentially short term (over time residents may accept the new landscape). Sensitivity = Low-medium Magnitude = Minor negative Significance = Slight negative effect reducing to neutral in the long term, not significant.

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
Trinity Primary School Bridge	Noise and vibration	A slight increase in noise levels at the school is predicted in the short term, but this is not sufficient to warrant noise mitigation. The effect of noise on children can lead to annoyance who have less coping mechanisms than adults. Sensitivity = High Magnitude = Minor negative Significance = Slight adverse effect, not significant. There are no significant adverse effects from vibration.
	Access to services Access to green space, open spaces, and physical activity	The new bridge will replace the existing at grade crossing. Low gradient ramps will be provided in addition to stair cases for people with reduced mobility. The bridge will result in a longer crossing due to the ramps on either side. Sensitivity = High Magnitude = Minor negative Significance = Neutral to slight negative but not significant effect
	Townscape and quality of the local environment	Although the proposals will permanently alter the landscape, the proposed landscaping near Tansy Lane would help to soft the appearance of the structure in time and therefore the proposals may have a slight negative impact on the sense of well-being for the immediate adjoining neighbours. Sensitivity = Low-medium Magnitude = Negligible Significance = Slight negative but not significant effect

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
Portishead to Portbury Junction New permanent compound at Sheepway	Noise and vibration	The closest residential property to the DCO Scheme is the Old Station House at Portbury. This is predicted to experience a moderate increase in ambient noise level, which would be significant in EIA terms. A noise barrier is proposed as mitigation which would reduce the predicted impact to minor and no significant effect. The health impact could range from annoyance to sleep disturbance, depending on the age and health condition of receptors and the acoustic properties of the buildings. Sensitivity = High Magnitude = Minor negative Significance = Slight adverse effect, not significant There are no significant adverse effects from vibration.
	Crime and safety	Modest improvements in safety for equestrians through modified crossing on Royal Portbury Dock Road and new bridleway under the M5 and slight widening of NCN26 under three bridges. Sensitivity = High Magnitude = Minor positive Significance = Slight positive, but not significant effect

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
Portbury Junction to Pill Junction New station and car park in Pill New road rail access off Pill car park	Noise and vibration	Noise will be introduced into the area from the trains and activity at Pill Station and car park during operational hours. This could cause annoyance and sleep disturbance for people in nearby properties. However research suggests that communities near railways can adapt to noise levels. The vibration levels measured near Pill Station for freight trains are considered to be 'just perceptible in residential environments'. The impact of vibration on people's well-being may range from annoyance to sleep disturbance. Research suggests that rail noise when accompanied by vibration enhances the perception of noise and thus increases annoyance. At Pill this cumulative effect of combined noise and vibration levels is applicable to properties within 20 m of the railway line. Vibration measurements show that the freight trains cause more vibration than passenger trains, and as the vibration from freight trains is deemed to be just perceptible, any vibration from passenger trains would be less so. Sensitivity = High Magnitude = Minor negative Significance = Slight adverse effect for noise from the trains and station and for residents in properties within 15 m There are no significant adverse effects from vibration.
	Light pollution	The lighting for Pill station and car park will be designed to avoid glare and light spill. Existing planting along the railway and car park will further screen light spill along Monmouth Road. Sensitivity = Low-medium Magnitude = Minor negative Significance = Slight negative effect, but not significant effect to residents on Monmouth Road.

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
	Access to the DCO Scheme	The new station and passenger service will offer a safe, comfortable and fast service into Bristol for residents in Pill, which includes an above average elderly population. Sensitivity = Low-high Magnitude = Moderate negative Significance = Moderate positive, significant effect
Avon Gorge Permanent access off Chapel Pill Lane, Ham Green, and pedestrian access via the Avon Gorge Tow Path	Noise and vibration	An increase in noise levels is forecast at a small number of properties off Chapel Pill Lane. Noise increases through the Gorge are minor. Sensitivity = High Magnitude = Minor negative Significance = Slight adverse effect. There are no significant adverse effects from vibration.
Bower Ashton to Ashton Junction Permanent compound off Clanage Road	Noise and vibration	The closest residential receptors around Brunel Way and Paxton Drive may experience minor increases in day and night time levels. Sensitivity = High Magnitude = Minor negative Significance = Slight adverse effect, not significant. There are no significant adverse effects from vibration.
	Access to work and local business	The DCO Scheme will result in more frequent closure of the Ashton Vale Level Crossing but the effects on highway traffic will be mitigated through highway modifications and changes to traffic lights. Pedestrians and cyclists will be able to use the new ramp while the level crossing is closed. Sensitivity = Low Magnitude = Minor negative Significance = Slight negative, but not significant effect

Table 7.2: Summary of health impacts along the DCO Scheme during the operations phase

Site	Health determinant altered	Significance of the effect
Scheme-wide	Air Quality	The NO2 and PM10 concentration for the receptors along the DCO Scheme is below the limit that will trigger any effect on human health. Overall operational impact on air quality is not significant; therefore, the effect on health of receptors in the study area is assessed to be neutral.

7.3 Cumulative Effects

7.3.1 This HIA considers the potential for cumulative effects on vulnerable groups relating to air quality, noise and access. Other proposed developments along the DCO Scheme have the potential to cause cumulative effects in conjunction with the DCO Scheme. Appendix 18.1 contains a long list of other projects considered for the cumulative effects assessment and Appendix 18.2 contains a short list of other projects together with an assessment of the cumulative effects (DCO Document Reference 6.25). The other projects include other NSIPs within 10 km of the DCO Scheme, developments identified on the NSC and BCC planning portals within 0.5 km of the DCO Scheme, other works required for MetroWest Phase 1, and other major applications recommended by the NSC and BCC planning officers.

Other Projects along the Portishead Branch Line

7.3.2 Mixed-use, residential and employment developments have been proposed at locations along the DCO Scheme. None of the proposed developments is expected to have significant impacts on health. However, as the number of people living, working and shopping in the area will increase, especially in Portishead, beneficial cumulative effects relating to enhanced access between Portishead and Bristol may occur once the DCO Scheme is completed. In particular, an assisted living development for the over 60s is under construction in close proximity to the Portishead Station site. Once these apartments are occupied and the Portishead Branch Line is operating, residents would be able to travel easily into Bristol, for example, to access services and visit various shopping, recreational and leisure destinations, and travel more widely via the national train network.

7.3.3 The proposed residential developments have the potential to increase the number of residential receptors within the study area, and result in changes in road traffic, which in turn may lead to changes in ambient noise and air quality. Committed developments are considered in the traffic modelling for future scenarios, which have been used for the air quality and noise assessments.

7.3.4 In addition to the proposed developments above, further beneficial cumulative effects relating to increased access and connectivity across the wider Bristol area may occur between the Portishead Branch Line and MetroBus schemes, and Network Rail infrastructure improvements.

7.3.5 Cumulative effects resulting from overlapping construction programmes for the other projects and the DCO Scheme could be avoided by phasing developments and by implementing a range of mitigation measures to reduce construction-related impacts to be incorporated into the CEMP. Any residual cumulative effect is assessed to be **neutral**.

Other Works for MetroWest Phase 1

7.3.6 Other elements of MetroWest Phase 1, namely the Parson Street Junction works including Liberty Lane Sidings, Parson Street Station improvements, Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling and Bathampton Turnback comprise small scale works, confined within the existing railway land. These works are to be undertaken by Network Rail under their permitted development rights and do not form part of the DCO Application.

7.3.7 Network Rail undertakes their own procedures to prepare environmental appraisals and action plans, and environmental risk registers of permitted development works as part of their internal reporting for Network Rail's Governance for Railway Investment Projects ("GRIP") process. This process will identify the potential impacts and capture the need for mitigation during design and construction. The results will be carried forward from the present GRIP 3/4 phase into the detailed design phase (GRIP 5) and construction (GRIP 6).

7.3.8 Given the small scale nature of these works and the distances between these projects and the DCO Scheme route, it is considered that there are no significant cumulative effects during the construction of these projects on health determinants.

7.3.9 The DCO Scheme will result in additional railway services on the main line between Parson Street Station and Bristol Temple Meads. This may affect the *noise and vibration* and *air quality and emissions* determinants.

7.3.10 The passenger service will increase noise levels along the main line. In the vicinity of Parson Street Junction and Station, the highest noise increases are expected to be at those properties along Nelson Street and Trafalgar Terrace. Increases in day time noise are predicted to be up to 1 dB(A) for the short term and 1.5 dB(A) for the long term. These increases are assessed to be a **slight adverse effect**.

7.3.11 The main line between Parson Street Station and Bristol Temple Meads mostly lies within the Bristol Air Quality Management Area, which has been designated due to exceedances of NO_2 and PM_{10}. In Chapter 7 Air Quality and Greenhouse Gases (DCO Document Reference 6.10) the addition of an hourly service is estimated to increase NO_2 by 0.5 $\mu g/m^3$ at two receptors close to Parson Street Junction. However, as the future base case for NO_2 concentration is below the standard of 40 $\mu g/m^3$ and the DCO Scheme does not result in a new exceedance, this is assessed to be a **neutral** effect. At the other receptors modelled, the increase in NO_2 and all the PM_{10} was

negligible and did not exceed the air quality objectives, which is assessed to be a **neutral** effect.

Other Stations on the Local Network

7.3.12 In order for seamless and easily accessible travel to be experienced by the local population, other stations in the local network must also cater for vulnerable groups.

7.3.13 The works required to improve Parson Street Station will not affect passengers using the station. The additional train per hour may slightly increase the use of the station by passengers. However, as the only access between the street and the platform is via stairs, it is unlikely that mobility impaired or wheelchair users would use Parson Street Station. At Bedminster Station, no works are required for the platforms that passengers use.

7.4 Limitations in Conducting the Assessment

7.4.1 The baseline data on demography and health patterns of the local residents have largely been based on secondary sources and information collected from initial consultation with key stakeholders. While this search has provided information on vulnerable groups along the proposed route, it is possible that not all specific cases have been captured.

7.5 Further Steps

7.5.1 This document forms part of the DCO Application. People with an interest in the DCO Scheme can review the DCO submission and submit their own comments to The Planning Inspectorate. Further information on how members of the public can engage in the Examination phase of the application is available on the Planning Inspectorate's website.

SECTION 8

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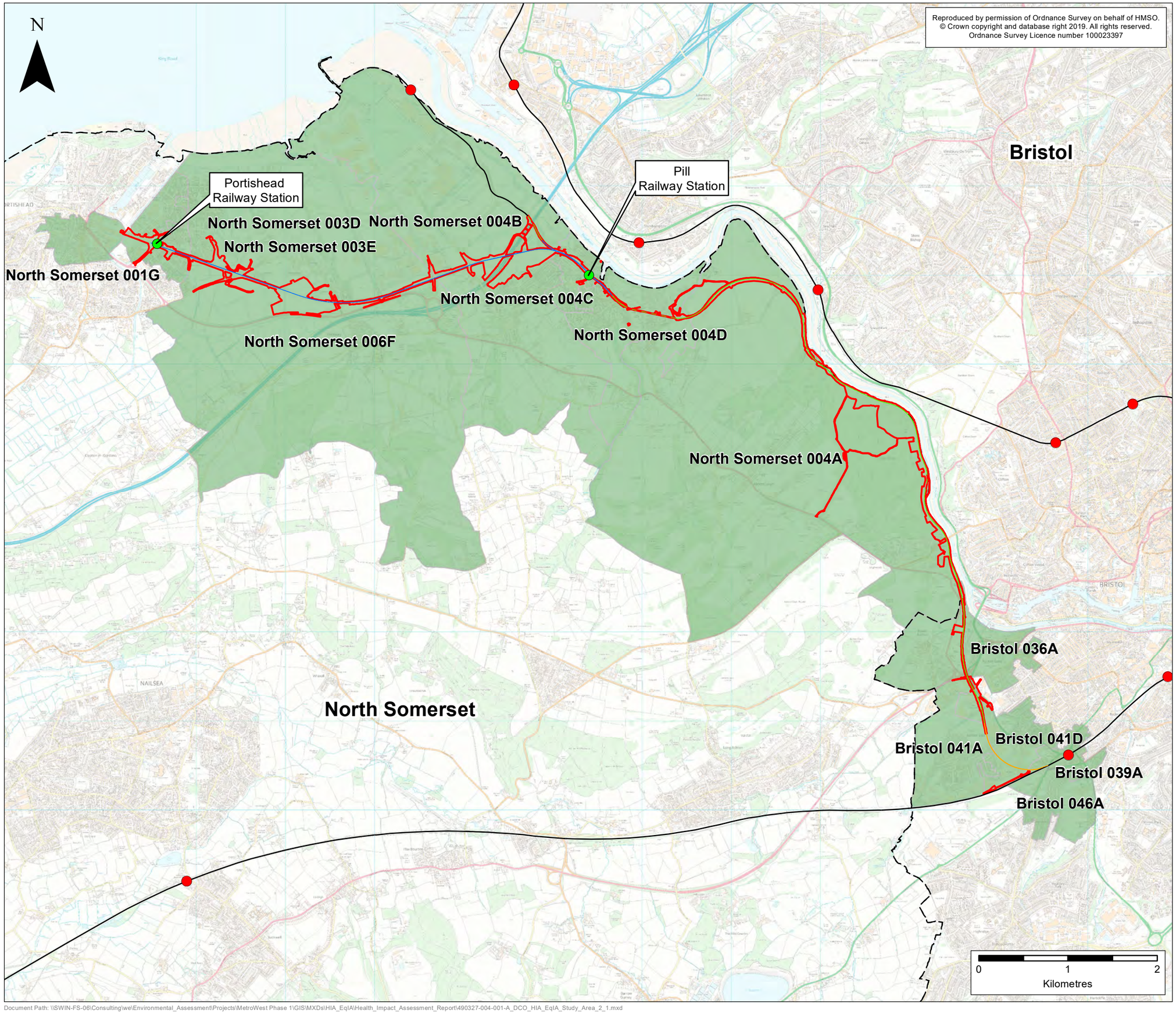
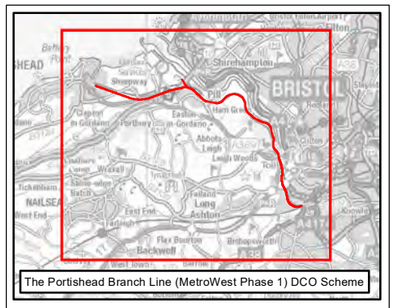
Figures





KEY

- Local Authority Boundary
- Lower Super Output Area (LSOA)

Existing Railway

- Existing Railway Line
- Existing Railway Station

Portishead Branch Line

- Order Limits
- The Nationally Significant Infrastructure Project (NSIP) Works
- The Associated Development Works
- Section in Tunnel
- Proposed Station

Other Works

- Network Rail Permitted Development Rights

ES-A	MPC	LS	CF	14/11/2019	First draft
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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 2.1: Study Area

Drawn By :	Martin Costello	Date: 14/11/2019
Checked By :	Lucy Stephenson	Date: 14/11/2019
Approved By :	Carolyn Francis	Date: 14/11/2019

Drawing No. : 674946 -003-001-A

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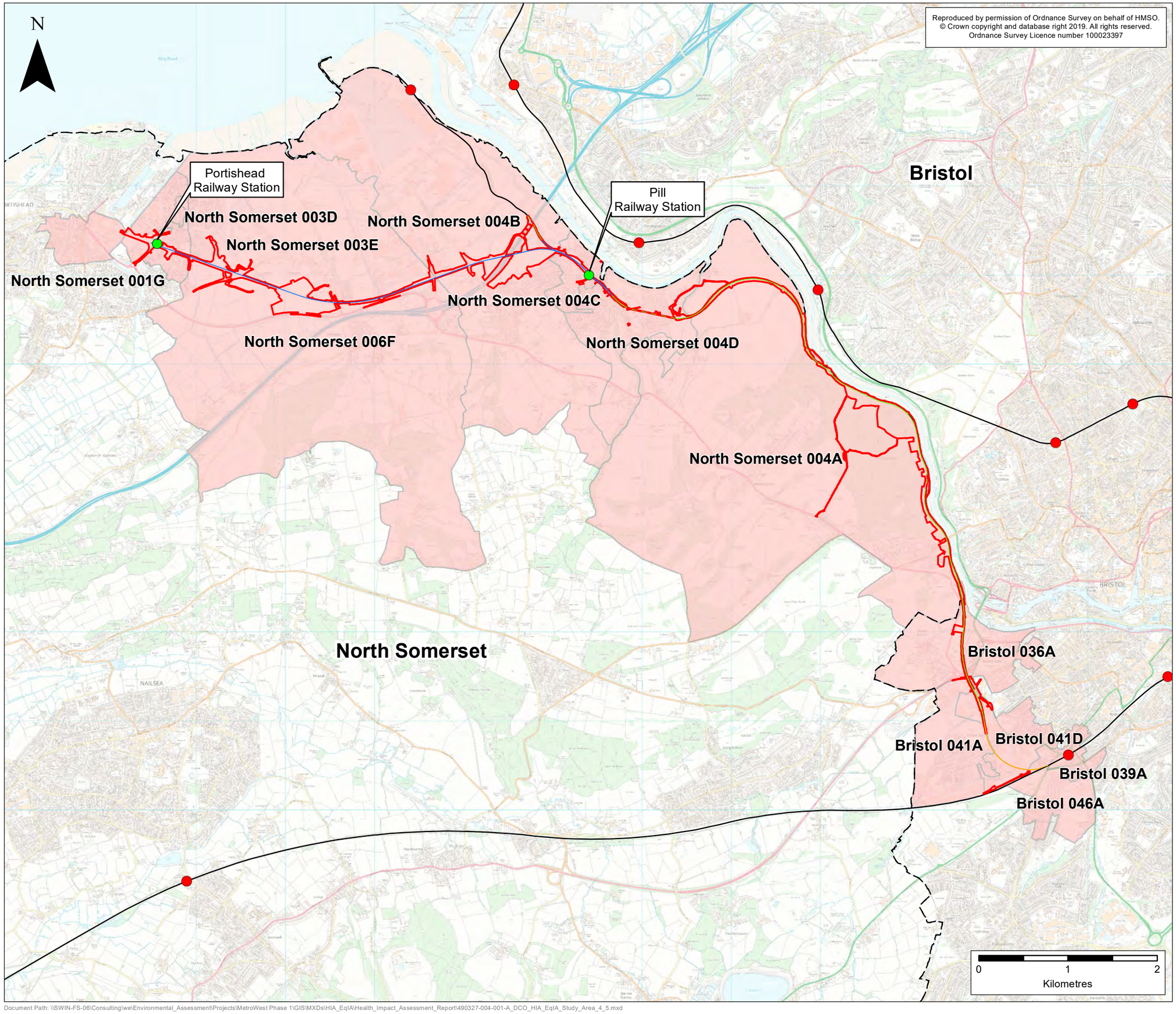

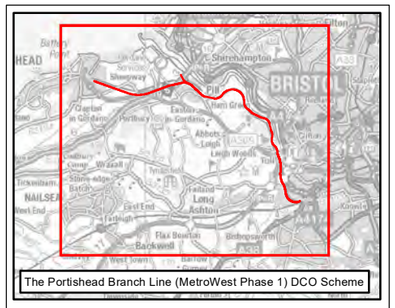

KEY

Local Authority Boundary

IMD (2015) – Income Deprivation

>20%

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

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Project :
Portishead Branch Line (MetroWest Phase 1)

Drawing :
Figure 4.5: Index of Multiple Deprivation - Income Deprivation

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Approved By : Carolyn Francis Date: 14/11/2019

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N

Harbourside Family Practice

Portishead Railway Station

Pill Railway Station

North Somerset 001G

North Somerset 003D

North Somerset 003E

North Somerset 004B

North Somerset 004C

North Somerset 004D

North Somerset 004A

North Somerset 006F

Bristol

North Somerset

Bedminster Family Practice

The Southville Surgery

The Malago Surgery

Bristol 036A

Gaywood House Surgery

Bristol 041D

Bristol 041A

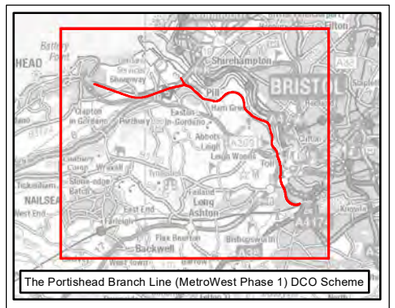
Bristol 039A

Bristol 046A

The Crest Family Practice

The Merrywood Practice

0 1 2
Kilometres



KEY

Local Authority Boundary

IMD (2015) – Health Deprivation and Disability

>5-20%

>20%

GP surgeries with prevalence of depression in adults significantly higher than national value (PHE, 2014)

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 4.6: Index of Multiple Deprivation – Health Deprivation and Disability

Drawn By :	Martin Costello	Date: 14/11/2019
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N

Portishead Railway Station

Pill Railway Station

North Somerset 001G

North Somerset 003D

North Somerset 003E

North Somerset 004B

North Somerset 004C

North Somerset 004D

North Somerset 004A

North Somerset 006F

North Somerset

Bristol

Bristol 036A

Bristol 041D

Bristol 041A

Bristol 039A

Bristol 046A

0 1 2
Kilometres

The Portishead Branch Line (MetroWest Phase 1) DCO Scheme

KEY

Local Authority Boundary

IMD (2015) – Outdoor Living Environment

>5-20%

>20%

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 4.9: Index of Multiple Deprivation – Outdoor Living Environment

Drawn By : Martin Costello Date: 14/11/2019

Checked By : Lucy Stephenson Date: 14/11/2019

Approved By : Carolyn Francis Date: 14/11/2019

Drawing No. : 674946 -003-004-A

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N

Harbourside Family Practice

Portishead Railway Station

Pill Railway Station

North Somerset 001G

North Somerset 003D

North Somerset 003E

North Somerset 004B

North Somerset 004C

North Somerset 004D

North Somerset 004A

North Somerset 006F

Bristol

North Somerset

Bristol 036A

Bristol 041D

Bristol 041A

Bristol 039A

Bristol 046A

Bedminster Family Practice

The Southville Surgery

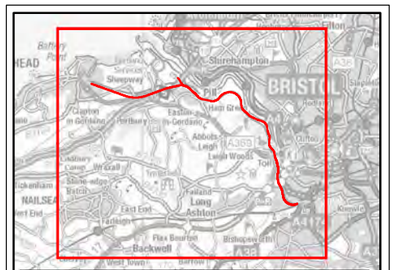
The Malago Surgery

Gaywood House Surgery

The Crest Family Practice

The Merrywood Practice

0 1 2
Kilometres



KEY

Local Authority Boundary

IMD (2015) – Geographical Barriers to Housing and Services

>0-5%

>5-20%

>20%

Existing Railway

Existing Railway Line

Existing Railway Station

Portishead Branch Line

Order Limits

The Nationally Significant Infrastructure Project (NSIP) Works

The Associated Development Works

Section in Tunnel

Proposed Station

Other Works

Network Rail Permitted Development Rights

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Project : Portishead Branch Line (MetroWest Phase 1)

Drawing : Figure 4.10: Index of Multiple Deprivation – Geographical Barriers to Housing and Services

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Approved By :	Carolyn Francis	Date: 14/11/2019

Drawing No. : 674946 -003-005-A

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Drawing Scale : 1:40,000 @ A3

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