



MetroWest+

Portishead Branch Line (MetroWest Phase 1)

TR040011

Applicant: North Somerset District Council

6.5, Environmental Statement, Volume 2, Chapter 2 Description of the Study Area

The Infrastructure Planning (Applications: Prescribed Forms and Procedure)

Regulations 2009, regulation 5(2)(a)

Planning Act 2008

Author: CH2M

Date: November 2019



Notice

© Copyright 2019 CH2M HILL United Kingdom. The concepts and information contained in this document are the property of CH2M HILL United Kingdom, a wholly owned subsidiary of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by Jacobs for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested. Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. This work has been undertaken in accordance with the quality management system of Jacobs.

Document history

Project	Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme
Planning Inspectorate Scheme Reference	TR040011
Part and Application Document Reference	6, 6.5
Document title	Environmental Statement, Volume 2, Chapter 2 Introduction
Regulation Number	Regulation 5(2)(a)
Applicant	North Somerset District Council
Lead Author	CFF at CH2M

Version	Date	Status of Version
Rev: 01	08/11/19	Application Issue

Table of Contents

Chapter		Page
2	Description of the Study Area	2-1
2.1	Introduction	2-1
2.2	Location	2-1
2.3	Built Environment.....	2-3
2.4	Physical Environment	2-7
2.5	Environmental Quality.....	2-13
2.6	The Planning Framework.....	2-15
2.7	References	2-16
2.8	Abbreviations	2-16

CHAPTER 2

Description of the Study Area

2.1 Introduction

2.1.1 This chapter provides an overview of the description of the study area, covering the location of the Portishead Branch Line (MetroWest Phase 1) Development Consent Order Scheme (“the DCO Scheme”), and the main characteristics of the study area. This covers the built environment, the natural environment, environmental quality and the planning framework. Further details on specific topics are provided in the Environmental Statement (“ES”) topic chapters 7 to 18 (DCO Document References 6.10 to 6.21).

2.2 Location

- 2.2.1 The DCO Scheme is located along an existing railway corridor between Portishead and the outskirts of Bristol, in the West of England. Portishead is situated on the coast of North Somerset, in the administrative area of North Somerset District Council (“NSDC”). Portishead is about 3 km south west, and downstream, from the confluence of the River Avon with the Severn Estuary. The railway corridor follows the River Avon upstream, and through the Avon Gorge, on its southern and western (left hand) flank towards the outskirts of Bristol. The branch line joins the main Bristol to Exeter railway line at Parson Street Junction, located to the south west of Parson Street Station.
- 2.2.2 The original railway line was built in the 1860s from Bristol to Portishead and closed in the 1960s. The branch line from Parson Street Junction to Royal Portbury Dock was re-opened in 2002 for freight trains only. The historical development of the railway is described in Chapter 4 Description of the Proposed Works (DCO Document Reference 6.7). The disused railway between Portishead and Pill remains in place and the disused railway corridor has been designated in NSDC's local plan for future transport use.
- 2.2.3 The western end of the railway corridor, protected in NSDC's local plan, lies in the retail area between Harbour Road, Station Road, and Wyndham Way, near the centre of Portishead. The railway corridor extends towards the south east, crossing the Portbury Ditch (which drains in a northerly direction and to the east of Portishead Pier to the Severn Estuary). The railway corridor extends east from Quays Avenue and continues through modern residential areas on the eastern side of Portishead with Trinity Primary School on the north side of the railway corridor.
- 2.2.4 Between Portishead and Pill the railway corridor continues towards the south east and then curves to the north east, crossing the low lying coastal plains of North Somerset. Between Portishead and old Portbury Station on the highway of Sheepway, the land use is predominantly agricultural. From Sheepway to the M5 Avonmouth Viaduct the railway corridor lies between the boundary of Royal Portbury Dock to the north west and agricultural land and the M5 corridor to the south east. In this section, the railway corridor passes under five road bridges carrying the highways of Sheepway, Station Road, Royal Portbury Dock Road, Marsh Lane and the M5. A new cargo

- storage area has recently been constructed between the disused railway line, Court House Farm, Royal Portbury Dock Road and Junction 19 of the M5. This area will be accessed from the port initially by an informal at-grade crossing over the disused railway until a new bridge is constructed (as per a planning condition) by the Port when works on the DCO Scheme commence (the new bridge is not part of the DCO Scheme).
- 2.2.5 On the approach to Pill, the railway corridor curves towards the south east, joining the existing operational Portbury Freight Line from Royal Portbury Dock at Portbury Junction on the immediate outskirts of Pill. Portbury Junction is referred to as a 'ghost' junction as it is not operational. The railway corridor passes through Pill in a south easterly direction, and parallel with the River Avon. Residential properties are along both sides of the railway through Pill Village. On the south west side of the railway, the houses on Lodway Close, Hardwick Road, and Sambourne Lane lie at a higher elevation and some 20 to 40 m from the railway depending on the length of the rear gardens which abut the railway boundary. The residential areas on the north east side of the railway generally lie at a lower elevation than the railway, with the houses on Monmouth Road and Avon Road some 10 to 25 m away from the railway line.
- 2.2.6 The site of the former station platforms in Pill lie north west of Station Road. About 100 m to the east of Station Road, the railway corridor crosses over Pill Viaduct, and continues in a south easterly direction. Housing on Mount Pleasant and Eirene Terrace lie between 10 and 18 m to the south west of the railway depending on the length of the rear gardens. An area of recreational land known as Watchouse Hill lies to the north east of the railway. The railway then enters a tunnel (known both as Ham Green Tunnel and Pill Tunnel). The overlying land use is a mix of public open space including a cricket ground and a residential street.
- 2.2.7 The railway emerges from the tunnel at the former Ham Green Halt (which will not be re-opened as part of the DCO Scheme), crossing the Ham Green Lake on Miles Viaduct. The lake is stocked with fish for recreational fishing and is also locally designated for its wildlife value. The railway swings in a broad loop to follow the River Avon upstream towards Bristol in a general south-south-east direction. This area is predominantly rural with farmland extending northwards to the shores of the River Avon and south towards Leigh Woods. Mature trees line the railway boundary along both sides. About 600 m further east the private road of Chapel Pill Lane passes over the railway providing the only vehicular crossing of the railway between Ham Green and the Clifton Suspension Bridge. The railway then enters the Avon Gorge, parallel to the River Avon, with the River Avon Tow Path running between the river itself and the railway.
- 2.2.8 The railway passes through the lower extents of the heavily wooded western slopes of the Avon Gorge. These woodlands are designated at the European level as the Avon Gorge Woodlands Special Area of Conservation ("SAC") for their woodland and calcareous grassland habitats. They are also designated at the national level for their ecological and geological interest as the Avon Gorge Site of Special Scientific Interest ("SSSI"). The railway is separated from the River Avon by a narrow strip of trees and shrubs, the River Avon Tow Path and sections of flood defences. The river is tidal and at low tide extensive mud banks are exposed. The only settlement in this

section close to the western side of the Avon Gorge is Leigh Woods, which is located above the gorge (and above the railway corridor). Leigh Woods can be accessed from Bristol via the Clifton Suspension Bridge or the A369 Clanage Road. The city of Bristol lies on the east side of the River Avon and the A4 Portway runs along the eastern bank of the river.

- 2.2.9 The railway corridor emerges from the Avon Gorge past the former Clifton Bridge Station site (which will not be re-opened as part of the DCO Scheme), crossing low lying open land between the A369 Clanage Road (from Portishead to Ashton) and the River Avon, running alongside cricket fields, allotments and Brunel Way to the east. The railway corridor passes under the A370 into the Ashton Gate area past the site of the former Ashton Gate Station (which will not be re-opened as part of the DCO Scheme).
- 2.2.10 From the A370 bridge, the railway initially adjoins the A3029 Winterstoke Road, with Ashton Gate Stadium on the eastern side of the road. The railway runs underneath the recently constructed bridge for the MetroBus scheme (“m2 route”), and then passes industrial and retail areas located between the railway and the A3029 Winterstoke Road, including the Imperial Tobacco head office and a large supermarket. The land use along the western side of the railway corridor comprises the Ashton Vale Road Industrial Estate, the Alderman Moore’s Allotments, Ashton Vale residential area, and the Liberty Industrial Park.
- 2.2.11 The railway corridor crosses two streams in Ashton Gate, Longmoor Brook and Colliter’s Brook, which are both culverted in this location and discharge to the River Avon.
- 2.2.12 The railway joins the Bristol to Exeter Mainline at Parson Street Junction, near the A38 Bedminster Down Road Bridge. Parson Street Station is located on the Mainline, about 300 m on the Up line.
- 2.2.13 The main environmental and planning constraints along the railway alignment are summarised below and more detailed information is provided in Chapters 6 to 17 (DCO Document References 6.9 to 6.20).

2.3 Built Environment

Settlements

- 2.3.1 Portishead town has undergone considerable redevelopment and expansion over the last decade with several thousand new homes built at The Vale, the Village Quarter and Port Marine. The whole area was formerly dominated by heavy industry, including two coal fired power stations and a phosphorous works, but these activities had all ceased by the late 1980s. Development since has been typically high density with a modern urban design layout and appearance. The population of Portishead reached approximately 24,000 in 2011 (Census, 2011), a 38% increase in the ten years from the previous census in 2001 and reached 25,847 based on the Office of National Statistics (“ONS”) Mid-Year population estimates for 2015. Portishead is a successful and vibrant town with an active high street. Portishead has strong socio-economic links with Bristol, which serves as the main centre of employment.

- 2.3.2 Pill is an historic village, with Easton-in-Gordano to the south west and Ham Green to the east. The three villages effectively form one urban settlement and are surrounded by Green Belt land. The disused Pill Station is located in the heart of the historic centre of the village. The population of Pill, Easton-in-Gordano and Ham Green is about 6,180 (Census, 2011).
- 2.3.3 Portishead and Pill are located within the North Somerset local authority area, a constituent part of the West of England Local Enterprise Partnership (“LEP”) and the wider South West region. The West of England LEP area covers the cities of Bristol and Bath as well as the Unitary Authority areas of South Gloucestershire, Bath and North East Somerset, and North Somerset. In total, the sub-region is home to more than 1.1 million residents based on the LEP’s baseline estimate for 2017.
- 2.3.4 The West of England LEP area is relatively prosperous both regionally and nationally, benefiting strong business performance, a well-qualified workforce and world-class academic research at a number of major university institutions. The sub-region has a diverse economy, anchored by the City of Bristol and its Temple Quarter Enterprise Zone, supplemented by designated Enterprise Areas across North Somerset, Bath and North East Somerset and South Gloucestershire which are the focus of investment and development. The sub-region has sectoral strengths in high value economic sectors such as advanced engineering, aerospace and defence (for example at Filton), creative and professional/financial services (such as in Bristol’s Temple Quarter), high technology and low carbon industries (as at Emersons Green). Within this context, the sub-region was estimated to generate gross value added of more than £30 billion in 2017 based on the LEP’s baseline estimates.
- 2.3.5 Bristol is the largest city in the West of England and across the wider south west region, with a population of about 428,100 (Census, 2011), which is projected to reach 500,000 by mid-2027 (Bristol City Council, 2016). The city developed on the River Avon, with close links with the sea and international trade. Bristol is a major centre of economic growth and employment in the region, with a strong and rapidly growing economy, characterised by high productivity, a skilled work-force, diverse industrial base, and a strong sense of enterprise and academic excellence. Constraints to growth include infrastructure and poor connectivity. Improvements in public transport within Bristol itself, and between Bristol and the outer lying settlements, would help to unlock development potential in Bristol, encourage a modal shift in traffic from the roads to the railway, and relieve congestion on the local highway network.

Cultural Heritage Assets

- 2.3.6 The area is long settled resulting in a rich variety of cultural heritage assets, including scheduled monuments, archaeological sites, conservation areas, listed buildings, parks and gardens and non-designated heritage features.
- 2.3.7 There are no Scheduled Monuments within 500 m of the disused railway corridor between Portishead and Pill. There is a Scheduled Monument comprising a hill fort at Portbury which lies about 550 m south of the DCO Scheme, on the other side of the M5 to the railway. There are three Scheduled Monuments within 0.5 km of the DCO Scheme in the vicinity of the Avon Gorge. Stokeleigh Camp lies in Leigh Woods on the west flank of

- the River Avon above the Avon Gorge, about 120 m from the railway corridor and approximately 75 m above the DCO Scheme. The site of the Roman settlement of *Abonae* at Sea Mills is on the opposite side of the River Avon to the DCO Scheme. An Iron Age hill fort at Clifton Down Camp is also located on the opposite side of the River Avon, close to the Clifton Suspension Bridge.
- 2.3.8 The railway corridor does not pass through any conservation areas, which are designated for their built architecture. However, there are eight conservation areas within 500 m of the DCO Scheme. Six conservation areas are located on the right hand side of the River Avon in Bristol, which are from north to south, Shirehampton, Sea Mills, Sneyd Park, The Downs, Hotwells and Clifton, and City Docks. Two conservation areas lie on the west side of the River Avon, Leigh Woods and Bower Ashton. The Leigh Woods Conservation Area lies in North Somerset and the rest lie in the City of Bristol.
- 2.3.9 There are many listed buildings within 500 m of the DCO Scheme, mostly within the conservation areas in Bristol at some distance from the DCO Scheme. The most famous is the Clifton Suspension Bridge, a Grade I listed structure, which crosses the Avon Gorge connecting Clifton in Bristol with the suburb of Leigh Woods. The railway corridor lies in a tunnel at the foot of the bridge on the western bank of the River Avon. Other notable listed buildings, mostly Grade II, include the Engineer's House approximately 25-30 m from the Clifton Suspension Bridge, Burwalls on Bridge Road and now part of Burwalls College for Continuing Education in Leigh Woods, and six listed buildings in Bower Ashton.
- 2.3.10 There are also a number of listed buildings outside the conservation areas within 500 m of the DCO Scheme. Between Portishead and Pill, there are 12 listed buildings, including St Mary's Church and churchyard (Grade I) in Portbury and the Church of St George (Grade II*) in Easton-in-Gordano. The remaining buildings close to the DCO Scheme are Grade II and include the White Lion Public House and former sea wall in Portishead, several farm houses (Moor Farmhouse, Elm Tree Farmhouse, Portbury Priors, and Court House Farmhouse), and Portbury Priory.
- 2.3.11 There are a number of listed buildings in and around Pill, all Grade II, including Lodway Croft, Mulberry House and Cottage, the Watch House, and a cluster of four buildings associated with the former Ham Green Hospital.
- 2.3.12 There are no Registered Parks and Gardens within 500 m of the disused section of the railway corridor between Portishead and Pill. The operating railway corridor does pass through the Leigh Court Registered Park and Garden and close to Ashton Court Registered Park and Garden, which are both located on the western flank of the River Avon. There is also an unregistered Park and Garden associated with the former Ham Green hospital in Pill.
- 2.3.13 There are also numerous non-designated heritage features close to and within the railway corridor, comprising components of railway heritage such as the original bridges and formation of the Portishead branch line itself, dating from the 1860s, Portbury Station, Pill viaduct, Ham Green Tunnel,

Ham Green Viaduct and Halt, Clifton Bridge No. 2 Tunnel, the platforms of Clifton Bridge Station, and Ashton Gate Halt.

Transport Infrastructure

- 2.3.14 The main highway network in the area is dominated by the M5. Junction 18 in Avonmouth connects to the A4 Portway 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.
- 2.3.15 The Long Ashton Park and Ride and associated dedicated m2 route to the city centre lies to the south west of Bristol. The section between the Long Ashton Park and Ride and A3029 Winterstoke Road follows a guided busway across Ashton Fields to a new bus stop at Ashton Vale, continues east crossing over the Portishead Branch Line on a skew bridge and follows the railway alignment to the north and west of the A370, from where it diverges to cross The Cut on the Ashton Avenue Swing Bridge before joining Cumberland Road. The highway section continues onto Commercial Road and Redcliff Hill where it connects to a MetroBus network loop around the City Centre at St Mary Redcliffe roundabout.
- 2.3.16 The A370 connects with the A369 Clanage Road and the A3029 Winterstoke Road at a complicated junction in Ashton Gate. The A3029 Winterstoke Road links to the south with the A38 between Bristol and Taunton in the vicinity of Parson Street Station. The A370 links with Brunel Way which connects with the western end of the A4 Hotwell Road and Bristol city centre on the north side of the River Avon while the A370 continues eastwards along the southern shore of the River Avon.
- 2.3.17 There is an existing level crossing over the 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 former allotments and open land to the south.
- 2.3.18 There are several public rights of way and permissive paths along the railway corridor. The Sustrans National Cycle Network (“NCN”) includes several of these. NCN route 41 (“NCN41”) runs along the western shore of the River Avon, next to the operational railway and following the Avon Gorge Tow Path for much of its length through the Avon Gorge. NCN26 uses (under licence from Network Rail) short sections of the disused railway corridor between the M5 Bridge and Royal Portbury Dock Road Bridge. NCN26 is on a dedicated bridleway to the north of and parallel to the railway line. At both the Royal Portbury Dock Road Bridge and Marsh Lane Bridge either the bridleway can be used to cross the roads at carriageway level or cycle and foot users can divert on to permissive paths under the road bridges using the disused railway. To provide a link to Pill a further licence permits cycle and foot users to pass alongside the railway under the M5 Motorway Bridge.
- 2.3.19 In Pill a public right of way passes under the operational railway between Avon Road and Lodway Close.

- 2.3.20 There are also several footpaths and bridleways criss-crossing the countryside in the vicinity of the DCO Scheme.

Socio-economic Profile

- 2.3.21 The socio-economic profiles of Portishead, Pill and the wider West of England region point to a relatively prosperous, open economy with the travel to work area mainly contained within the sub-region, but little evidence of self-containment within individual towns.
- 2.3.22 There are a number of vulnerable or disadvantaged groups in the study area. These include: disabled, ethnic minorities, young people and elderly, and low income groups. However, these groups tend to form a smaller than average proportion of the local population in the study area compared with national averages. The exception is Pill, which is home to an above average proportion of elderly and disabled residents.
- 2.3.23 There are high levels of car ownership in the West of England with around eight out of ten households owning a private car or van. A very high rate of car ownership is also reported in Portishead and Pill, with nearly nine out of ten households owning a private car or van. This suggests an over-reliance on private car ownership, which could be reduced through the provision of an improved public transport network, leading to socio-economic, health, equality and environmental benefits.
- 2.3.24 The West of England is a relatively self-contained travel to work area, with 90% of residents also working within the sub-region. Further, two-thirds of all residents who both live and work in the West of England travel to work using motor vehicles. This suggests a high reliance on private car ownership despite a high rate of containment within the sub-region. This points towards a lack of attractive alternative transport modes for commuting trips.
- 2.3.25 Trends for skills and qualifications, social grading, wages and occupational structure are more mixed. The general trend for Portishead, Pill and the West of England as a whole is positive, resulting in high levels of employment in high-value industries (including financial and business services) where residents are employed in higher end occupations (including senior and managerial professions). This is reflected in the absence of considerable levels of aggregate deprivation in the towns and across the wider context area in general.

2.4 Physical Environment

Topography and Natural Areas

- 2.4.1 The topography in North Somerset and Bristol comprises the low-lying coastal plain backed by alternating ridges and broad river valleys. Portishead itself is built on an area of higher land, which rises to about 100 m above ordnance datum ("AOD"), surrounded by the coastal plains at less than 10 m AOD elevation. A broad ridge of higher land extends from Clevedon, along Tickenham Ridge and through Failand and continues across the River Avon through Clifton and the northern suburbs of Bristol towards the Cotswolds. The River Avon has cut a valley through this ridge of high land, creating the Avon Gorge.

- 2.4.2 The railway corridor crosses two natural character areas defined by Natural England, the Severn and Avon Vales Natural Area (Number 56) and Bristol, Avon Valleys and Ridges Natural Area (Number 62).
- 2.4.3 The Severn and Avon Vales Natural Area is characterised by undulating low-lying land, where the river floodplains regularly flood in winter, including seasonally flooded washlands. There are also relict wetland sites and features such as old pollards, wet pastures, ditches and tall hedges.
- 2.4.4 The Bristol, Avon Valleys and Ridges Natural Area is a complex and variable landscape, characterised by alternating ridges and broad valleys with some steep wooded slopes and open rolling farmland. The large urban expanse of Bristol and the limestone Avon Gorge dominate the central part. Elsewhere the area supports parklands of conservation value, limited areas of calcareous grasslands and a number of significant water bodies including reservoirs and some wildlife-rich rivers and streams.

Land Use and Landscape

- 2.4.5 The urban land uses in the area include residential, commercial and industrial uses in Portishead, Pill and the outskirts of Bristol. The Royal Portbury Dock is a large scale utility landscape characterised by extensive areas of hard surfacing and lighting for the storage of imported goods, mostly vehicles in recent years but also including coal transit facilities. There are extensive areas of countryside, characterised by grazing pasture with fields bounded by hedgerows and patches of woodland.
- 2.4.6 Much of the countryside lies in the designated Green Belt, an important planning designation to protect the countryside from inappropriate development. However, there are no national or local landscape designations.
- 2.4.7 The railway corridor passes through various historic landscape character areas including: late medieval enclosed open fields around Sheepway; post-medieval 15th to 17th century enclosure of anciently reclaimed inland moors on the east side of Portishead and around Portbury; 18th and 19th century parliamentary enclosures near Ham Green; pre-1800 ancient woodland on the west side of the Avon Gorge; post-medieval designed ornamental landscapes in Ham Green, Leigh Court, and Bower Ashton; and 20th century development and infill in Portishead, Pill and Bristol.
- 2.4.8 Between Portishead and Pill, views to and from the DCO Scheme are restricted due to the low lying topography, hedge boundaries around many of the fields, and the trees and shrubs that have grown up along the railway corridor. Recent vegetation clearance within the railway corridor to allow surveys and geotechnical investigations has opened up views of the railway locally. Longer views along the railway corridor are possible from the road crossings and the M5.
- 2.4.9 The urban character of Pill with the elevated viaduct and cuttings and the locally complex landform at Ham Green, where the line passes into a tunnel, result in complex views in and out from the railway line. There are longer views over fields towards Ham Green and across the River Avon to Shirehampton.

- 2.4.10 Views are constrained within the Avon Gorge and views down into the gorge are possible only at specific locations such as the Clifton Suspension Bridge and from certain locations on the edge of the gorge, for example from the Circular Road on The Downs in Bristol. Elsewhere, such as in Leigh Woods, views are constrained by the wooded slopes.
- 2.4.11 As the Avon Gorge opens out towards Bristol, there are longer views out to Ashton Court Estate to the west and the housing in Clifton on the higher ground above Hotwells to the north east on the opposite side of the River Avon. Open views in the industrial and commercial areas of Ashton Gate are constrained by larger buildings and highway infrastructure such as the A370 / A369 Clangage Road / A3029 Winterstoke Road junction. The dense urban nature at Ashton Vale with its larger scale retail and commercial buildings screen views to the railway line from the surroundings. Glimpsed views are possible between buildings, down roads and across car parking areas.

Nature Conservation

- 2.4.12 The importance of the area for nature conservation is evidenced by the European, nationally and locally designated sites, the presence of species of flora and fauna protected by European and national legislation, and areas of ancient woodland.
- 2.4.13 The Severn Estuary is designated as a SAC, Special Protection Area ("SPA"), Ramsar site and a SSSI. Designated areas include the sub-tidal and inter-tidal areas of the Severn Estuary and the lower reaches of the River Avon. The designated areas lie along the North Somerset coast within 1 km north of the DCO Scheme in the vicinity of Portishead and Sheepway and comes within 80 m of the DCO Scheme in the vicinity of Pill. Of relevance to the DCO Scheme are the large populations of over-wintering wildfowl and waders, including protected species, which feed and roost on the foreshore along the Severn Estuary and the River Avon. During wintering bird surveys near Pill in 2014/2015 two qualifying bird species for the SPA designation were observed in very low numbers namely, Common Redshank *Tringa tetanus* and Common curlew *Numenius arquata*.
- 2.4.14 There are six European sites within 30 km of the DCO Scheme which have bats as a qualifying feature, the North Somerset and Mendip Bats SAC, the Mendip Limestone Grasslands SAC, the Bath and Bradford-on-Avon Bats SAC, the Mells Valley SAC, the Wye Valley Woodlands SAC, and the Wye Valley and Forest of Dean Bat Sites SAC.
- 2.4.15 The Avon Gorge Woodlands SAC is designated for its *Tilio-Acerion* forests of slopes, screes and ravines and semi-natural dry grasslands and scrubland facies on calcareous substrate *Festuco-Brometalia*. Two European protected species are found in the SAC, the Greater and Lesser horseshoe bat *Rhinolophus ferrumequinum* and *R. Hipposideros*, although Natural England has stated that the bats are not a reason for the designation.
- 2.4.16 The Avon Gorge SSSI is co-incident in area with the SAC designation and includes the Leigh Woods National Nature Reserve ("NNR"), both of which are designated for their nature conservation interest. Leigh Wood is also listed on Natural England's ancient woodland inventory. The Avon Gorge

SSSI exhibits natural cliffs and quarry exposures of Carboniferous limestone, which are of great geological interest and, together with the scree, scrub, pockets of grassland and adjacent woodland, support an exceptional number of nationally rare and scarce plant species. The woodland includes Pedunculate and Sessile Oak *Quercus robur* and *Q. petraea*, with Ash *Fraxinus excelsior*, Wych Elm *Ulmus glabra*, Small-leaved Lime *Tilia cordata*, Birch *Betula sp* and Whitebeams *Sorbus spp*. The SSSI citation notes that the woods and gorge have an exceptional diversity of Whitebeams *Sorbus spp* including two which are unique to the Avon Gorge, *Sorbus bristoliensis* and *S. wilmottiana*. National rarities are *S. anglica* and *S. eminens*, and the nationally scarce *S. porrigentiformis* occurs. Various tree species have been planted, including Beech *Fagus sylvatica*, Hornbeam *Carpinus betulus* and Spanish Chestnut *Castanea sativa*. The shrub layer is discontinuous and includes Hazel *Corylus avellana* and occasional Field Maple *Acer campestre*, Privet *Ligustrum vulgare*, Hawthorn *Crataegus monogyna*, Spindle *Euonymus europaeus*, Dogwood *Cornus sanguinea* and Yew *Taxus baccata*. The ground flora is very diverse, the main species including Ivy *Hedera helix*, Male Fern *Dryopteris filix-mas*, Bluebell *Hyacinthoides non-scripta*, Ramsons *Allium ursinum*, Dog's Mercury *Mercurialis perennis* and Bramble *Rubus fruticosus*. Other species of note include Wild Service Tree *S. torminalis* and the introduced Swedish Whitebeam *S. intermedia*.

- 2.4.17 There are three other SSSIs designated for their nature conservation value within 2 km of the DCO Scheme. Weston Big Wood SSSI is a mixed deciduous ancient woodland to the southwest of Portishead. Horseshoe Bend at Shirehampton SSSI on the right hand bank of the River Avon (the opposite bank to the DCO Scheme) supports saltmarsh and a wooded river cliff. Ashton Court SSSI, located about 70 m west of the DCO Scheme at the nearest point, is designated for the saproxylic invertebrate fauna (invertebrates dependent on decaying and dead wood) associated with the woodlands and ancient trees in the historic parkland.
- 2.4.18 There are a number of non-designated local wildlife sites within 500 m of the DCO Scheme, eight of which adjoin the railway corridor. The Portbury Wharf Nature Reserve lies on the eastern side of Portishead, between the railway corridor and the Severn Estuary SAC, SPA, Ramsar site, and SSSI. The Portishead Eco Park separates the Portbury Wharf Nature Reserve from the housing on the outskirts of Portishead and was created to mitigate the loss of habitat and provide flood attenuation resulting from the construction of housing in this area. Between Sheepway and Pill, the Drove Rhyne and a number of fields are designated local wildlife sites. Along the railway corridor, the Avon Gorge and Leigh Woods are designated wildlife sites as is the part of the Portishead Branch Line that is designated as the Bower Ashton Mineral Railway Site of Nature Conservation Interest ("SNCI"). Bristol City Council has also designated wildlife corridors along the railways.
- 2.4.19 A variety of protected species of fauna are known to occupy the habitats along and adjoining the railway corridor. There are records of amphibians, including Great crested newts, Smooth newt, Common frog and Common toad. Reptiles are widespread, including Grass snake and Slow worm, as well as invertebrates. The mammals Badger, Otter, Water Vole, and various

species of Bat are present. Dormice are recorded in the ancient woodlands in the Avon Gorge. Nesting birds are found throughout the area.

- 2.4.20 The invasive plant species Japanese knotweed has been found in isolated patches along the railway corridor and has been treated where it occurs in Portishead on NSDC owned land, and falling under Network Rail's management processes on the rest of the rail corridor. The biodiversity of the Avon Gorge Woodlands SAC and Avon Gorge SSSI is also affected by invasive plant species such as Holm oak *Quercus ilex*, Turkey oak *Quercus cerris*, Rhododendron *Rhododendron sp*, Buddleia *Buddleia sp*, Cherry laurel *Prunus laurocerasus*, and Sweet Chestnut *Castanea sativa*.

Surface Water Resources

River Catchments

- 2.4.21 The DCO Scheme extends along the coastal plain of North Somerset and the left¹ (south and west) bank of the River Avon.
- 2.4.22 The coastal plains are drained by an extensive network of small field drains and ditches, many of them heavily overgrown. Two of them, the Portbury Ditch and The Cut, flow through Portishead. The two principal streams between Portishead and Pill are the Drove Rhyne and the Easton-in-Gordano stream. Drove Rhyne rises to the south of the M5 and crosses under the motorway at two locations one on either side of Junction 19 and flows parallel to the railway corridor between Royal Portbury Dock Road and The Drove and then flows north to discharge to the Severn Estuary. The Easton-in-Gordano stream, which is culverted through the village of the same name, flows through part of the port and discharges to the River Avon. Markham Brook is culverted through Pill and discharges to the River Avon. There are also a number of small ponds and marshy, poorly drained areas.
- 2.4.23 The study area lies within the catchment of the River Avon, a tributary of the River Severn. The River Avon has a large catchment area of approximately 2,220 km² encompassing the major cities of Bristol and Bath. The primary river flows from its source upstream of Malmesbury south then west for approximately 134 km through gentle rural landscapes and towns such as Bradford-on-Avon, Bath, and Bristol, before flowing through the Avon Gorge to Avonmouth, and into the Severn Estuary.
- 2.4.24 The lower River Avon is tidal, with one of the largest tidal ranges in the world. In Bristol the water levels can rise and fall twice a day by up to 12 m. At low tide the amount of shipping on the Avon is restricted as the water depth is reduced and the watercourse narrowed as extensive mud flats are exposed. By the late 18th century this tidal regime was beginning to affect the growth of shipping in Bristol. As a result, the Floating Harbour was conceived to provide some 28 ha of non-tidal harbour. The River Avon was dammed upstream at Totterdown and downstream at Rownham. The water level was controlled by the construction of Netham Weir, Netham Lock and a feeder canal to Totterdown and an overspill weir at Rownham. The New Cut was dug between Totterdown and Rownham to carry the tidal River

¹ The left and right hand banks of a river assume the respondent is facing in the downstream direction.

Avon and provide navigation for smaller vessels. These works facilitated the growth of Bristol as a major port through the 19th and into the 20th century.

- 2.4.25 At the eastern end of the DCO Scheme in the Ashton Gate area, the railway corridor crosses two streams, Longmoor Brook and Colliter's Brook, both of which are extensively culverted through the urban areas of Bristol, and discharge to the River Avon.

Flood Zones

- 2.4.26 Much of the DCO Scheme area between Portishead and Pill lies partly within Flood Zones 2 and 3 as defined by the Environment Agency. However, this area is defended from tidal flooding from the Severn Estuary by existing flood defences, namely the Sea Commissioner's Bank and an inland bund defence. Flood modelling indicates that the disused section of the railway would not be flooded under present-day conditions for all tidal return periods up to the 1000 year event. The Easton-in-Gordano stream is at risk from tidal flooding from the River Avon and fluvial flooding during heavy rainfall. Modelled flood levels are below the railway level for the 1000-year return period tidal and fluvial flood events.
- 2.4.27 Tidally dominated flooding from the River Avon in Bristol only affects a small area of the DCO Scheme, as much of the existing operational railway line through the Avon Gorge is significantly above the Avon flood plain. The low lying area around Bower Ashton lies in Flood Zone 3 and floods approximately once every 5 to 10 years. The DCO Scheme area around Colliter's Brook lies in Flood Zone 2.

Climate Change

- 2.4.28 The predicted future forecast rise in sea level due to climate change would increase the risk of flooding. Assuming no change in the current provision of flood defences, flood modelling indicates that the disused section of the railway would not be flooded under 2075 conditions for all tidal return periods up to the 1000 year event. The coastal flood inundation of the disused railway between Portishead and Pill is projected to increase to once every 200 to 1000 years on average by 2115. Portishead station and car parks and the pedestrian crossing of Portbury Ditch are forecast to be above the 200-year coastal flood level in 2075 and in 2115. The fluvial flood risk from Portbury Ditch, Drove Rhyne and Easton-in-Gordano stream is not considered to be material.
- 2.4.29 The operational railway along the Avon Gorge would not be affected by climate change. Flood modelling indicates that in 2075 and 2115 the operational railway will be outside of the Colliter's Brook and Longmoor / Ashton Brook 50-year return period flood extent and within the 75-year return period flood extent, and both streams are culverted under the railway in this location. In the Bower Ashton area the modelling suggests that this area would flood approximately once every year on average in 2075, and more frequently than once every year on average by 2115.

Geology and Groundwater Resources

- 2.4.30 The geology of the area between Portishead and Pill comprises the Mercia Mudstone Group for the most part overlain by Tidal Flat Deposits. There are deposits of artificial ground in Portishead. The higher ground of the Avon

Gorge is composed of Carboniferous limestone. Coal bearing strata are found around Ashton Gate in Bristol.

- 2.4.31 There are two SSSIs designated specifically for their geological interest within 500 m of the DCO Scheme. The Ham Green SSSI comprises a railway cutting through which the Portishead Railway passes which has exposed a geological sequence through Pleistocene and Carboniferous sediments. Quarry Steps Durdham Downs SSSI, on the opposite side of the River Avon to the DCO Scheme is designated for its fossil assemblage. While the Avon Gorge SSSI is primarily designated for the ecology, the citation also mentions the natural cliffs and quarry exposures of Carboniferous limestone.
- 2.4.32 The Mercia Mudstone Group is classified as a Secondary B aquifer - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers. The Carboniferous sediments are classified as a Principal aquifer; these are layers of rock having high permeability and can provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. The Devonian sandstones are classified as Secondary A aquifers; permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- 2.4.33 There are no groundwater source protection zones or groundwater abstraction licences within 250 m of the DCO Scheme. There are two groundwater abstractions within 1 km, one within Portbury Docks off Marsh Lane and one for the motorway service area at Junction 19 on the M5. There are no nitrate vulnerable zones in the area.
- 2.4.34 Slope instability is a known risk in the Avon Gorge, with recorded incidents of stones and boulders slipping downslope and rock falls. Some individual trees naturally become unstable and fall downslope, while others are damaged by rock fall. Network Rail carries out regular visual inspections of the rock face throughout the gorge. Stone picking, rock bolting and catch nets are already applied in the gorge to protect the freight line services.
- 2.4.35 In the past, limestone quarries have been mined in the Avon Gorge and coal mining has occurred in the Ashton Gate area.

2.5 Environmental Quality

Water Quality

- 2.5.1 The River Avon is tidal throughout the study area and is a transitional waterbody with mixed fresh and saline water. There are extensive intertidal areas along both banks which are exposed at low tide. The river is heavily modified due to flood protection works, navigation and the quay line. The water quality is good and the current ecological quality is stated to be moderate “potential”, indicating that the ecology cannot achieve natural conditions due to the heavily modified nature of the water body.
- 2.5.2 The small calcareous water bodies such as the Portbury Ditch, Easton-in-Gordano stream, Markham Brook, and Colliter’s Brook are either artificial

(drainage ditches) or are heavily modified and there is little information on their water quality and ecology.

- 2.5.3 The current chemical quality of the ground water in the Portishead Mercia Mudstone and the Carboniferous Limestone (Bristol) is good and in the Bristol Triassic it is reported to be poor in the Severn River Basin Management Plan (Environment Agency, 2015).

Air Quality

- 2.5.4 An Air Quality Management Area (“AQMA”) has been declared for the city of Bristol for nitrogen dioxide (“NO₂”) and particulate matter (“PM₁₀”) indicating that air quality is approaching or exceeding the air quality objectives for these pollutants. NO₂ and PM₁₀ are strongly associated with the burning of fossil fuels and transportation is a major source of contributions. The AQMA covers the city centre and the main radial roads out of the city. Elsewhere, NO₂ and PM₁₀ are below the air quality objectives and there are no AQMAs in North Somerset.

Ambient Noise

- 2.5.5 Ambient noise levels vary across the study area, with typically higher levels in urban areas compared with rural areas. In Portishead, daytime noise levels are typically 45 to 55 dB(A) falling to 38 to 48 dB(A) at night. The noise climate is made up of various noise sources, including the distant M5 Motorway traffic, local traffic, bird song, high aircraft, and activities around Trinity Primary School.
- 2.5.6 Around Sheepway, the noise levels are between 50 and 55 dB(A), falling by about 4 dB(A) at night. The noise climate is dominated by the M5 traffic, with other noise sources including local traffic, bird song, and occasional aircraft.
- 2.5.7 In Pill daytime noise levels are typically around 50 dB(A), with the noise climate comprised of distant motorway noise, local traffic, infrequent freight trains, and bird song. In more rural locations, such as Chapel Pill Lane, the noise levels were lower between 40 to 48 dB(A). The difference between day and night time noise levels is typically 3 to 7 dB(A).
- 2.5.8 Daytime noise levels in the Avon Gorge are relatively high for a rural location at about 59 dB(A), although this reflects the proximity of the heavily trafficked A4 Portway on the opposite side of the river to the DCO Scheme and the reflection of noise off the cliffs in the gorge. In the Ashton Gate area noise levels are consistently about 50 dB(A) during the daytime and about 45 dB(A) at night. The noise climate is comprised of local traffic, although passing freight trains are clearly audible in the vicinity of the railway.

Ground Conditions

- 2.5.9 Historic land uses and the made ground in Portishead have resulted in contaminated land conditions, which has been attended to as brownfield sites have been redeveloped. There are two historic landfill sites near the disused railway, Priory Farm landfill which lies between the disused railway and A369 Portbury Hundred and another site further from the disused railway near Elm Tree Farm. In Pill, the potential car parking area may be affected by residual contamination associated with the historical use of the

site as a railway goods yard. There are also historical landfill sites in the Ashton Vale area of Bristol.

- 2.5.10 Trackbed investigations have shown that there are sections of contaminated ballast along the railway corridor, possibly due to the re-use of contaminated material in the original construction and the deposition of contaminants associated with railway use over a hundred years such as hydrocarbons and asbestos.

2.6 The Planning Framework

- 2.6.1 Bath & North East Somerset, Bristol City and South Gloucestershire authorities formed the new West of England Combined Authority (“WECA”) in February 2017. This has seen a transfer of new strategic powers and responsibilities from Central Government to local decision-makers and secured control over investment in key transport infrastructure projects in the three West of England authorities. NSDC is not part of WECA, however there is a continued commitment to work with WECA and the other authorities on strategic transport issues, governed through the West of England Joint Committee.
- 2.6.2 In November 2018, WECA became a joint promoter of MetroWest Phase 1 with NSDC, taking over responsibility from Bristol City Council, Bath & North East Somerset Council and South Gloucestershire Council.
- 2.6.3 The DCO Scheme passes through two local authorities, NSDC and Bristol City Council. A detailed description of the planning framework is provided in Chapter 6 (DCO Document Reference 6.9), while an assessment of compliance of the DCO Scheme with policy is provided in the Planning Statement (DCO Reference 8.11).
- 2.6.4 A location for a station in Portishead and the railway corridor have been safeguarded in local policy plans for over a decade. In North Somerset the DCO Scheme passes through the Green Belt, which has been designated to protect the countryside from the expansion and coalescence of urban areas.
- 2.6.5 Both NSDC and Bristol City Council have policies to protect the natural environment, including sites of nature conservation sites and geological and geomorphological sites, as well as cultural heritage and the built environment, such as archaeological sites, conservation areas and listed buildings. There are also policies to avoid unsuitable development in flood risk areas.
- 2.6.6 A review of proposals on the Planning Inspectorate’s website shows a number of other nationally significant infrastructure projects within a 10 km radius of the DCO Scheme. The most notable project is the National Grid Hinkley Point C Connection Project, as the proposed electricity transmission lines will cross the DCO Scheme between the eastern side of Portishead and Sheepway.
- 2.6.7 Bristol Port Company which owns the Royal Portbury Dock recently developed an additional vehicle storage area at Court House Farm on the south side of the disused railway corridor. In the last ten years the Council has also approved a number of developments in Portishead near the marina and Harbour Road which have led to increased density of commercial and

- residential urbanisation in the vicinity of the proposed location of Portishead Station.
- 2.6.8 Bristol City Council and NSDC have promoted public transport, with the construction of the MetroBus corridor between the Long Ashton Park and Ride and Bristol Temple Meads. The former Alderman Moore's Allotments off Silbury Road and adjoining the railway corridor have been allocated for housing, now under construction, and would be served by MetroBus.
- 2.6.9 The West of England Joint Spatial Plan plans to provide a framework for delivering up to 105,000 net additional homes between 2016 and 2036, across the four West of England authorities, North Somerset, Bristol City Council, South Gloucestershire, and Bath and North East Somerset, once adopted. The consultation plan points to strategic development locations to the south of the study area in Nailsea, Backwell, the M5 to A38 transport corridor and south east Bristol. To the north of the study the locations are in the North and East fringe of Bristol (South Gloucestershire). Urban intensification is proposed for Bath, Bristol, the North and East fringe and Weston-super-Mare. Strategic employment locations in Avonmouth, Bristol, Bath, Weston-super-Mare and the Somer Valley are also proposed. These requirements point to future trends of increasing urbanisation and the need for improved transport links between the new development and employment centres.

2.7 References

Bristol City Council, 2016. The population of Bristol.

Environment Agency, 2015. Severn River Basin District River Basin Management Plan.

Office for National Statistics 2015. Population estimates for the UK, England and Wales, Scotland and Northern Ireland: mid-2015.

2.8 Abbreviations

AOD	Above ordnance datum
AQMA	Air Quality Management Area
dB(A)	'A' weighted decibels
DCO	Development Consent Order
ES	Environmental Statement
km	kilometre
LEP	Local Enterprise Partnership
m	metre
m2 route	The MetroBus route between Long Ashton Park and Ride and Bristol city centre
NNR	National Nature Reserve
NO ₂	Nitrogen dioxide
NSDC	North Somerset District Council
ONS	Office of National Statistics

PM ₁₀	Particulate matter with a diameter <10 µm
SAC	Special Area of Conservation
SNCI	Site of Nature Conservation Interest
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WECA	West of England Combined Authority

ch2m.SM