



**MetroWest** 

**Portishead Branch Line (MetroWest Phase 1)**

**Project**

**Baseline Report**

**June 2015**

**travelwest** 

Bath & North East Somerset, Bristol, North Somerset and South Gloucestershire  
Councils working together to improve your local transport



BASELINE REPORT

# Portishead Branch Line (MetroWest Phase 1)

*Prepared for*

North Somerset Council

June 2015



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# Document History

## Portishead Branch Line (MetroWest Phase 1)

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# Acronyms and Abbreviations

ALC	Agricultural land classification
AONB	Area of Outstanding Natural Beauty
APIS	Air Pollution Information System
AQMA	Air quality management area
AQS	Air quality standard
ASHE	Annual Survey of Hours and Earnings
ATC	Automatic Traffic Construct
AURN	Automatic Urban Rural Network
B&NES	Bath & North East Somerset Council
BAP	Biodiversity Action Plan
BCC	Bristol City Council
BCCLP	Bristol City Council Local Plan
BGS	British Geological Survey
BRERC	Bristol Regional Environmental Records Centre
BRES	Business Register and Employment Survey
CA	Conservation Area
CAMS	Catchment Abstraction Management Strategies
CO <sub>2</sub>	Carbon dioxide
CSR	Comprehensive spending review
DAS	Discretionary Advice Service
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DFT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DoB	Defence of Britain
DPD	Development Plan Document
EA	Environment Agency
EC	European Commission
EH	English Heritage
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
GHG	Greenhouse gas
GRIP	Governance for Railway Infrastructure Projects

ACRONYMS AND ABBREVIATIONS

HA	Highways Agency
HER	Historic Environment Record
HLC	Historic Landscape Characterisation
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
IAN	Interim Advice Note
IDB	Internal Drainage Board
IDBR	Inter-Departmental Business Register
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
IMD	Indices of Multiple Deprivation
IPPC	Intergovernmental Panel on Climate Change
IROPI	imperative reasons of overriding public interest
JLTP	Joint Local Transport Plan
JNCC	Joint Nature Conservation Committee
JSA	Job-seekers allowance
LAQM	Local Air Quality Management
LDF	Local Development Framework
LEP	Local Enterprise Partnership
LFRMS	Local Flood Risk Management Strategy
MAGIC	Multi-Agency Geographic Information for the Countryside
NAEI	National Atmospheric Emissions Inventory
NCA	National Character Area
NDP	Neighbourhood Development Plans
NE	Natural England
NGR	National Grid Reference
NMR	National Monuments Record
NN NPS	National Networks National Policy Statement
NNR	National Nature Reserve
NMU	Non-motorised users
NO <sub>2</sub>	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
NSC	North Somerset Council
NSIP	Nationally Significant Infrastructure Project
NVZ	Nitrate Vulnerable Zone
OD	Ordnance Datum

OHLE	Overhead line electrification
OS	Ordnance Survey
PM <sub>10</sub>	Particulate matter (diameter of 10 µm)
PRoW	Public rights of way
RBD	River Basin District
RBMP	River Basin Management Plan
RG&G	Registered Park and Garden
SAC	Special Area of Conservation
SADMP	Site Allocations and Development Management Policies Document
SEB	Statutory environmental body
SEP	Strategic Economic Plan
SGC	South Gloucestershire Council
SHC	Somerset Heritage Centre
SLM	Sound Level Metre
SM	Scheduled monument
SMP	Shoreline management plan
SNCI	Site of National Conservation Interest
SPA	Special Protection Area
SP	Structure Plan
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
TA	Transport Assessment
TQEZ	Temple Quarter Enterprise Zone
WCA	Wildlife and Countryside Act
WFD	Water Framework Directive
WHS	World Heritage Site
WPZ	Water Protection Zone
WS	Wildlife Site
WWI	World War I
WWII	World War II
ZTV	Zone of theoretical visibility
<b>Units</b>	
ha	Hectare
m	metre
km	kilometre
Kt	Kilotonne



# Introduction

- 1.1.1 The four West of England authorities, North Somerset Council ("NSC"), Bristol City Council ("BCC"), Bath and North East Somerset Council ("B&NES") and South Gloucestershire Council ("SGC"), are jointly promoting a programme of rail enhancement projects known as MetroWest. The MetroWest programme includes MetroWest Phase 1, Phase 2 and smaller projects such as specific new/re-opened stations. MetroWest Phase 1 proposes to re-open the Portishead rail line with stations at Portishead and Pill and operate half hourly train services to Bristol Temple Meads and through to the Severn Beach line to Avonmouth (hourly beyond Avonmouth), and provide a half hourly train service for local stations between Bristol Temple Meads and Bath Spa. MetroWest Phase 1 is being led by North Somerset Council (on behalf of the four councils) as a third party rail project working with Network Rail.
- 1.1.2 The passenger train service to Portishead ceased in the 1964, under the Beeching cuts. Freight trains continued to operate to Portishead to serve heavy industry until the mid-1980s. In 2002 a major part of the line was reopened between Parson Street Junction (which connects with the main southwest Bristol) and Pill and Royal Portbury Dock. West of Pill the 5 km of railway to Portishead remains dis-used although much of the railway infrastructure (including the track) is still in place. Engineering feasibility work undertaken in 2014 (Network Rail GRIP stage 2) identified a need to replace the track and signalling assets and undertake associated enhancement works. The railway land is partly overgrown, although some minor vegetation clearance has been undertaken to enable topographical surveys and inspection of engineering structures.
- 1.1.3 Small sections of the route have been partly re-laid as a permissive cycle path, (national cycle route 26), the cycle path using the edge of the rail alignment at three rail bridges. The site of the former station at Portishead has been redeveloped. However, following an optional appraisal process a new site for Portishead station has been identified. At Pill, the former station is to be reopened using the dis-used southern platform with associated works. The old station at Portbury has been converted to a private house, however no intermediate stations are proposed between Portishead and Pill. The railway corridor from its terminus in Portishead to Portbury old station is owned by NSC and the railway corridor from Portbury old station to the junction with the Portbury Freight Line at Pill is owned by Network Rail. The whole dis-used route, including the proposed location for a new station in Portishead and re-opening Pill station, is safeguarded in the NSC local plan.
- 1.1.4 The freight line ("Portbury Freight Line") between Portbury Dock and its junction with the south west main line (Parson Street Junction) is an operational railway, and Portbury Dock has commercial rights to run up to 20 freight trains per day in each direction. There are currently no passenger services on this line. The Portbury Freight Line comprises predominantly a single track railway, with a viaduct at Pill and four tunnels along the section through the Avon Gorge. There is a section of double track west of Parson Street Junction to east of Ashton Gate level crossing. Network Rail has indicated that the line was originally built with extensive sections of double tracking except for the section of line through which the four tunnels are located. Train movements are governed by a basic token operated signalling system, which requires manual interaction from train drivers.
- 1.1.5 The proposed works to re-open the Portishead line are classed as a nationally significant infrastructure project ("NSIP") under the Planning Act 2008 and planning consent will be sought under a Development Consent Order ("DCO"). The DCO Application will apply to the disused section of the railway line between Portishead and Pill, the section of the Portbury Freight Line from the entrance to Royal Portbury Dock through Pill to the eastern end of Pill Tunnel, two short sections on the Portbury Freight Line at Ashton Gate Level Crossing and Barons Court Pedestrian Crossing and the proposed sites for Portishead and

Pill and associated car parking. The Project for which planning consent is required through a DCO is known as "Portishead Branch Line (MetroWest Phase 1)". The location of the Project, within the context of MetroWest Phase 1, is shown in Figure 1.1 in Appendix A.

1.1.6 The Project entails re-opening 5 km of disused railway between Portishead and Pill and upgrade works to the Portbury Freight Line, between Parson Street Junction and Portbury Dock Junction. The infrastructure that requires planning consent through a Development Consent Order includes:

- Rebuilding the disused Portishead to Pill line (5 km)
- Closure of historic and permissive crossings and where appropriate provision of alternative access arrangements locations
- A possible provision of fully accessible pedestrian bridge near Trinity Primary School
- New station at Portishead including car park, pedestrian and cycle link to the town centre and highway alterations to Quays Avenue/Harbour Road/Phoenix Way
- Reopening of former station at Pill and new fully accessible pedestrian bridge and car park
- Double track works through Pill (including widening of the Avon Road bridge underpass)
- Improvements to highway access to Pill tunnel and other locations
- New signalling for the branch line from Parson Street Junction to Portishead
- Environmental mitigation measures.

1.1.7 Further works will be required along the Portbury Freight Line which will be undertaken by Network Rail under their permitted development rights. These works include:

- Minor lifting and modifications to the track alignment
- A new signal in the Avon gorge
- Improvements in highway access for maintenance
- A new track to provide double tracking from Bower Ashton to Ashton Gate
- Enhancement of Parson Street Junction

1.1.8 In addition to the above, some infrastructure enhancement works are required to the operational railway (beyond the Portishead Branch Line) to implement all the projects promoted for MetroWest Phase 1. These works will be implemented using Network Rail's general permitted development rights and will not form part of the DCO Application:

- Partial reinstatement of down relief line at Bedminster, known as "Bedminster Down Relief Line (MetroWest Phase 1)"
- Additional signal on the Avonmouth to Severn Beach line, known as "Severn Beach / Avonmouth Signalling (MetroWest Phase 1)". Two options are under consideration, Option 6B to site the signal at Avonmouth station and Option 5B to site the signal between Avonmouth and Severn Beach.
- Bathampton turn-back (track crossover and signalling to allow trains to turn around at Bath off the main line) known as the "Bathampton Turnback (MetroWest Phase 1)"

1.1.9 The potential impacts arising from these works will be considered in the environmental impact assessment ("EIA") of the Portishead Branch Line (MetroWest Phase 1) Environmental Statement as part of the cumulative impacts assessment.

- 1.1.10 This Baseline Report has been prepared on behalf of NSC to describe the key characteristics of the environment in the vicinity of the Portishead Branch Line (MetroWest Phase 1). The baseline is presented in the following chapters:
- planning and legislation framework,
  - air quality and carbon,
  - cultural heritage,
  - ecology and biodiversity,
  - geology, hydrogeology, ground conditions and contaminated land,
  - landscape and visual,
  - materials and waste,
  - noise and vibration,
  - socio-economics, regeneration, health and equality,
  - soils, agriculture and land use,
  - transport, access and non-motorised users, and
  - water resources, drainage and flood risk.
- 1.1.11 The accompanying drawings are presented in Appendix A, with the exception of some small drawings which are included in the main report. Baseline data for Bathampton Turnback, Severn Beach / Avonmouth Signalling, and Bedminster, are provided in Appendix B. The results of ecological surveys are presented in Appendix and data from the Envirocheck search are presented in Appendix D.
- 1.1.12 The baseline studies have been based on data collected from various sources, including documentary sources, maps, historic records, in confidence meetings with the statutory consultees, field surveys and Network Rail GRIP Stage 2 engineering feasibility report, drawings and deliverables. The methods for the baseline surveys largely follow the Highways Agency's Design Manual for Roads and Bridges ("DMRB") and Interim Advice Notes ("IAN"), which are appropriate for a linear transportation scheme. The study area for data collection and field surveys is based on the potential area of direct and indirect effects of the Project on people and the environment. The study area varies with the topic under consideration and is defined in the topic chapter.
- 1.1.13 A separate Scoping Report has been prepared setting out the proposed approach to the EIA of the Portishead Branch Line (MetroWest Phase 1) which provides additional information on the Project including the Red Line drawings showing the physical extent of the project.
- 1.1.14 Further information about the project is contained in the Preliminary Business Case (September 2014) which is available from [www.travelwest.info/metrowest](http://www.travelwest.info/metrowest).





# Planning Framework

## 2.1 Introduction

2.1.1 This section describes the policy framework relevant to MetroWest Phase 1, which will be implemented across all four planning authorities in the West of England, and provides an overview of the key relevant planning policies and guidance at national, regional and local levels. As Portishead Branch Line (MetroWest Phase 1) Project involves substantial physical works, most consideration is given to the relevant planning policies of NSC and BCC through which the Project passes.

## 2.2 National Framework

### Overview

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

### Planning Act 2008<sup>1</sup>

2.2.2 The Planning Act 2008 introduced the DCO regime as the means of seeking planning permission for developments categorised as NSIPs. These include railway schemes, where the railway when constructed [or altered] will be wholly within England, is part of a network operated by an approved operator, and where the construction is not permitted development.

2.2.3 The Highway and Railway (Nationally Significant Infrastructure Project) Order 2013 amended Section 25 of the Planning Act 2008 on railways to include within the definition of an NSIP a stretch of track with "*a continuous length of more than 2 kilometres*" that "*is not on land that was operational land of a railway undertaker immediately before the construction work began or is on land that was acquired at an earlier date for the purpose of constructing the railway*".

2.2.4 The proposed works for the new railway between Portishead and Portbury on NSC land is considered to be a NSIP for the following reasons.

1. The scheme when built will be wholly in England.
2. The scheme will form part of a network operated by an approved operator.
3. The proposed new section of railway exceeds the threshold length of 2km.

2.2.5 In addition to the railway, which is the principal development for which development consent is required under the Planning Act 2008, other development is required as part of MetroWest Phase 1. Permission for this could be sought under other consenting and planning regimes. However, section 115 of the Planning Act 2008 provides that, in addition to the principal development, consent may also be granted in a DCO for 'associated development'. In considering whether other works that form part of MetroWest Phase 1 are 'associated development' and can be included within the DCO application for the principal development, regard has been had to the Department for Communities and Local Government's ("DCLG") advice in *Planning Act 2008: Guidance on Associated Development Applications for Major Infrastructure Projects* (DCLG, 2013). Annex B to the guidance

<sup>1</sup> Section 14(1)(k) of the Planning Act 2008 defines an NSIP as the construction or alteration of a railway and Section 25(1) and (2) further defines an NSIP including the construction and alteration of projects.

identifies typical associated developments for railway schemes to include new stations and alterations and extensions to existing platforms.

- 2.2.6 The application for DCO will be prepared in accordance with section 37 of the Planning Act 2008 and secondary legislation including the EIA Regulations. The request for the Scoping Opinion forms part of the pre-application stage, which is the first of six stages in the development consent regime. In preparing the application for the DCO the Applicant will have regard to the series of advice notes published by the Planning Inspectorate that provide useful information about the Planning Act 2008 process (as amended by the Localism Act 2011). These include Advice note 3 *The Planning Inspectorate and Nationally Significant Infrastructure Projects* and Advice note 7 *Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping*.

## The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009

- 2.2.7 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 SI (as amended) (the "EIA Regulations") set out the requirements for undertaking an EIA for a NSIP. The EIA Regulations provide that where development of a type listed in Annex 2 of the EIA Regulations is likely to give rise to significant environmental effects, the Secretary of State for Transport ("the SoS") cannot lawfully grant development consent for the development until they have taken into account the environmental information required by the EIA Regulations. Environmental information comprises the information required to be provided by the applicant in the form of an environmental statement ("ES"), including any further or other information, any representations made by specified consultees and any representations duly made by any other person about the environmental effects of the development.
- 2.2.8 An EIA is required for all Schedule 1 developments and for Schedule 2 developments which are "*likely to have significant effects on the environment by virtue of factors such as its nature, size or location*". Schedule 1 developments include "*construction of lines for long distance railway-traffic*"<sup>2</sup> and Schedule 2 developments include "*Construction of railways (unless included in Schedule 1)*"<sup>3</sup>. Schedule 3 to the EIA Regulations provides criteria for determining whether a Schedule 2 development requires an EIA. Schedule 4 to the Regulations identifies the information to be included in the ES.
- 2.2.9 The Project is considered to be a Schedule 2 development which is likely to give rise to significant adverse effects and thereby is EIA Development.

## National Policy Statements

- 2.2.10 Government advice on infrastructure proposals of national significance is variously published by the relevant Government department in the form of NPSs. The NN NPS was adopted in December 2014.
- 2.2.11 Within its introductory paragraph the NN NPS confirms its role is to set out "*the need for, and Government's policies to deliver, development of nationally significant infrastructure projects (NSIPs) on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State*". The Project will be considered in relation to its compliance with NN NPS.

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<sup>2</sup> Schedule 1 to the EIA Regulations Section 7(a)

<sup>3</sup> Schedule 2 to the EIA Regulations Section 10(d)

- 2.2.12 The Government's vision and strategic objectives for the national networks are defined as follows:
- "The Government will deliver national networks that 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 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."*
- 2.2.13 The NN NPS recognises that travel demand for road and rail is expected to increase in the foreseeable future with economic and population growth. Without action, this growth will in turn lead to a worsening in congestion and crowding, constrain economic growth, and worsen quality of life. Transportation networks can unlock regional economic growth and regeneration, by improving connectivity and performance, particularly in disadvantaged areas. The government recognises that there is a compelling need to develop the national networks. Within this framework, railways must provide a safe and reliable route to work, facilitate increased leisure and business travel, support regional and local public transport to connect communities with public services, work places and each other, and provide for freight transport across the country and to and from ports.
- 2.2.14 At paragraph 2.35 the NN NPS goes on to confirm that it is the Government's view that rail transport has a crucial role to play in delivering significant reduction in pollution and congestion. At paragraph 2.37 it states *"the Government's policy is to improve the capacity, capability, reliability and resilience of the rail network at key locations for both passenger and freight movements to reflect growth in demand, reduce crowding, improve journey times, maintain or improve operational performance and facilitate modal shift from road to rail..."* The other emphasis of the Government is to encourage modal shift to rail in the light of the need to reduce significantly national CO2 emissions from the transport sector.
- 2.2.15 The need to improve transport networks is to consider the Government's policies on the environment, safety, technology, sustainable transport and accessibility.
- 2.2.16 The NN NPS requires an application for a transportation project to be accompanied by a transport business case, based on the Transport Business Case guidance and WebTAG guidance published by the Department for Transport ("DfT"). WebTAG combines the economic, environmental, and social appraisal of the development which is taken into consideration when deciding whether to finance the project.
- 2.2.17 An EIA will be required for projects likely to result in significant effects on the environment in accordance with the EIA Regulations. Where some details are still to be decided, the assessment needs to be based on a worse case to ensure that the potential impacts have been addressed properly. The Examining Authority needs to assure themselves that all the likely significant effects have been assessed and that any requests for additional information is proportionate and focussed on significant effects.
- 2.2.18 The NN NPS records the obligation on the SoS to ensure compliance with the Conservation of Habitats and Species Regulations 2010 ("Habitats Regulations"). The Habitat Regulations set out a stage by stage process, known as the Habitat Regulations Assessment ("HRA") to determine whether a project is likely to have a significant effect on a European site. The first stage of the process involves screening to determine whether a project is likely to have a significant effect on the interest features of a European site

alone or in combination with other plans and projects. If likely significant effects are identified then the decision-maker is required to go onto Stage 2 and to undertake an appropriate assessment to determine whether the project will have implications on the conservation objectives of the European site. If it will, then consent for the development can be granted at this stage only if it can be ascertained that the project will not adversely affect the integrity of the European site. Stages 3 and 3 become relevant if it cannot be ascertained that there will be no adverse effects on the integrity of the European site. This involves the consideration of alternative solutions and, if there are no alternatives, the process of determining whether imperative reasons of over-riding public importance and the provision of compensatory measures justify the grant of consent.

- 2.2.19 The development of the project and the assessment of effects needs to take account of good design principals and adaptation to climate change. Any activities that are regulated under pollution control legislation will need to obtain the relevant consents before operation commences. Consideration must be given to possible sources of nuisance under section 79 of the Environmental Protection Act 1990, such as noise, and the means for mitigation. The design of the railway and associated facilities will take account of safety, security, and the health and well-being and quality of life of the population.
- 2.2.20 The NN NPS identifies generic impacts associated with transport schemes, which will need to be assessed as part of the EIA. These impact listed include air quality and emissions; biodiversity and geological conservation; waste management; dust, odour, artificial light, smoke and stream; flood risk; the historic environment; land use including open space, green infrastructure and Green Belt; noise and vibration; transport networks; water quality and resources.
- 2.2.21 The NN NPS identifies the Portbury Freight Line as a strategic freight route with negligible interaction with passenger services and the Bristol - London main line as a strategic freight route with interaction with high speed passenger services.

### National Planning Policy Framework (March 2012)

- 2.2.22 The NPPF published by the Department for Communities and Local Government ("DCLG") in March 2012 sets out Government planning policies for England to achieve sustainable development and details how the policies are expected to be applied. The overarching aim of the NPPF is the achievement of sustainable development, with the planning system expected to contribute to this goal. Within this context, the NPPF places emphasis on contributing to a strong economy by ensuring that development supports growth and innovation, creating a high quality built environment that supports strong, vibrant and healthy communities, and development that protects and enhances the natural, built and historic environment.
- 2.2.23 Although the NPPF does not contain specific policies for NSIPs, the following provisions will require further consideration during the EIA:
- Building a strong, competitive economy (Section 1): this section requires that planning should operate to encourage and not act as an impediment to sustainable growth and should seek to address potential barriers to investment, including any lack of infrastructure provision.
  - Promoting sustainable transport (Section 4): This section supports development that reduces greenhouse gases and reduces congestion, facilitates the use of sustainable modes of transport and develops strategies for the provision of viable infrastructure including large scale facilities such as rail freight interchanges. Local planning authorities are required to identify and protect sites and routes which could be critical in developing infrastructure to widen transport choice. Whilst there is also a requirement to ensure that during the decision making process consideration has been given to maximising the use of sustainable modes of transport.

- Requiring good design (Section 7): Good design is seen as a key aspect of sustainable development and integral to delivering good planning. Good design applies not only to individual buildings, public and private spaces, but also to wider area development schemes. The provisions in this section seek to not only enhance the aesthetic appearance of development, but also to ensure that the development functions well, optimises the potential of the site, and supports local facilities and transport networks. Whilst it is recognised that the visual appearance of development is important, during the decision making process consideration will need to be given to the connections between people and places and the integration of new development into the natural, built and historic environment. Infrastructure proposals which promote high levels of sustainability should not be refused planning permission by local planning authorities because of concerns about incompatibility with an existing townscape, if those concerns have been mitigated by good design.
- Promoting health communities (Section 8): this section identifies that development has a role in contributing to the promotion of healthy communities by providing safe integrated environments free from crime, deliver high levels of accessibility, and seek to protect and enhance public rights of way.
- Protecting green belt land (Section 9): This section seeks to define and enhance the beneficial use of Green Belt land. Inappropriate development should not be approved except in very special circumstances where any harm is clearly outweighed by other considerations. However, this section also identifies certain forms of development that are not considered inappropriate in the Green Belt provided they preserve openness and do not conflict with the purposes of the Green Belt, including local transport infrastructure which can demonstrate a requirement for a Green Belt location.
- Meeting the challenge of climate change, flooding and coastal change (Section 10): This section seeks to reduce carbon emissions through policies to encourage energy efficiency and a move to a low carbon economy, as well as address the longer term impacts from climate change such as the risk of flooding.
- Conserving and enhancing the natural environment (Section 11): This section relates to the protection and enhancement of landscapes, geo-diversity and biodiversity.
- Conserving and enhancing the historic environment (Section 12): This section seeks to conserve and enhance historic assets.

2.2.24 The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development and that a presumption in favour of sustainable development is at the heart of the NPPF. Similarly, and in light of the drive towards sustainable development, the NPPF highlights a number of core principles that should govern development planning. These include:

- proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs;
- support the transition to a low carbon future in a changing climate;
- contribute to conserving and enhancing the natural environment and reducing pollution; and,
- actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling.

2.2.25 The promotion of more sustainable modes of transport is intrinsically linked to a number of these core principles. The NPPF aims to integrate planning and transport by noting that transport policies can help facilitate sustainable development at the same time as

contributing to wider sustainability, health and economic objectives. Sustainable transport and other infrastructure are also presented as crucial to supporting economic development, by improving accessibility to consumer and labour markets for businesses and improving access to jobs for the labour force. To this end, the NPPF promotes the delivery of high quality public transport provision.

### National Planning Practice Guidance (March 2014)

- 2.2.26 On 6 March 2014 DCLG launched the National Planning Practice Guidance ("NPPG") as a web-based resource to provide planning guidance on a range of categories covering issues such as the green belt, flood risk, housing and employment and transport and infrastructure, along with guidance to assist with the preparation of local plans, determining planning applications, and the use of planning conditions. This guidance recognises the importance of local infrastructure planning in the development of healthy communities.

## 2.3 Regional Planning Framework

- 2.3.1 The Localism Act 2011 made provision for the removal of regional planning policy. The Regional Strategy for the South West (Revocation) Order 2013, which came into force on 20 May 2013, revoked the Regional Strategy for the South West. It also revoked all directions made under paragraph 1(3) of Schedule 8 to the Planning and Compulsory Purchase Act 2004 preserving policies contained in structure plans within the area to which the Regional Spatial Strategy related, except for the direction made in September 2007 in respect of the Somerset and Exmoor National Park Joint Structure Plan Alteration 1991-2011 so far as it preserves policy 6 (Bristol/Bath green belt). This policy therefore still forms part of the development plan and is a material consideration until such time that it is replaced by other policies in emerging plans
- 2.3.2 There is the intention from NSC, BCC, B&NES and SGC to prepare a Joint Strategic Planning Strategy, which will provide a strategic planning framework for the West of England. It will be used to inform local plan reviews and set out objectives for the overall quantum of housing and jobs to be delivered within the West of England, including their distribution across the sub-region, the overall spatial strategy, strategic priorities, and strategic infrastructure necessary to support the deliver the strategy. A Pre-commencement Document was published in December 2014, with aim of submitting the document for Examination in summer 2016 and ultimate adoption in spring 2017. Given that the strategy is at a very early stage, it currently carries little weight.

## 2.4 Local Planning Framework

- 2.4.1 The local planning framework comprises a number of key adopted documents which form the statutory development plan for each authority, against which proposals seeking planning permission are assessed. These policy documents comprise saved policies from extant Local Plans as well as new emerging policy documents.
- 2.4.2 Whilst, emerging plans and the policies and proposals contained within them do not form part of the development plan until adopted, depending on the stage at which such documents have reached in the plan preparation process they may be held as material considerations in the determination of applications for development. The further advanced such documents are, the more weight they carry. It is also recognised that during the formulation of a preferred option for the Project, the planning context may evolve and as a consequence, emerging documents of potentially significant influence are described in the following sections.



- 2.4.3 MetroWest Phase 1 crosses all four West of England Authorities while the Project lies with the jurisdiction of two local planning authorities, NSC and BCC. A summary of the local planning framework for all four local authorities is provided below.

## North Somerset Council

- 2.4.4 The statutory development plan for North Somerset comprises the following documents:
- North Somerset Core Strategy (April 2012): The North Somerset Core Strategy remains an adopted development plan document with the exception of nine housing policies, which are the subject of a legal challenge.
  - Saved policies from the Replacement Local Plan (March 2007): policies from this document are applied in the assessment of development proposals.
  - Policies relating to minerals and waste development covered by the North Somerset Waste Local Plan (2002), Joint Waste Core Strategy (2011) and Minerals Working in Avon Plan (1993).
- 2.4.5 Other planning policy considerations include:
- Sites and Policies Plan Part 1: Development Management Policies: The Council is in the process of preparing this document and consulted on the Consultation Draft of the Sites and Policies Development Plan Document in 2013. Subsequently, the Plan has been split into two parts, the first of which is the Sites and Policies Plan Part 1: Development Management Policies (Part 1 Plan). Consultation on the Publication version of the Part 1 Plan commenced on 16 February 2015. Once adopted this plan will supersede many of the remaining policies in the North Somerset Replacement Local Plan.
  - Neighbourhood Development Plans
    - Long Ashton NDP - Long Ashton Parish Council has prepared a neighbourhood development plan that once fully approved will replace specific planning policies covering Long Ashton. The NDP underwent consultation between August and October 2014.
  - Supplementary Planning Guidance ("SPG")
    - Forest of Avon - A Guide for Developers (October 2005): This SPG has its basis in replacement local plan policy relating to new developments in the Forest of Avon and the requirement for new tree planting.
    - Biodiversity and Trees SPG (Dec 2005): This is intended to provide additional guidance to applicants by supplementing the policies and proposals relating to biodiversity in the North Somerset Replacement Local Plan and seeks to further the actions of Biodiversity Action Plans.
- 2.4.6 Of these plans, the policies within the Core Strategy, the saved policies of the Replacement Local Plan and the emerging policies within the Sites and Policies Plan Part 1: Development Management Policies are of particular relevance to the application and are discussed further in Sections 2.4.1.1 to 2.4.1.3.

### *The North Somerset Council Core Strategy (April 2012)*

- 2.4.7 The Core Strategy sets out the broad long-term vision, objectives and strategic planning policies for North Somerset up to 2026. It was the subject of a legal challenge in 2012 in respect of housing supply figures and was remitted to the Planning Inspectorate for re-examination. The hearings took place in March 2014 and as a result of the inspector's findings Main Modifications to Policy CS13 were consulted on for six weeks from 24 September until November 2014. The inspector called additional hearings on Tuesday 6

and Wednesday 7 January 2015. The remaining policies are considered to remain adopted and these policies guide development choices and decisions on planning applications within North Somerset including those affecting the proposed project. Those policies of particular relevance to the Project are shown in Table 2.1.

Table 2.1. Summary of Adopted Policies from the NSC Core Strategy

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
CS1	Addressing climate change and carbon reduction	An overarching policy to encourage implementation of measures to reduce CO <sub>2</sub> , through design, use of walking, public transport and reuse of land.	The proposed works will complement this policy as rail transport is more energy efficient than road transport.
CS2	Delivering sustainable design and construction	Sets out the energy, drainage and thermal requirements for new buildings.	The proposed railway and new railway stations will need to be designed in a sustainable manner.
CS3	Environmental impacts and flood risk management	An overarching policy aimed at directing developments away from flood plains.	Some sections of the track are at risk of flooding. The effects of the project on flood risk will require further consideration.
CS4	Nature conservation	Promotes the conservation and enhancement of biodiversity through various measures.	The impacts on nature conservation will be assessed and mitigated (where required) through the EIA process.
CS5	Landscape and the historic environment	Emphasis on protecting the character, distinctiveness, diversity and quality of North Somerset's landscape and townscape while also conserving the historic environment.	A landscape/visual impact assessment and heritage impact assessment will be carried out as part of the EIA.
CS9	Green infrastructure	Has the objective of protecting and expanding the provision of green infrastructure throughout the borough.	The effects of the proposed works on existing and future green infrastructure proposals will be appraised during the EIA.
CS10	Transportation and movement	This policy references the reopening of the Portishead to Bristol line for passenger services, which is a priority objective, and outlines the criteria which transport schemes have to fulfil.	The Project is positively supported by the core strategy policy.



Table 2.1. Summary of Adopted Policies from the NSC Core Strategy

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
CS26	Supporting healthy living and the provision of health care facilities	Sets out the requirements for Health Impact Assessments of developments and health impacts of developments to the wider community. Point 1 of the policy states that all “large scale developments” require a Health Impact Assessment (HIA).	As the DCO process has identified that the Project is a NSIP, this would fall under the criteria of large scale, and thus the project will require HIA (the baseline HIA is provided in this report). MetroWest Phase 1 supports many of the points outlined in this policy relating to the promotion of healthy lifestyles.

### *North Somerset Replacement Local Plan (Saved policies) (March 2007)*

- 2.4.8 The North Somerset Replacement Local Plan was adopted in 2007 primarily to “develop the policies and general proposals of the Structure Plan for the period to 2011 and relate them to precise areas of land where appropriate”.
- 2.4.9 Whilst a number of policies in the Replacement Local Plan have been superseded by the Core Strategy, the remaining saved policies still remain a material consideration in the determination of new development proposals until replaced by the emerging Sites and Policies DPD. The Replacement Local Plan contains a number of key policies assigned to themes that set out the long term vision for planning and development in the North Somerset area. Those policies of particular relevance to the Portishead Branch Line (MetroWest Phase 1) project are shown in Table 2.2.

Table 2.2. Summary of Extent Planning Policy in the Replacement Local Plan

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
ECH/1	Amenity areas and gateways to settlements	Aims to protect amenity areas of public value from unacceptable harm or loss.	The design and appraisal of the proposed works will need to consider its effects on amenity areas in North Somerset.
ECH/3	Conservation Areas	Policy aimed at protecting Conservation Areas and their setting from inappropriate development.	The Project lies close to Conservation Areas so consideration to the impact on setting of Conservation Areas will be required during the EIA.
ECH/4	Listed Buildings	Development proposals need to preserve the interest, style and design of listed buildings and their settings.	The proposed works will pass adjacent to numerous listed buildings, which will require further consideration.

Table 2.2. Summary of Extent Planning Policy in the Replacement Local Plan

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
ECH/5	Historic Parks and Gardens	Policy aimed at protecting historic parks and their setting from inappropriate development.	The Project passes through Leigh Woods Registered Park and Garden (“RP&G”) so the impact of the project on the setting of RP&Gs will need to be considered during the EIA.
ECH/6	Archaeology	Confirms that development causing significant alteration to, damage to nationally important historic assets or significant impacts on their remains would not be permitted.	The numerous non-designated heritage assets close to and within the Project, including railway architectural assets, will require further consideration to ensure the works conform to this policy.
ECH/9	Forest of Avon	Policy may require landscape and planting to develop the woodland setting.	The proposed works will require some tree removal, which will require further consideration in the EIA.
ECH/11	Protected species and their habitats	This policy is aimed at avoiding and mitigating for harm to and habitats used by protected species	Protected species surveys have been undertaken for the Project and mitigation strategies will be implemented where required to ensure protected species and their habitats are not harmed.
ECH/12	Wildlife sites of international importance	This policy is aimed at protecting international designations from direct or indirect adverse effects	A Habitat Regulations Assessment Screening Report has been prepared to assess the effects of the Project on the Severn Estuary and Avon Gorge European sites.
ECH/13	Sites of Special Scientific Interest and National Nature Reserves	This policy is aimed at protecting international designations from direct or indirect adverse effects balanced against other material considerations	The Project lies within 2km of the Severn Estuary SSSI and passes through Ham Green SSSI and the Avon Wood SSSI, which will be considered further during the EIA.
ECH/14	Wildlife and geological sites and local nature reserves	This policy has the objective of protecting local designations from direct or indirect adverse effects from new development	The Project passes through Ham Green SSSI, which is designated for its geological interest, and adjacent to various local conservation sites,

Table 2.2. Summary of Extent Planning Policy in the Replacement Local Plan

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
			which will require further consideration.
ECH/15	Coastal zone	This policy restricts development within the defined Coastal Zone for uses and activities appropriate to a coastal location that cannot be accommodated elsewhere. Consideration will be given to a number of issues, including the degree of risk from flooding, and the provision of public access to the coast.	Some sections of the track are at risk of flooding. The effects of the Project on flood risk will require further consideration.
RD/3	Development in the Green Belt	This policy, which aims to protect the green belt, confirms that development contained within the Local Transport Plan (LTP) and has been subject to an assessment of travel impacts would likely be acceptable.	Rural land between Portishead and Parson Street is classified as green belt. The Portishead Branch Line (MetroWest Phase 1) project, which is outlined in the LTP is positively supported by this policy.
E/5	Safeguarded Employment Areas	This policy identifies land that has been safeguarded for future employment development.	The creation of a station and associated parking facilities will be required on land safeguarded by the policy for employment development.
E/6	Proposals for development on safeguarded land at Court House Farm	This policy safeguards land for port related uses associated with the Royal Portbury Dock.	The creation of a station and associated parking facilities will be required on land within the allocation, but which is also allocated as part of Policy T/3 for a future railway station.
H/2	Proposed sites for new residential development, incorporating target for previously-developed land and phasing policy	This policy identifies sites that are allocated for future housing development	Some allocations are located adjacent to the Project at Portishead, but should not be affected by the Project.
T/1	Existing and proposed railway lines	Safeguards the alignment of the Portishead – Portbury railway line for rail traffic use	The Project is fully in accordance with the provisions of this policy.

Table 2.2. Summary of Extent Planning Policy in the Replacement Local Plan

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
T/3	Proposed railway stations	Safeguards land for stations and associated parking facilities in conjunction with the reopening of the Portishead to Bristol line at sites at Harbour Road, Off Royal Portbury Dock Road, and at Severn Road.	The Project is fully in accordance with the provisions of this policy.
T/7	Protection, development and improvement of the rights of way network and other forms of public access	The policy seeks to maintain and improve public access provision along the existing public right of way network.	The Project will lead to the alteration of parts of the PROW network and mitigation / replacement provision will have to be assessed against this policy.
T/8	Strategic cycle routes	The policy seeks to protect existing and proposed strategic cycle routes.	The Project will lead to the alteration of parts of the network and mitigation / replacement provision will have to be assessed against this policy.
T/10	Safety, traffic and the provision of infrastructure, etc. associated with development	The policy seeks to ensure that proposals will not lead to unacceptable highways impacts or that such impacts will be appropriately mitigated by entering into a legal agreement to fund any necessary improvements.	The Project will require the creation of stations and associated parking facilities, the impact of which will need to be considered against the provisions of this policy.
RT/3	The other town and district centres	The policy allows for the extension of Portishead Town Centre for retail development along with non-food and/or business employment uses on land at Wyndham Way.	Whilst the Project is located adjacent to this allocation it should have no impact on the future retail and business employment uses within it.
CF/4	Safeguarding of existing and proposed sites and buildings	This policy seeks to protect existing community facilities and open space from inappropriate development.	The Project is located adjacent to a number of community facilities and open spaces which could be affected by the Project and will need to be assessed against this policy.

*Sites and Policies Plan Part 1: Development Management Policies  
(Publication Version) (February 2015)*

- 2.4.10 The development management policies are generic policies that are used when assessing a range of planning applications and development proposals. It does not contain site allocations, which will be detailed in Part 2, but instead focuses on a broad range of development issues such as the Green Belt, major transport schemes, development in the countryside and retailing.
- 2.4.11 Whilst the Part 1 Plan has not yet been adopted, it has reached a relatively advanced stage. A document at the Publication stage will be submitted to the Secretary of State prior to the further consideration through the examination process. Whilst, the plan could be subsequently amended, its current provisions are considered by the Council to be robust and 'sound', and will be promoted by the Council as the final draft. Therefore the Publication version of the Part 1 Plan represents a relatively advanced stage and as such the policies and proposals are considered to carry sufficient weight that they should be considered as part of this application. Those policies of particular relevance to the Project are shown in Table 2.3.

Table 2.3. Summary of Emerging Planning Policy in the Sites and Policies Plan Part 1: Development Management Policies

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
SPS1	Presumption in favour of sustainable development	Sets the framework for working with the development industry to deliver sustainable development and growth	The Project is in accordance with the principles of delivering sustainable development as it seeks to deliver a high quality sustainable transport connection
DM1	Flooding and drainage	Aims to discourage inappropriate development in flood risk areas and to ensure that the impact of new development on flooding is fully taken into account	Some sections of the track are at risk of flooding. The effects of the Project on flood risk will require further consideration
DM8	Nature Conservation	Seeks to protect and enhance biodiversity, particularly on sites of recognised nature conservation interest. To protect trees, hedges and other landscape features of amenity value and to secure suitable replacements in instances where their loss is justified	The Project is likely to impact upon the natural environment and as such further consideration as to the extent of this impact and any measures to mitigate it will be required
DM12	Development within the Green Belt	To provide detailed guidance and consistency of approach concerning those types of new development which are considered to be not inappropriate in the Green Belt and on the redevelopment of	The Project will need to be designed to accord with the policy principles of development in the green belt

Table 2.3. Summary of Emerging Planning Policy in the Sites and Policies Plan Part 1: Development Management Policies

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
		sites on previously developed land	
DM21	Motorway Junctions	Provides protection to land at existing motorway junctions for potential future capacity improvements	The Project will need to consider the potential for future capacity enhancement works at the M5 Junction 19
DM22	Existing and proposed railway lines	Existing and proposed railway lines will safeguard land for the proposed route	The Project is fully in accordance with the provisions of this 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	The Project will lead to the alteration of parts of the PROW network and mitigation / replacement provision will have to be assessed against this policy
DM29	Car Parks	Aims to ensure that new development is provided with adequate parking, which meets the needs of intended users and that parking problems are not created or exacerbated in the surrounding area	The Project will need to comply with the requirements of this policy
DM49	Royal Portbury Dock	Seeks to ensure that development of land safeguarded for port uses at Court House Farm takes account of environmental considerations and proposals for rail-based park-and-ride	The Project is fully in accordance with the provisions of this policy
DM70	Development Infrastructure	To ensure that infrastructure is adopted in a timely manner or long-term maintenance plans are in place for infrastructure which is not adopted	The Project is fully in accordance with the provisions of this policy

## Bristol City Council

2.4.12 The statutory development plan for BCC is the Bristol Local Plan which comprises the following suite of documents, which are used alongside the NPPF to guide development in the city:

- Bristol Core Strategy (Adopted June 2011): The Bristol Core Strategy is part of the Local Plan (formerly the Local Development Framework), which sets out the overall

approach and spatial strategy for future development in Bristol and provides the overarching strategic policy and guidance to deliver sustainable communities and economic growth across the City. The Core Strategy replaces a number of strategic policies saved from the 1997 Plan.

- Site Allocations and Development Management Policies (Adopted July 2014): This document incorporates site allocations for development, policy designations and development management policies. It forms part of the Bristol Local Plan and will seek to deliver the policies of the Core Strategy. It also replaces a number of saved policies from the 1997 Plan.
- Bristol City Council Local Plan Saved Policies (1997): A number of policies from the 1997 Plan have been saved by a Secretary of State Direction and remain a material consideration within the Bristol Central Area until replaced by the adoption of the Bristol Central Area Plan.
- West of England Joint Waste Core Strategy: The Joint Waste Core Strategy guides decisions about where waste management facilities should be located within the West of England.

2.4.13 Other planning policy considerations include:

- Bristol Central Area Plan Publication Version (February 2014): The Publication Version was submitted to the Secretary of State on 4 July 2014 for independent examination. Following the hearing in October 2014, consultation has taken place on the proposed Main Modifications. All consultation responses are now with the Inspector for consideration before confirmation will be given on the soundness of the document. This document includes site allocations, spatial policies and development management policies specifically for the centre of Bristol, and once adopted will replace any relevant saved policies of the 1997 Plan. Whilst, it has not yet been adopted, given its advanced nature, it carries significant weight and as such will need consideration.
- Supplementary Planning Guidance
  - PAN 2 - Conservation Area Enhancement Statements (November 1993) - seeks to protect and enhance whole areas with architectural or historic character and details the Clifton Conservation Area and is accompanied by the Conservation Area 5 - Clifton & Hotwells Character Appraisal & Management Proposals.

2.4.14 Of these plans, the policies within the Core Strategy, Site Allocations and Development Management Policies and those saved in the Local Plan are considered to be of particular relevance to the proposed Portishead Branch Line and are discussed further in Sections 2.4.2.1 to 2.4.2.3. Those policies of most relevance to the Severn Beach / Avonmouth Signalling and Bedminster Down Relief Line are considered further in Appendices B2 and B3.

*Bristol Core Strategy (June 2011)*

2.4.15 The Core Strategy sets the Spatial Vision and Strategic Objectives for Bristol up to 2026, identifying the future development intentions and strategy for the city and its neighbourhoods. It provides a Delivery Strategy which identifies the means of delivering the vision and objectives and includes a spatial strategy which contains the Council's strategic policies for different parts of the city. It sets out the type, scale and broad location of where new homes, transport improvements, jobs, shops, open spaces and services will be located during the plan period, and incorporates a number of development principles that will ensure new development addresses key issues faced by the city. Whilst the Core Strategy does not set out site-specific proposals or allocations it does cover the broad locations for delivering new development.

2.4.16 Those policies within the Bristol City Council Core Strategy of particular relevance to the Portishead Branch Line (MetroWest Phase 1) project are shown in Table 2.4.

**Table 2.4. Summary of Adopted Policy from the Bristol Core Strategy**

<b>Policy No.</b>	<b>Title</b>	<b>Subject</b>	<b>Relevance to Portishead Branch Line (MetroWest Phase 1)</b>
BCS1	South Bristol	Strategic policy which has the overall objective to regenerate south Bristol and focus development within the existing built up area connected by high quality transport networks	The Project will support this objective by providing a high quality transport route
BCS6	Green Belt	This policy indicates the broad extent of the Green Belt within Bristol and the approach to development within it, following the principles set out in national planning policy	The Project will need to be designed to accord with the policy principles of development in the green belt.
BCS9	Green Infrastructure	The City Council aims to increase the connectivity of the strategic green infrastructure network, retain and prevent its loss	The Project has potential to sever existing areas of green infrastructure or reduce provision, but also to enhance the green infrastructure network
BCS10	Transport and Access Improvements	This policy confirms the support for the reopening of the Portishead to Bristol Rail Line	The Project is supported by this policy
BCS16	Flood Risk and Water Management	This policy sets out the Council's approach to minimising the risk and impact of flooding in the context of new development	Some sections of the track are at risk of flooding. The effects of the Project on flood risk will require further consideration



*Bristol Site Allocations and Development Management Policies (July 2014)*

- 2.4.17 To support the delivery of the Core Strategy, the Site Allocations and Development Management Policies, incorporates development management policies, designations and site allocations that will deliver the strategic policies and principles of the Core Strategy.
- 2.4.18 The detailed development management policies will be applied by the Council when assessing planning applications. The designations identify land which that is intended to be safeguarded from development such as for open space or transport infrastructure, or where specific policies apply, whilst the site allocations identify sites that are intended to be allocated for development for particular land uses such as, homes, business and mixed-use developments. The intention is to provide clarity to applicants and the local community regarding the land uses on specific sites that are acceptable in principle to the Council. The Site Allocations and Development Management Policies replace a number of saved Local Plan policies.
- 2.4.19 Those policies within the Site Allocations and Development Management Policies of particular relevance to the Project are shown in Table 2.5.

Table 2.5. Summary of Extent Planning Policy in the Site Allocations and Development Management Policies Document

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
DM1	Presumption in favour of sustainable development	Policy reflects the core planning principles set out in the NPPF that a positive approach will be taken that reflects the presumption in favour of sustainable development. Planning applications that accord with the policies in the Local Plan will be approved without delay, unless material considerations indicate otherwise.	The Project is in accordance with the principles of delivering sustainable development as it seeks to deliver a high quality sustainable transport connection
DM17	Development Involving Existing Green Infrastructure	The Core Strategy seeks to conserve existing green infrastructure assets. This policy sets out the detailed approach to this where further detail to support the Core Strategy is required.	The Project has potential to sever existing areas of green infrastructure or reduce provision, but also to enhance the green infrastructure network.
DM19	Development and Nature Conservation	Seeks to ensure that consideration is given to the likely impact that development could have upon habitat, species or features, which contribute to nature conservation in Bristol, and that	The Project is likely to impact upon the natural environment and as such further consideration as to the extent of this impact and any measures to mitigate it will be required.

Table 2.5. Summary of Extent Planning Policy in the Site Allocations and Development Management Policies Document

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
		appropriate mitigation is provided where such impacts would occur.	
DM23	Transport Development Management	This policy sets out the transport and traffic considerations that development proposals should address, including parking standards for non-residential development. It also seeks to ensure that new development is accessible by sustainable transport methods such as walking, cycling and public transport.	The Project is supported by this policy, however there are conflicts particularly with respect to PROW along the railway corridor which will be affected by the Project.
DM24	Transport Schemes	The policy details a number of infrastructure projects, including rapid transit schemes and rail, Park and Ride and highway improvements. These proposals reflect the schemes set out in the West of England Partnership's Joint Local Transport Plan 3 (2011-2026) and the purpose of the policy is to safeguard land required for the implementation of these schemes, which includes safeguarding railway sites and associated land for passenger and rail freight purposes.	The Project accords with the provisions of this policy.
DM25	Greenways	The policy sets out how development proposals should facilitate and, where possible, improve access to the network of 'Greenways' in and around Bristol.	The Project could potentially sever existing green infrastructure connections or reduce provision, but there are also opportunities to enhance the green infrastructure network.
DM35	Noise Mitigation	This policy identifies that development that would have an unacceptable impact on environmental amenity or	The Project will pass through areas which are sensitive to noise and as such consideration of this impact and measures

Table 2.5. Summary of Extent Planning Policy in the Site Allocations and Development Management Policies Document

Policy No.	Title	Subject	Relevance to Portishead Branch Line (MetroWest Phase 1)
		biodiversity by reason of noise will be expected to provide an appropriate scheme of mitigation	that may be required to mitigate it will be undertaken.

### *Bristol Saved Local Plan Policies*

- 2.4.20 A number of Local Plan (1997) policies continue to be saved but only for the purposes of determining planning applications within the Bristol Central Area following the adoption of the Site Allocations and Development Management Policies. Those policies will remain extant until they are replaced by the adoption of the Bristol Central Area Plan.

### **Bath and North East Somerset Council**

- 2.4.21 The statutory development plan for Bath and North East Somerset Council ("B&NES") comprises of the following suite of documents, which are used alongside the NPPF to guide development in the city:
- The Bath & North East Somerset Core Strategy (Adopted July 2014): The Core Strategy sets out the overall approach and spatial strategy for future planning development in Bath and North East Somerset and provides the overarching strategic policy and guidance to deliver sustainable economic growth across the District. The Core Strategy replaces a number of strategic policies saved from the 2007 Local Plan.
  - Bath & North East Somerset Local Plan Saved Policies (2007): A number of policies from the Local Plan have been saved by a Secretary of State Direction and remain a material consideration until replaced. Whilst the Core Strategy has replaced a number of saved policies, there are still saved policies that remain extant and relevant to the project.
  - West of England Joint Waste Core Strategy (2011): the Joint Waste Core Strategy supersedes all 2007 Local Plan policies on Waste apart from Policies WM.4 and WM.9.
- 2.4.22 Other policy considerations include the emerging Placemaking Plan, which will complement the strategic framework in the Core Strategy by setting out detailed development principles for development sites and other management policies across Bath and North East Somerset. The Placemaking Plan is still in the early stages in the statutory plan preparation process and therefore very little weight can currently be attributed to it at this stage. The Council consulted on an Options document in November 2014. The Plan is due to be submitted to the Secretary of State in January 2016, with adoption expected to take place in September 2016.
- 2.4.23 Of these plans, the policies within the Core Strategy and the saved policies of the Local Plan are of particular relevance to the Project and are discussed further in Sections 2.4.3.1 and 2.4.3.2.

### *Bath & North East Somerset Core Strategy (July 2014)*

- 2.4.24 The Core Strategy is a key policy document for B&NES that delivers a strategic planning framework to guide development in the District over the next 20 years and beyond. It sets a Spatial Strategy to deliver the vision and objectives of the plan and provides overarching

strategic policies that set the principles and broad locations of future development. It will ultimately guide the site allocations and detailed development management policies in the emerging Placemaking Plan.

- 2.4.25 Those policies within the B&NES Core Strategy of particular relevance to the Bathampton Turnback (MetroWest Phase 1) Project are shown in Table 2.6.

Table 2.6. Summary of Relevant Planning Policies from the B&NES Core Strategy

Policy No.	Title	Subject	Relevance to Bathampton Turnback (MetroWest Phase 1)
DW1	District-wide spatial Strategy	This policy sets the overarching strategy to promote sustainable development in B&NES.	The Project seeks to deliver a high quality sustainable transport connection and as such is in accordance with the principles of delivering sustainable promoted in this policy.
SD1	Presumption in favour of sustainable development	This policy sets out the Council's intention to take a positive approach when considering proposals that reflects the NPPF's presumption in favour of sustainable development. Planning applications that accord with the policies in the Core Strategy will be approved without delay, unless material considerations indicate otherwise.	The Project is in accordance with the principles of delivering sustainable development as it seeks to deliver a high quality sustainable transport connection
CP6	Environmental Quality	This policy sets out the requirements for delivering high quality design, protecting the historic environment and landscape character, and seeks to ensure that development will protect and enhance the natural and built environment.	The Project is likely to impact upon the natural environment within the operational railway land and as such further consideration as to the extent of this impact and any measures to mitigate it will be required.
CP7	Green Infrastructure	This policy seeks to protect and enhance the integrity, multi-functionality, quality and connectivity of the strategic Green Infrastructure.	The Project could potentially remove a small area of green infrastructure on operational railway land.
CP8	Green Belt	This policy seeks to protect the openness of the Green Belt from inappropriate development in accordance with national planning policy.	The Project will need to be designed to accord with the policy principles of development in the green belt.

Table 2.6. Summary of Relevant Planning Policies from the B&amp;NES Core Strategy

Policy No.	Title	Subject	Relevance to Bathampton Turnback (MetroWest Phase 1)
CP13	Infrastructure provision	<p>The Council’s Transport Strategy seeks to reduce the use of cars, by progressing improvements to public transport and other sustainable modes such as walking and cycling. The strategy promotes rail improvements, such as the electrification of Great Western Railway (“GWR”) mainline; the new 15 year GWR franchise (including the Greater Bristol Metro Project); and increasing the capacity of local rail services travelling through Bath Spa rail station.</p> <p>The policy requires that new developments must be supported by the timely delivery of the required infrastructure to provide balanced and more self-contained communities, whilst ensuring that infrastructure proposals do not cause harm to the integrity of European wildlife sites which cannot be mitigated.</p>	The Project compliments this policy and the overarching transport strategy for B&NES

### *Bath & North East Somerset Local Plan (2007)*

- 2.4.26 The Local Plan (2007) formed the primary basis for deciding planning applications under the old Local Plan system. It set out policies to guide development and sought to influence where people lived and worked whilst providing protection to the environment and local character. The 'saved policies' from the Local Plan (2007) will continue to be used in conjunction with policies in the Core Strategy and the Joint Waste Core Strategy until replaced by the Placemaking Plan once adopted. Those saved policies from the B&NES Local Plan of particular relevance to the Bathampton Turnback (MetroWest Phase 1) Project are shown in Table 2.7.

Table 2.7. Summary of Relevant Planning Policies from the B&amp;NES Core Strategy

Policy No.	Title	Subject	Relevance to Bathampton Turnback (MetroWest Phase 1) Project
T1	Overarching access policy	Policy which aims to: improve public transport in conjunction with the policies and proposals of the Local Transport Plan and seek new public transport facilities; reduce car-based traffic levels; and integrate new development with public transport.	The Project is supported by this policy.
T3	Promotion of walking and use of public transport	Aims to promote safe walking routes and integrate public transport in new developments	The Project is supported by this policy.
T9	Railways: safeguarding of existing network and use of former railway land	Policy aims to protect operational and non-operational railway land from development which may prejudice its current and future operations.	The Project is supported by this policy.
ES.10	Air Quality	Aims to protect existing environmental conditions from potentially harmful development in terms of odour, dust and/or other forms of air pollution.	The Project will help to reduce private car usage and associated air pollution.
ES.12	Noise and Vibration	Aims to protect existing environmental conditions from potentially harmful development in terms of noise and vibration particularly where it may present itself as a hazard to the general public.	Noise issues will require further consideration with regard to the Project.
NE.1	Landscape Character	Aims to protect the landscape character of the B&NES from harmful development	The Project will need to be designed to avoid harmful impacts on landscape character.

2.4.27 There are also several policies relating to nature conservation, which may require further review, if any works for the Bathampton Turnback (MetroWest Phase 1) Project are carried out within or adjacent to sensitive habitats.

## South Gloucestershire Council

- 2.4.28 The Local Plan for South Gloucestershire comprises the following documents:
- Core Strategy 2006 - 2027 (Adopted 2013): The Core Strategy is the key planning policy document for South Gloucestershire, setting out the general location of development, its type and scale, as well as protecting what is valued about the area. It replaces a number of saved policies from the Local Plan (2006).
  - South Gloucestershire Local Plan Saved Policies (2006): The Local Plan set out the overall planning policies for the district up to 2011. A number of policies were saved by a Secretary of State Direction and remain extant until they are replaced by emerging policy.
  - West of England Joint Waste Core Strategy: The Joint Waste Core Strategy guides decisions about where waste management facilities should be located within the West of England. The policies in this document supersede a number of policies in the Minerals and Waste Local Plan (2002).
  - Minerals and Waste Local Plan (2002): The minerals and waste local plan provides a framework for determining planning applications for minerals and waste development. The local plan is being replaced by documents in the new Local Plan for South Gloucestershire as these documents are prepared and adopted by the Council.
- 2.4.29 Other planning considerations include the emerging Policies, Sites and Places Development Plan Document ("DPD") which is the final document that will complete the South Gloucestershire Local Plan. The Plan will contain detailed development management policies, small scale site allocations, and identify the vision and objectives of local communities for their respective area, including future development. A draft of the Plan was consulted on in August 2014, however due to the early stage of preparation, the Plan currently carries little weight.
- 2.4.30 Of these plans, the policies within the Core Strategy are of particular relevance to the project and are discussed further in Sections 2.4.4.1.

### *South Gloucestershire Core Strategy (2013)*

- 2.4.31 The Core Strategy was adopted in December 2013 and has superseded a number of saved Local Plan (2006) policies. It identifies the aspirations for future housing deliver and sustainable economic growth and seeks to deliver high quality design in development, tackle congestion and provide improved infrastructure and sustainable accessibility, whilst taking into account climate change and the impacts of development on the natural and historic environments. A summary of the relevant general Core Strategy and area-based policies which are relevant to the proposal are outlined in Table 2.8 below.

Table 2.8. Summary of Planning Policy in the South Gloucestershire Council Core Strategy

Policy No.	Title	Subject	Relevance to MetroWest Phase 1
CS4A	Presumption in Favour of Sustainable Development	This policy sets out the Council's intention to take a positive approach when considering proposals that reflects the NPPF's presumption in favour of sustainable development. Planning applications that accord with the policies in the Core Strategy will be approved without delay, unless material considerations indicate otherwise.	The Project is in accordance with the principles of delivering sustainable development as it seeks to deliver a high quality sustainable transport connection
CS5	Location of Development	Aims to encourage the location of development to the north and east fringes of Bristol and deliver the West of England transport packages.	This is a strategic policy aimed at delivering the aims and objectives of the plan and transport proposals.
CS7	Strategic Transport Infrastructure	Seeks to deliver transport plans, policies and programmes during the plan period.	Relates to the implementation of Joint Transport Plan programmes.
CS36	Proposals for Major Infrastructure Projects	Relates to the Council's policy stance and requirements for developments which fall into the NSIP legislation.	Where the Council is the determining authority or as a consultee for major infrastructure projects, it will seek various criteria to be met and ensure proposals do not impact upon the implementation of the Council's vision.

### *South Gloucestershire Local Plan Saved Policies (2006)*

- 2.4.32 The South Gloucestershire Local Plan was adopted in January 2006 and set out the overall planning strategy and policies to deliver new development in the district up to 2011. It is being replaced by the new suite of documents that make up the new South Gloucestershire Local Plan as and when these documents are produced and adopted by the Council. Many of the strategic policies of relevance have been replaced by the adopted Core Strategy.



## 2.5 Other Relevant Plans

### West of England Joint Local Transport Plan 3 (2011-2026) (March 2011)

- 2.5.1 The plan, published by the West of England Partnership, outlines the transport strategy for the sub-region going forward. The transport strategy for the West of England revolves around five aspirational goals: reducing carbon emissions, supporting economic growth, improving accessibility, providing for a safe, healthy and secure population, and enhancing quality of life.
- 2.5.2 The plan portrays the West of England as one of the fastest growing economies in the UK and a critical hub for the South-West's economy. The West of England is home to many major employment sites, the majority of which are located in proximity to Bristol City Centre or the North Fringe. Forecast growth in economic output for Bristol is estimated at 3.4% between 2010 and 2020, compared to 3.2% across the UK. Similarly, Bristol is regarded as the most competitive large city outside London. Within this context, the wider sub-region is expected to deliver 95,000 new jobs over the next 20 years which will assist local economic growth and national economic recovery. To support these ambitions, the plan highlights major transport improvements as a key priority for businesses. The plan aims to synchronise transport investment with major development and regeneration areas, such as Bristol's Temple Quarter Enterprise Zone ("TQEZ").
- 2.5.3 The plan suggests that residents in North Somerset would be primary beneficiaries of any investment in transport infrastructure. Currently, residents in the district have the worst accessibility to major employment sites of any residents across the West of England. Only 21% of residents can access major employment sites by public transport within 20 minutes, compared to a regional average of 31%. At the same time, only 55% of residents have access within 40 minutes, compared to 73% for the West of England.
- 2.5.4 The key strategy of the plan is to support economic growth by providing an affordable, low carbon, accessible, integrated, healthy, safe and reliable transport network. Provision of reliable public transport infrastructure is considered to be a vital mechanism for achieving this strategy. In particular, the plan acknowledges a range of major transport schemes that were prioritised through the DfT's Regional Funding Allocation in 2010. These major schemes include significant investment in rail infrastructure such as MetroWest Phase 1. The Project aims to reinstate rail connections between Portishead and Bristol, to provide enhanced accessibility to the city centre for Portishead's 25,000 residents. Currently, the plan suggests there is significant out-commuting from Portishead to Bristol via car, meaning the Portishead Rail Corridor will provide a more sustainable, alternative mode of transport for many workers and will also improve network resilience.

### Local Growth: Realising Every Place's Potential (2010)

- 2.5.5 The Local Growth White Paper outlines the Government's proposals to decentralise many services, empowering local communities to create their own entrepreneurial local economies, with active support from the private sector. It aims to encourage economic recovery by:
- Shifting power to local communities and businesses;
  - Promoting efficient and dynamic markets by increasing confidence to invest, and;
  - Focusing on supporting investment that will have a long term impact on growth.
- 2.5.6 As outlined in the Local Growth White Paper, the Government recognises the importance of economic growth for supporting economic recovery, for giving people throughout the country new opportunities, and for making sure that the UK is well placed for competing in

an expanding global economy. The focus of the White Paper is on private sector led economic recovery at a localised level.

2.5.7 The White Paper highlights transport schemes as a key area for investment. The rationale for delivering such schemes is that they act as enablers for innovation, help to create jobs and are essential to successful economic growth and recovery. The White Paper also recognises the importance of improving accessibility to jobs in growing the economy. Within this context, the Government's Comprehensive Spending Review ("CSR") prioritised economically significant local transport projects as key enablers of growth.

2.5.8 *The Path to Strong, Sustainable and Balanced Growth (November 2010)*  
This report presents the Government's approach to achieving strong, sustainable and balanced growth that is more evenly shared across the country. The Government recognises the importance of the private sector to deliver this objective. In particular, the document states that the corporate sector is in a strong position to drive an investment-led recovery. To make this happen, the report articulates the Government's four-part commitment to the private sector which reflects the prevailing attitude:

- providing the stability business needs to plan and invest;
- making markets more dynamic by removing barriers to growth wherever possible;
- focusing the Government's own activities on providing the conditions for private sector growth and investment;
- ensuring that strong growth is fairly shared and sustainable in the long-term.

2.5.9 The report notes that the construction sector is one of six key sectors highlighted by the Government. It is argued that the improved output and performance of this sector is vital to the country's prospects for growth. As a result, the Government is committed to investment in housing and infrastructure including transport infrastructure.

### Transforming Places; Changing Lives: Taking Forward the Regeneration Framework (May 2009)

2.5.10 This report, prepared by the DCLG, sets out a package of proposals that aim to shape the way that regeneration is carried out in the future in England. It contains a renewed focus on ensuring that regeneration tackles the underlying economic challenges to increase social mobility, with a specific focus on the following priority outcomes:

- improving economic performance and tackling worklessness, particularly in the most deprived areas;
- creating the right conditions for business growth which could include investment in infrastructure, land use, and a better public realm;
- creating sustainable places where people want to live and work, and where businesses want to invest.

2.5.11 The report indicates that regeneration investment should be targeted at creating new jobs or helping people to access jobs over the long term, in order to tackle the underlying economic causes of deprivation.

### West of England LEP Strategic Economic Plan 2015-2030

2.5.12 The Strategic Economic Plan ("SEP") prepared by West of England Local Enterprise Partnership ("LEP") outlines how the region will achieve sustainable economic growth over the plan period. Specifically, the SEP was prepared to support the West of England's attempts to secure government funding to assist economic development in the region between 2015 and 2021, via the Local Growth Deals initiative. Within this context, the SEP

aims to facilitate the creation of more than 25,000 jobs and develop an economy worth around £25bn per year (which also contributes some £10bn to the Treasury annually).

- 2.5.13 The SEP positions the West of England as 'the city region of choice for a sustainable future', based on the region's legacy of innovation, world class university and research facilities, strong visitor economy and high quality of life. This positioning is supported by a focus on five priority sectors: creative and digital media, low carbon, high tech industries, advanced engineering and aerospace and professional services. The SEP highlights that expansion of these sectors will be driven by a number of 'levers of growth', including investment and promotion and places and infrastructure. In particular, infrastructure is presented as a key enabler of growth in the region, with MetroWest rail improvements phase 1 and phase 2 emphasised as key cross-boundary infrastructure interventions in the SEP.
- 2.5.14 The SEP also predicts that MetroWest Phase 1 could generate around 1,150 direct jobs leading to a contribution to the region's economy of around £110m per year (measured in terms of gross value added ("GVA")). These economic outputs will be achieved by increasing the connectivity between Temple Quarter Enterprise Zone and the West of England's various Enterprise Areas, meaning major employment sites are brought closer to the skilled workforce residing in the region.

### West of England LEP Business Plan 2011-13

- 2.5.15 The plan identifies inadequate transport systems as a barrier to business growth. Enhanced transport infrastructure is considered a necessity to delivering the LEP's key economic objectives, by:
- Improving access to jobs;
  - Reducing congestion and carbon emissions;
  - Attracting new businesses; and
  - Maintaining the strong performance of existing businesses.
- 2.5.16 The business plan presents the reopening of the Portishead line as an important rail scheme that could unlock growth in North Somerset and across the West of England more generally. The plan also suggests that the Project, along with other major transport schemes, is instrumental to business performance and access to jobs in the West of England. Specifically, these schemes are expected to underpin the viability and long-term success of Temple Quarter Enterprise Zone, other enterprise areas and priority growth locations in the sub-region.

### West of England Local Economic Assessment 2011

- 2.5.17 The assessment further emphasises the links between transport and the economy in Bristol. In the ten years up to 2009; the volume of traffic on West of England's roads increased by 11%, leading to congestion being perceived as a key issue by residents and businesses alike. Perceptions of congestion are thought to act as a deterrent to new businesses locating in the area and a motivation for existing businesses to relocate elsewhere. Based on these effects, the assessment states that the economic impact of congestion is expected to reach £600m by 2016.
- 2.5.18 The assessment also highlights the rapid growth of rail transport in the West of England, with the number of rail passengers increasing by 56% between 2004 and 2009. To accommodate this level of growth and to facilitate economic growth and enhanced accessibility in the region, the assessment supports the reopening of the Portishead line and the wider MetroWest Phase 1.

- 2.5.19 Investment in public transport infrastructure is highlighted as a key mechanism for tackling congestion. Upgrading and adding to existing networks will help to make the West of England more attractive to businesses, employees and residents. Focussing on schemes such as the Portishead line will also help to rebalance the West of England economy by promoting growth in peripheral areas away from Bristol and the North Fringe. For example, the assessment highlights market demand for office development at locations close to the M5 in the Portishead area; such developments would become increasingly viable with improved transport infrastructure.

## Unlocking our Potential: The Economic Benefits of Transport Investment in the West of England 2012

- 2.5.20 This summary report, produced by Atkins and West of England Authorities in 2012, outlines the importance of transport investment in unlocking economic growth. Transport investment is presented as a critical factor in delivering large numbers of new jobs and economic output in areas where the underlying growth potential exists. The West of England is identified as an area with underlying growth potential, which is currently constrained by the existing transport network. Problems with the existing transport network include:

- Congestion on local roads;
- Public perception of buses as expensive and slow;
- Infrequent and poor coverage of rail services;
- Poor access to the motorway network.

- 2.5.21 Under these circumstances, the economic potential of the West of England can only be fully realised through investment in transport infrastructure and major schemes. One such scheme highlighted in the report is the MetroWest Phase 1 (encompassing the reopening of the Portishead line), which is expected to reduce dependence on private vehicles and increase access to key growth areas such as Temple Quarter Enterprise Zone. The technical paper supporting this summary report (*GVA Impacts of Major Transport Schemes 2012*) provides evidence of consultation responses regarding MetroWest Phase 1. The report suggests that consultees believed the rail scheme would make a significant difference to the West of England economy. In particular, commuters had a highly favourable view of MetroWest Phase 1 - especially commuters who would benefit from the reopening of the Portishead line. Two key reasons are provided for this support:

- The project will provide a viable alternative to the car for commuter journeys;
- The project will increase access to employment markets for the labour force;
- The project will increase access to labour markets for businesses.

- 2.5.22 The technical report also specifically highlights the correlation between connectivity and employment densities. In particular, public transport provision is presented as closely related to commuting and business travel for the producer and consumer services sectors. This reflects the concentration of these sectors in the centre of urban areas in the sub-region, such as Bristol. Therefore, the report illustrates the importance of improving the public transport network, especially in light of increased constraints on highway capacity.

## Growth and Opportunity: Bristol's Economic Development 2012-25

- 2.5.23 Bristol is the economic hub of the West of England and the centre point for the various MetroWest Phase 1 routes that the Portishead line will be linked too. The prospectus states that Bristol has a strong but rapidly growing economy, characterised by high

productivity, a skilled work-force, diverse industrial base, a strong sense of enterprise and academic excellence. Nevertheless, the Local Economic Assessment undertaken in 2011 did highlight a number of weaknesses, which the prospectus aims to alleviate.

- 2.5.24 One such weakness relates to infrastructure and connectivity, which the prospectus considers to be a key constraint to economic growth. As a result, the prospectus indicates that Bristol would benefit from improved local public transport provision via the implementation of a rapid transit network linking the city centre to peripheral employment and residential areas.

## Economic Development and Regeneration Strategy for North Somerset 2007

- 2.5.25 The Strategy aims to achieve economic development and regeneration in the local area based on *"economic, social and environmental sustainability (to support the development of sustainable communities)"*.
- 2.5.26 The strategy outlines a number of objectives that aim to utilise transport improvements as a means to achieve this overarching aim, including:
- Objective A sets out to deliver a more sustainable approach to economic development and regeneration through improving transport infrastructure to minimise cost of congestion benefits to business. Integrated and improved public transport is considered central to achieving this.
  - Objective E outlines how the local authority will address economic exclusion in North Somerset via transport initiatives.
- 2.5.27 With specific reference to Portishead, the Strategy identifies a requirement for land for office development and aims to promote employment and commercial projects in Portishead. Such development could take advantage of any transport infrastructure improvements in the area, including the reopening of the Portishead line. Indeed, during the consultation process for the Strategy stakeholders expressed a desire for a rail link between Bristol and Portishead.

## Temple Quarter Enterprise Zone Prospectus

- 2.5.28 The Bristol TQEZ is earmarked as a key driver of economic growth in Bristol and across West of England as a whole. The Prospectus outlines the development opportunities available at 70 hectare site in the centre of Bristol. The MetroWest Phase 1 is identified as a key infrastructure project that will help to ensure the success of the ambitious plans at TQEZ.
- 2.5.29 A key requirement for delivering a successful Enterprise Zone is providing high quality, integrated transport links both to TQEZ and across the wider West of England area. This will allow the economic benefits arising from TQEZ to be spread over as wide an area as possible. The MetroWest Phase 1 will provide an affordable, low carbon, accessible, integrated, healthy, safe and reliable transport network for commuters, connecting residential areas to the Enterprise Zone.

## Great Western Route Utilisation Strategy, March 2010

- 2.5.30 Network Rail developed a programme of route utilisation strategies ("RUS") to establish the strategic direction of the railway based on a systematic analysis of future requirements of the network. The Great Western RUS covers much of the railway network between London, the south west and south Wales. The strategy focussed on investment needs over the ten years to 2019, but considered the implications of growth in demand over 30 years. Several major, high-profile investment enhancement schemes were identified for Network Rail's control period 5 from 2014 to 2019, including the

electrification of the Great Western Main Line. The RUS identified a number of areas for further study, including capacity issues at Bristol Temple Meads and enhanced cross-Bristol services. The RUS recommended the Bristol Temple Meads to Bath Spa shuttle and further assessment of options for Clifton Down to Bath Spa and Avonmouth to Bath Spa.

## Long Term Planning Process (Regional Urban Markets) Study

- 2.5.31 This document is one of four market studies published as a key element of the long term planning process adopted by the rail industry to help guide planning and investment decision making over the next 30 years. Regional urban markets cover an area of less than 50 miles from regional centres, where people travel in large numbers for commuting and leisure. The study included a review of service levels for different parts of the country. For the South West region, the routes studied included Severn Beach to Bristol Temple Meads and Bath Spa to Bristol Temple Meads. The analysis indicated that improving the generalised journey time between Severn Beach and Bristol and between Bristol and Bath would have a relatively large impact on labour supply and reduce deprivation by providing access to employment.

### Summary

- 2.5.32 Local planning policy identifies road congestion and other transport issues as key constraints on economic growth. In line with national planning policy, local policy advocates investment in transport infrastructure as a key enabler of economic growth. Similarly, local planning policy highlights the inter-relations between economic growth and accessibility, most noticeably by expanding labour markets and improving employment opportunities for the labour force. Consequently, there is a general consensus across the local planning policy documents that the reopening of the Portishead line and the wider MetroWest Phase 1 represent transport infrastructure projects which could assist with economic development and improving accessibility in the area.

## 2.6 Major Planning Applications

- 2.6.1 Major planning applications within 2km of the Scheme between Portishead and Pill are presented in Table 2.9. These will be reviewed during the development of the cumulative impacts assessment for the project.

## SECTION 2

Table 2.9. Major Planning Applications within 2km of the Project between Portishead and Pill

Reference	LPA	Determination date	Site name	Description	EIA	Status
13/P/2079/F	NSC	N/A	Land off Harbour Road	Erection of two class A1 retail units and one class A4 unit together with car parking, landscaping, associated works and extension to existing 'park and ride' facility.	No	Pending
14/P/2519/F	NSC		Portishead Quays Marina Newfoundland Way Portishead	Extension of pontoons to west and north-east of existing system to increase berths from 249 to 373	No	Decision Pending
14/P/2570/F	NSC		Harbour Road/Martingale Way Portishead BS20 7AW	Erection of an assisted living development comprising 135 apartments and integrated care support and well being facilities (Use Class C2) for the over 60s age group with associated landscaping and infrastructure.	No	Decision Pending
13/P/1809/F	NSC	10 February 2014	Former St Joseph's School 53 West Hill Portishead BS20 6LG	Erection of 15 no. dwelling houses and 4 no. flats, conversion of listed building to 5 no. flats (24 residential dwellings in total) with associated infrastructure. Demolition of surrounding classrooms.	No	Determined
11/P/0955/F	NSC	21 May 2012	Sainsbury's Supermarkets	Erection of food store, customer parking, service access and associated development.	No	Determined
11/P/1145/F	NSC	03 October 2011	Land at Portishead Quay at junction of Harbour Road & Newfoundland Way	Construction of a 108 bed hotel.	No	Determined
11/P/1099/F	NSC	29 September 2011	176 High Street	Redevelopment of site to form 58 no. sheltered apartments for the elderly (category 2 type accommodation) including community facilities, access, car parking and landscaping.	No	Determined



Table 2.9. Major Planning Applications within 2km of the Project between Portishead and Pill

Reference	LPA	Determination date	Site name	Description	EIA	Status
10/P/1407/F 4	NSC	11 March 2011	Land off Wyndham Way	Major mixed use development. Application to extend time limit to submit reserved matters until 24 October 2013 on planning permission 00/P/1846/O which varied the time limits of 94/0348 for the Demolition and excavation of existing structures	No	Determined



# Air Quality and Carbon

## 3.1 Approach

- 3.1.1 This section provides an overview of air quality monitoring and carbon in North Somerset and Bristol City, covering the Portishead Branch Line (MetroWest Phase 1) Project and permitted development works along the Portbury Freight Line. A description of air quality relevant to the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling and Bathampton Turnback is provided in Appendix B.
- 3.1.2 Information for this section has been obtained from the following sources:
- Air quality monitoring and air quality management areas ("AQMA") have been identified based on local authority review and assessment documents to identify areas where air quality objectives are not being met.
  - Designated nature conservation sites within 1 km of the Portishead Branch Line (MetroWest Phase 1) project and Portbury Freight Line were obtained from the MAGIC website ([www.magic.gov.uk](http://www.magic.gov.uk)) and the Air Pollution Information System ("APIS").
  - Baseline carbon emission data were obtained from the National Atmospheric Emissions Inventory ("NAEI").

## 3.2 Regional Overview

### Air Quality

- 3.2.1 The Local Air Quality Management ("LAQM") process, as set out in Part IV of the Environment Act 1995 and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, places an obligation on all local authorities regularly to review and assess air quality in their areas, and to determine whether or not air quality objectives are being achieved.
- 3.2.2 The UK government is responsible to the European Commission ("EC") for ensuring that it complies with the provisions of the European Union ("EU") Directives. The UK government and governments of other Member States are currently in negotiations with the EC over breaching limit values for particulate matter ("PM<sub>10</sub>") and nitrogen dioxide ("NO<sub>2</sub>"). The air quality strategy objectives are presented in Table 3.1, showing the objectives in units of microgrammes per cubic metre ( $\mu\text{g}/\text{m}^3$ ) with the number of exceedances in each year that are permitted (where applicable).

Table 3.1. Air Quality Strategy Objectives

Pollutant	Concentration	Measured as	Date to be achieved by
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
	40 µg/m <sup>3</sup>	Annual Mean	31.12.2004

3.2.3 Where it is anticipated that an air quality objective will not be met, it is a requirement of the Environment Act 1995 that an AQMA be declared, for which the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.

3.2.4 BCC has declared a single AQMA which covers Bristol city centre and parts of the main radial roads including the M32 (see Figure 3.1 Air Quality Overview in Appendix A). The AQMA includes part of the local railway network within the centre of Bristol (including a short section of the Portbury Freight Line around Ashton Gate and the Bristol to Taunton main line to Parson Street). The AQMA has been declared for NO<sub>2</sub> (1-hour mean and annual mean objectives) and PM<sub>10</sub> (24-hour mean objective).

## Air Quality Monitoring

3.2.5 There are two principal methods for measuring air quality: passive sampling techniques such as diffusion tubes and more sophisticated continuous monitoring equipment. A review of the monitoring carried out by NSC and BCC is detailed below for sites within 1km of the Portishead Branch Line (MetroWest Phase 1) and the Portbury Freight Line. Further data on the Bedminster Down Line, Severn Beach / Avonmouth Signalling and Bathampton are provided in Appendix B.

### *North Somerset Council*

#### Air Quality Monitoring Sites

3.2.6 NSC monitors NO<sub>2</sub> concentrations at over 40 diffusion tube sites, with two locations also including diffusion tubes for benzene measurements. NSC does not carry out any PM<sub>10</sub> monitoring. Those air quality monitoring sites located within 1 km of the Project are shown in Table 3.2 and on Figure 3.1 Air Quality Overview.

3.2.7 Several air quality monitoring sites are located within 500m of the Project, the closest being the Pill (Railway Line) monitoring site located 150m north-west of Pill station and 10m from the new railway line.

#### Air Quality Monitoring at Nature Conservation Sites

3.2.8 Several designated nature conservation sites (see Figure 3.1 and Section 5) have also been identified within 1 km of the Portishead Branch Line (MetroWest Phase 1), where air quality has been monitored:

- the Severn Estuary Special Area of Conservation ("SAC"), Special Protection Area ("SPA"), Ramsar site and Site of Special Scientific Interest ("SSSI") located along the coast and less than 80m north of Pill, and
- Ashton Court SSSI

3.2.9 Table 3.3 provides data on the average nitrogen deposition within the designated nature conservation sites and an empirical estimate of the critical load. Critical loads are a quantitative estimate of an exposure of one or more pollutants below which significant harmful effects on specified sensitive environmental receptors do not occur. The data suggest that the estimated average nitrogen deposition on the Severn Estuary SAC and SSSI is unlikely to damage the meadows and grasslands.

Table 3.2. Non-automatic Monitoring Results for Mean Annual NO<sub>2</sub> Concentration from 2010 – 2012 for NSC's Diffusion Tubes within 1km of the Project

Location	X	Y	Site Type	Data Capture for 2012 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )		
					(Bias adjustment factor = 0.77) 2010	(Bias adjustment factor = 0.83) 2011	(Bias adjustment factor = 0.95) 2012
Long Ashton Park & Ride (A370)	356021	171009	Back-ground	92	22.0	20.3	21.9
Downside Road	351054	165665	Kerbside	100	25.9	24.2	30.4
Downside Road (Homelea)	350920	165745	Back-ground	92	15.3	14.8	15.0
Portbury (Priory Road)	349766	175441	Roadside	100	26.8	24.7	28.8
Pill (Railway Line)	352084	176273	Roadside	92	23.2	19.2	20.5
Portishead (High Street)	346747	175935	Roadside	100	24.0	24.2	25.8

*Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup>*

*Source: North Somerset Council, April 2013, Air Quality Progress Report*

Table 3.3. Average Nitrogen Deposition (Based on Measured-Interpolated Data for 2009 to 2011) and Critical Loads for Designated Ecology Sites within 1km of the Project

Designated site	Designation	Average nitrogen deposition (kg N/ha/yr)	Empirical critical loads (kg N/ha/yr)
Severn Estuary	SSSI (meadows and grassland)	14.72	20-30
Ashton Court	SSSI (coniferous woodland)	31.87	5-15

Source: Air Pollution Information System, accessed 24/4/14 – [www.apis.ac.uk](http://www.apis.ac.uk)

### *Bristol City Council*

#### **Air Quality Monitoring Sites**

- 3.2.10 BCC has an extensive air quality monitoring network. They operate 12 automatic air quality monitoring stations and a further two stations in Bristol are operated as part of the Automatic Urban Rural Network (“AURN”). None of these stations is located within 1km of the project.
- 3.2.11 The BCC automatic station at Parson Street School is located close to Portbury Freight Line at Parson Street Junction. The monitoring station is located within the BCC AQMA and the measured annual mean NO<sub>2</sub> concentrations shown in Table 3.4 for 2010 to 2013 indicates exceedances of the AQS objective. The location of this monitoring station is shown in Figure 3.1. No PM<sub>10</sub> monitoring is carried out at this site.

Table 3.4. Automatic Monitoring Results from 2010 to 2013 for Bristol City Council Diffusion Tubes within 1 km of the Portbury Freight Line

Location	X	Y	Site Type	Data Capture for 2013 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
					2010	2011	2012	2013
Parsons Street School	358042	170582	Roadside	99.6	50.5	48.2	47.9	50.8

*Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup>*

Source: Air Quality Progress Report for Bristol City Council, May 2014

- 3.2.12 BCC also monitors NO<sub>2</sub> from a network of 96 diffusion tube sites. A summary of the bias adjusted NO<sub>2</sub> concentrations from sites within 1 km of the Portbury Freight Line, including the Ashton Gate Level Crossing and Barons Close Pedestrian Crossing which form part of the Portishead Branch Line, is shown in Table 3.5 for 2010 to 2013. The locations of the air quality monitoring locations are shown in Figure 3.1.

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Table 3.5. Non-automatic Monitoring Results from 2010 to 2013 for Bristol City Council Diffusion Tubes closest to the Portbury Freight Line

Location	Site ID	X	Y	Site Type	Data Capture for 2013 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
						(Bias adjustment factor = 0.88) 2010	(Bias adjustment factor = 0.91) 2011	(Bias adjustment factor = 0.87) 2012	(Bias adjustment factor = 0.94) 2013
Parson Street A38 East	239	357880	170506	Roadside	82	81.3	82.0	76.9	78.0
Parson Street									
Bedminster Down Road	242	357510	170401	Roadside	90	80.3	75.5	73.9	75.1
Bedminster Down Rd	418	357737	170642	Roadside	90	92.9	90.5	81.8	74.0
Parson Street	419	357832	170686	Roadside	90	63.2	54.7	54.1	53.6
North St/Dean	420	358277	171562	Roadside	80	43.8	39.6	38.1	38.9
North St/Langton	422	358168	171525	Roadside	90	43.4	41.2	39.8	39.0
Savanna coffee drainpipe	466	357466	171622	Roadside	81	41.1	39.0	39.6	41.1
Strada Exeter Road	467	357568	171537	Roadside	90	40.7	33.4	35.1	34.8
Jamiesons Autos	472	358226	171284	Roadside	90	52.4	47.4	46.5	48.2
B&G Snax West St	473	358105	171124	Roadside	90	49.2	43.1	44.6	43.5
Martial Arts West Street	474	357991	170979	Roadside	90	45.1	39.7	37.9	39.1

Table 3.5. Non-automatic Monitoring Results from 2010 to 2013 for Bristol City Council Diffusion Tubes closest to the Portbury Freight Line

Location	Site ID	X	Y	Site Type	Data Capture for 2013 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
						(Bias adjustment factor = 0.88) 2010	(Bias adjustment factor = 0.91) 2011	(Bias adjustment factor = 0.87) 2012	(Bias adjustment factor = 0.94) 2013
Greville Smyth Park	99	357072	171703	Urban Background	90	32.7	28.1	30.0	33.1
Merchants Road Hotwells	254	357118	172429	Roadside	100	47.1	55.6	55.3	53.2
Lamppost on Whiteladies Road \ Cotham Hill, Clifton	314	357751	174063	Roadside	84	51.1	44.1	40.4	44.4
Jacobs Wells Road near Hotwells roundabout	155	357838	172713	Roadside	100	47.4	52.4	46.9	48.5
Hotwells Road	154	357601	172483	Roadside	100	54.7	40.9	40.3	44.3
Jacobs Wells Road opposite Clifton Hill	156	357709	173018	Roadside	100	56.1	49.1	45.8	44.2

Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup>. Bold denotes exceedance

Source: Air Quality Progress Report for Bristol City Council, May 2014

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- 3.2.13 The diffusion tubes closest to the project at Ashton Gate Level Crossing and Barons Close Pedestrian Crossing are Greville Smyth Park, where annual mean NO<sub>2</sub> is well under the objective, and Savannah Coffee Drainpipe and Strada Exeter Road, which show annual mean concentrations slightly under or over the objective.
- 3.2.14 The diffusion tubes located on Parsons Street, approximately 50m from Parson Street Junction, are the nearest monitoring locations to the Portishead Branch Line. These monitoring stations are located within the BCC AQMA and show exceedances of the annual mean NO<sub>2</sub> objective. No PM<sub>10</sub> monitoring data are available within close proximity (i.e. within 1 km) of the Portbury Freight Line.

**Air Quality Monitoring at Conservation Sites**

- 3.2.15 Four designated nature conservation sites are located within BCC, namely, Horseshoe Bend, Shirehampton SSSI, Avon Gorge Woodlands SAC and Avon Gorge SSSI (on the eastern flank of the gorge), and (a small part of) Ashton Court SSSI. These sites are shown in Figure 3.1 in Appendix A. Table 3.6 provides information on the average nitrogen deposition and empirical critical loads for these sites. The average nitrogen deposition rates exceed the empirical critical loads, which may be an indication of significant harmful effects occurring due to pollution.

**Table 3.6. Average Nitrogen Deposition (Based on Measured-Interpolated Data for 2009-2011) and Critical Loads for Designated Sites near the Portbury Freight Line**

Designated Site	Designation	Average Nitrogen Deposition (kg N/ha/yr)	Empirical Critical Loads (kg N/ha/yr)
Horseshoe Bend, Shirehampton	SSSI (Wooded cliff and salt marsh)	28.14	5-15
Avon Gorge Woodlands	SAC (Meso- and eutrophic <i>Quercus</i> woodland)	31.79	15-20
Avon Gorge	SSSI (Coniferous woodland)	39.62	5-15
Ashton Court	SSSI (Coniferous woodland)	31.87	5-15

*Source: Air Pollution Information System ("APIS") website*

## Carbon

- 3.2.16 An estimate of the mass of carbon dioxide (“CO<sub>2</sub>”) emitted (kilotonnes (Kt) per year) in the administrative boundaries of NSC, BCC and B&NES is shown in Table 3.7 by economic sectors. On average, the carbon emissions for all three local authorities were estimated at 7Kt for diesel railways (0.003% of total CO<sub>2</sub> emissions), with road transport accounting for about 516Kt (25% of total CO<sub>2</sub> emissions) for BCC and NSC.

Table 3.7. BCC, NSC and B&NES CO<sub>2</sub> Emissions for 2011 for Different Economic Sectors

Economic Sector	CO <sub>2</sub> (Kt)		
	BCC	NSC	B&NES
Industry & Commercial Electricity	587	203	179
Industry & Commercial Gas	141	106	53
Large Industrial Installations	0	0	0
Industrial & Commercial Other Fuels	45	53	37
Agricultural Combustion	1	13	11
Domestic Electricity	356	186	164
Domestic Gas	364	183	162
Domestic Other Fuels	13	39	33
Road Transport (A roads)	149	102	131
Road Transport (Motorways)	77	247	0
Road Transport (Minor roads)	290	172	108
Diesel Railways	6	7	7
Transport Other	3	13	1
LULUCF Net Emissions	4	27	10
Total for all sectors	2,036	1,351	897

Source: National Atmospheric Emissions Inventory

### 3.3 Portishead Branch Line (MetroWest Phase 1)

- 3.3.1 Monitoring data from NSC within 1 km of the Portishead Branch Line (MetroWest Phase 1) project are shown in Table 3.2. The annual mean NO<sub>2</sub> measurements for the diffusion tube monitoring carried out by NSC are all well below the air quality objective for annual mean NO<sub>2</sub> of 40 µg/m<sup>3</sup>.
- 3.3.2 Two designated nature conservation sites within NSC have been identified within 1 km of the Project: the Severn Estuary SAC, SPA, Ramsar and SSSI and Ashton Court SSSI. The nitrogen deposition concentrations (see Table 3.3) are below the empirical critical load at the Severn Estuary conservation site but above the critical load for Ashton Court SSSI.



- 3.3.3 The Ashton Gate Level Crossing works extends slightly into the BCC AQMA although the nearest air quality monitoring station at Greville Smyth Path indicates annual mean NO<sub>2</sub> concentrations below the AQS objective.

## 3.4 Recommendations for Further Survey Work

- 3.4.1 Given the likely sources of emissions arising from the project, no air quality surveys will be required during the EIA as there is adequate information available from local authority monitoring for carrying out an air quality assessment. Physical surveys are not relevant to carbon emissions, as they are calculated on the basis of emission-generating activities.



# Cultural Heritage

## 4.1 Approach

- 4.1.1 This section describes the known cultural heritage assets that may potentially be affected by the Portishead Branch Line (MetroWest Phase 1). The cultural heritage assets described in this section comprise buried and extant archaeology, buried palaeo-environmental features, historic landscapes and built heritage including listed buildings and conservation areas.
- 4.1.2 Information on the cultural heritage assets was obtained from the following sources:
- the Historic Environment Record ("HER") data held by NSC for archaeological sites and monuments data, derived from a GIS dataset obtained from NSC;
  - aerial photographic records held by the National Monuments Record ("NMR");
  - listed buildings, scheduled monuments, registered battlefields and historic parks and gardens information from the NMR;
  - cross-checking of designation data from English Heritage ("EH") through the website [www.magic.gov.uk](http://www.magic.gov.uk);
  - historic mapping (Ordnance Survey ("OS") and pre-OS) from the Somerset Heritage Centre ("SHC") in Taunton;
  - published sources such as local histories and archaeological journals at the SHC;
  - the National Heritage List for England ([www.english-heritage.org.uk](http://www.english-heritage.org.uk)) to cross-check designation information;
  - the NSC HER website (<http://map.n-somerset.gov.uk/HER>) for cross-checking designated and non-designated assets in addition to Historic Landscape Characterisation ("HLC") data;
  - BCC website (<http://maps.bristol.gov.uk/knowyourplace>) for cross-checking designated and non-designated assets; and
  - the Pastscape website ([www.pastscape.org.uk](http://www.pastscape.org.uk)) for archaeological sites in the Bath and North East Somerset region.
- 4.1.3 Data on designated heritage assets (listed buildings, scheduled monuments, etc) have been gathered for the Portishead Branch Line (MetroWest Phase 1) and Portbury Freight Line and a 500m buffer area extending outwards from the centre line of the railway corridor. Where topography results in inter-visibility, designated features beyond the 500m buffer area have been included.
- 4.1.4 Data for non-designated built heritage and archaeology have been gathered for a 50m buffer area extending outwards from the centreline of the railway corridor.
- 4.1.5 A site walkover of the disused section of the Project between Portishead and Pill was undertaken by the Project Archaeologist on 19 March 2014 to observe features in the field.
- 4.1.6 The cultural heritage features are shown on Figures 4.1 to 4.5.
- 4.1.7 The cultural heritage assets in the following sub-sections are reproduced from the NSC's HER and the NMR designation datasets available from EH. They are an accurate record of the known designations within the vicinity of the project.
- 4.1.8 The NSC dataset is not a definitive record of the non-designated cultural heritage within the study area, but rather a record of the known cultural heritage resource from previous

studies (including but not exclusive to historic map studies, documentary searches, aerial photographic studies and old photographs, and previous archaeological interventions).

- 4.1.9 The cultural heritage assets relating to the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling, and Bathampton Turnback are given in Appendix B.

## 4.2 Regional Overview

- 4.2.1 MetroWest Phase 1 is located in a long settled area with a rich cultural heritage. There is a range of statutory heritage assets within the area, including the following.

- Portishead Branch Line and Portbury Freight Line (See Figures 4.1 to 4.5). The cultural heritage designations within 500m of the railway corridor include Schedule Monuments, Registered Parks and Gardens (Leigh Court and Ashton Court), Grade I and Grade II Listed buildings, and Conservation Areas. There are numerous historic railway architecture features such as the branch railway line between Portishead and Pill, Pill viaduct, signal box and four railway tunnels. The Portbury Freight Line passes under the iconic Brunel structure Clifton Suspension Bridge. There are also historic landscape features including "a large scale utility" landscape associated with Portbury Docks on the Portishead Branch Line and former quarries on the Portbury Freight Line (see chapter 6 on historic mining).
- Severn Beach / Avonmouth Signalling. Two options are under consideration to locate a new signal either in the vicinity of Avonmouth station or near Severn Beach. There are three Grade II listed buildings within 500m of the study area, none of which is directly adjacent to the existing railway line, and some 54 non-designated monuments. There are no scheduled monuments, registered battlefields, registered historic parks and gardens, or conservation areas with 500m of either option.
- The Bedminster Down Relief Line (MetroWest Phase 1) lies within 500m of the Bedminster Conservation Area. There are also 16 listed buildings within 500m of the Project, all Grade II, and none of these lies within 200m of the existing railway line.
- Bristol to Bath railway line. A number of Grade II\* listed railway portals still lie along the active railway line: St Anne's Tunnel (West and East portals) and Fox's Wood Tunnel (West Portal only). Between Bristol and the edge of the City of Bath, there are 94 listed buildings, two registered Historic Parks and Gardens and two scheduled monuments within 500m of the railway line. The City of Bath is a UNESCO World Heritage Site ("WHS"), and there are approximately 200 listed buildings and seven scheduled monuments within 500m of the railway line, though no designations along the line of the railway itself. The Bath WHS extends to approximately 350m from the likely footprint of the Bathampton Turnback.

- 4.2.2 There are no Registered Battlefields within the area to be served by MetroWest Phase 1.

## 4.3 Portishead Branch Line (MetroWest Phase 1)

### Statutory Designations

#### Scheduled Monuments

- 4.3.1 There are no Schedule Monuments ("SM") along the disused section of the Portishead Branch Line. The Conygar Hill SM (Figure 4.2) lies just outside the study area; 550m from the Project. Conygar is an univallate hillfort dating to the prehistoric period (likely to be Late Bronze Age and / or Early Iron Age) and is included in this study because of its position on a visually prominent hill in the middle of an area of levels. There is some inter-visibility between it and the Project.
- 4.3.2 Three SMs lie within 500m of the Portbury Freight Line.

- Sea Mills SM. This site forms part of the Roman Settlement of Abonae. It is located approximately 180m east of the Portbury Freight Line, on the east side of the River Avon near its confluence with the River Trym. This major Romano-British settlement probably served the nearby spa town of Aquae Sulis (Bath) as its river port.
- Clifton Down Camp SM. This is an Iron Age hill fort on the eastern side of the sheer Avon Gorge, just over 200m east of the Portbury Freight Line and just to the north of the present-day Clifton Suspension Bridge. The fort is roughly circular, with double ditches and banks and earthen ramparts now covered in dense tree growth. The camp is part of the Clifton Downs parkland.
- Stokeleigh Camp SM. This site is a promontory fort in Leigh Woods located on the west bank of the River Avon and about 120m west of the Portbury Freight Line at its closest point. The monument includes an Iron Age fort and an associated linear earthwork situated on a carboniferous limestone promontory in Leigh Woods, overlooking the Avon Gorge to the east and the Nightingale Valley to the south.

4.3.3 SMs are designated by EH and are accorded a cultural heritage asset value of high.

#### **Registered Parks and Gardens**

4.3.4 There are no registered parks and gardens along the Portishead Branch Line.

4.3.5 The Portbury Freight Line passes through the north eastern edge of Leigh Court; a Grade II listed Registered Park and Garden ("RP&G"). The designation comprises the remnants of early 19th century parkland, which replaced an earlier landscape. The designation covers 233 hectares ("ha") and abuts the River Avon.

4.3.6 Ashton Court, a Grade II\* listed RP&G abuts the Portbury Freight Line further to the south, though the existing freight line does not run through the designation. The site has been developed as formal parkland since 1802 and replaced an earlier formal landscape.

4.3.7 RP&Gs are designed by EH and are accorded a cultural heritage asset value of high.

#### **Conservation Areas**

4.3.8 The Portishead Branch Line does not run through any Conservation Areas.

4.3.9 There are seven Conservation Areas within 500m of the Portbury Freight Line in BCC, which are, from north to south:

- Shirehampton;
- Sea Mills;
- Sneyd Park;
- The Downs;
- Clifton;
- City Docks; and
- Bower Ashton.

4.3.10 Of all the Conservation Areas listed above, only Bower Ashton lies to the west of the River Avon.

4.3.11 In NSC the Leigh Woods Conservation Area lies just to the west of the Clifton Suspension Bridge and the Avon Gorge.

4.3.12 Conservation Areas are accorded a cultural heritage asset value of medium. The Conservation Areas contain many listed buildings, which are described in the following subsection.

#### **Listed Buildings**

4.3.13 There are no Listed Buildings along the line of the Portishead Branch.

4.3.14 There are 12 Listed Buildings within 500m of the centreline of the disused section of the Portishead Branch Line (see Figures 4.1 and 4.2). In summary, these comprise:

- The White Lion Public House at the junction of Portishead High Street and Wyndham Street (ST4675676502). The Grade II designation includes part of the former sea wall. The building lies at the western edge of the study area and has no inter-visibility with the Project.
- Moor Farmhouse on the north side of Sheepway on Portbury Common (ST4792975862). This Grade II listed property dates to 1837. There might be very limited inter-visibility between the property and the railway line.
- No. 38 Station Road, Sheepway (ST4933276030). This is a Grade II rubble-built cottage from the early 17<sup>th</sup> century which might have some inter-visibility with the Project.
- Elm Tree Farmhouse dates to c. 1830-40 and lies on the east side of Station Road (ST4954775813). This has a Grade II listing and has little or no inter-visibility with the Project.
- Portbury Priors is a Grade II listed mid-17<sup>th</sup> century farmhouse with major 19<sup>th</sup> century amendments. It has no inter-visibility with the Project given it lies to the south of the M5 embankment.
- The Priory is a Grade II listed property on Station Road in Portbury (ST4984475340). Like Portbury Priors this has no inter-visibility with the Project.
- Portbury Priory and its boundary wall (ST4983775231) is a Grade II listed designation. Originally a medieval priory, the structure was substantially remodelled in the 19<sup>th</sup> century. It lies on the southern edge of Portbury and has no inter-visibility with the Project.
- St Mary's Church (ST5029275436) on Church Lane, Portbury is a Grade I listed building, originally comprising a 12<sup>th</sup> century Norman Church which was extensively modified throughout the medieval and post-medieval periods. The churchyard is included in the designation and comprises two separate listed structures: both 18<sup>th</sup> century chest tomb monuments to the Ballard (ST5027475423) and Davids/Maynard (ST5030475408) families. The church is adjacent to Junction 10 of the M5 and has no inter-visibility with the Project.
- The Church of St. George (ST5142575746) is a Grade II\* listed building on the south side of Church Lane, Portbury. This is a medieval building which was heavily restored in the 19<sup>th</sup> century. It has no inter-visibility with the Project.
- Court House Farmhouse on Marsh Lane (ST5111975951) is a Grade II listed farmhouse dating to 1630, which was remodelled in the 19<sup>th</sup> century. Lying to the south of Church Lane in Portbury, there is no inter-visibility with the Project.

4.3.15 The following listed buildings are located within 500m of the Portishead Branch Line in and around Pill.

- Lodway Croft, Pill, a Grade II listed mid 17<sup>th</sup> century farmhouse.
- Mulberry House and Mulberry Cottage, Pill, Grade II listed mid to late 17<sup>th</sup> century properties.
- The Watch House, a Grade II former Customs House dating to 1850, and now a private house, with retaining walls to the River Avon and former boathouse which is now a garage.
- A cluster of four listed buildings in and adjacent to Ham Green Hospital (Figure 4.3). These are a mid-18th century Grade II residence called 'Watergate' at the end of Watchhouse Lane in Pill, a Grade II gazebo 25 yards north east of the main

administrative block of the hospital and two flats (under one listing) in the administrative block itself.

4.3.16 The following listed buildings are located within 500 of the Portbury Freight Line between Ham Green and Parson Street Junction.

- The Clifton Suspension Bridge (a Grade I listed structure, see Figure 4.4) and its associated toll houses and flanking walls (also Grade I listed). Opened in 1864, the bridge was designed and started by Isambard Kingdom Brunel. The structures are also on the List of Buildings of Special Architectural and Historic Interest for the City of Bristol. The Portbury Freight Line passes directly underneath the bridge.
- A Grade II listed house dating to around 1872 and built for Francis F. Fox, Chief Engineer of the Bristol and Exeter Railway (Figure 4.4). This lies approximately 25-30m from the Clifton Suspension Bridge but has no inter-visibility with the Portbury Freight Line.
- A Grade II listed property 'Burwalls' (Figure 4.4), abutting Bridge Road. Now a college (Burwall's College for Continuing Education), the house was built in 1873 but has no inter-visibility with the Portbury Freight Line.

4.3.17 On the east side of Avon Gorge, a number of listed properties and other structures, mainly in the Clifton area of Bristol, lie within 500m of the Portbury Freight Line.

- The Harbour Walls of Sea Mills Dock (Grade II; Figure 4.4).
- Nos. 4, 6 and 8 Cook's Folly Road, Sneyd Park (Grade II; Figure 4.4).
- 'The Downs' on Towerhirst Sea Wall Road (Grade II; Figure 4.4).
- A limestone, marble and granite drinking fountain (Grade II; Figure 4.4) on Clifton Down.
- Eight semi-detached residential properties covered by four Grade II listings on Clifton Down. The listing covers the garden walls, gates and gate piers (Figure 4.5).
- Two Grade II arc lamp posts on Clifton Down (road above).
- Six Grade II\* and five Grade II houses on Clifton Down (Figure 4.5).
- A concentration of listed buildings within the Clifton Conservation Area (Figure 4.5), situated mostly on Sion Hill, Westfield Place, West Mall, Caledonia Place, Royal York Crescent, Cornwallis Crescent, Hotwell Road, Windsor Terrace, Windsor Place, Freeland Place and Albermarle Row. These are mostly an assortment of listings, with the greater majority being Grade II. Few of these buildings have inter-visibility with the Portbury Freight Line owing to topography, other buildings and mature vegetation. Only those buildings fronting on to Hotwell Road have limited inter-visibility with the Portbury Freight Line, given that there is mature vegetation between the banks of the River Avon and the railway line, which is terraced into the west side of the Avon Gorge. Most of these properties are Grade II listed, but there are several Grade II\* listed properties among them.
- The City Docks Conservation Area contains a number of listed structures reflecting the historic activity in and around Bristol Docks from the 19<sup>th</sup> century onwards (Figure 4.5). The Floating Harbour Quay Swing bridge (Grade II\*), its walls and bollards (Grade II) along with the west side of the harbour (Grade II\*) known as 'Brunel's entrance' are listed. Between the New Cut and Cumberland Basin lie the A and B-Bond warehouses (Grade II), in between which the Ashton Swing Bridge (Grade II) spans the New Cut. South of the New Cut is the C-Bond Tobacco warehouse (Grade II). Views to and from these designations are very limited owing to their positions with respect to the Portbury Freight Line in addition to mature vegetation.

- There are six listed buildings at Bower Ashton within 500m of the centreline of the Portbury Freight Line (Figure 4.5). These comprise No. 4 Clamage Road (Grade II) a semi-detached property; Kennel Lodge (with walls) on Kennel Lodge Road (Grade II); No. 1 Parklands Road (Grade II); 'Oakleigh' (Grade II), Nos. 1 and 2 Park Farm (Grade II) and Lower Lodge on Ashton Road (Grade II\*). The railway line lies in a cutting so there is no inter-visibility between these listed properties and the Portbury Freight Line.
- No. 248 Robin House (Grade II) near Parson Street Station (Figure 4.5). There is no inter-visibility with the railway line.

4.3.18 The cultural heritage asset value of Grade II listed buildings and structures is medium, and the value of Grade II\* and Grade I listed buildings is high.

### Non-designated Assets

4.3.19 On the NSC and BCC HERs, there are seven non-designated cultural heritage assets which lie along, or intersect the Portishead Branch Line located between Portishead and Pill:

- 40141 - The site of the Portishead Gasworks, a mid-19<sup>th</sup> century construction
- 40653 - Boundary to west side of Portbury Rhyne
- 45888 - Defence of Britain ("DoB") site comprising a light Machine Gun post - Anti-aircraft Artillery
- 05027 - The remains of Portbury Railway Station and World War I and II ("WWI" and "WWII") DoB sites at the station
- 40662 - Site of a 19<sup>th</sup> century signal box at Portbury Station
- 41842 - Remains of Portbury Shipyard Signal Box, with WWI and II sidings, and
- 40203 - Portishead branch line from the 1860s.

4.3.20 The site walkover survey identified a range of railway architecture not on the NSC HER, including:

- Track;
- Signal posts;
- Signal / Junction boxes;
- Three historic railway bridges: two carrying the Sheepway across the former railway line and one taking Church Road over the railway line.

4.3.21 There are a further three archaeological monuments and historic structures located along the Portishead Branch Line in and around Pill.

- 45392 - Easton in Gordano/Pill - core settlement
- 40325 - Pill Railway Viaduct built in the 1860s
- 41846 - Ham Green Tunnel, which was used in WWII as a shelter for trains

4.3.22 There are eleven non-designated archaeological monuments and historic structures located along the Portbury Freight Line between Ham Green and Parson Street Junction.

- 41310 - Site of a 19<sup>th</sup> century signal box on railway line at Leigh Woods (1885 OS)
- 05052 - Site of Nightingale Valley Halt
- 42500 - Site of the 'Cupiloe' at Nightingale Valley, 1684
- 42501 - Site of cottage in Nightingale Valley, 1626
- 42502 - Site of a lime kiln, 1626



- 41843 - Clifton Bridge Rail Tunnel, which was used as air raid shelter in WWII
- 2022M - Clifton Bridge Railway Station
- 2023M - Ashton Gate Halt
- 2225M - 1930s + garage
- 2064M - Frayne's Colliery
- 2028M - Parson Street Station

4.3.23 There are a further 39 non-designated assets recorded on the HER within 50m of the Portishead Branch Line and the Portbury Freight Line:

#### **Portishead Branch Line**

- 40652 - Boundary stone to the east of Portbury Rhyne
- 43584 - Sheepway Gate, Portbury
- 06993 - Group of small undated enclosures, Sheepway
- 42833 - Esso Petroleum Company - secret oil pipeline, 1960
- 41852 - WWII DoB unloading area for munitions
- 41450 - Site of WWII rail sidings and branch line to Marsh Lane camp
- 05039 - Site of WWI and II Portbury Shipyard railway station platform
- 07001 - Site of a medieval fishpond at Court Farm
- 05039 - Site of a railway station on 19<sup>th</sup> century OS map.
- 05040 - Pill Station
- 40669 - 18<sup>th</sup> century Station Hotel, Monmouth Road
- 195 - Non-registered historic park and garden, Easton-in-Gordano
- 40011 - Union Church, Pill
- 40671 - Site of a former 19<sup>th</sup> century church, Chapel Row
- 40357 - Site of a 19<sup>th</sup> century coal yard
- 40014 - Starr Inn, Bank Place
- 45987 - Former site of the 'Friendly Home'
- 40327 - Site of the former 19<sup>th</sup> century dry dock
- 40502 - The site of a medieval and later harbour
- 40355 - 19<sup>th</sup> century Methodist Chapel, Pond Head
- 02981 - 13<sup>th</sup> century pottery scatter at Pill Tunnel
- 40018 - Ham Green Farm, post-medieval farmstead
- 10703 - Palaeolithic flint flakes
- 05042 - Site of Ham Green Station, 1867

#### **Portbury Freight Line**

- 44796 - Railway spoil heap south of Ham Green, 1860s
- 44801 - Sea Mill railway spoil heap, 1860s
- 40363 - Site of a wharf at a former quarry (Walcombe Slade)

- 40037 - Old (19<sup>th</sup> century) quarry 300m west of old Zig-Zag pumping station
- 40359 - Old (19<sup>th</sup> century) quarry North of Stokeleigh Camp
- 40038 - Old quarry 200m South West of Zig-Zag pumping station
- 42497 - Old quarry east of Stokeleigh hillfort
- 42499 - 17<sup>th</sup> century quarry at the bottom of Nightingale Valley
- 02206 - 17<sup>th</sup> century Stockley Vale Copper Works
- 04903 - Iron Age coin findspot
- 5808 - Ruins of a 19<sup>th</sup> century cotton mill at Burwalls
- 05808 - Mill remains at Rownham
- 165 - Leigh Woods non-registered historic park and garden
- 2783M - Miner's Arms, Bedminster Down
- 2957M - Pound at Bedminster Down Road
- 2212M - West End Brick and Tile Works
- 2784M - St. Aldhelm's Church, Bedminster Down Road
- 2959M - Plough Inn, Bedminster Down Road
- 2958M - Bedminster Gate Toll House, Bedminster Down Road
- 2786M - Hart's Farm, Bedminster.

4.3.24 The former quarries are now historic landscape features.

4.3.25 These non-designated assets are all considered to have a low heritage asset value.

4.3.26 The Portishead Branch Line forms part of, passes through, or abuts several HLC Areas. Some of these character areas have been assigned a reference number, owing to the specific type which recurs across the country, while other unique landscapes are referred to by name only. The HLCs are from west to east:

- Two areas of HLC Area 28: a "large scale utility landscape" currently Portishead Business Park and Trading Estate / former Portishead-Bristol Railway and Portbury Docks.
- HLC Area 6: formerly a 15<sup>th</sup> to 17<sup>th</sup> century area of enclosure in an ancient area of reclamation, currently residential development on the east side of Portishead. These features also occur at Portbury.
- HLC Area 20: An area of 18<sup>th</sup> and 19<sup>th</sup> century parliamentary enclosures.
- HLC Area 1: Enclosed open fields from the late medieval period around Sheepway. These enclosures were created by local arrangement and exchange. They also occur at Pill.
- 19<sup>th</sup> century infill at Core Acre, Portbury.
- 'Pill (West)' 20<sup>th</sup> century suburban expansion.
- 'Pill (North) core settlements': representing the historic core of the town.
- Two areas of HLC Area 26: comprises post-medieval designed ornamental landscapes.
- 'Ham Green (West)' 19<sup>th</sup> century infill;
- HLC Area 20: 18<sup>th</sup> and 19<sup>th</sup> century enclosure by local and Parliamentary Acts;
- Ham Green Hospital;

- HLC Area 11: Post-medieval (18<sup>th</sup> and 19<sup>th</sup> century) parliamentary enclosure;
  - Two areas of medieval (or earlier) enclosure of rich, wet grassland; and
- 4.3.27 The Portbury Freight Line passes through
- HLC Area 11: Post-medieval (18<sup>th</sup> and 19<sup>th</sup> century) parliamentary enclosure;
  - HLC Area 26: comprises post-medieval designed ornamental landscapes.
  - HCL Area 21: Pre-1800 ancient woodland.
- 4.3.28 The locations of these areas can be found on the NSC planning portals.
- <http://map.n-somerset.gov.uk/HER.html>

## Preliminary Archaeological Comments

- 4.3.29 The following description of the archaeological resource the Portishead Branch Line (MetroWest Phase 1) was provided by the NSC County Archaeologist. The comments relate to that part of the Project lying in North Somerset.

*"This very large search area contains complex geology, some of which dictates the nature of the archaeology found there e.g. Avon gravel terraces containing Lower Palaeolithic flint hand axes.*

### *Early prehistoric*

*The gravel islands at Sheepway and the gravel terraces at Chapel Pill have both yielded Lower Palaeolithic flint tools (300,000- 500,000 years BP), and any disturbance of these areas may well turn up further examples.*

### *Roman*

*Roman structures and finds are uncommon along the search line, despite Portishead having been a Roman settlement of some note. A potential Roman fort has been noted on air photos at ST54577550, of which one corner may have been clipped during the original construction of the railway. A known Roman road running from a settlement at Abbotsleigh seems to be running to this fort. This is too recent a discovery to have yet reached the formal HER database.*

### *Early medieval*

*Little or nothing is known of this period, although Late Antique burials (6th century AD) are known from close to the former dock at Portishead.*

### *Later medieval*

*Rather more is known about this period. The origins of several parish churches lie in this period, especially Portbury (St Mary's) which is not only a Grade I minster church, but sits firmly on top of earlier Roman structures.*

*The medieval pottery industry at Ham Green and Pill is something that could potentially be affected by works. The industry has its origins in (probably) the 11th century AD, the early industry being large clamp fired, and not involving formal kilns. It produced the earliest known glazed pottery in the West Country (c 1120- 1140), and waste heaps of this occurred at the Pill end of the Ham Green tunnel, so this may have implications for any work done to the tunnel.*

*A number of the settlements along the road have their origins in the medieval period, such as Sheepway and Abbotsleigh (both Portbury and Portishead have Roman roots). At an*

*early date, such settlement would probably develop close to the parish church, although the area is not one that traditionally has nucleated villages: settlement tends to be very dispersed from an early date. Portbury is a special case: the village developed within the former precincts of a priory, and so has a nucleated appearance).*

*The harbour at Pill (which provided pilots to guide ocean-going ships into and up the Avon to the Port in Bristol) also developed its own infrastructure with a port, dry-dock and vessel construction and breaking facilities. Some elements of this may be vulnerable to any repairs or works to the viaduct.*

#### *Post-medieval*

*The major consideration in this period is the railway and its associated features: the line, the station and halt sites, the various tunnels, bridges, and the splendid viaduct at Pill. The suggestion in the scoping document that all the line be carefully photographically recorded when cleared is a sensible response to this.*

*The rise of Portishead Docks in the second half of the 19th century led to their importance in both World Wars, which meant that in WW2, heavy anti-aircraft defences were deployed around the port and the railway.*

*The industrial and defence structures have gradually disappeared, mainly in the late 20th century, and Portishead dock is now completely redeveloped as residential properties.*

*With care, and given the few exceptions cited above, most of the sites within the search area should minimally affected by the proposals, although access roads and construction camps will need to be sites carefully, and possibly archaeologically evaluated prior to construction."*

## 4.4 Recommendations for Further Survey Work

- 4.4.1 The historic railway architecture along the Portishead Branch Line (MetroWest Phase 1) will be affected by the re-establishment of a railway line between Portishead and Pill.
- 4.4.2 Prior to the commencement of construction, and after the clearance of vegetation along the entire route, it may be appropriate to undertake historic building recording of all the visible parts of the remaining infrastructure, including sections of the track, old signals and junction boxes, stations and bridges. This survey should be undertaken to a minimum of Level 1 in terms of the English Heritage guidance (English Heritage, 2006) for the archaeological recording of historic buildings.
- 4.4.3 There might be a requirement to investigate the development footprint of Portishead station prior to construction to test for the presence of previously unknown buried archaeology. This would have to be extended to any haul roads, new road access and contractor's compounds should they be situated in areas where archaeological potential is identified. If available, the results of geological ground investigation could be used in this instance to inform the need for, and scope of, such an exercise. Planning applications for large scale development around the Portishead station area will be reviewed to determine whether the associated environmental documents include new archaeological information.
- 4.4.4 Detailed assessment of the cultural heritage resource using historic maps and formulating an impact assessment based on the latest designs during the EIA would be appropriate to inform these investigations.

- 4.4.5 Once the design details for the Project along the Portbury Freight Line have been finalised, these will be reviewed against the NSC HER and historic maps to determine the need for an archaeological walkover survey to inform detailed assessment.



# Ecology and Biodiversity

## 5.1 Approach

5.1.1 This section focuses upon sensitive ecological receptors, comprising receptors with potential legal or policy implications, such as statutory and non-statutory sites designated for their nature conservation interest, species with legal protection, valued habitats and species (scarce, rare or a Biodiversity Action Plan ("BAP") priority) invasive plants, and habitat connectivity.

5.1.2 The ecological baseline assessment was undertaken for:

- The Portishead Branch Line (MetroWest Phase 1) incorporating the section of disused railway line between Portishead and Pill, the new alignment through Pill to Pill Junction where the railway joins the Portbury Freight Line, to the eastern Portal of Pill Tunnel;
- The existing Portbury Freight Line between Pill and Parson Street Junction with the south west main line, including the sections at Ashton Gate Level Crossing and Parson Street Junction which form part of the red line boundary for the Portishead Branch Line;
- Bedminster Down Relief Line (MetroWest Phase 1) on the south west main line between Parson Street Junction and Temple Meads;
- Severn Beach / Avonmouth Signalling (MetroWest Phase 1) on the line to Severn Beach; and
- Bathampton Turnback (MetroWest Phase 1) on the main line between Bristol and London near Bath.

5.1.3 The ecological baseline for the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling and Bathampton Turnback is discussed in Appendix B. The following text focuses on the Portishead Branch Line and the Portbury Freight Line that covers the route from Portishead to Parson Street Junction.

5.1.4 Baseline habitat data were obtained for the project area and immediately adjacent habitats (as the works will be largely confined to the existing railway land boundaries), with a 0.5 km buffer for all protected species records (extended to 2.5 km for bats) and locally designated sites, a 2 km buffer for nationally designated sites, and a 5 km buffer for internationally designated sites, except for those with bats as a qualifying feature where the buffer was extended to 30 km. This appraisal area is considered to be sufficient to cover the likely zone of influence of the project.

5.1.5 Information on ecology was obtained from the following sources.

- A review of existing ecological reports:
  - Halcrow (2011) Ecological Appraisal - Portishead. North Somerset Council. This survey covered the disused section of the railway between Portishead and Lodway.
  - Mott MacDonald (2011) Portishead Railway Project - Phase 2 Habitat and Protected Species Report. North Somerset Council. This survey covered the disused section of the railway between Portishead and Pill.
- The *Multi-Agency Geographic Information for the Countryside* ("MAGIC") website ([www.magic.gov.uk](http://www.magic.gov.uk)).

- Natural England ("NE") and Joint Nature Conservation Committee ("JNCC") Protected Site data.
  - Bristol Regional Environmental Records Centre ("BRERC"). A data search was undertaken for records of protected and priority species in the UK, locally important species of conservation concern and statutory and non-statutory designated sites of nature conservation interest. Data provided by the BRERC are updated periodically and do not guarantee presence of all known protected species within the area. Therefore even where no records exist for protected species, where suitable habitat exists, there is opportunity for species to be present.
- 5.1.6 Field surveys have been undertaken comprising a Phase 1 Habitat Survey undertaken in March-April 2014, preliminary bat surveys along the disused section of the railway between Portishead and Pill undertaken in August-October 2014, and overwintering bird surveys in the vicinity of Pill undertaken between October 2014 and January 2015. Further surveys are proposed and on-going, as discussed in Section 5.4.
- 5.1.7 The Phase 1 Habitat surveys were conducted along the Portishead Branch Line and Portbury Freight Line, comprising land within the railway land boundaries (the "railway corridor") and land immediately adjacent and connecting habitats. Habitats were classified using the JNCC standard Phase 1 habitat survey methodology<sup>4</sup> as extended in accordance the recommendations made in the *Guidelines for Preliminary Ecological Appraisal*<sup>5</sup>. The objectives of the survey were:
- To assess the existing habitat mapping and target notes (undertaken in 2011 by Halcrow<sup>6</sup>) for the disused section between Portishead and Pill, and determine whether any changes have occurred since these were produced;
  - To undertake a baseline Phase 1 habitat survey for the Portbury Freight Line between Pill and Parson Street Junction with the Bristol to Taunton main line;
  - To identify the presence, or potential presence, of protected and valued species and habitats;
  - To recommend any additional detailed survey requirement necessary to inform project design;
  - To recommend likely appropriate mitigation measures to remove or reduce potential impacts and effects, and
  - To identify opportunities for enhancement.
- 5.1.8 The results of the Phase 1 Habitat survey are presented in the Ecological Appraisal Survey Report in Appendix C.
- 5.1.9 As the Portbury Freight Line passes close to and through European designated sites, a draft Habitats Regulations Assessment ("HRA") screening report was prepared in accordance with the requirements of the European Habitats Directive and is presented in Appendix A to the Scoping Report, which has been prepared in parallel with this Baseline Report. The screening assessment concluded that 'Sufficient Uncertainty Remains' regarding the impacts of the works upon the Avon Gorge Woodlands SAC and Severn Estuary SAC, SPA and Ramsar site (alone or in combination with other plans or projects). A

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4 Joint Nature Conservation Committee (2010) Handbook for Phase I Habitat Survey – a Technique for Environmental Audit, reprinted 2010, JNCC, Peterborough.

5 Chartered Institute of Ecology and Environmental Management (2013) Guidelines for Preliminary Ecological Appraisal. Revised 2nd Edition. CIEEM. Winchester.

6 Halcrow (2011) Ecological Appraisal, Portishead Railway. North Somerset Council.



statement of the 'likely significant effects' cannot be fully determined until detailed environmental assessment relating to noise and air quality have been undertaken. NE agrees with this conclusion and further formal consultation with NE will be undertaken.

- 5.1.10 NE was consulted in April 2014 in relation to restrictions and likely impacts related to working within the Avon Gorge Woodlands SAC. Copies of the HRA screening report and the ecology chapters from the Baseline Report and the Scoping Report were supplied to NE in the summer of 2014. A meeting was held with NE in September 2014 to discuss the Project and the proposed approach. A formal request for feedback on the proposed approach to the ecological studies was requested via NE's Discretionary Advice Service ("DAS") in January 2015 to advise on the overwintering bird surveys and comment on the range and scope of ecological surveys proposed and consider whether these are sufficient to inform all potentially significant impacts from the Project and to support and ecological impact assessment. A copy of their advice is provided in the Scoping Report.
- 5.1.11 An overwintering bird survey was commenced in November 2014, following feedback from NSC's ecologist on the potential impact of the Project on the Severn Estuary SAC, SPA, and Ramsar site, which comes within 80 m of the Project in the vicinity of Pill. The survey was suspended in February 2015, following agreement by NE that the overwintering bird surveys were showing that there were no significant populations of overwintering birds in the area likely to be affected by the Project. A copy of the wintering bird survey is provided in Appendix C.
- 5.1.12 A preliminary bat survey was conducted between August and October 2014, to identify the value of the disused section of the Project between Portishead and Pill for bats. A copy of the bat survey is provided in Appendix C.

## 5.2 Regional Overview

- 5.2.1 The ecological importance of the MetroWest Phase 1 wider study area is reflected in the designation of international (e.g. Severn Estuary SAC, SPA, and Ramsar site; the Avon Gorge Woodlands SAC, and Bath and Bradford-on-Avon SAC), national (SSSIs and a National Nature Reserve ("NNR")), and local designated conservation sites (e.g. Portbury Wharf Nature Reserve, River Avon, and the Kennet and Avon Canal).
- 5.2.2 The Portishead Branch Line lies within NE's Severn and Avon Vales Natural Area (Number 56) and Bristol, Avon Valleys and Ridges Natural Area (Number 62). Bedminster Down Relief Line and Severn Beach / Avonmouth Signalling lie in the Bristol, Avon Valleys and Ridges Natural Area (Number 62). The Bathampton Turnback (MetroWest Phase 1) Project lies within the Cotswolds Natural Area (Number 55).
- 5.2.3 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 washland, and there are relict wetland sites and features such as old pollards, wet pastures, ditches and tall hedges.
- 5.2.4 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.
- 5.2.5 The Cotswolds Natural Area overlies Jurassic Limestone rich in fossils. The Natural Area supports over 50% of the national resource of limestone grassland characterised by upright brome and tor grass and rich in plants and invertebrates. The Cotswolds also contain significant areas of ancient woodland. Woodland cover is relatively continuous on

the scarp where internationally important stands of beech wood are to be found and in some parts of the plateau where there are woodland estates.

- 5.2.6 Habitats within the MetroWest Phase 1 wider study area include scrub, woodland, trees, ruderals, unimproved and semi-improved grassland, waterbodies (e.g. the River Avon, ditches, streams and ponds) and infrastructure (e.g. tunnels, bridges and viaducts). These habitats are known to support dormice, badger, breeding birds, reptiles (e.g. slow worms and grass snakes), bats and protected hedgerows. A significant number of habitats and species considered to be of Principle Importance in England are also found within the region. These include, intertidal mudflats, lowland woodlands, great crested newt *Triturus cristatus* and greater horseshoe bat *Rhinolophus ferrumequinum*.

## 5.3 Portishead Branch Line (MetroWest Phase 1)

### Designated Sites

- 5.3.1 International and national designated conservation sites are shown on Figure 5.1 in Appendix A. Further descriptions of the designated and non-designated sites are provided in the Ecological Appraisal Report in Appendix C to this Baseline Report. The internationally designated sites are described in more detail, including qualifying features, in the HRA Screening Report in Appendix A to the Scoping Report. The following text provides a brief description of the main features of these sites.
- 5.3.2 There are four internationally designated sites within a 5 km radius of the Project. Three of these sites are associated with the Severn Estuary, namely the Severn Estuary SAC, SPA and Ramsar site. These sites partially coincide and mostly lie off the north Somerset coast in the estuary itself, with a short extension up the River Avon. The Project lies within 1km of the Severn Estuary SAC, SPA and Ramsar site at the western end near Portishead and approximately 80m from Pill near the River Avon. The fourth internationally designated site is the Avon Gorge Woodlands SAC which is located on both sides of the Avon Gorge. The existing Portbury Freight Line passes through this designated site.
- 5.3.3 Seven nationally designated sites are located within a 2km radius of the Project, namely: The Severn Estuary SSSI; Weston Big Wood SSSI; Ham Green SSSI; Horseshoe Bend SSSI; Quarry Steps, Durdham Down SSSI; Avon Gorge SSSI, including Leigh Woods NNR, which is traversed by the Portbury Freight Line; and Ashton Court SSSI.
- 5.3.4 The areas for the Severn Estuary SSSI and the Avon Gorge SSSI overlap with the European designations for the same sites. Weston Big Wood SSSI is a mixed deciduous ancient woodland to the south west of Portishead. The Ham Green SSSI located along a cutting of the Portbury Freight Line is designated for its geological interest (see Chapter 6 Geology, Ground Conditions and Contaminated Land). Quarry Steps at Durdham Down SSSI, which lies 1.3km north east of the Project, is also designated for its geology, and is not considered further as the Project is unlikely to impact upon this site. Horseshoe Bend, some 780m north of the Project, is designated for its saltmarsh and wooded river cliff. Ashton Court SSSI lies about 80 m west of the Project and is designated for the saproxylic invertebrate fauna (invertebrates dependent on decaying and dead wood) associated with the woodlands and ancient trees of this historic parkland.
- 5.3.5 There are no Local Nature Reserves within 0.5 km of the Project.
- 5.3.6 There are a number Wildlife Sites ("WS") and Sites of Nature Conservation Importance ("SNCI") (non-statutory designated sites within North Somerset and the City of Bristol respectively) within 0.5 km of the Project. Eight of these sites are located immediately adjacent to the railway corridors, namely:

#### Portishead Branch Line

- Portbury Wharf Nature Reserve WS (also an Avon Wildlife Trust Nature Reserve);

- Drove Rhyne and adjacent fields WS;
- Fields between the railway line and the A369 Portbury WS (part of which is Priory Farm Avon Wildlife Trust Nature Reserve);
- Field east of Court House WS;
- Field east of M5 motorway, Lodway WS;
- The River Avon at Ham Lakes;

#### Portbury Freight Line

- Avon Gorge and Leigh Woods, and
- Bower Ashton Mineral Railway (disused).

### Habitats

5.3.7 The following habitats are found along the disused section of the railway between Portishead and Pill.

- **Woodland, trees and scrub** - Mature ash *Fraxinus excelsior* trees and silver birch *Betula pendula* woodland are present within the Project along with small willow *Salix* sp. and alder *Alnus glutinosa* woodland with a rose *Rosa canina*, bramble *Rubus fruticosus* agg. and hawthorn *Crataegus monogyna* understorey.
- **Grassland** - Two large area of semi-improved grassland, one to the west of Quays Avenue in Portishead (colt's-foot *Tussilago farfara* and sedge *Carex* sp. present with bramble and butterfly bush encroaching) and one at the far western end of this section near Pill (species include cock's-foot *Dactylis glomerata*, common bent *Agrostis capillaris*, ribwort plantain *Plantago lanceolata*, teasel *Dipsacus fullonum*, broadleaved dock *Rumex obtusifolius*, vetch *Lathyrus* sp., white clover *Trifolium repens* and creeping cinquefoil *Potentilla reptans*) where patches of bare ground are present and bramble is starting to develop within the sward.
- **Tall Ruderals** - Common nettle *Urtica dioica* is the dominant species, along with broad-leaved dock *Rumex obtusifolius*, rosebay willowherb *Chamerion angustifolium* and cleavers *Galium aparine* in areas surrounded by bramble.
- **Reedbed and Wetlands** - Stands of common reed *Phragmites australis* within the railway corridor were dry, except reed growing immediately east of Portbury Dock Road, which was associated with a wet ditch. Reed stands were species-poor and generally small in extent.
- **Watercourses** - A number of watercourses and drains are present passing beneath the Project and draining parallel to the site. In most cases the watercourses parallel to and within the Project were wet at the time of the survey and are considered to be ephemeral features.
- **Ponds** - Ponds or standing water in ditches within the Project are all shallow and shaded features of small extent and often covered with duckweed *Lemna minor*. There are a number of ponds outside the Project boundary.
- **Structures** - Over-bridges and under-passes cross the railway corridor. A small derelict building was identified within close proximity to the Project to the east of the M5.

5.3.8 As the section of railway is disused and substantially overgrown, the diverse range of habitats provides value as a linear corridor for the foraging and movement of fauna. The habitat also provides connectivity within the wider landscape such as the network of hedgerows and woodland belts for a variety of species groups including mammals, invertebrates, amphibians and reptiles.

- 5.3.9 The vegetation along the railway corridor was partially cleared in 2013 to facilitate access to the railway corridor, and herbaceous plants had re-grown by the time of the Phase 1 survey. Selective removal of vegetation, including small trees growing between the railway lines, was undertaken in spring 2014 to permit access for the site investigations undertaken as part of the GRIP 2 studies. A corridor approximately 10m wide was cleared along the centre of the railway corridor in February 2015 in advance of the topographical survey to provide access and good sight lines.
- 5.3.10 The following habitats are found within and immediately adjacent to the Portbury Freight Line between Pill and Parson Street Junction.
- **Scrub** - Both scattered and dense scrub comprising bramble *Rubus fruticosus agg.*, hawthorn *Crataegus monogyna* with sections of blackthorn *Prunus spinosa*, willow *Salix sp.* and Butterfly-bush *Buddleja davidii*.
  - **Woodland and trees** - Within the banks of the railway, trees are dominated by sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior*, oak *Quercus robur* and silver birch *Betula pendula* with hazel *Corylus avellana* and willow *Salix sp.* understorey.
  - **Grassland** - There is very little grassland habitat within the railway corridor as most of the habitat is shaded by woodland or dominated by scrub.
  - **Tall Ruderals** - There are some dense patches of common nettle *Urtica dioica*, along with broad-leaved dock *Rumex obtusifolius*, rosebay willowherb *Chamerion angustifolium* and cleavers *Galium aparine* in areas surrounded by bramble. Two stands of Japanese knotweed *Fallopia japonica* were recorded.
  - **Ephemeral/short perennial** - Sections of railway ballast along the track are distinctly species-rich and include species such as bristly ox-tongue *Helminthotheca echioides*, clover *Trifolium repens*, purslane *Claytonia sibirica*, germander speedwell *Veronica chamaedrys*, herb Robert *Geranium robertianum*, barren strawberry *Potentilla sterilis* and wood sedge *Carex sylvatica*.
  - **Watercourses** - The River Avon runs parallel to the railway for much of its length of which a small tributary stream runs under the site into Oak Wood. A number of ditches and streams run parallel and underneath the site.
  - **Ponds** - No ponds or standing water lie within the railway land. However two ponds were identified approximately 50m from the Project near Ham Green.
  - **Structures** - There are four tunnels along this section of railway, some of which are extensive in length. A number of over-bridges, under-passes and viaducts run across and under the site and there is one derelict building close to the Project near Ashton Gate.
- 5.3.11 The habitats within this section are largely limited to the sides and banks adjacent to the railway line itself. The habitats flanking the railway line provide an important linear habitat and connectivity to habitat features within the wider landscape, such as hedgerows, woodlands and watercourses as well as providing habitat corridor within the urban area of Bristol.

## Protected Species

- 5.3.12 Protected species records from BRERC have confirmed the presence of the following species within or in habitat immediately adjacent to the Project.

### Amphibians

- 5.3.13 Amphibians are partially protected by the Wildlife and Countryside Act ("WCA"), 1981 (as amended). Great crested newts *Triturus cristatus* are fully protected by the WCA 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 ("the Habitats

Regulations"). The following records were found in the vicinity of the Portishead Branch Line.

- Great crested newt - There are records for this species at a pond within the study area close to the railway line near Portbury Dock Road where three adult great crested newts were recorded during a survey in 2011<sup>7</sup>. Further records were received from BRERC.
- Smooth newt *Lissotriton vulgaris* and Palmate newt *Lissotriton helveticus* - These species were also identified at the location above and at other ponds near to the site.
- Common frog *Rana temporaria* - There are recent records up to 2010 from Pill.
- Common Toad - A registered toad crossing is active on the cycle path in Pill next to the Project. There are a number of known toad migrations, some with toad patrols set up in the wider area: one centred on Fennel Road, Portishead (pers comm).

### Reptiles

- 5.3.14 Widespread reptiles receive a limited degree of protection in the UK under the WCA 1981 (as amended). Reptiles likely to use the site (e.g. grass snake *Natrix natrix* and slow worm *Anguill fragilis*) are protected against killing, injury and sale.
- 5.3.15 A reptile survey was undertaken as part of a Phase 2 habitat and protected species survey following the results of an initial Phase 1 survey of the disused section of the Portishead Branch Line between Portishead and Pill<sup>8</sup>. A single juvenile grass snake was found at the western end of the site and a low population of slow worms was recorded along the length of the disused railway (valued as a medium population of reptiles). Opportunities for reptiles also exist at the former station at Pill and locations along the Portbury Freight Line, although their presence was not confirmed during the site survey.

### Badgers

- 5.3.16 Badgers *Meles meles* and their setts are protected under the Protection of Badgers Act 1992. An active badger sett in Portishead was identified during the 2014 Phase 1 Habitat survey. A badger survey undertaken by Mott MacDonald in 2011 as part of a Phase 2 habitat and protected species survey recorded one active and one inactive badger hole a few metres apart from each other in Portbury.

### Water vole

- 5.3.17 Water voles and their places of shelter receive full protection under the provisions of Section 9 of the WCA 1981 (as amended). A significant population of water vole *Arvicola amphibious* was recorded in 2007 in Drove Rhyne approximately 0.75 km to the north of the disused section of the Portishead Branch Line. This species has also been reintroduced to Portbury Wharf Nature Reserve, which extends immediately adjacent to the disused section of the Project between Portishead and Pill.

### Bats

- 5.3.18 All bat species and their places of refuge are fully protected in the Conservation and Habitats Regulations 2010 (as amended) and the WCA 1981 (as amended).
- 5.3.19 A bat survey undertaken in 2011 by Mott MacDonald found a high level of bat activity with mostly foraging behaviour along the disused section of the Portishead Branch Line; below bridges at Sheepway and from the Portbury area to Pill. In Portishead commuting

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<sup>8</sup> Mott MacDonald (2011) Portishead Railway Project - Phase 2 Habitat and Protected Species Report. North Somerset Council

behaviour was recorded with low levels of foraging and with overall lower numbers of bats than the rest of the railway line.

- 5.3.20 A further preliminary bat survey along the disused section of the Portishead Branch Line was undertaken from August to October 2014. The surveys showed that the disused railway line was being used by at least six bat species during late summer and autumn 2014, including lesser horseshoe bats *Rhinolophus hipposideros* and greater horseshoe bats *Rhinolophus ferrumequinum*. Bat roost potential is confined to a low number of trees and structures.
- 5.3.21 No signs of bats were observed along the Portbury Freight Line. However there are a number of trees and structures with bat potential. Greater and lesser horseshoe bats *Rhinolophus ferrumequinum* and *R. hipposideros* and Daubenton's bat *Myotis daubentonii* are known to be present within the Avon Gorge Woodlands SAC and Leigh Woods NNR. Records were also received from BRERC for many other bat species including Leisler's bat *Nyctalus leisleri*, Common pipstrelle *Pipistrellus pipistrellus* and Noctule *Nyctalus noctula*.

#### Dormice

- 5.3.22 The hazel dormouse is fully protected under Schedule 5 of the WCA 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations 2010 (as amended). Records of dormice are known from Leigh Woods NNR, Ham Green Lake and habitat along the Avon Gorge.

#### Birds

- 5.3.23 All breeding birds are protected in the UK under the WCA 1981 (as amended) while actively nesting.
- 5.3.24 Numerous bird records have been provided for the search area. These include Red List species<sup>9</sup> (Eaton *et al.*, 2010), birds listed on Section 41<sup>10</sup> of the Natural Environment and Rural Communities Act 2006 ("NERC Act"), and species listed on Schedule 1 of the WCA 1981 (as amended). Many species of wetland bird have been recorded, due to the proximity to the Severn Estuary, and there are records for ground nesting species, raptors and passerine species.
- 5.3.25 During the 2014 Phase 1 Habitat survey and a breeding bird survey (Mott MacDonald 2011) passerine birds such as Blue tit *Cyanistes caeruleus*, Blackbird *Turdus merula* and Robin *Erithacus rubecula* were present throughout the length of the disused section of the Portishead Branch Line. Numerous opportunities for nesting and foraging exist within the site in hedgerows, trees and scrub.
- 5.3.26 A partial overwintering bird survey has been undertaken of the Pill foreshore, part of the Severn Estuary SPA, SAC and Ramsar site. The surveys found very few birds present and anthropogenic disturbance from walkers, dogs and cyclists.

#### Invertebrates

- 5.3.27 A number of invertebrate species receive different levels of protection under various pieces of legislation. Some species are protected under Schedule 5 of the WCA 1981 (as amended). In addition, almost 400 invertebrate species, some of which are also Schedule 5 and European Protected Species ("EPS"), are listed under Section 41 of the NERC Act 2006, and form the Species of Principal Importance in England list as a Government priority for conservation action.

<sup>9</sup> Birds that meet one of the following criteria (i) globally threatened, (ii) historical population decline in UK during 1800–1995, (iii) severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969) or (iv) severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period.

<sup>10</sup> Species of principal importance for biological conservation in England.



- 5.3.28 An invertebrate survey of Portishead Branch Line was conducted in 2011 (Mott MacDonald 2011) and five Nationally Scarce invertebrate species were recorded. Of these, only one (a parasitoid fly *Athrycia curvinervis*) is considered important, although it is thought that this species is under-recorded. Numerous invertebrate records have been provided for the search area (BRERC, 2014), including records for notable beetles, dragonfly and other odonata, grasshoppers and crickets, butterflies and moths, many of which are listed on Schedule 5 of the WCA 1981 (sale only) and Section 41 of the NERC Act 2006. The majority of the records are from the designated sites outside of the disused railway section of the Portishead Branch Line such as Avon Gorge Woodlands SAC.

#### Fish

- 5.3.29 In their response to consultation, the Environment Agency state that there are records of European eel *Anguilla anguilla* in the vicinity of the Project. This species occurs in watercourses and marshes of the low lying coastal plains. The European eel is not protected under legislation, but it is classified as critically endangered on the IUCN Red List.

#### Plants

- 5.3.30 Numerous records of notable plants have been provided for the search area. None of the notable plant species found within the adjacent Avon Gorge Woodlands SAC and SSSI were identified during the Phase 1 habitat survey.
- 5.3.31 The invasive species Japanese knotweed *Fallopia japonica* was identified within a section of railway east of Quays Avenue on the Portishead Branch Line and at two locations on the Portbury Freight Line.

## 5.4 Recommendations for Further Survey Work

- 5.4.1 A number of protected species surveys were undertaken along the disused section of the Portishead Branch Line by Mott MacDonald in 2011. In 2014/15 CH2M HILL undertook a Phase 1 Habitat survey along the Portishead Branch Line and the Portbury Freight Line, a preliminary bat survey along the disused section of the Project and an overwintering bird survey near the Severn SAC, SPA and Ramsar site in Pill. The following surveys are recommended in order to provide updated results in line with best practice.
- 5.4.2 **Great crested newts** - A habitat suitability index ("HSI") assessment for great crested newts is being undertaken in winter/spring 2015 for ponds within 250 m of the Project and which are connected to the Project boundary by suitable habitats. Based on the findings of the HSI surveys and the proximity of ponds to each other and the Project, a great crested newt survey will be undertaken between March and June 2015. Surveys will involve a minimum of four survey visits to each pond to be undertaken between mid-March and mid-June.
- 5.4.3 If great crested newts are discovered in close proximity to, or within the Project, a detailed impact assessment and mitigation plan will be prepared. In order to permit construction within great crested newt habitat a development licence from NE will be required. The process of obtaining such a licence can take two months or longer and will involve a detailed method statement and mitigation plan to be prepared by an experienced ecologist and submitted to NE.
- 5.4.4 **Badgers** - It is recommended that the setts identified are retained. It is not possible to confirm presence of other setts without clearance of vegetation. Some vegetation clearance has been undertaken in winter 2015 to facilitate a topographic survey in the spring of 2015 for engineering design and full clearance would not be done until the start of works which is likely to be autumn 2017 / winter 2018. Any vegetation clearance of the study area will be undertaken in association with a watching brief by an experienced ecologist. A further badger survey is planned in 2015 following the first round of

vegetation clearance. Setts located within 30m of construction activities, setts considered to be at risk of collapse, and setts located where badgers may be threatened by running trains, should be temporarily or permanently closed. Sett closure must be carried out under licence from NE. Licences are generally not issued between the beginning of December and the end of June when badgers are breeding. A two month period should be allowed for the licence application process.

- 5.4.5 **Bats** - Any trees with bat roost potential that are likely to be felled should be inspected prior to removal by a suitably qualified ecologist for bat roost signs. Bat-potential trees are usually mature trees, which have cracks or broken branches and may be ivy covered, which could be used for shelter. Bat surveys require up to three visits covering dusk and dawn periods to be undertaken between May and September. Winter surveys may also be deemed necessary if hibernation features are identified within structures. All surveys should be undertaken in accordance with Bat Surveys, Good Practice Guidelines<sup>11</sup>. A preliminary bat survey of the disused section between Portishead and Pill was undertaken in 2014, prior to vegetation removal for the topographical survey in the winter of 2015. A winter survey of this area will be undertaken in 2015, followed by a more detailed bat survey in the summer 2015. Bat surveys of the four tunnels on the Portbury Freight Line are also planned for 2015 to assess potential effects from running passenger trains, which may affect potential bat roosts in the tunnels due to changes in air quality, noise and lighting.
- 5.4.6 **Reptiles** - It is recommended that the reptile survey is updated in April-May 2015, to inform a reptile mitigation strategy to prevent killing or injury to reptiles during construction.
- 5.4.7 **Water vole** - As water voles are known to be present within Portbury Wharf Nature Reserve, surveys of watercourses connecting the Nature Reserve to the disused section of the railway are recommended in 2015 as well as other waterbodies along the disused railway line with potential to support water voles.
- 5.4.8 **Dormouse** - Adjacent habitat along the Portbury Freight Line within the Avon Gorge Woodlands SAC and at Ham Green are known to support dormice (BRERC, 2014). Connective habitat, such as woodland, hedgerow and scrub that connects to the Project corridor has likely potential to support dormice. Should any vegetation within the Avon Gorge Woodlands SAC or connected to the SAC have to be cleared then these sections should be subject to a dormouse survey prior to clearance.
- 5.4.9 **Plants** - Adjacent habitat along the Portbury Freight Line within the Avon Gorge Woodlands SAC supports important flora species including small-leaved lime *Tilia cordata* and rare whitebeams *Sorbus spp.* None of the rare plants found within the Avon Gorge Woodlands SAC was identified within the Project boundaries during the Phase 1 Habitat Survey undertaken in 2014. However, should any vegetation within the Avon Gorge Woodlands SAC or connected to the SAC have to be cleared, then it may be necessary to survey these sections for SAC qualifying plant species.
- 5.4.10 Further surveys are not proposed for the following species.
- 5.4.11 **Birds** - Another breeding bird survey is not considered necessary as long as mitigation measures are employed during the construction phase of the Project e.g. vegetation clearance is undertaken in the winter months and disturbance is minimised close to the nature reserves. A partial overwintering bird survey has been completed for the Severn Estuary SPA and Ramsar site, and Natural England has confirmed that no further wintering bird surveys are required.

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11 Bat Conservation Trust (2012) Bat Surveys Good Practice Guidelines. Second Edition



- 5.4.12 **Invertebrates** - Natural England guidance suggests a survey for invertebrates is required if distribution and historical records suggest that important invertebrates may be present. The biological records search found important invertebrates are present but the majority of these were in the designated sites. Habitat suitable for some of these invertebrates, such as Chalkhill blue *Polyommatus coridon* is not present within the Project boundaries. Further invertebrate survey is not considered necessary. Opening up the densely scrubbed-over areas along the disused section of the railway will provide opportunities to enhance the habitat for invertebrates.
- 5.4.13 **European eel** - The Project crosses or runs alongside a number of drainage ditches, many of which are dry or overgrown, but some may support aquatic life. At present it is considered that it will not be necessary to enlarge the existing culverts and this will be confirmed during GRIP 3 and 4. During construction, a precautionary approach will be taken to protect the aquatic habitats of the water courses through housekeeping measures, such as measures to prevent runoff and sediment discharging to ditches, and if localised de-watering is required, this would be done in the presence of suitably qualified ecologists who would transfer aquatic fauna. Given the poor habitat of nearby ditches and a precautionary to mitigation, it is not considered necessary to conduct fish surveys.



# Geology, Hydrogeology, Ground Conditions and Contaminated Land

## 6.1 Approach

- 6.1.1 This section describes the underlying geology, designated geological sites, ground conditions and presence of contamination or mineral workings with the potential to affect or be affected by the Portishead Branch Line (MetroWest Phase 1) Project.
- 6.1.2 The area considered in this baseline section comprises the footprint of the Portishead Junction Branch Line and the Portbury Freight Line within the context of the wider study area of MetroWest Phase 1. Information on the existing environment for the Bathampton Turnback, Bedminster Down Relief Line and Severn Beach / Avonmouth Signalling projects is provided in Appendix B.
- 6.1.3 The following sources of information have been used in determining the likely ground conditions:
- British Geological Survey ("BGS") online mapping tool;
  - Environment Agency "What's in your backyard" online data warehouse;
  - Landmark EnviroCheck report covering Portishead (see Appendix D);
  - Coal Authority data held on their website;
  - MAGIC online data ([www.magic.gov.uk](http://www.magic.gov.uk)) and
  - The GRIP 2 report by Network Rail and URS 2014<sup>12</sup>, which included the results of a preliminary site investigation along the disused section between Portishead and Pill.
- 6.1.4 As part of this baseline study, the contaminated land specialist undertook a reconnaissance visit of the proposed station locations at Portishead and Pill station and discussed his observations with NSC's Environmental Health Department in spring 2014.

## 6.2 Portishead Branch Line (MetroWest Phase 1)

### Geology

- 6.2.1 The geological sequence underlying the project is described in Table 6.1.

Table 6.1. The Geological Sequence Underlying the Project

Period	Strata	Description
Triassic	<ul style="list-style-type: none"> <li>• Mercia Mudstone Group</li> </ul>	<ul style="list-style-type: none"> <li>• Dominantly red, less commonly green-grey, mudstones and subordinate siltstones. Thin beds of gypsum/anhydrite widespread; sandstones are also present.</li> </ul>
Carboniferous	<ul style="list-style-type: none"> <li>• Pennant Sandstone Formation</li> <li>• South Wales Middle Coal Measures Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Green-grey and blue-grey sandstones with thin mudstone/siltstone and seatearth interbeds and mainly thin coals.</li> <li>• Grey coal-bearing mudstones/siltstones, with seatearths and minor sandstones.</li> </ul>

<sup>12</sup> Network Rail and URS, July 2014. Feasibility Report Version 1.00, MetroWest Phase 1, Governance For Railway Investment Projects (GRIP) Stage 2

Table 6.1. The Geological Sequence Underlying the Project

Period	Strata	Description
	<ul style="list-style-type: none"> <li>• Cromhall Sandstone Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Brown and red fine- to coarse-grained quartzitic sandstone with subordinate mudstone and limestone.</li> </ul>
	<ul style="list-style-type: none"> <li>• Oxwich Head Limestone Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Thick bedded fine- to coarse-grained, limestones. Units of dark grey, irregularly bedded skeletal packstones with shaly partings are developed at intervals.</li> </ul>
	<ul style="list-style-type: none"> <li>• Clifton Down Limestone Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Mudstones and limestones. Sandy limestone at base in Bristol area.</li> </ul>
	<ul style="list-style-type: none"> <li>• Goblin Combe Oolite Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Massive, medium to coarse grained oolitic limestone with lenses of crinoidal limestone.</li> </ul>
	<ul style="list-style-type: none"> <li>• Clifton Down Mudstone Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Thin- to medium-bedded calcite and dolomite mudstones. A unit of crinoidal and oolitic limestones occurs in the middle of the Formation, and a 15m-thick unit of oolitic and crinoidal limestone occurs in the upper part of Formation.</li> </ul>
	<ul style="list-style-type: none"> <li>• Gully Oolite Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Medium- to thick-bedded oolitic grainstone with fine-grained skeletal packstones. Locally in the north Bristol to Tytherington area 6-21m of grey crinoidal limestones, the Sub-Oolite Bed, occurs at the base of the Formation.</li> </ul>
	<ul style="list-style-type: none"> <li>• Black Rock Limestone Subgroup</li> </ul>	<ul style="list-style-type: none"> <li>• Thin to thick-bedded fine to coarse grained packstones with subordinate thin beds of argillaceous packstone and mudstone.</li> </ul>
	<ul style="list-style-type: none"> <li>• Avon Group Mudstone and Limestone</li> </ul>	<ul style="list-style-type: none"> <li>• Interbedded grey mudstones and thin- to medium-bedded skeletal packstones with one to several thick units of ooidal and skeletal grainstones. Thin units of calcite mudstone and mudstone locally present. Sparse thin ironstones.</li> </ul>
	<ul style="list-style-type: none"> <li>• Avon Group Limestone</li> </ul>	<ul style="list-style-type: none"> <li>• Interbedded grey mudstones and thin- to medium-bedded skeletal packstones with one to several thick units of ooidal and skeletal grainstones. Thin units of calcite mudstone and mudstone locally present. Sparse thin ironstones.</li> </ul>
	<ul style="list-style-type: none"> <li>• Shirehampton Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Interbedded, thin- to medium-bedded red, green and grey mudstone, limestone, sandstone and siltstone with a thick red crinoidal limestone.</li> </ul>
Devonian	<ul style="list-style-type: none"> <li>• Portishead Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Red-green mudstones and marls, red siltstones and red-yellow, hard, fine-grained quartzose sandstones, with conglomerate locally.</li> </ul>
	<ul style="list-style-type: none"> <li>• Black Nore Sandstone Formation</li> </ul>	<ul style="list-style-type: none"> <li>• Sandstones</li> </ul>

- 6.2.2 The Portishead to Pill section of the Portishead Branch Line lies on sediments of the Mercia Mudstone Group for the most part overlain by Tidal Flat Deposits. The Mercia Mudstone Group comprises dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thin beds of gypsum/anhydrite and sandstones also present. Tidal Flat Deposits comprise clay with sand, gravel and peat. There are deposits of artificial ground along the section of the route within Portishead.
- 6.2.3 The Portbury Freight Line crosses an area of alluvial clays and silts associated with a small stream tributary of the River Avon north of Ashton Gate and crosses River Terrace Deposits comprising sands and gravels and Head deposits comprising clay, silt, sand and gravel around Pill.
- 6.2.4 The Portbury Freight Line crosses coal bearing strata the surface along the southernmost section around Ashton Gate (which lies in the Red Line Boundary for the Portishead Branch Line). An old coal pit is marked on the 1884 OS map, some 300m to the west from the railway which survives on mapping editions up to 1955 when the area is developed as allotments. At Ashton Gate the earliest OS map dated 1886 shows Fraynes Colliery as being disused and a colliery associated with the Ashton Vale Ironworks to the north which remains until sometime in the 1940s. Given the long established nature of the railway no impacts are considered from mining.
- 6.2.5 The Portbury Freight Line passes through a railway cutting at Ham Green which has been designated as a SSSI due to the geological sequence exposed in the cutting. The citation for the SSSI is reproduced below.
- "The cutting shows a section through Pleistocene sediments, which include two to three metres of red-brown, gritty, stony silts, with abundant Greensand chert and other far-travelled rock-types. These deposits appear to be heavily-cryoturbated terrace gravels or presumed fluvial origin, although a fluvio-glacial origin has also been suggested. Such deposits cap a number of flat-topped hills at around 30 metres O.D. A number of Acheulian handaxes have been found in the area, mostly in the early part of this century. This site is one of the last good exposures of "high" terrace deposits along the Bristol Avon. This site's great research potential and its fine exposures make it one of considerable importance."*
- 6.2.6 Ham Green SSSI is also designated for its geological interests as it hosts a complete local succession of the Carboniferous Limestone. The classic work of Vaughan and Reynolds on the marine fossils of the limestones, and the adoption of the sections as the standard for the 'Avonian', makes this one of Britain's historic geological sites, important for both the study and development of stratigraphy. The section spans (with gaps) the entire Tournaisian and Viséan series (Courseyan-Brigantian stages), and also includes the Old Red Sandstone Portishead Beds below.
- 6.2.7 The Portbury Freight Line also passes through the Avon Gorge which is designated as a SSSI primarily for reasons of ecology but part of the citation is reproduced below:
- "The Gorge has natural cliffs and quarry exposures of Carboniferous limestone, which are of great geological interest....."*
- 6.2.8 The Avon Gorge affords one of the best opportunities for the study of Carboniferous rocks in Britain, studies which have continued since the early 19th century.

## Hydrogeology

- 6.2.9 The Mercia Mudstone 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.

- 6.2.10 There are no source protection zones ("SPZ") along or within 2 km of the project. The River Terrace Deposits are classified as Secondary A aquifers are likely to provide limited water resources due to their limited catchment, being isolated over less permeable lithologies.

## Land Use History

### *Route Section*

- 6.2.11 The railway corridor was established along its present route in the 1860s, prior to the first edition of the OS map in 1884. The historic maps show that no changes to land use have occurred since that time. However, the railway services were stopped, with the line closed to passenger services in 1964 and for freight in 1981. The Portbury Freight Line was re-opened in 2002 to Portbury Dock and for freight only.

### *Portishead*

- 6.2.12 Three options for the proposed location of the Portishead station were initially considered for the Portishead Branch Line, with Option 2B being selected. This option requires a new roundabout at the southern end of Haven View and a link between this roundabout and Quay's Avenue.
- 6.2.13 The 1884 edition of the OS map shows the railway to the port at Portishead already present and the land between this and the town centre largely undeveloped and low lying. An inlet of the estuary approaches to the north. There is a gas works noted to the north and a nail works to the south as well as the various dock related activities to the north. Between 1931 and 1968 the area was substantially modified with infilling of the inlet and establishment of the road network including Harbour Road to the north. The new development area was used for railway sidings with cranes. By 1974, some of the current commercial buildings along Old Mill Road were established. By 1987, the sidings were gone and the rail connections to the docks were much reduced with further commercial development along Old Mill Road and Harbour Road. Between 1987 and 1999 the last rail connections to the docks were removed and much of the industrial activity in the area ceased. Redevelopment of the area was well established by 2003 and development continues through to 2005 when the current Waitrose building and car park were completed.
- 6.2.14 The area to the west of Quays Road, bounded by Wyndham Road to the south, the railway to the north, and a drainage ditch to the west, was marked as a "depot" between 1970 and 1999 on the OS mapping. It is thought that this is the site of a fuel storage depot, which has since been cleared and remediated to make way for redevelopment.
- 6.2.15 To the east of Quays Avenue, the 1884 OS edition shows the railway as established with the surrounding area divided by field boundaries, which remained unchanged until 1961. The 1968 OS edition shows land raising in cells either side of the drainage ditch, one of which is labelled as a refuse tip. The 1974 OS edition labels these as slag heaps with the 1987 OS edition showing "Tips Disused". Aerial imagery from 2003 shows the current road network being constructed with its completion by 2005 and construction of the residential housing to the north underway.
- 6.2.16 During a site visit in March 2014, the proposed station site within the railway boundary was observed to be largely overgrown with trees and bushes. The proposed car park area comprises a raised area of grassland along Quays Avenue and Harbour Road. There was no

visual evidence of any contamination present. Evidence of a ground investigation was seen within the proposed car park area with three gas monitoring standpipes and a number of trial pits. The made ground at the exposed surface of the trial pits comprised a clay and sand matrix with gravel and cobbles of bricks, sandstone and slag. It is not known who commissioned this ground investigation.

### *Pill Station*

- 6.2.17 Pill Station was opened in 1867 and closed in 1964. The 1881 OS map shows the railway line in place and a station located within the village. By 1915 Monmouth Road has been built to the north of the railway with housing. Further residential development occurred between 1938 and 1955 continuing until the village reached its current extent sometime between 1970 and 1981. The original station is no longer present.
- 6.2.18 The proposed car park to the west of the station is located on former railway sidings/goods yard. These appear on the 1915 OS edition consisting of a single track off the main line with a number of buildings.
- 6.2.19 During a site visit in March 2014, the car park site was observed to comprise a generally flat area paved with macadam at the entrance and then aggregate. No significant contamination issues were observed from the boundary although access to the site was not possible. The former station area is not accessible from the road above but does not appear to have any significant issues with regards contamination.

### Potentially Contaminative Land Uses

- 6.2.20 The route of the MetroWest Portishead Branch Line (MetroWest Phase 1) project was an established railway corridor for a considerable period and as such there is potential for the underlying ground to be affected by contaminants associated with railway use such as hydrocarbons and asbestos. The GRIP 2 study (URS, 2014) showed that the existing ballast along the disused section between Portishead and Pill is no longer suitable and will have to be lifted and replaced with new stone. Some of the ballast is also contaminated and may require treatment, disposal or possibly re-use within the project.
- 6.2.21 At Portishead the new station is likely to be located on made ground, which may be contaminated due to historic land use. It is unlikely that any contamination would be so significant as to prevent development given the likely structures involved, namely, a station building, platform, car parking and pedestrian and cycle path to the town centre. However, given alterations are required to Quays Avenue, there is more potential to encounter contamination, given the proximity to the former fuel storage depot.
- 6.2.22 At Pill Station the potential car parking area may be affected by residual contamination associated with use of the site as sidings.

## 6.3 Recommendations for Further Survey Work

- 6.3.1 Further consideration of the ground conditions is needed and investigations designed to determine the nature of any constraints present and also foundation designs for the stations and car parks. This will include further assessment of contaminated land and ground conditions within the railway land as part of the next phase of the works to be undertaken in GRIP 3<sup>13</sup> and the requirements for further highway engineering design.

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<sup>13</sup> The Governance for Railway Investment Projects (GRIP) process is Network Rail's management and control process for delivering projects on the operational railway; GRIP 3 is 'Option selection'.





# Landscape and Visual

## 7.1 Approach

- 7.1.1 The purpose of this landscape and visual assessment is to establish the baseline landscape and visual resources in the vicinity of the Portishead Branch Line (MetroWest) Project and the Portbury Freight Line. This baseline will then be used to assess the impact of the project on these resources and develop mitigation measures.
- 7.1.2 Landscape character and visual impact assessments are separate, but related. The landscape character assessment relates to features, elements and patterns which make up the landscape character. The visual assessment relates to the change in view from particular locations, and concerns visual receptors.
- 7.1.3 The assessment of the landscape character takes into account regional assessments i.e. the descriptions contained within the National Character Area ("NCA") profiles developed by Natural England ("NE"), and local landscape character assessments developed by the local planning authorities, here NSC and BCC. Site specific landscape character assessment has been developed by the assessment team. This hierarchy of assessment scales (national, regional and local) allows the character of the site to be put into its wider context and helps to establish an understanding of the importance of the various features. The study of the landscape character assessments responds to these various scales.
- 7.1.4 The study area for the visual assessment has been to establish a visual envelope and to identify receptors within this envelope. The envelope has been derived from a digital terrain model. A zone of theoretical visibility ("ZTV") at a 3km offset from the railway line was first developed to identify potential long range views from surrounding areas. This map at a 50m grid does not include buildings, woodland or other features which could potentially screen the view to the line. An approximate visual envelope has been developed from this model by testing it against actual views to and from the railway line from site. It is from within this visual envelope that visual receptors have been identified and their existing views described below. The most likely affected visual receptors have been identified by their various sensitivities and grouped together where they have a broadly common view.
- 7.1.5 Desk top assessment and field surveys have been undertaken in order to identify and provide an overview of the study area.
- 7.1.6 The following data sources have been used to establish the baseline conditions:
- North Somerset Adopted Core Strategy 2012
  - North Somerset Joint Replacement Local Plan 2007
  - Bristol City Council Development Framework Core Strategy 2011
  - Natural England National Character Area Profiles 2013
  - North Somerset Landscape Character Assessment 2005
  - Bristol City Council City Centre Context Study Character Area Cumberland Basin 2013
  - Bristol City Council Conservation Area Character Appraisals
  - Bath and North East Somerset Council Landscape Character Area Assessment 2003
  - Magic Map ([www.magic.gov.uk](http://www.magic.gov.uk))
- 7.1.7 Site visits were undertaken on 17 March 2014 and 28 April 2014. The site visit included:
- Site specific character analysis, through consideration of landform, vegetation, human influence (built form and culture) and nature of views.

- Establishing the outline visual envelope, identifying visual receptors and views.

## 7.2 Regional Overview

### Landscape Character

7.2.1 This section considers the wider landscape character and context within which the project sits, through consideration of relevant designations and NCAs. In addition, there are numerous landscape designations within the wider study area, including Green Belt and the Forest of Avon Community Forest, which are crossed by the Portishead Branch Line (MetroWest Phase 1) Project. The parklands of Ashton Court and Leigh Court are designated as Registered Parks and Gardens ("RP&G") and are in close proximity to the Portbury Freight Line. There are no Areas of Outstanding Natural Beauty ("AONB"), which would be affected by the Project.

7.2.2 The Portishead Branch Line (MetroWest Phase 1) Project passes through two NCAs (see Figures 7.1 and 7.2 for the disused section of the Portishead to Pill railway line and Figures 7.5 to 7.7 for the Portbury Freight Line). These are:

- Natural England NCA 106 Severn and Avon Vales (Portishead to Pill disused section of railway line)
- Natural England NCA 118 Bristol, Avon Valleys and Ridges (Portbury Freight Line)

#### NCA 106 Severn and Avon Vales

7.2.3 NCA 106 Severn and Avon Vales encompasses the lower valleys of the rivers Severn and Avon which dominate *"this low lying open agricultural vale landscape"*. Industrial development is a defining element of this character area, particularly at Avonmouth. *"The archaeology/heritage of former industry is prominent around Sharpness Docks, Pill, Gloucester-Sharpness Canal and Stroudwater Canal."* The M5 and M49 motorways bisect the landscape.

7.2.4 The rivers of the Avon and Severn, and their associated floodplains contribute to the character of the NCA. The Severn Estuary SPA and Ramsar site provides a valuable habitat for wildfowl and has the second largest tidal range in the world. Avonmouth and its surroundings are at risk of flooding, with tide-locking as a key contributor.

7.2.5 In the south of the NCA, estuarine levels provide considerable land cover, with peat deposits in the Gordano Valley creating characteristic wetlands. Productive soils occur east of the Severn and within the Avon Valley, as a result of the underlying Lias clay. Fossil bearing river terrace gravels flank the edges of watercourses. Triassic rock forms cliffs exposing fossils at Hock, Aust and Sedbury.

7.2.6 Within the NCA, there are numerous rights of way including Offa's Dyke National Trails (located to the south of the Project) and the waterways.

7.2.7 Current trends within this NCA include:

- Increased management of woodlands through Woodland Grant Schemes
- Traditional smaller holdings replaced with a few large-scale farms
- Neglected field boundaries
- Reasonably high development rate in rural areas, especially alongside major transport corridors.

7.2.8 Forces for change within this NCA include:

- Climate change resulting in dried out, eroded and exhausted soils, increased flooding of development and infrastructure and the loss of isolated habitats

- Demands for renewable energy resulting in the introduction of onshore windfarms and tidal energy creation which could impact the tidal reaches of the Severn Estuary
- Continued industrial expansion to Avonmouth
- Population growth resulting in increased pressure for food production
- Partnership work seeking to improve biodiversity and habitats on a large scale

7.2.9 The landscape associated with the project displays many of the characteristics and features described in the Severn and Avon Vales NCA. This includes industrial development and the sense of industrial heritage at Pill, the motorways and the low lying agricultural landscape. However, the estuarine levels, wetlands, and cliffs are not a dominant feature in the landscape traversed by the project.

#### **NCA 118 Bristol, Avon Valleys and Ridges**

- 7.2.10 The NCA of Bristol, Avon Valleys and Ridges *"encompasses the City of Bristol with its historic port, and the surrounding area including the Chew and Yeo valleys, Keynsham, Clevedon, Portishead and parts of the Cotswolds and Mendip Hills AONB. The area is characterised by alternating ridges and broad valleys, with some steep, wooded slopes and open rolling farmland"*. The western part of this NCA includes the Severn and Avon vales and the small stretch of coastline between Clevedon and Portishead, which flanks the Mouth of the Severn.
- 7.2.11 The NCA includes both urban and rural areas, with the City of Bristol and infrastructure such as the M5 contributing to the considerable amount of urban development. The surroundings are maintained as farmland, heritage parkland, grassland and woodland. Pressures for development around the City of Bristol and M5, present a considerable challenge.
- 7.2.12 The landform and geology of this character area is one of alternating ridges and broad valleys, with a limestone ridge which spans from the Yeo Valley towards Thornbury, forming a predominately wooded scarp. Above the scarp there is open arable farmland, with scattered farmsteads, low hedgerows and patches of woodland. The coastal stretch from Clevedon to Portishead sees the ridge descend towards the Severn Estuary, with views across the water to Wales and the Forest of Dean. Of note are the Failand Hills to the south-east of Portishead.
- 7.2.13 The Avon Gorge, crossed by the Clifton Suspension Bridge, cuts through the scarp, exposing Carboniferous Limestone and creating areas of scree, scrub and pockets of grassland of considerable ecological value. The ancient woodland of the Avon Gorge SSSI and Leigh Woods NNR lie to the west of the Avon Gorge.
- 7.2.14 From a historic perspective, this character area has a wealth of significant buildings and landscapes, including the Clifton Suspension Bridge, the townscape of Clifton with its wealthy merchants houses, the nationally important architecture and parkland of Ashton Court and the roman port at Sea Mills. Pennant sandstone has historically been used as a building material to the south-west of the character area.
- 7.2.15 This NCA provides substantial opportunities for recreation through parklands such as Ashton Court, The Avon Community Forest, The River Avon Trail, as well as a large number of other trails and cycle routes.
- 7.2.16 Current trends within this NCA include:
- Improvement to boundary features (ditches, hedgerows and stone walls)
  - Increased management of woodlands through Woodland Grant Schemes
  - Increased management and planting of orchards
  - Countryside Stewardship uptake for semi-natural features e.g. grassland

- Traditional smaller holdings replaced with a few large-scale farms
- Increasing urbanisation and development, particularly to motorway corridors damaging historic character

7.2.17 Forces for change within this character area include:

- Climate change resulting in increased flooding
- Climate change resulting in changes to woodland composition, loss of veteran trees and ancient woodland
- Population growth resulting in increased urbanisation and pressure for food production
- Green infrastructure strategies leading to improved landscape quality

7.2.18 The landscape along the Portbury Freight Line section displays many of the characteristics and features described in the Bristol, Avon Valleys and Ridges NCA. These include the steep, wooded slopes of the gorge and rolling farmland, although this is mainly pastoral. The historic Clifton Suspension Bridge and Ashton Court are particularly relevant.

## Visual Amenity and Views

- 7.2.19 The visual envelope has been derived from a combination of digital terrain modelling and review from visits to the site. The visual baseline ZTVs indicate an envelope which does not consider buildings, woodland and other screening features and is therefore much wider than the more realistic envelope established from visits to the site.
- 7.2.20 Views from within the residential area of the east side of Portishead are constrained by the buildings, but become more open around Harbour Road. The rural landscape to the east of Portishead allows open views in most directions and to the higher ground to the south and west.
- 7.2.21 Existing woodland by the motorway junction and alongside the railway line limit views out, with further screening provided by the large scale industrial buildings to the north of the line. In contrast the large areas of car storage associated with Portbury Dock allow open views and in particular the higher ground to the south.
- 7.2.22 There are longer views down the line to the M5 as it crosses the River Avon with views to the industrial areas of Avonmouth and Portbury Docks. The urban character of Pill with elevated viaduct and cuttings and the locally complex landform at Ham Green (where the line passes into tunnel) result in complex views in and out from the railway line.
- 7.2.23 There are longer views to the north of Shirehampton and north west over the fields towards Ham Green. Views open out again from north of Sneyd Park.
- 7.2.24 Views become constrained along the line of the Avon Gorge with views to the surrounding areas at the higher levels limited by the edge of the gorge itself. Views down into the gorge are possible only from its edge, for example from the viewing at on the Circular Road on The Downs. Views from Leigh Woods are constrained by the wooded slopes. Ashton Court and Hotwells/Clifton mark the southern entrance to the Avon Gorge.
- 7.2.25 There are longer views out to the higher ground of the Ashton Court Estate to the west and the housing in Clifton on the higher ground above Hotwells to the north east.
- 7.2.26 More open views are possible to the south of the Cala Trading Estate, but again views out are constrained by larger buildings, and highway structures at the Winterstoke Road/Brunel Way junctions.
- 7.2.27 The dense urban nature at Ashton Vale with its larger scale retail and commercial buildings screen views to the line from the surroundings. Glimpsed views are possible between buildings down roads and across car parking areas.

- 7.2.28 There are large numbers of potential visual receptors due to the urban nature of parts of the study area. There is a mix of residential and commercial at Portishead, commercial through the Portbury docks, residential at Pill and Ham Green, road and leisure through the gorge, longer distance residential from the edge of Clifton and Hotwells, commercial and roads at Winterstoke Road and a mix of residential and commercial at Ashton Vale and Parson Street.

## 7.3 Portishead Branch Line (MetroWest Phase 1) Landscape (Portishead to Pill)

### *Landscape Designations*

- 7.3.1 The following landscape designations fall within the Portishead to Pill section:
- Green Belt bounded by the edge of Portishead and Portbury which is crossed by the disused railway.
  - Forest of Avon which covers the whole of North Somerset.
  - The Vale Park in Portishead, bounded by the disused railway line to the north, is designated as Amenity in North Somerset Adopted Local Plan only and Local Green Space in North Somerset Emerging Site and Polices Plan only.
  - Common Land and Town or Village Greens designed by NSC in its Emerging Site and Polices Plan to the northwest and south of Pill.
  - National Forest Inventory woodland to the east of Elm Tree Farm with its southern extent adjacent to the line (refer to Figure 7.1).
  - National Forest Inventory woodland north of Junction 19 and adjacent to the railway line (see Figure 7.2).
  - National Forest Inventory woodland on the River Avon bridge approach embankment of the M5 (south side) (see Figure 7.2).
- 7.3.2 Additional designations (described further under other receptor headings) contribute to the landscape character of the Portishead Branch Line (MetroWest Phase 1) Project as follows:
- Listed buildings alongside the Sheepway; Moor Farm, the Thatched Cottage, Elm Tree Farmhouse (see Figure 4.1).
  - Listed buildings within Portbury south of the M5 (see Figure 4.2).
  - Listed buildings at the church east of Portbury south of the M5 (see Figure 4.2).
  - Listed building at Court House Farm on Marsh Lane south of the line (see Figure 4.2).
  - The listed Church at Easton-in-Gordano south of the M5 (see Figure 4.2).
  - Non-registered Park and Garden at St. Georges Hall designated in North Somerset Adopted Local Plan and Emerging Site and Polices Plan to the south of the M5 and east of junction 19.
  - Local Nature Reserve along the Markcombe Road to the south of the M5 and east of junction 19 (see Figure 7.2).

### *Local Authority Character Areas*

- 7.3.3 The Portishead Branch Line (MetroWest Phase 1) Project passes through two landscape character areas defined by NSC (North Somerset Landscape Character Assessment 2005), as shown on Figures 7.1 and 7.2. These are listed and summarised below:

- North Somerset Local Character Area A2 Clapton Moor
- North Somerset Local Character Area C2 Portbury Settled Coastal Edge

### A2 Clapton Moor

- 7.3.4 According to NSC 2005, Clapton Moor is characterised by the distinct geography of the Gordano Valley and enclosed by limestone ridges to the north and south. The area has a number of important geological features, for example the Weston-in-Gordano SSSI, which lies to the south west of Weston Big Wood. This area has a primarily rural, pastoral character, with other landscape types including woodland, marshy grassland fens, reed beds, scrub and occasional arable fields, creating a varied landscape. There are three Sites of Conservation Interest (SNCI) in the valley, all consisting of marshy grassland, with one also containing wet woodland (see Section 5 Ecology and Biodiversity).
- 7.3.5 This rural feel is somewhat diluted by views along the valley towards The Royal Portbury Dock, as well as views to the M5 and edge of Portishead. There is also a sense of industrial heritage resulting from the presence of remnants of the Clevedon Portishead minerals light railway.
- 7.3.6 Field boundaries are defined by irregular hedgerows, ditches and belts of trees. However, these are increasingly being replaced by fencing.
- 7.3.7 NSC has described the following as forces for change:
- Increasing use of fencing to field boundaries and decline in condition of hedgerows
  - Increasing ribbon development and infill
  - Change in land use of fringe to horse pasture
  - New development around Portishead.

### C2 Portbury Settled Coastal Edge

- 7.3.8 Portbury Settled Coastal Edge is characterised by flat, low lying land giving rise to wide views. Its character is predominately industrial and maritime. The Royal Portbury Docks, with huge industrial buildings, expanses of hard-standing, numerous cranes and tall metal fences, is prominent. Associated unsympathetic amenity landscape provides limited visual amenity and distinctiveness. Large container ships and wide views over the Bristol Channel contribute to the maritime character.
- 7.3.9 Remnant grazing marshland and Court House Farm, with its traditional building style, influence the character to the east. There are some areas of nature conservation interest, such as unimproved neutral grassland and marshy grassland, however these are not easily accessible. The presence of the elevated M5 and junction 19 and the Portbury Freight Line passing nearby, reduce the sense of tranquility and remoteness. Along the coast, further marshy grassland and remnant woodland provide biodiversity value.
- 7.3.10 NSC has described the following as forces for change:
- Poor hedgerow management resulting in declining condition
  - Increasing large-scale industrial development, resulting in the loss of pastoral farmland
  - Lower Palaeolithic artefacts that may be present in gravel deposits may be damaged as a result of future development
- 7.3.11 The landscape associated with the Portishead Branch Line (MetroWest Phase 1) Project in the section between Portishead and Pill displays some of the characteristics and features described by NSC in their character assessment summarised above. For example, the project sits within a rural, pastoral character, which is diluted in places by features such as the edge of Portishead. However, the Royal Portbury Dock with its industrial maritime

character and the wide views typical of this character area, are not key features of the project.

### *Site Specific Character Areas*

- 7.3.12 Site specific landscape character areas are shown on Figure 7.3. These have been derived from consideration of key features which make up the landscape character of the site and its immediate surroundings.

#### **Commercial Portishead**

- 7.3.13 This area of Portishead has a predominately flat, low lying landform. It has a predominately urban character, with its mix of unsympathetic, commercial 'box' units and modern apartments - generally three to four storeys high - and associated areas of car parking and managed amenity landscaping of trees and shrubs. Contrasting with this, there are also large areas of undeveloped land with unmanaged grassland and scrub. The units have a large footprint and are quite spread out from one another, creating a disjointed feel, with little connectivity between individual units. Views are variable, with open views across the car parks and areas of grassland and scrubland, and constrained by industrial units in places.

#### **Residential Portishead**

- 7.3.14 This area of Portishead has a predominately flat, low lying landform. The area is one of residential estates, with occasional amenity landscape features such as The Vale Park and the 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.

#### **Sheepway**

- 7.3.15 This area is predominately rural and is characterised by small, regular fields bounded by a mix of fences and hedgerows with occasional mature trees. Views across the flat, pastoral landscape look towards distant, gently rolling hills, which enclose the area.
- 7.3.16 Dense, shrubby vegetation follows the line of the disused railway, which can be overlooked from the Sheepway bridge. To the west, the edge of Portishead is visible, slightly diluting the rural feel. To the south, the Portbury Hundred and M5 are generally screened by vegetation, however, they are clearly visible to the east of the character area.
- 7.3.17 Settlement is generally limited to small, traditional stone farmsteads and rendered residential properties, which tend to cluster around the Sheepway road. Farming appears to be on a small scale. There are a number of listed buildings in the area. Ridge and furrow contributes to the character, providing a sense of history.

#### **Portbury**

- 7.3.18 Portbury has a predominantly industrial character, with industrial units and the expansive car store area as dominant elements. The units are generally large, box developments, which enclose the view. The car store offers wider views, however, there is still a strong sense of enclosure due to the mesh fencing which surrounds it. The landform is generally flat.
- 7.3.19 Associated amenity landscape, embankments, as well as poorly managed grassland and woodland/shrub belt contribute to the character, often screening views and furthering the sense of enclosure. The disused railway line is overgrown and derelict.
- 7.3.20 To the east of this character area, the visually intrusive and elevated M5 stretches above the cycle path.



## Visual Amenity (Portishead to Pill)

7.3.21 Table 7.1 and Figure 7.4 summarises the key visual receptors and views, which have been identified from the desk top study and site visits.

**Table 7.1. Summary of Key Receptors and Views along the Portishead to Pill Section**

No	Location	View
1	Harbour Road	View south across open ground towards the line partially screened by existing vegetation.
2	Quays Avenue	View north and south with views out generally enclosed by hedges and adjacent buildings.
3	Sheepway	Views out partially enclosed by boundary hedges but with views of the adjacent fields and longer views across the landscape. Elevated view from bridge over the disused railway perpendicular to road, with its associated dense vegetation, and adjacent open fields.
4	The Portbury Hundred/A369	Views out from the road limited by the roadside planting with occasional views through gaps. More open in winter.
5	Marsh Lane	Views out partially screened by adjacent vegetation with occasional views to adjacent car storage areas. Elevated views from the bridge over the railway line down onto the track.
6	M5	Variety of open and more enclosed views depending on roadside planting and adjacent landform. Views north at the junction enclosed by planting and landform with increasingly extensive views on the approach embankments to the River Avon bridge.
7	Footway/cycleway on and adjacent to the line	A variety of views from the junction with the Sheepway to where the route passes under the M5. Views north to the car storage in close proximity and nearby commercial buildings. Views south partially screened by adjacent vegetation with longer views towards the M5.
8	Town Centre/Waitrose, Portishead	View east from Waitrose across car park, with fencing partially screening open grassland and commercial properties beyond.
9	Commercial Buildings, north side Harbour Road, Portishead	Views south from commercial properties across amenity landscape and road to dense vegetation, with the railway line beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
10	Commercial Buildings, Serbert Road	Limited views north from the back of the buildings towards the line which is adjacent.
11	Industrial Units, Portbury Way	View south from industrial units over the car storage area to dense vegetation screening railway line, with the M5 beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.



Table 7.1. Summary of Key Receptors and Views along the Portishead to Pill Section

No	Location	View
12	School, Marjoram Way	Open views south from the grounds to the railway line.
13	Residential Buildings, north of the line, Portishead	View south from residential properties across front gardens and road to dense vegetation adjacent to the railway line beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
14	Residential Buildings, south of the line, Portishead	View north from backs of garden to the vegetation adjacent to the railway line.
15	Sheepway, houses north side	Views south from the scattered properties alongside the Sheepway across the roadside hedge and open fields to the railway line and the M5 beyond.
16	Sheepway Gate Farm	View south from the farm house to the railway line partially screened by farm buildings. Open views from the farm yard south to the line.
17	The Orchard and adjacent houses	Views south across well enclosed garden towards the railway.
18	Shipway Farm and adjacent houses	Views south from the front of houses enclosed by trees and other vegetation. Trees within hedgerow to the south also provide additional screening towards the railway line.
19	Elm Tree Farmhouse	View from listed Elm Tree Farmhouse across lane to dense vegetation screening open fields. Limited views through in the summer and partial views in the winter. Beyond the open fields, views to the railway line which is screened by further dense vegetation.
20	Elm Tree Park	Generally well enclosed by trees and other vegetation. South boundary adjacent to the railway line.
21	Station Road and Priory, Portbury	Views north screened by the motorway and its roadside vegetation and vegetation alongside The Portbury Hundred.
22	Residential Buildings, Pill	View from residential properties across back gardens to open fields, with dense vegetation bounding both forks of the railway line beyond. The elevated M5 is visible in the distance.
23	The Vale Park	Views north to the line mostly screened by trees and other vegetation around the balancing pond. Some glimpsed views more open in the winter.

## Landscape (Portbury Freight Line)

### *Landscape Designations*

- 7.3.22 The following landscape designations fall within the Portbury Freight Line:
- Green Belt from Pill and along the western bank of the River Avon to the outskirts of Bristol.
  - Forest of Avon which covers the whole of North Somerset.
- 7.3.23 Additional designations contribute to the landscape character of the Portbury Freight Line section as follows:
- Leigh Court and Ashton Court RP&G on the west bank of the River Avon (see Figures 7.5 and 7.7).
  - Five Conservation Areas in Bristol, namely Sea Mills, Sneyd Park, The Downs, Clifton and City Docks, which extend partially or wholly across the River Avon and which include many listed buildings (see Figures 4.3 to 4.5 and 7.5 to 7.7).
  - Two Conservation Areas in North Somerset, Leigh Woods and Bower Ashton and their associated listed buildings (See Figures 4.4 and 4.5).
  - The Avon Gorge Woodlands SCA and Avon Gorge SSSI and Leigh Woods NNR (see Figure 5.1).

### *Local Authority Character Areas*

- 7.3.24 The Portbury Freight Line between Pill and Parson Street Junction sits within the Natural England NCA 118 Bristol, Avon Valleys and Ridges. It also passes through four character areas defined by NSC (North Somerset Landscape Character Assessment 2005), shown on Figures 7.5, 7.6 and 7.7. These are:
- North Somerset Local Character Area J6 Avon Rolling Valley Farmland
  - North Somerset Local Character Area E5 Tickenham Ridge
  - North Somerset Local Character Area D1 Avon Gorge
  - North Somerset Local Character Area G2 Failand Settled Limestone Plateau

#### **J6 Avon Rolling Valley Farmland**

- 7.3.25 Avon Rolling Valley Farmland *"is a transitional area, with gentle slopes falling away northward...at the banks of the River Avon."* A number of exposed 'high' terrace tidal deposits are a geologically important element of this character area.
- 7.3.26 The overall character of the area lacks cohesion, with no defining elements across the site as a whole. It is split into two halves by the A369 and associated ribbon development. South of the A369, large fields are enclosed by low, broken up hedgerows and fences. North of the A369, the landscape *"is more complex with numerous landscape elements"*.
- 7.3.27 To the west, historic parkland, mainly comprising pasture, creates the setting for Leigh Court, a Grade II\* listed building. A tree lined avenue to the recently re-established railway line stands prominently in the landscape. Watercourses, which dissect the area, are well wooded. Specimen trees in the parkland and belts of woodland create a *"deceptively wooded feel."*
- 7.3.28 There is also an urban aspect to this area. The large settlement of Pill, with its new red brick homes and large office units developed around remnants of historic parkland, is a dominant feature of the landscape.
- 7.3.29 NSC describe the following forces for change:
- Development along transport corridors
  - Infilling of historic settlements and new ribbon development

- Increased large-scale farming detrimental to historic landscape and grasslands
- Damage to archaeological remains such as earthworks due to development and modern farming techniques, which would have the potential to affect landscape character

### **E5 Tickenham Ridge**

7.3.30 Tickenham Ridge Character Area is characterised by elevated ridges and intimate wooded steep slopes, with wide views across open lowlands. Large areas of ancient broad-leaved woodland, parkland and pastoral farmland create a rural character and sense of remoteness. The topography creates concealed coombes with winding roads. There are a number of small working limestone quarries. A strong sense of heritage exists in the area, due to the historic parkland of Ashton Court and its mature pollards, as well as traditional stone walls, monuments and earthworks to the top of the scarp. The area has a strong rural character, however in places this is diluted by ribbon development and suburban settlements.

7.3.31 Forces for change are:

- Poor management of landscape elements such as stone walls
- Increasing signage, visual clutter, masts and traffic noise
- Increasing lighting, kerbs and road markings to rural roads
- Leisure causing "wear and tear" to landscape, including important geological and ecological sites
- Expansion of villages such as Tickenham
- Increasing abundance of rural/urban fringe activities including recreation, horse paddocks, tip sites and quarrying, and
- Damage to archaeological remains due to modern farming techniques.

### **D1 Avon Gorge**

7.3.32 The Avon Gorge character area is of geologic interest due to its exposed limestone faces. Woodland clinging to the slopes creates an intimate, enclosed feel. This area is also ecologically important, with varied habitat types such as coppiced and ancient woodland, wood pasture, calcareous grassland, scrubland and rare species such as Whitebeam. Views to the listed Clifton Suspension Bridge contribute to the character. There is a sense of tranquillity, which this is slightly lessened by traffic noise from the Portway A4 road.

7.3.33 Forces for change are:

- Limited maintenance of coppiced woodland and wood pasture
- Leisure causing "wear and tear" to landscape, including important geological, historical and ecological sites
- Increasing signage, visual clutter and traffic noise
- Development to urban fringe in adjacent landscape types impacting the rural character.

### **G2 Failand Settled Limestone Plateau**

7.3.34 Failand Settled Limestone Plateau is a flat, upland area characterised by leisure and recreational uses. There are numerous large leisure facilities which dominate the landscape, including golf courses, playing fields, sports clubs and hotels. Areas of unimproved grassland to the golf courses and amenity grassland with shelter belts and hedgerows to the many playing fields contribute to the character. Unsympathetic brick buildings, goal posts and fencing associated with the playing fields lack visual amenity.

Woodland plantations and parkland to historic estates, along with the ancient woodland at Leigh Woods create a rural feel in places. Settlement is limited to occasional farmsteads and the 20th century properties at Failand. There are also linear roads, with kerbing, fencing and occasional shelter belts, as well as both working and discussed quarries. All these elements contribute to the character.

7.3.35 NSC describe the following as forces for change:

- Management of sports pitches impacting woodland through fertilizer run-off and removal of woodland edge
- Modern farming methods damaging landscape quality
- Limited maintenance of coppiced woodland, mixed woodland, hedgerows and drystone walls
- Increasing demand for recreational land uses
- Increasing signage, visual clutter and traffic noise, and
- Loss of mining remains.

7.3.36 The landscape associated with the Portbury Freight Line contains many of the characteristics and features described by North Somerset in their Character Assessment. These include the gentle slopes and settlement of Pill described in J6, Ashton Court and parkland described in E5, the intimate, wooded slopes and Clifton Suspension Bridge described D1 and Leigh Woods described in G2. Of less relevance are the large fields enclosed by low, broken up hedgerows and fences describes in J6 and the golf courses and playing fields described in G2.

7.3.37 This section of the route also sits within Bristol City Council's City Centre Context Study Character Area of Cumberland Basin, the focus of which is the *"low lying land at the western end of Floating Harbour"*. According to Bristol City Council (City Design Group 2013) *"the character area is a major gateway into Bristol's Central Area, characterised by a hard industrial dockside landscape punctuated by warehouses and robust harbour buildings and equipment. This is interlaced by the concrete multi-level road junction that carries vehicles across the Avon and Floating Harbour. The large brick-bonded warehouses are landmarks that identify the area from the south west. The surviving railway and maritime infrastructure provides a unique industrial heritage which contributes greatly to the area's character. Despite the dominance of road and rail infrastructure, the area suffers from poor and convoluted connections. The Ashton Avenue Bridge is an important route for cycles and pedestrians from south Bristol, though this route is undermined by physical deterioration of the built fabric and an overall sense of neglect"*.

7.3.38 Another relevant character area identified in the City Centre Context Study is Hotwells, which sits in close proximity to the Project. However, this character area is not considered in depth by BCC as it does not "intersect with the major areas of change as identified by the Bristol Central Area Plan".

7.3.39 The Portbury Freight Line is situated alongside a number of conservation areas, such as Clifton and Hotwells and City Docks. These are discussed further in Chapter 5 Cultural Heritage and are discussed in detail in the following Bristol City Council documentation:

- Conservation Area 5 Clifton & Hotwells Character Appraisal & Management Proposal 2010
- Conservation Area 17 City Docks Character Appraisal & Management Proposal 2011

#### *Site Specific Character Areas*

7.3.40 Site specific landscape character areas are shown on Figure 7.8. These have been derived from consideration of key features which make up the landscape character.

**Pill**

- 7.3.41 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. They often have small front gardens or are built directly onto the street. There are also a number of stone retaining walls, which contribute to the intimate feel.
- 7.3.42 The redbrick 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.
- 7.3.43 The landform is complex, with properties built into the slope. Views are generally constrained, although there are wider ranging views from properties built on higher ground. The railway line winds its way through the village, and can be overlooked from the two bridges which cross it. To the west of this character area, there are views to the dominant, elevated M5.

**Ham Green Lakes**

- 7.3.44 Ham Green has an intimate, well maintained, pastoral character. Hedgerows, occasional mature trees and woodland bound rural lanes and fields. However, these are fragmented and have been replaced with fencing in places.
- 7.3.45 The landform is one of gentle slopes which constrains views. Views are further constrained by vegetation and winding roads, although there are occasional views across open fields as a result of fragmentation.
- 7.3.46 Settlement is limited to occasional, scattered properties and farmsteads, often with long, private driveways. Features such as the private fishing lake and allotments provide a recreational aspect.
- 7.3.47 To the edge of this character area, views to Sea Mills to the east and Pill and the elevated M5 to the west, dilute the rural character.

**Sea Mills**

- 7.3.48 North of Leigh Woods and the Avon Gorge (see below), the landscape begins to open out giving way to views across open flood meadow. Nonetheless, views are still constrained to within the valley.
- 7.3.49 This area has contrasting elements and semi-rural feel, with rough flood meadow and cultivated fields, and the settlement of Sea Mills contributing to the character.
- 7.3.50 Fences and low hedges provide field boundaries. There are also occasional mature trees, as well as blocks of woodland, creating a sense of a fragmented landscape.
- 7.3.51 To the northeast, there are views to the settlement of Sea Mills and its church, fencing, as well as the disused railway bridge and the A4 road.

**Avon Gorge**

- 7.3.52 This area is characterised by the rugged Avon Gorge, with its exposed rock faces. Patches of scrub and woodland cling to the exposed rock on the east bank. To the west bank, the densely wooded Leigh Woods create an intimate feel. Views are narrow and channelled down the gorge, with the cliff constraining views outwards.
- 7.3.53 Buildings and settlement are limited to the edges of this character area. To the south, where the slope of the gorge begins to slacken, the historic settlement of Clifton, with its Georgian terraces, steps up the landform and overlooks the River Avon. To the north, the 20th century residential properties of Sneyd Park are built on the flat top of the gorge and surrounded by woodland.

7.3.54 The Avon Gorge Cycle Route follows the base of the gorge. The historically important Grade I listed Clifton Suspension Bridge flanks the Gorge and is a dominant feature. The gorge is overlooked from both the bridge, which provides long views, and the edge of Clifton Downs, which provides panoramic views.

7.3.55 The A4 runs parallel to the River Avon on the east bank.

7.3.56 Whilst the enclosed nature of the gorge creates a private feel, the residential properties, well used cycle route and noisy A4 road dilute the sense of remoteness.

#### **Ashton Gate**

7.3.57 At Ashton Gate, the landform is generally flat, although the parkland of Aston Court slopes downwards, with views across the landscape and railway line. More generally, views are constrained by vegetation, fences and buildings. The pedestrian bridge which crosses the railway line offers more far reaching views.

7.3.58 The landscape here appears sprawling, disjointed and piecemeal, with a complex network of roads diving the area. Occasional large buildings, such as the residential flats and Police Dog Kennels, as well as the railway line, allotments and the parkland of Ashton Court are all contrasting features creating a complex urban character. Areas of fencing associated with the railway line, kennels and roads create visual clutter. The A Bond and B Bond buildings contribute to the sense of industrial heritage in the area and are dominant features.

7.3.59 The parkland landscape is well maintained, and generally consists of open grassland interspersed with mature belts of woodland. Scrubby vegetation is associated with elements such as the railway line.

7.3.60 The road network is surrounded by extensive areas of unmanaged grassland and scrubland. It is a visually intrusive feature of the landscape, elevated by large pillars.

#### **Ashton Vale**

7.3.61 This area has a strong urban-fringe feel. The railway line, wide distributor roads such as Winter Street, unsympathetic, 'box' units with predominately commercial and office uses, as well as associated metal security fences, lighting and car parks all contribute to the character.

7.3.62 Vegetation is limited to generic amenity landscape with few trees, as well as the scrubby landscape associated with the railway line.

7.3.63 The landform is fairly flat, however views are generally constrained due to large, dominant buildings.

7.3.64 Visual Amenity (Portbury Freight Line)

7.3.65 Table 7.2 shows the views associated with the Portbury Freight Line (see Figure 7.9).

Table 7.2. Summary of Key Receptors and Views along the Portbury Freight Line Section

No.	Location	View
1	Monmouth Road, Court and Crescent	Views southwest to adjacent railway line partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
2	Underbanks/Watchhouse Road	Direct views south to viaduct and elevated railway line.
3	Mount Pleasant	Direct views north to viaduct and elevated railway line.
5	Chapel Pill Lane	Glimpsed views south through vegetation towards lake, with railway line beyond. Looking east, railway line is hidden by landform.
6	Portway A4 – North of Avon Gorge	Long, glimpsed views south and west through roadside vegetation, across River Avon to the railway line and vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
7	Portway A4 – Within Avon Gorge and Hotwells Road	Open views looking across River Avon towards vegetation alongside railway and railway line beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
8	Brunel Way	Views north from elevated Brunel Way looking across the River Avon and gorge to the Clifton Suspension Bridge, with views to Leigh Woods partially screening railway line to the west. Limited views through vegetation in the summer and partial views through vegetation in the winter.
9	Clanage Road	Open views looking east across cricket club towards railway line and vegetation alongside it. Beyond the railway line, the brick warehouse is visible in the distance.
10	Winterstoke Road	Views looking west towards railway line, with some open views when adjacent to road and some screened by commercial buildings.
11	Ashton Drive	Narrow view looking down road towards elevated railway line and bridge.
12	South Liberty Lane	Limited and glimpsed views along line of road to railway line as it passes below.
13	Co-operative Food, Pill	View south west across Chapel Row to footbridge and wall partially screening railway line which is in a cutting.
14	Sea Mills Station	Views looking south across River Avon towards vegetation partially screening railway line. Limited views through vegetation in the summer and partial views through vegetation in the winter.
15	Bedminster Cricket Club and Nursery/Preschool on Clanage Road	Views looking east towards adjacent railway line and vegetation alongside it. Beyond the railway line, the brick warehouse is visible in the distance. Limited views through vegetation in the summer and partial views through vegetation in the winter.
16	Police Dog Kennels and Stables, Clanage Road	Views east to adjacent railway line partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.



Table 7.2. Summary of Key Receptors and Views along the Portbury Freight Line Section

No.	Location	View
17	A Bond and B Bond	Glimpsed views across River Avon and vegetation alongside it towards elevated Brunel Way with railway line and vegetation beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
18	Commercial Buildings, Winterstoke Road to Ashton Drive	Views from buildings to nearby railway line partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
19	Commercial Buildings, Sainsburys to South Liberty Lane	Views south from buildings to adjacent railway line partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
20	Commercial Buildings, South Liberty Lane south of line	Views north from buildings to adjacent railway line partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
21	Residential Buildings, Monmouth Road, Court and Crescent	Direct views looking south east from back windows of buildings across Monmouth Road to the adjacent railway line beyond, partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
22	Underbanks, Bank Place	Oblique view south to viaduct and elevated railway line.
23	Residential Buildings, Eirene Terrace	Direct views looking north east from buildings across back gardens to the adjacent railway line beyond, partially screened by vegetation alongside it. Limited views through vegetation in the summer and partial views through vegetation in the winter.
24	Chapel Pill Lane properties, Ham Green	Glimpsed views south through vegetation towards lake, with railway line beyond. Looking east, railway line is hidden by landform.
25	Residential Buildings, Sea Mills	Views looking south across River Avon towards vegetation partially screening railway line. Limited views through vegetation in the summer and partial views through vegetation in the winter.
26	Residential Buildings, Sneyd Park	Elevated view from buildings across wooded eastern slope of the gorge, the Portway A4 and the River Avon to vegetation on the western bank and the railway line. Limited views through vegetation in the summer and partial views through vegetation in the winter.
27	Residential Buildings, Hotwells	View from buildings on Hotwell Road A4 across River Avon towards railway line partially screened by vegetation on the western bank. Limited views through vegetation in the summer and partial views through vegetation in the winter.
28	Residential Buildings, Clifton	Views south from an elevated position over Cumberland and Brunel Way, some open from Royal York Crescent for example and other views limited by buildings. Views to the railway line partly screened by the roads of



Table 7.2. Summary of Key Receptors and Views along the Portbury Freight Line Section

No.	Location	View
		Brunel Way and Winterstoke Road and then the commercial buildings further south.
29	Residential Buildings, Paxton Drive	Views west from buildings across vegetation and yard, towards vegetation partially screening railway line beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
30	Residential Buildings, Ashton Drive	Oblique view looking down road towards elevated railway line and bridge.
31	Residential Buildings, Swiss Drive	View looking north east across back gardens towards vegetation partially screening railway line beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
32	Avon Gorge footway/cycleway	Longer views up and down the gorge with limited views to either side enclosed by the gorge sides and vegetation of Leigh Woods. Railway line in close proximity
33	Clifton Down viewer terrace on Circular Road	Long views north and south along the gorge to the Suspension Bridge to the south and across the gorge to Leigh Woods. Views down from the edge to the river, the Portway and the railway line. Views set back from the edge across the gorge to Leigh Woods
34	Leigh Woods	Limited views east from the footpaths towards The Downs and Clifton through the existing trees towards Clifton. Limited views down into the gorge.
35	Clifton Suspension Bridge	Open and long views south across Ashton Gate and Bedminster and more limited views north along the line of the gorge. Views down from the edge to the river, the Portway and the railway line.
36	Brandon Hill	Long views south west towards the railway occasionally visible in the distance between the large scale commercial buildings on Winterstoke Road.
37	Ashton Court	Views east, sometimes open and other enclosed by trees, towards the line of the railway in the middle distance behind the Cricket Club.
38	Allotments, Brunel Way	Views west towards the line partly screened by existing vegetation. More open views in the winter.

## 7.4 Recommendations for Further Survey Work

7.4.1 The landscape character and visual baseline described above is in response to the preliminary descriptions of the proposals. As the project design develops, further survey work would need to be undertaken as part of the iterative assessment process in order to gain a more detailed understanding of the baseline conditions and the potential effects of the detailed design of the project. This will be the case for the visual impact where the current visual receptor groups may need to be divided further in order to explain the potential differences between effects and impacts.

**Landscape**

- Night-time survey

**Visual**

- Detailed visual receptor survey
- Detailed summer and winter survey
- Night-time survey

# Materials and Waste

## 8.1 Approach

- 8.1.1 This section details the environmental baseline pertaining to the use and consumption of materials and the production and management of waste, associated with the construction of the works for the Portishead Branch Line (MetroWest Phase 1) Project, in accordance with Highways Agency Interim Advice Note (“IAN”) 153/11 *Guidance on The Environmental Assessment of Material Resources*.
- 8.1.2 The following baseline data have been gathered from desk-based research of existing information, simple analysis and review of stakeholder information:
- Description of the current study area, including information about current material requirements and details of the types and quantities of wastes generated (if any);
  - The key legislative and policy instruments influencing the consideration of the environmental assessment of material resources and waste<sup>14</sup>;
  - The sensitivity of the global climate system to continued greenhouse gas (“GHG”) emissions;
  - An assessment of the regional available land-bank for sand and gravel, and crushed rock;
  - A strategic assessment of the waste management infrastructure available to treat and dispose of the waste anticipated to be generated by the project; and
  - A review of the GRIP 2 Feasibility Report (URS, 2014) and Appendix H *Trackbed Investigation MetroWest Phase 1 Interpretive Report* which was undertaken in April 2014 to investigate the condition of the trackbed below the redundant track.
- 8.1.3 Consultation has been undertaken with NSC’s Recycling and Waste Contracts Manager and Waste Service Manager in order to validate the baseline assessment of the waste management infrastructure available to treat and dispose of the waste anticipated to be generated by the project (i.e. whether there are any particular constraints with regards to waste management infrastructure within the West of England Unitary areas).
- 8.1.4 During the operation of the project, the use of material resources and the generation of waste is likely to be negligible (by type, duration and quantity). Operational materials use and waste have therefore been scoped out of this baseline assessment. The assessment of any environmental impacts associated with material resource use and waste, during any subsequent maintenance or renewal works, will be reported by Network Rail’s GRIP 5 Designer and GRIP 6 Contractor in accordance with Network Rail’s Project Consenting and Environment Assessments Procedures. In addition, it has been assumed that any rolling stock, using the proposed alignment, will be maintained at existing railway depots outside of the project boundary (i.e. in accordance with the rail operating company’s existing Environmental Management Systems).

## 8.2 Portishead Branch Line (MetroWest Phase 1)

### Existing Material Resource Use and Waste Generation

- 8.2.1 The disused section of the project between Portishead and Pill is not in operational use and therefore any existing use of materials or waste generation is likely to be negligible.

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<sup>14</sup> The key aspects of the legislative and policy framework will be reported during subsequent stages of assessment.

The use of material resources and the generation of waste during the operation of the existing Portbury Freight Line is also likely to be negligible.

- 8.2.2 The GRIP 2 Feasibility Report, Appendix H *Trackbed Investigation MetroWest Phase 1 Interpretative Report* (Network Rail and URS, 2014) states that the condition of the existing railway trackbed (throughout the three miles of redundant track, situated between Portishead and Portbury Dock Junction) is not suitable for the passage of traffic without complete renewal of the trackbed. The former ballast material is degraded, undersized and in many places has been contaminated with clayey cohesive fines. The investigation also reports that the existing ballast material is likely to be classified as hazardous or non-hazardous waste depending on the concentration of heavy metals (arsenic, copper, chromium, lead, nickel and zinc) present.
- 8.2.3 Notwithstanding, the GRIP 2 Feasibility Report, Appendix E Portishead Reopening Environmental Appraisal Report (Network Rail and URS, 2014) suggests that existing ballast from the disused track may be reusable as engineering fill in the proposed works. The redundant three miles of disused rail cannot be reused, due to its age, but there is potential for all metal components such as track clips and bull head rail to be recycled.

## Climate Change

- 8.2.4 The Intergovernmental Panel on Climate Change (IPPC, 2013<sup>15</sup>) states that *“continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions”. All new greenhouse gas emissions are therefore likely to contribute to a significant negative environmental effect (IEMA, 2010<sup>16</sup>)*.

## Natural Resources (aggregates<sup>17</sup>)

- 8.2.5 Defra (2011<sup>18</sup>) identifies aggregates as being at risk of future scarcity for the UK construction and civil engineering sector. Defra suggests that the availability of indigenous supplies is thought to be 40 years for crushed rock and 10 years for land sand and gravel. The NPPF requires mineral planning authorities to maintain a minimum land bank of seven years for sand and gravel and a minimum land bank of ten years for crushed rock. This is used to determine whether there is a shortage or surplus of supply in a given minerals planning area. The South West Aggregates Working Party Annual Report 2010<sup>19</sup> confirms that the south west’s available land bank for sand and gravel is approximately 11 years, whereas for crushed rock, the last publicly available land bank figure was approximately 45 years. These data therefore suggest that there is a limited supply of sand and gravel in the region but substantial reserves of crushed rock<sup>20</sup>.

## Waste Management

- 8.2.6 The available waste management infrastructure in the West of England Unitary areas has been ascertained through an outline review of the Environment Agency’s *South West Inputs and Capacity 2012* data<sup>21</sup>. These data suggest that the West of England Unitary

<sup>15</sup> Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis - Summary for Policymakers [http://www.climatechange2013.org/images/uploads/WGIAR5-SPM\\_Approved27Sep2013.pdf](http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf)

<sup>16</sup> IEMA (2010) Climate Change Mitigation & EIA [www.iema.net/system/files/climate20change20mitigation20and20eia.pdf](http://www.iema.net/system/files/climate20change20mitigation20and20eia.pdf)

<sup>17</sup> Chosen as a surrogate indicator of regional natural resources.

<sup>18</sup> Defra (2011) ‘Review of the Future Resource Risks Faced by Business and an Assessment of Future Viability’ <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=2&ProjectID=17161>

<sup>19</sup> The South West Aggregates Working part, Annual Report 2010 [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/201196/SWRAWP\\_Report\\_10\\_Final\\_WEB.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/201196/SWRAWP_Report_10_Final_WEB.pdf)

<sup>20</sup> Landbanks are affected by planning permissions granted and the rate of working at existing sites. These numbers were accurate at the time of the report, but are likely to have changed in the interim as new planning permissions are granted and as existing reserves are worked.

<sup>21</sup> Environment Agency’s ‘South West Inputs and Capacity 2012’ <http://www.environment-agency.gov.uk/research/library/data/150326.aspx>

areas had the following waste management facilities and capacities at the end of 2012: non-hazardous landfill (1,458,970 m<sup>3</sup>); inert landfill (4,700,000 m<sup>3</sup>); animal carcasses, clinical and hazardous waste incineration (19,000 t/annum); waste transfer (hazardous waste; household waste, industrial, commercial waste; clinical; civic amenity site; non-biodegradable) (868,000 t/annum); and waste treatment (physical, physico-chemical, chemical, composting, biological) (1,108,000 t/annum). These data suggest that there are no specific constraints to the Project with regards to inert and non-hazardous waste infrastructure in the West of England Unitary areas. However there appears to be limited treatment and disposal infrastructure for hazardous waste. Rail specific waste streams (e.g. track, sleepers, and ballast) could be transported to Network Rail's National Rail Recycling Centre in Westbury.

## 8.3 Recommendations for Further Survey Work

8.3.1 In reporting the simple assessment, it is recommended that the following baseline data be gathered from desk-based review of existing information, analysis and review of the GRIP Stage 3 and 4 studies and further highways engineering design:

- Information about current material requirements for the project and details of the types and quantities of wastes likely to be generated during construction;
- An updated review of the regional available land-bank for sand and gravel, and crushed rock (i.e. to act as a surrogate indicator of regional natural resources);
- A more detailed assessment of the regional waste management infrastructure available to pre-treat, reuse, recycle, recover or dispose of the waste anticipated to be generated by the project infrastructure, including:
  - Types of waste management facilities, including transfer stations, recycling sites, material recovery facilities, composting sites, anaerobic digestion plants, energy from waste sites, mass burn incinerators and registered landfill sites etc.
  - Locations of waste management facilities in relation to the study area; and if available
  - Capacities of identified waste management facilities for each type of waste forecast to be produced by the project.



# Noise and Vibration

## 9.1 Approach

- 9.1.1 This chapter describes the existing noise climate in areas surrounding the Portishead Branch Line (MetroWest Phase 1) Project and Portbury Freight Line, based on a site visit and a baseline survey. Noise measurements undertaken at locations shown on Figure 9.1 in Appendix A. These locations were representative of noise receptors likely to be affected during the construction and operational phases of the project.
- 9.1.2 The baseline survey also included the area at Bathampton Turnback, and the noise measurement results for that location are provided in Appendix B. Also contained within Appendix B is a desktop baseline assessment of Severn Beach / Avonmouth Signalling and Bedminster Down Relief Line.
- 9.1.3 The noise measurements were conducted at locations along the project in April 2014, December 2014 and January 2015 during the proposed operating hours, which are understood to be between 06:00 and 24:00. The noise measurements were conducted for day and night periods, where day is considered as being between 07:00 and 23:00, and night between 23:00 and 07:00, following the Noise Insulation Regulations and WHO guidelines.
- 9.1.4 A series of 15-minute noise measurements during operational daytime and 5-minute noise measurements during operational night-time were undertaken.
- 9.1.5 The noise measurements were conducted with a Type 1 01dB Solo Sound Level Meter ("SLM"); serial number 61046. The SLM was field-calibrated before and after each survey period using a 01dB CAL21 Acoustical Calibrator; serial number 50441914 (2004). Both the SLM and calibrator had a valid certificate of calibration covering the survey.
- 9.1.6 Vibration measurements have not been undertaken. An assessment of potential impacts from vibration that may be required at a later stage would consider absolute levels and not a change in the level of vibration. Therefore the collection of existing levels of vibration at this stage would not aid assessment. The absolute levels would need to be predicted during the assessment stage to determine any potential impact from the Portishead Branch Line (MetroWest) project.

## 9.2 Regional Overview

- 9.2.1 The local area is served by the north-south main line railway to Birmingham and to the south west of England, and the east-west line to London and to Wales. These lines carry both intercity trains and also local services, together with some freight trains with some operating at night. Without any other dominant noise source in the area, the noise climate close to these routes is likely to be dominated by the trains. Other less used lines, such as that from Bristol Temple Meads to Severn Beach, also serve the region.
- 9.2.2 The additional services provided by MetroWest Phase 1 will vary from introducing trains to a location where there are currently none, to a few additional trains on an existing route. The subsequent operational impacts are likely to vary from noticeable to negligible.

## 9.3 Portishead Branch Line (MetroWest Phase 1)

### Noise

- 9.3.1 The noise survey was conducted at locations likely to be affected by the project. Three alternative locations for the Portishead railway station were under consideration at the time of undertaking the baseline noise survey. However, NSC have since endorsed option

2B as the preferred option for Portishead station. After the initial site visit, noise sensitive receptors were identified to establish the sampling locations (Figure 9.1 in Appendix A), and the selected locations are described in Table 9.1. Ambient noise surveys were undertaken on 1 April 2014 and 3 April 2014, with some further measurements undertaken in December 2014 and January 2015.

Table 9.1. Description of the Measurement Locations

Location	Coordinates		Description
	Latitude	Longitude	
MP1	51.482823 -2.7544302		<p>This position is considered to be acoustically representative of the ambient noise levels at the existing residential premises on both sides of the Project, together with the north boundary of the Project, where School Trinity is located at 25m from the proposed track. This area is representative of the Option 2 location for the proposed Portishead railway station located on Quays Avenue.</p> <p>Operational day-time and night-time noise levels were recorded at this location. The sound level meter was located south of the proposed track, between the residential houses on Tansy Lane and Galingale Way.</p> <p>The dominant noise source at this location was children playing at the school, birds singing constantly, and also road traffic noise from A369 Wyndham Way.</p>
MP2	51.482225 -2.7517855		<p>This position is considered to be acoustically representative of the ambient noise levels at the existing residential premises on the south boundary of the proposed track. This area was representative of the option 3 location for the proposed Portishead railway station located on land north of Moor Farm.</p> <p>Operational day-time and night-time noise levels were recorded at this location. The sound level meter was located south of the proposed track and west of the option 3 location for the proposed new station, between Tydeman Road and The Pippins.</p> <p>The dominant noise sources at this location were road traffic noise from the M5 and also noise from birds singing constantly. There was also occasional noise from aircraft.</p>
MP3	51.480979 -2.7439052		<p>This position is considered to be acoustically representative of the ambient noise level along the line to the east of Portbury towards the M5.</p> <p>Operational day-time and night-time noise levels were recorded at this location. The sound level meter was located north of the proposed track, at the Portbury Wharf Natural Reserve, just off Sheepway.</p> <p>The dominant noise sources at this location was road traffic from the M5 and the A369. Noise from birds singing and aircraft also contributed to the noise climate.</p>
MP4	51.482118 -2.6881662		<p>This position is considered to be acoustically representative of the ambient noise levels at the existing residential premises on both sides of the Project in Pill. It is also representative of the location of the proposed Pill railway station located on Monmouth Road.</p>



Table 9.1. Description of the Measurement Locations

Location	Coordinates		Description
	Latitude	Longitude	
			Operational day-time and night-time noise levels were recorded at this location. The sound level meter was located on Monmouth Road, which forms the east boundary of the new station location.  The dominant noise sources at this location were road traffic noise from the M5 and birds singing constantly. There was also occasional noise from aircraft.
MP5	51.478964	-2.6827884	This position is considered to be acoustically representative of the ambient noise levels at the residential premises located along Ham Green in Pill.  Operational day-time and night-time noise levels were recorded at this location. The sound level meter was located in Watch-House Park at a location representative of dwellings in the area.  The dominant noise sources at this location were road traffic noise from Ham Green and birds singing constantly. There was also occasional noise from aircraft.
MP6	51.442038	-2.6248848	This position is considered to be acoustically representative of the ambient noise level along the approach to Parson Street Junction.  Operational day-time noise levels were recorded at this location. The sound level meter was located at the Meridian Building (the new housing development off Paxton Drive) in Ashton Gate.  The dominant noise source at this location was road traffic road from A370 and A3029. Noise from birds singing also contributed to the noise climate, especially during the April 2014 survey.

- 9.3.2 Tables 9.2 and 9.3 present a summary of the operational daytime and night-time ambient noise from short term measurements at the six noise monitoring locations described in Table 9.1.
- 9.3.3 On 1 April 2014 the daytime temperatures during the survey ranged from 8 to 15°C, while wind speed varied between 5.5 and 10.8 m/s. Night-time temperatures were about 14°C, while wind speed varied from 5.5 to 8 m/s.
- 9.3.4 On 3 April 2014 the daytime temperatures during the survey ranged from 8 to 12°C, while wind speed varied between 5.5 and 10.8 m/s.
- 9.3.5 On 20 January 2015 the daytime temperatures during the survey was -1°C, while wind speed varied between 0.3 and 1.5 m/s.
- 9.3.6 Although during some of the survey periods the wind speed was above the 5 mm/s recommended level, it was not considered to be influencing the measured noise level.

Table 9.2. Ambient Noise Survey Results – Operational Daytime

<i>Operation Daytime</i>							
Position	Date	Start time	Duration	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A10, T</sub> dB	L <sub>A90, T</sub> dB
MP1	01/04/2014	14:03:58	15-minute	49.3	63.8	51.2	45.5
	01/04/2014	19:09:14	15-minute	53.0	67.9	56.8	45.2
	03/04/2014	07:39:12	15-minute	53.9	64.7	57.8	46.7
MP2	01/04/2014	14:41:13	15-minute	48.7	63.6	49.8	46.6
	01/04/2014	16:43:15	15-minute	49.7	63.3	50.7	47.8
	03/04/2014	07:12:34	15-minute	53.2	67.5	55.2	49.9
MP3	01/04/2014	15:58:35	15-minute	47.7	57.5	49.6	45.0
	01/04/2014	18:19:26	15-minute	50.0	61.7	51.9	47.4
	03/04/2014	08:10:24	15-minute	52.7	62.1	55.0	49.3
MP4	01/04/2014	14:37:03	15-minute	52.5	80.8	53.9	45.4
	01/04/2014	17:50:39	15-minute	52.8	66.1	56.4	45.8
	03/04/2014	06:13:15	15-minute	52.9	63.4	55.2	49.1
MP5	01/04/2014	17:11:53	15-minute	48.3	61.6	50.8	44.0
	01/04/2014	17:27:22*	15-minute	48.8	61.4	51.6	44.5
	01/04/2014	17:27:22**	15-minute	53.2	70.3	55.2	44.6
	03/04/2014	06:37:26	15-minute	54.6	62.1	56.9	51.5
MP6	03/04/2014	06:14:40	15-minute	62.1	77.5	54.6	57.6
	05/07/2013	15:09:00***	3- hour	54.0	72.7	55.7	50.3
	20/01/2015	06:00:02	30-minute	63.0	74.1	65.5	58.1

\* Measurement period with the contribution from a passing freight train removed.

\*\* Measurement period \* with the inclusion of the contribution from the passing freight train.

\*\*\* This measurement was undertaken during another project for BCC in 2013.

Table 9.3. Ambient Noise Survey Results – Operational Night-time

<i>Operation Night-time</i>							
Position	Date	Start time	Duration	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A10, T</sub> dB	L <sub>A90, T</sub> dB
MP1	01/04/2014	23:51:48	5-minute	42.5	51.6	43.6	40.7
MP2	01/04/2014	23:39:41	5-minute	46.1	54.5	48.0	43.7
MP3	01/04/2014	23:26:21	5-minute	45.3	57.8	47.3	41.9
MP4	01/04/2014	23:55:05	5-minute	40.9	45.9	42.5	39.0
MP5	02/04/2014	00:03:44*	5-minute	41.7	49.0	43.5	39.1

\* While this time period was just outside of the operational time period for the trains, the noise climate was considered to be consistent with that immediately before 00:00.

- 9.3.7 During the day the higher noise levels were recorded during the early morning, where the road traffic noise had a greater influence on the measurements.
- 9.3.8 In addition to the short term measurements, a long term measurement was undertaken at Pill in order to gather information on the influence of the freights trains on ambient noise levels. A noise monitor was set up in the rear garden of a dwelling along Hardwick Road where the garden backs directly onto the freight line. This location lies on the opposite side of the proposed station, but it was considered that the measured levels would be representative of that location too.
- 9.3.9 The ambient noise survey was conducted from 15 to 19 December 2014, and the location is described in Table 9.4. During the survey the temperatures ranged from 2 to 6°C.

Table 9.4. Description of Long Term Survey Location

Location	Coordinates		Description
	Latitude	Longitude	
MP9*	51.481781		This position is considered to be acoustically representative of the ambient noise levels at the dwellings in Pill that are the most exposed to noise from the freight train line.
	-2.688665		Operational day-time and night-time noise levels were recorded at this location. The sound level meter was located at the rear back garden at 38, Hardwick Road.

\* Although the survey locations presented in Table 9.1 stop at MP6, MP7 and MP8 relate to locations at the Bathampton Turnback which are reported in Appendix B.

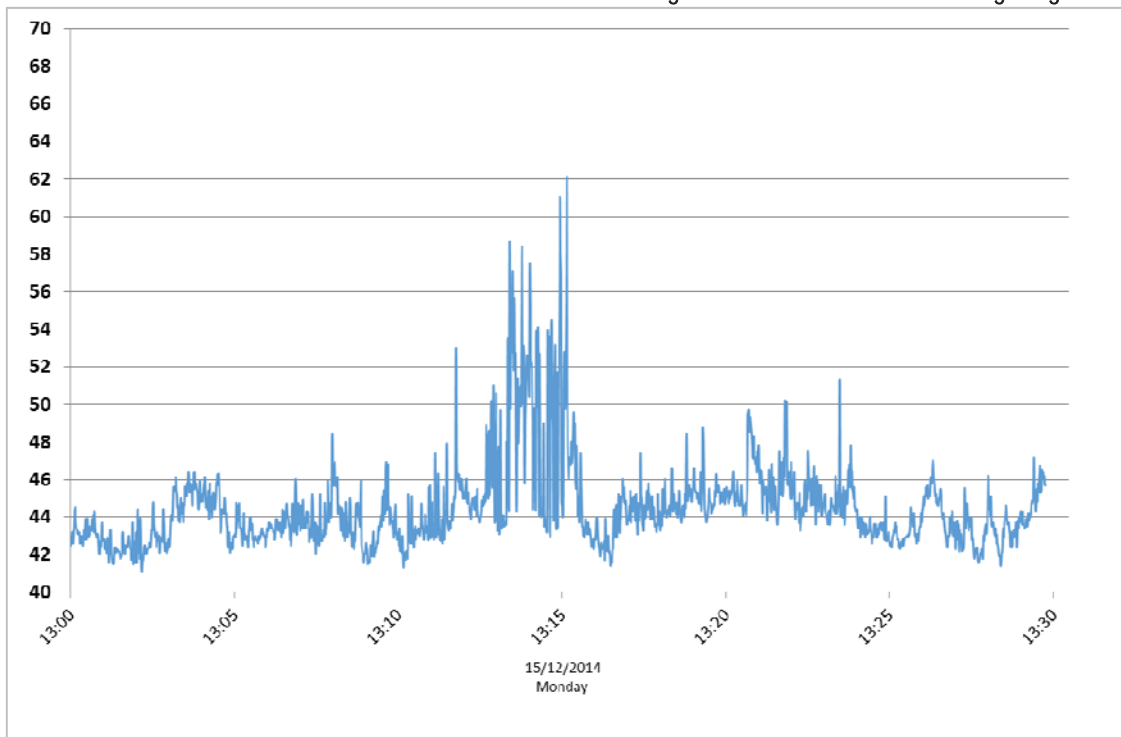
- 9.3.10 Table 9.5 presents the day and night levels measured at MP9. The periods used are 07:00 to 23:00 for day, and 23:00 to 07:00 for night. However, it should be noted that trains are expected to be running during some of the period covered by night.
- 9.3.11 In addition to the overall levels presented in Table 9.5, a graphical representation of a passing freight train is shown in Figure 9.1. This was selected from the measured data and determined using an observation noted by the resident of the house. This shows a freight train passing in the direction from Portbury towards Bristol.

Table 9.5. Noise Survey Results at MP9

Date	Time*	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A10, T</sub> dB	L <sub>A90, T</sub> dB
15/12/2104	11:09 – 23:00	49.6	85.3	50.3	43.7
	23:00 – 07:00	48.9	71.6	51.8	41.7
16/12/2014	07:00 – 23;00	51.4	85.8	53.7	41.4
	23:00 – 07:00	47.0	71.0	49.0	41.4
17/12/2014	07:00 – 23;00	50.6	80.3	51.7	46.4
	23:00 – 07:00	47.9	74.1	50.6	42.7
18/12/2014	07:00 – 23:00	51.4	78.3	53.3	44.4
	23:00 – 07:00	49.2	66.9	53.0	42.1
19/12/2014	07:00 – 10:56	55.4	86.9	55.6	50.4

\* The period 23:00 – 07:00 is that from 23:00 on date indicated to 07:00 on the following day.

Figure 9.2. Noise Level from Passing Freight Train



- 9.3.12 It can be seen from Figure 9.2 that the noise level is at times elevated by at least 10dB with the passing freight train from Portbury Dock. Other periods noted by the owner of the house showed similar changes in noise. However, periods when freight trains were travelling towards the docks did not show a similar increase in noise.

### Vibration

- 9.3.13 The existing level of vibration has not been measured at this stage since this would not be used during an assessment of potential impacts.

## 9.4 Recommendations for Further Survey Work

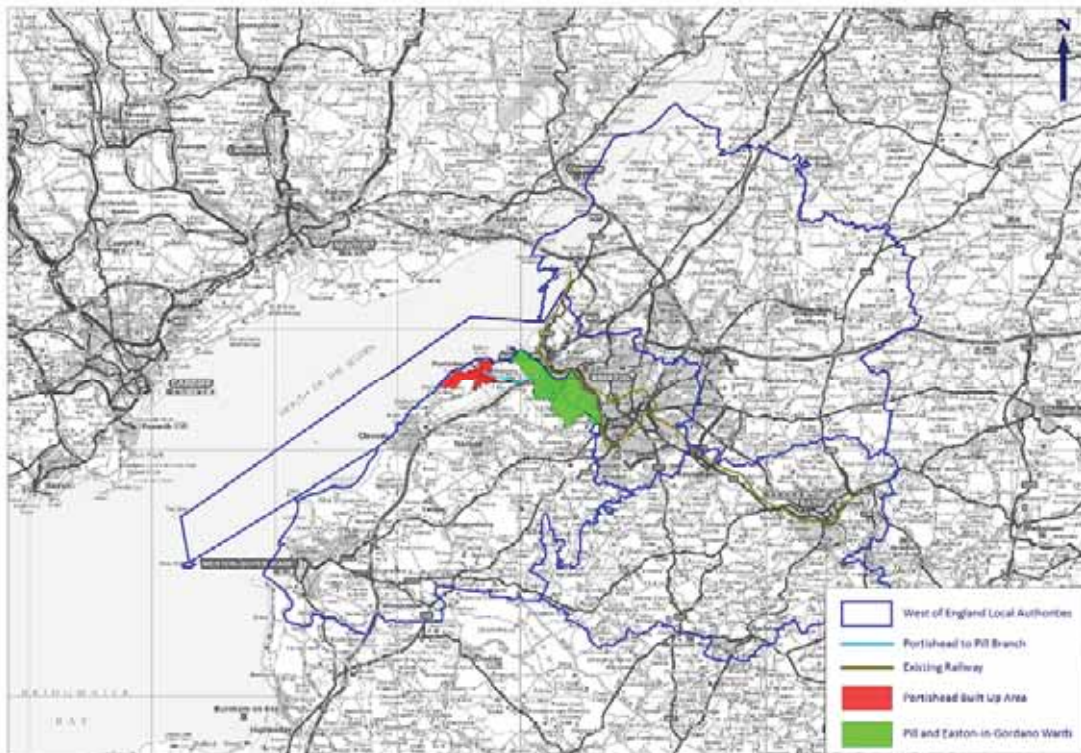
- 9.4.1 When detailed information regarding construction methods and programme are available during the detailed design stage of the project, it is recommended that consideration is given to undertaking further noise measurements to gather information on the noise climate. For example, in some locations, such as Bathampton Turnback, works are likely to be undertaken at night and so additional noise measurements may be required during GRIP 3 to characterise the baseline and assess construction-related impacts

# Socio-economics, Regeneration, Health and Equality

## 10.1 Approach

- 10.1.1 This section outlines the prevailing socio-economic, equality and health context for the towns of Portishead and Pill and in the wider context of the West of England as a whole. This context provides the basis for developing an understanding of the key socio-economic issues in the area and how they may relate to MetroWest Phase 1 in general and the Portishead Branch Line (MetroWest Phase 1) Project in particular.
- 10.1.2 For the purpose of this baseline study, the regional overview encompasses four local authorities in the West of England (North Somerset, City of Bristol, Bath and North East Somerset and South Gloucestershire), which are considered representative of the wider study area for MetroWest Phase 1.
- 10.1.3 The baseline section on the Portishead Branch Line (MetroWest Phase 1) Project specifically focusses on the towns of Portishead and Pill. For the purpose of the baseline analysis, the town of Portishead is defined as Portishead built-up-area. The town of Pill is defined as the wards of Pill and Easton-in-Gordano, given that these wards cover the three settlements of Pill, Easton-in-Gordano and Ham Green which are contiguous and share similar characteristics. The study areas are shown in Figure 10.1. Presenting data for Portishead is appropriate because the project covers Portishead and the junction with the main Portbury Freight Line, including a new Portishead station. Socio-economic conditions in Pill are also presented, as the Portbury Freight Line forms a key part of the proposals, linking Pill junction and Parson Street Junction, including Pill and redevelopment of the station.

Figure 10.1. MetroWest Phase 1 Context Area



- 10.1.4 This section comprises the following interconnected elements:
- Identification and analysis of vulnerable and disadvantaged groups in the context area;
  - Highlighting and investigation of the effects on human health from the project; and
  - Setting out the socio-economic profile of the context area - through analysis of key social and economic indicators focussed on the following themes: demography, travel patterns, labour market, participation, socio-economic classification, employment profile, deprivation.
- 10.1.5 An examination of the socio-economic policy context, including a review of the most pertinent national and local planning policies concerning the inter-relationships between the economy and accessibility / infrastructure is described in Section 2 Planning Framework.
- 10.1.6 This section is based on data available in the public domain from a range of sources, comprising:
- Census 2011 and 2001 statistics,
  - the Business Register and Employment Survey ("BRES"),
  - the Annual Survey of Hours and Earnings ("ASHE"),
  - the Claimant Count Register,
  - Indices of Multiple Deprivation ("IMD"); and
  - NOMIS (previously referred to as the National Online Manpower Information System).
- 10.1.7 The data available from these sources are reasonably up-to-date, typically providing estimates for 2011, 2012 and/or 2013. Demographic information has also been obtained through consultation with the Senior Research and Monitoring Officer at NSC (also based on the Census 2011).
- 10.1.8 These data sets provide an insight into the characteristics of the resident and workplace population in the Portishead Branch Line (MetroWest Phase 1) Project and wider study area of MetroWest Phase 1. This insight can support an appraisal of how MetroWest Phase 1 may impact on various social groups and their health in Portishead and across the West of England as a whole.
- 10.1.9 The main determinants of health are the social, economic, environmental and cultural factors that indirectly influence health and wellbeing. They include diet, the home environment, working conditions and the social relationships and connections between people and organisations. Some, such as gender, age and family history of illness, cannot change or are difficult to change, while others can be changed by planning and policy interventions. Transport can also impact on human health in a variety of ways, for example :
- Direct effects on health and wellbeing through changes in noise, air pollution, water quality, climate change and the availability of fresh food;
  - Lifestyle changes by encouraging travel by means other than private car and encouraging walking and cycling;
  - Effects on the local economy by changing access to employment;
  - Promoting access to key services, particularly access to health facilities;
  - Changes to the built environment to promote exercise through a healthy environment; and
  - Impacts on accessibility to the countryside and local green spaces



- 10.1.10 The positive and negative health impacts of the MetroWest Phase 1 therefore need to be understood with consideration of a wide range of other health determinants.
- 10.1.11 For the purposes of the equality and health baseline studies, the area of study is based on the location of population densities along the route and the locations where most development within the Project will take place i.e. in the towns of Portishead and Pill. Demographic study at Portishead is suitable as this is the terminal of the rail line. Furthermore, this town will experience the most physical change with the construction of a new station. Equality and health have also been considered at Pill, as the rail line passes through this village and the station will be re-opened.

## 10.2 Regional Overview

- 10.2.1 The main routes for MetroWest Phase 1 (Portishead to Bristol, Bristol-Severn Beach, and Bristol-Bath) will link to other areas in the West of England region. The socio-economic baseline for the West of England is therefore presented below. This begins with an overview of the economic policy context for the West of England and its constituent local authorities. This allows initial conclusions to be drawn about how MetroWest Phase 1 could contribute to national and regional policy priorities and objectives. Some detail is also provided on policy priorities and objectives that relate directly to the towns of Portishead and Pill, within the West of England. Following this, key socio-economic indicators for the West of England are presented with some comparison against equivalent indicators in the towns of Portishead and Pill and national averages also provided. The equality and health baseline for Portishead and Pill are also presented below, with initial conclusions on how MetroWest Phase 1 could contribute to NSC's Local Development Framework ("LDF") and analysis on the demographics of Portishead and Pill that identify vulnerabilities of MetroWest Phase 1 in equality and health.

### Socio-Economic, Equality and Health Indicators

#### Demography

- 10.2.2 The 2011 Census reveals that there were 1.1 million residents across the West of England in 2011 (see Table 10.1). Since 2001, the annual growth rate of population was around 0.84% for the West of England; above the national benchmark (0.76%). However, population growth in the West of England as a whole was lower than for the town of Portishead.

Table 10.1. Population and Annual Growth Rates

Geography	Population 2001	Population 2011	Overall Growth	Annual Growth Rate
Pill	6,324	6,180	-2.3%	-0.2%
Portishead	17,121	23,699	38%	3.30%
West of England	983,856	1,069,583	9%	0.84%
England	49,138,831	53,012,456	8%	0.76%

Source: 2001 and 2011 Census

#### Age Structure

- 10.2.3 The 2011 Census also indicates that the modal age bands vary across the West of England and are distinct from the national average (see Table 10.2). For example, the West of England has a high proportion of residents concentrated in the 'working-age' bands (i.e. 66% aged 16-64) relative to England as a whole. These findings suggest that a significant proportion of residents in the West of England are currently at working age, and are

therefore likely to be economically active and commute to work. Consequently, MetroWest Phase 1 could provide a viable mode of transport for current commuters in the West of England. The rail service could benefit those that are economically active, but are unable to use road based transport to commute for employment. The rail service could enable travel in a mode previously unavailable for commutes outside of Portishead and Pill. The additional option for commuting could improve some people’s provision of a steady income while providing health benefits if commuting involves a walk to/from the railway station.

Table 10.2. Population Age Structure

Age Group	Pill	Portishead	West of England	England
0-15	16.7%	19.4%	18.2%	18.9%
16-64	59.4%	61.4%	65.5%	64.8%
64+	23.9%	19.2%	16.3%	16.3%

Source: 2011 Census

### Ethnicity

- 10.2.4 The West of England is less ethnically diverse than England as a whole (see Table 10.3), with around 9% of residents belonging to ethnic minority groups compared to a national average of 15%. However, the West of England is more ethnically diverse than the towns of Portishead and Pill.

Table 10.3. Ethnicity

Ethnic Group	Pill	Portishead	West of England	England
White	97.3%	97.4%	90.9%	85.4%
Mixed/multiple ethnic groups	1.1%	1.1%	2.2%	2.3%
Asian/Asian British	1.1%	1.1%	3.5%	7.8%
Black/African/Caribbean/Black British	0.2%	0.2%	2.8%	3.5%
Other ethnic group	0.3%	0.3%	0.5%	1.0%

Source: 2011 Census

- 10.2.5 Although minority ethnic groups form a relatively small proportion of the population in the West of England, members of ethnic minority groups are considerably less likely to own a private car relative to the white population. The 2011 Census shows that 14% of white residents in the West of England do not have access to a car rising to 26% for mixed ethnic group residents and 39% for black residents. This implies that minority ethnic groups must be more reliant on public transport provision to access jobs and services. At present, these minority groups are disadvantaged in terms of transport options, as the main transportation out of Pill and Portishead is currently by car. As these groups do not have access to a car, this limits their employment and social opportunities, which could also impact on their overall health. MetroWest Phase 1 will provide an affordable and convenient transport option that will help reduce this social and health inequality.

### Disability



- 10.2.6 Residents in the West of England are less likely to suffer long term health problems or disabilities relative to the national average, and their day-to-day activities are less limited than in England overall, as shown in Table 10.4 (although only by approximately 1% of the population).

Table 10.4. Long Term Health Problems or Disability

Geography	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited
Pill	8.4%	10.2%	81.4%
Portishead	6.1%	8.6%	85.3%
West Of England	7.7%	9.1%	83.2%
England	8.3%	9.3%	82.4%

Source: 2011 Census

- 10.2.7 These data mean that currently, less people are being discriminated against in terms of predominantly road based transport options. However, those that are disabled could be overlooked by development design and planning proposals. This would be due to the small proportion of the population that are disabled, and thus may not have their needs taken into consideration, leading to further discrimination. These findings are supported by analysis of benefit claimants in the context area relative to the national average. Department for Work and Pensions data (May 2013) indicates that 4.7% of the West of England's population is entitled to disability living allowance. This is marginally below the England average at 5.1%.

### Summary

- 10.2.8 The demographic profile of the West of England suggests that residents in the wider study area are well placed to benefit from the delivery of MetroWest Phase 1, based on the key findings outlined below:
- The study area is home to a growing population in general, increasing the potential market catchment for any transport infrastructure;
  - Across the context area, there are regions with an estimated high proportion of working age residents both currently and in the future - these residents will benefit from an alternative mode of travel for commuting;
  - The context area is generally home to a lower than average proportion of residents with long term health problems and disabilities; and
  - The ethnic minorities who reside in the study area will not be discriminated against for not having access to a car.
  - The residents in the towns of Portishead and Pill will be more encouraged to lead a healthier life style by having a rail station in walking and cycling distance.

## Travel Patterns

### Car Ownership

- 10.2.9 The 2011 Census data show that 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 (Table 10.5). In contrast, around a quarter of households across England do not own a car or van. This suggests an over-reliance on private car ownership in the wider context area, which could be reduced through the provision of an improved public transport network, leading to socio-economic, health, equality and environmental benefits.

Table 10.5. Proportion of Households with No Cars or Vans, (2011 Census)

Cars	Pill	Portishead	West of England	England
% of households with no car	11.9%	11.6%	21.7%	25.8%

Source: 2011 Census

### Method of Travel to Work

- 10.2.10 The proportion of commuters travelling to work via private car in the West of England (69%) is similar to the nationwide average (66%) but lower than for Portishead and Pill (see Table 10.6). Therefore alternative modes of commuting must be available across parts of the West of England, which are not available in Portishead and Pill. For example, 2.3% of commuters in the West of England travel to work by train; in the absence of rail infrastructure this proportion falls to less than 1% for commuters in Portishead and Pill. This may give an indication of potential market for an increase in rail-based passenger transport in these towns if MetroWest Phase 1 is delivered. This would also provide a transport method for commuters who do not own a car, which will improve the economic, social and health inequality in these areas.

Table 10.6. Method of Travel to Work

Method of Travel to Work	Pill	Portishead	West of England	England
Train	0.8%	0.8%	2.3%	5.6%
Motor Vehicle	80.5%	85.5%	69.2%	66.4%

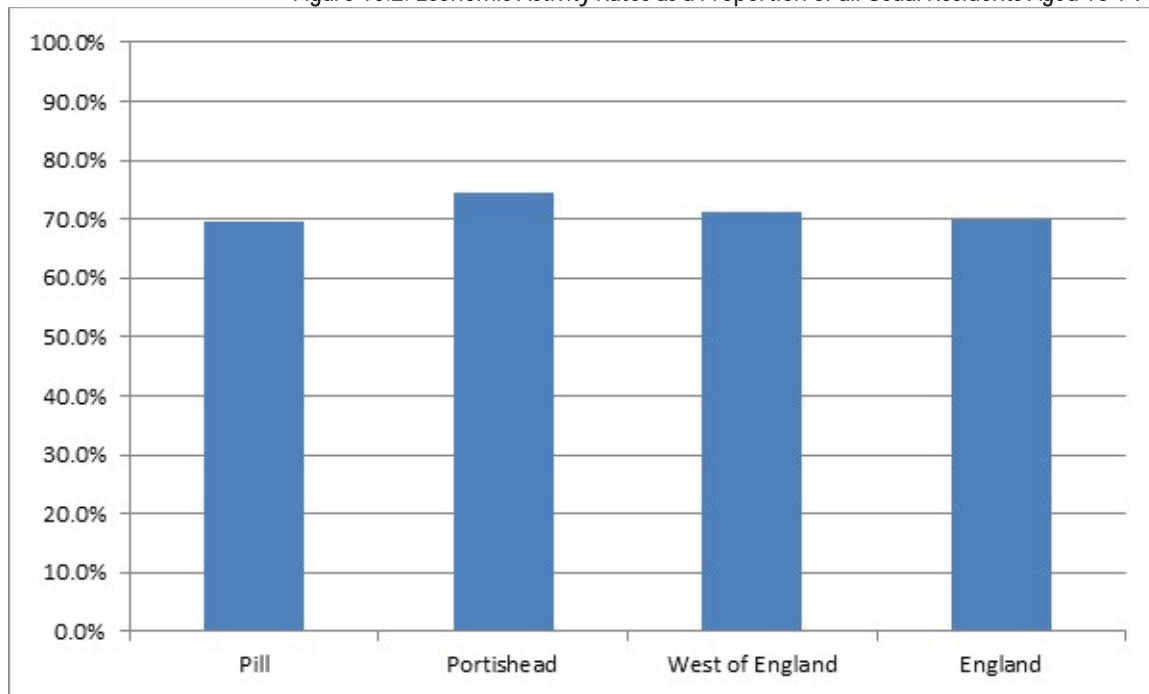
Source: 2011 Census

## Labour Market Participation

### Economic Activity and Unemployment

- 10.2.11 Economic activity rates provide a proxy for the labour market participation of the working age population in an area. Economic activity in the study area is above the national average (70%), with rates in Portishead being particularly high (75%) – see Figure 10.2. This implies that the wider study area is home to a high proportion of residents who are in employment or actively seeking employment, for whom the MetroWest Phase 1 may improve accessibility to the labour market.
- 10.2.12 However, the relatively high rates of economic activity are not achieved by all social groups in the West of England. For example, most ethnic minority groups are less likely to be economically active relative to the total population of the West of England, as highlighted in Table 10.7. In addition, the data suggest that ethnic minority groups in the West of England tend to be less economically active compared to ethnic minority groups nationally as well.

Figure 10.2. Economic Activity Rates as a Proportion of all Usual Residents Aged 16-74



Source: 2011 Census

Table 10.7. Economic Activity by Social Group

Social Group	Economic Activity Rate	
	West of England	England
Total population	65%	64%
White ethnic group	65%	63%
Mixed/multiple ethnic group	66%	68%
Asian/Asian British	62%	63%
Black/African/Caribbean/Black British	64%	69%
Other ethnic group	59%	59%
Disabled – day-to-day activities limited to some extent	24%	23%

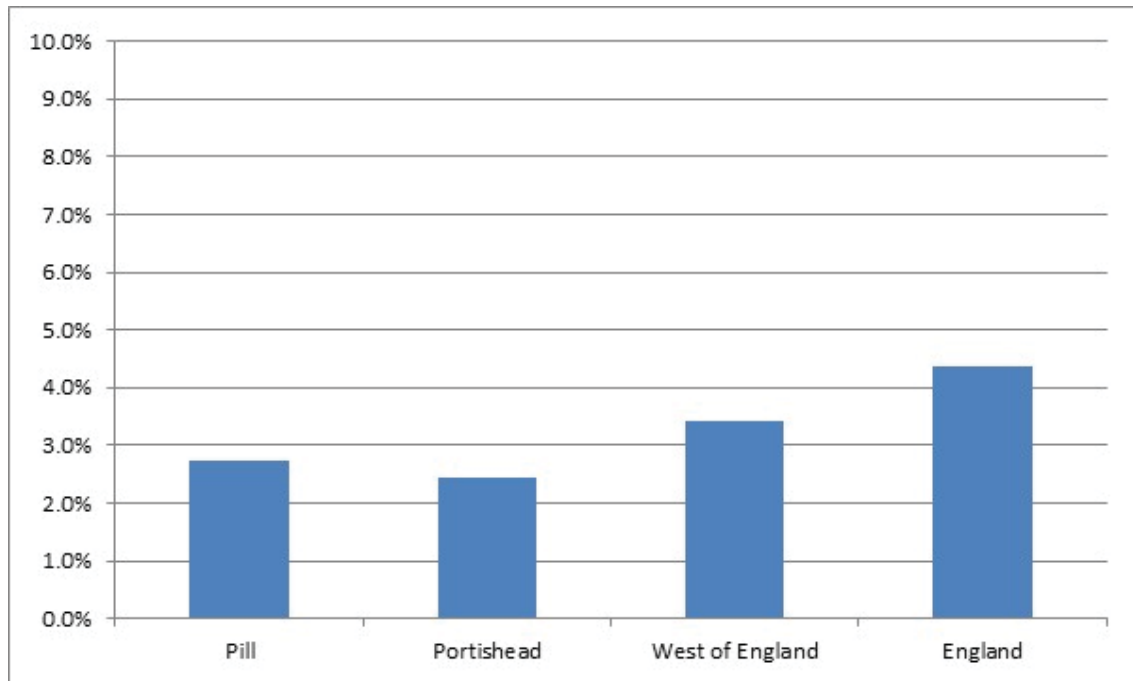
*\*NB: the economic activity rates outlined in Table 10.7 cover the entire population aged 16 plus, rather than just 16-74 population as per the rates outlined in Figure 10.2.*

Source: 2011 Census

10.2.13 Unemployment rates are also lower in the wider study area relative to across England as a whole (Figure 10.3). Furthermore, unemployment affecting vulnerable groups including youth and the long-term unemployment is less severe in the wider study area.

10.2.14 Despite these positive trends in comparison to the national average, there is a continued need to provide employment opportunities for residents looking for work. MetroWest Phase 1 could widen the catchment area in which members of the labour force can access jobs. This would improve access to employment for those unable to travel to work by road and potentially improve health.

Figure 10.3. Unemployment Rate as a Proportion of all Usual Residents Aged 16-74



Source: 2011 Census

10.2.15 In addition to geographical variances across the West of England, patterns of unemployment vary across social groups too. For example, all ethnic minority groups have higher unemployment rates than the local average (Table 10.8). The unemployment rate for disabled residents is low; however, this may result from the low levels of economic activity for disabled residents, as highlighted in Table 10.8.

Table 10.8. Unemployment Rate by Social Group

Social Group	Unemployment Rate	
	West of England	England
Total population	4%	5%
White ethnic group	4%	4%
Mixed/multiple ethnic group	9%	10%
Asian/Asian British	5%	7%
Black/African/Caribbean/Black British	12%	12%
Other ethnic group	8%	8%
Disabled – day-to-day activities limited to some extent	2%	3%

*\*NB: the economic activity rates outlined in the table above cover total population aged 16 plus, rather than just 16-74 population as per the rates outlined in Figure 10.3.*

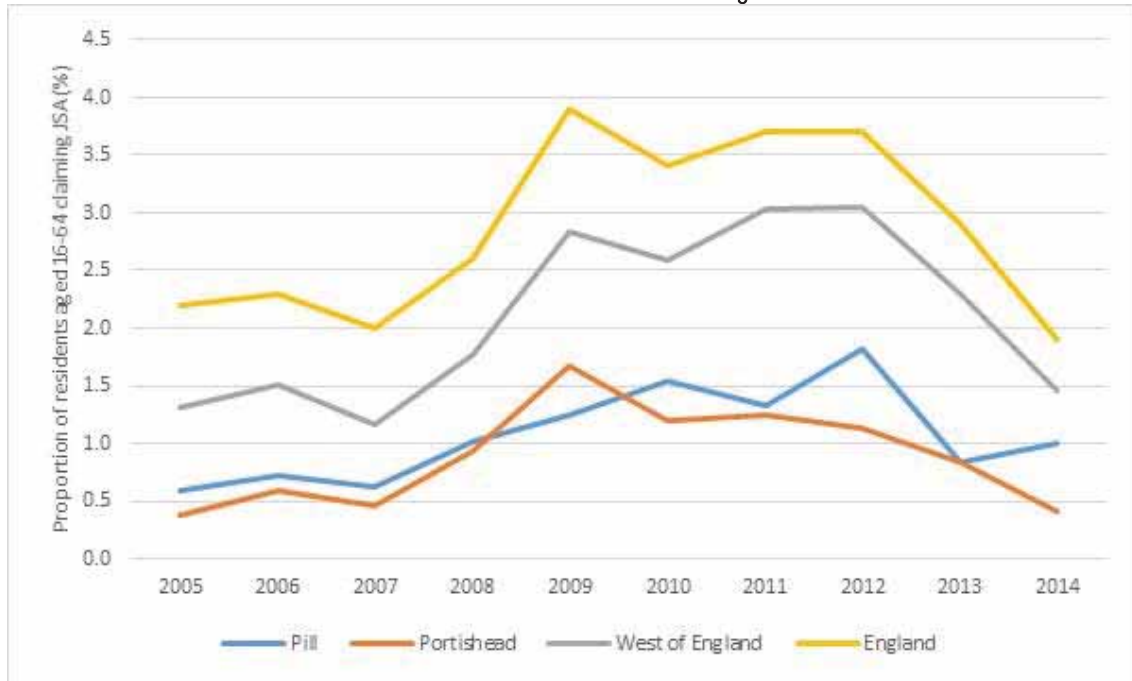
Source: 2011 Census

#### Unemployment Benefit Claimants

10.2.16 The claimant count rate measures the proportion of the resident working age population claiming job-seekers allowance (“JSA”) and provides time-series information on unemployment as well as acting as an up-to-date proxy for current unemployment. The

time-series data for the last decade suggests that unemployment in the wider study area has stayed consistently below the national average since 2005. At the same time, despite the significant spike in unemployment following financial crisis in 2008 and 2009, the number of JSA claimants has started to decline since 2012. Nevertheless there is an ongoing need to improve employment opportunities for residents in the wider study area.

Figure 10.4. Claimant Count Rate: 2004-13



Source: Claimant Count Register

### Summary

10.2.17 The labour market in the wider study area can be characterised by the following key findings:

- High levels of labour market participation, measured in terms of economic activity;
- Generally low levels of unemployment, including some vulnerable groups (with the town of Pill being the exception for the youth and long-term unemployed); and
- Low levels of JSA claimants, albeit the proportion of claimants has risen disproportionately in Portishead since 2005.

10.2.18 Given these findings, it is understandable that much of the West of England is subject to relatively low levels of employment deprivation, particularly around Portishead and Pill. However, as shown in Figure 10.5, some extreme pockets of deprivation persist elsewhere across the West of England. As a result, the increased accessibility to job opportunities offered by MetroWest Phase 1 could be a clear benefit for the labour market in the context area. This will raise the level of employment in the residents of Portishead and Pill that are classed as vulnerable groups and decrease the social and health inequality.

## Socio-Economic Classification

### Skills and Education

10.2.19 The 2011 Census reveals that residents in some parts of the wider study area have achieved high levels of educational attainment. Similarly, a low proportion of residents in many parts of the West of England have no formal qualification relative to the national average (19% for West of England versus 23% nationally). This implies that the working age population of the study areas is generally well-skilled, an assertion that is reflected by

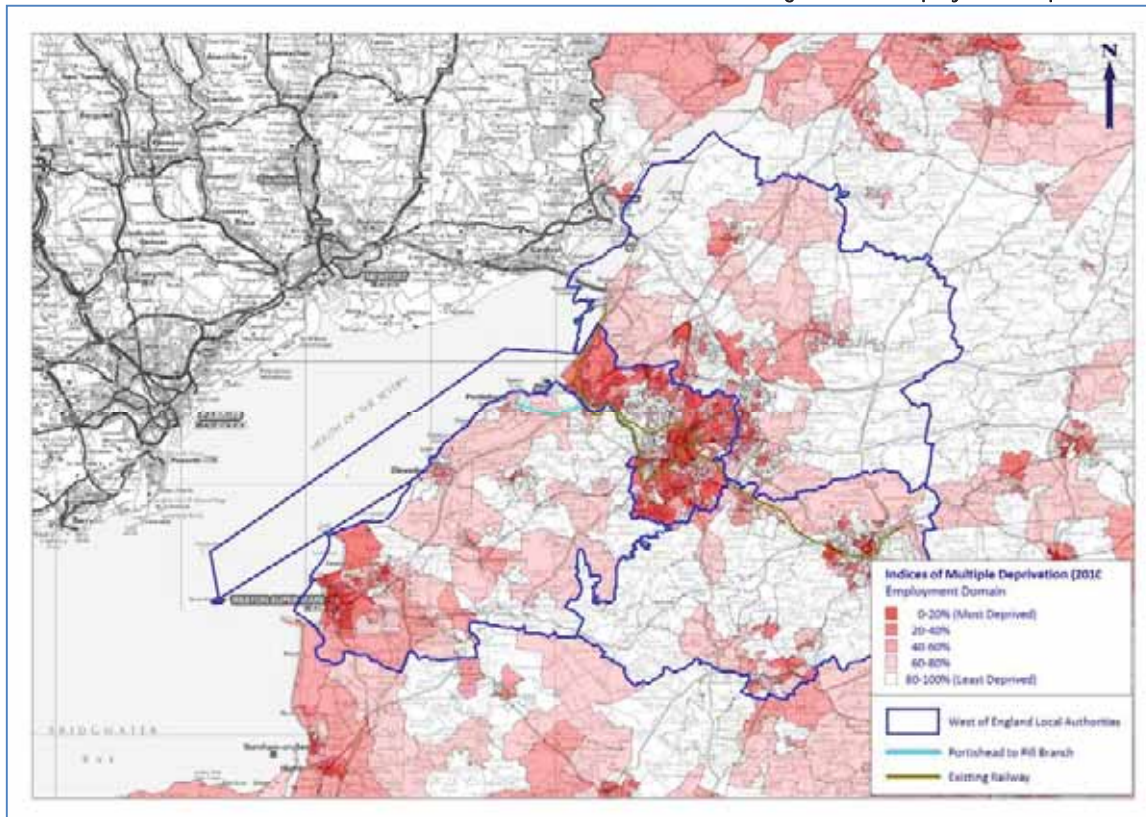
the skills, education and training deprivation indicator illustrated in Figure 10.6. This reduces the social and health inequality in Pill and Portishead.

Table 10.9. Qualification Levels

Qualifications	Pill	Portishead	West of England	England
No Qualifications	18.0%	14.5%	19.2%	22.5%
NVQ Level 4+ Qualifications	35.3%	36.2%	30.6%	27.4%

Source: 2011 Census

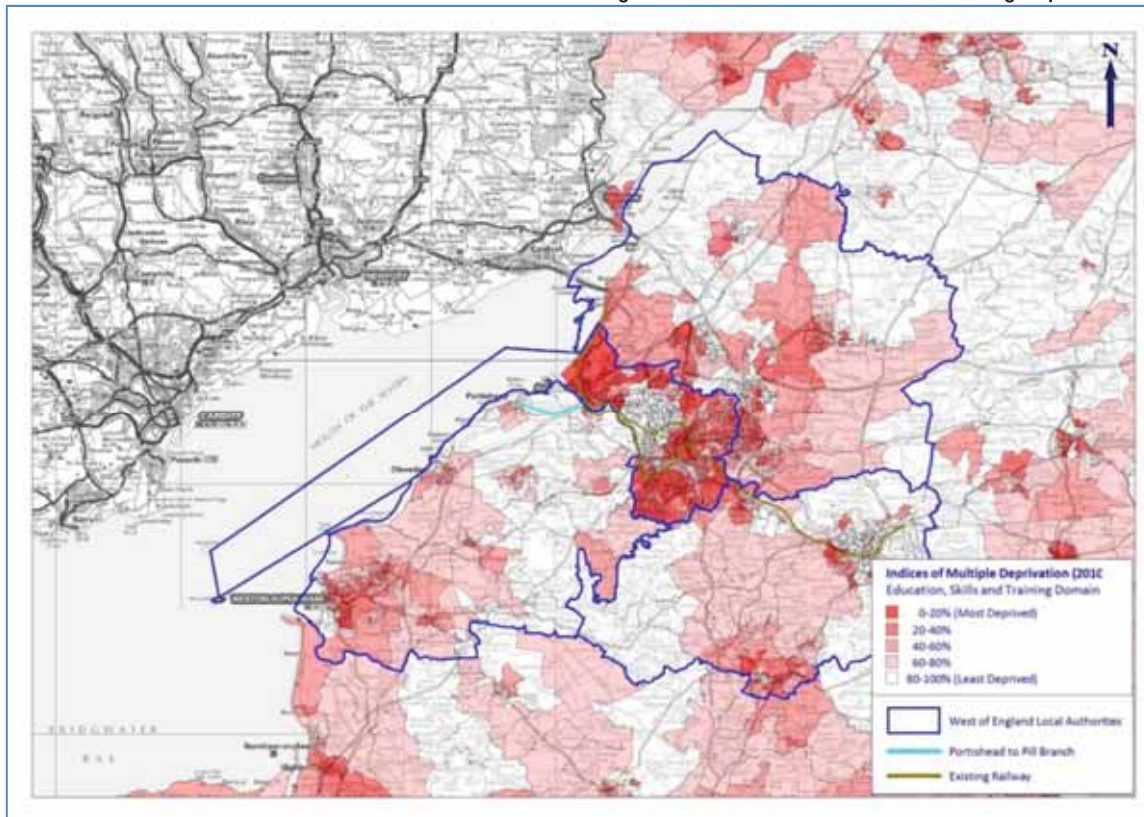
Figure 10.5. Employment Deprivation



Source: IMD, 2010



Figure 10.6. Skills, Education and Training Deprivation



Source: IMD, 2010

### Occupational Structure

- 10.2.20 Skills and qualifications are often reflected in occupational structure and average earnings. This general trend holds for the wider study area, as a well-educated population are over-represented in higher level occupations (e.g. managers, directors and senior officials, professional occupations and associate, professional and technical occupations). Forty-three per cent of residents across the West of England are concentrated in these occupations at the top-end of the occupational structure (top three rows in Table 10.10). In contrast, only 41% of the population nationally hold these types of positions.
- 10.2.21 Similarly, West of England residents are generally under-represented in lower level occupations (e.g. caring, leisure and other service occupations, sales and customer service occupations and elementary occupations).

Table 10.10. Occupational Structure

Occupation	Pill	Portishead	West of England	England
1. Managers, directors and senior officials	14.0%	13.3%	10.2%	10.9%
2. Professional occupations	21.1%	21.6%	20.2%	17.5%
3. Associate professional and technical occupations	13.5%	17.0%	13.0%	12.8%
4. Administrative and secretarial occupations	11.4%	12.3%	11.9%	11.5%

Table 10.10. Occupational Structure

Occupation	Pill	Portishead	West of England	England
5. Skilled trades occupations	11.1%	8.5%	10.8%	11.4%
6. Caring, leisure and other service occupations	8.2%	7.4%	8.8%	9.3%
7. Sales and customer service occupations	5.8%	8.5%	8.7%	8.4%
8. Process plant and machine operatives	5.1%	4.5%	5.9%	7.2%
9. Elementary occupations	9.8%	7.0%	10.5%	11.1%

Source: 2011 Census

### Income Earnings

- 10.2.22 The ASHE (2013) provides data on median gross weekly pay. The most recent data suggests that residents in the West of England earn marginally more than the national average (£525 and £520 respectively). However, with gross weekly earnings of almost £550, residents in North Somerset local authority earn significantly above the national average. This reflects the higher qualifications and occupational structure characteristic of some of the key towns in North Somerset (e.g. Portishead) and is illustrated in Figure 10.7. It should also be noted that wages for residents in North Somerset are much higher than wages for workers who are employed in the local authority area (£549 and £522 respectively). The implication of this finding is that a significant proportion of North Somerset residents must be commuting out of the district for work. MetroWest Phase 1 would improve the range of options for out-commuting from North Somerset.

Table 10.11. Gross Weekly Earnings Comparison

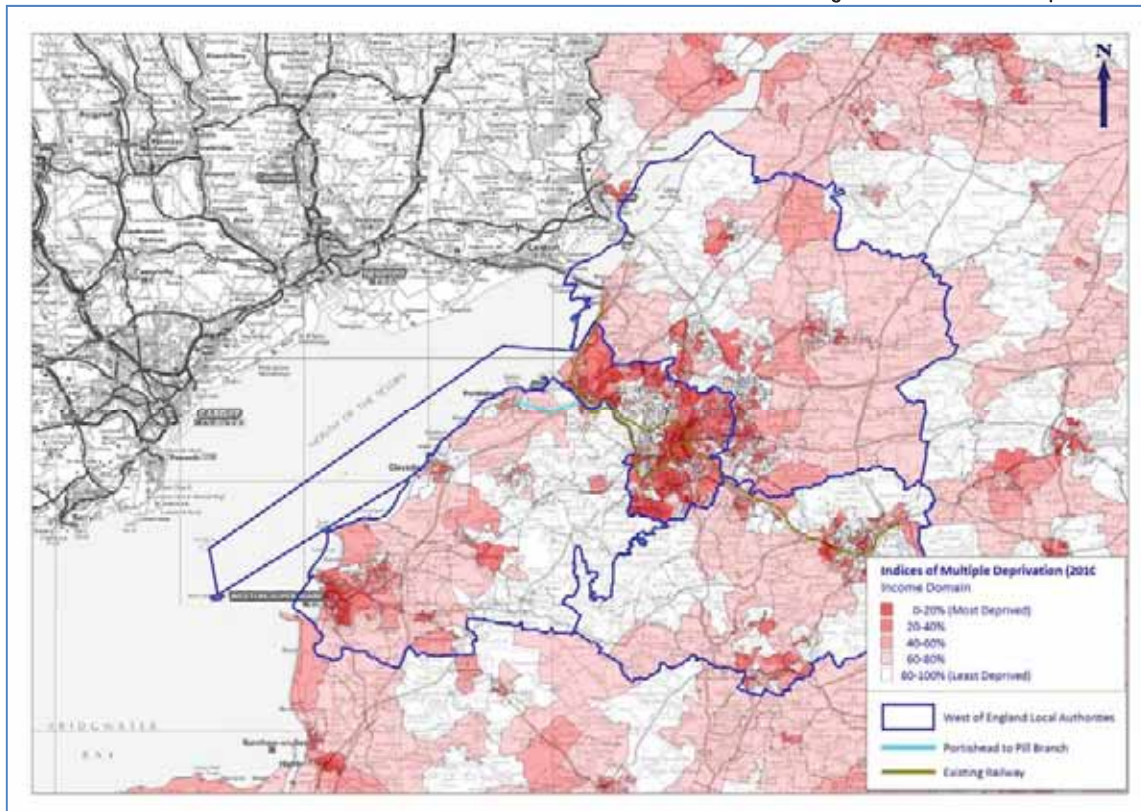
Occupation	North Somerset	West of England	England
Workplace (Median)	522.3	513.425	520.5
Resident (Median)	549.3	524.8	520.7

Source: ASHE, 2013

- 10.2.23 The relative wealth of residents in North Somerset is reflected by patterns of income deprivation across the West of England (Figure 10.7). Analysis of neighbourhoods in Portishead reveals that only one area of the town features in the most income-deprived 50% of neighbourhoods nationally; more than 80% feature in the least income deprived 30%. At a wider level, 30% of neighbourhoods in the West of England feature in the 20% least income-deprived areas whilst only 11% feature in the 20% most income-deprived neighbourhoods nationally. Combined with the ASHE data outlined above, these trends suggest that vulnerable, low income groups are under-represented in the context area for the MetroWest Phase 1.



Figure 10.7. Income Deprivation



Source: IMD, 2010

### Social Grade

10.2.24 The socio-economic classification analyses above are consolidated into one socio-economic indicator via approximated social grade. This indicator considers an individual's occupation, employment status, qualification status, tenure and whether they are working full-time, part-time or not working. Based on these factors, households are classified into one of the following categories of social grading:

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

10.2.25 Based on 2011 Census data, the West of England in general is home to a much higher proportion of residents in the top socio-economic grades (i.e. A/B and C1) relative to the national average. As a result, residents in the wider study area are far less likely to be concentrated in the bottom socio-economic grades (i.e. C2 and D/E).

Table 10.12. Approximated Social Grade

Geography	AB	C1	C2	DE
Pill	33%	29%	21%	18%
Portishead	34%	35%	17%	14%
West of England	26%	32%	20%	22%

Table 10.12. Approximated Social Grade

Geography	AB	C1	C2	DE
England	23%	31%	21%	25%

Source: Census, 2011

### Summary

- 10.2.26 The review of the socio-economic classification indicators for the West of England highlights a number of key characteristics of the local population that are pertinent to the possible delivery of MetroWest Phase 1, including:
- A skilled population with considerable educational attainment levels;
  - Well-developed occupational structure skewed towards higher-end occupations;
  - Higher residential than workplace wages, implying a significant level of out-commuting from the context area; and
  - High proportion of residents at the upper-end of the social grading system.
- 10.2.27 This summary provides a general picture of socio-economic conditions in West of England and is also accurate for Portishead in particular. It should be noted that the same trends are less positive for the town of Pill. Taken together, these findings have a number of important implications for residents in the immediate and wider study area.
- 10.2.28 For example, the generally positive socio-economic trends for residents in Portishead and the West of England imply that residents are likely to be employed across a wide catchment area and would therefore benefit from the introduction of new transport networks to improve accessibility and connectivity to the wider region. On the other hand, Pill is somewhat socio-economically depressed in comparison. Therefore, residents in Pill may benefit from increased accessibility to wider job markets, education facilities and other services offered by MetroWest Phase 1. This would also provide employment opportunities to vulnerable groups and improve health inequalities.

### Employment Profile

- 10.2.29 There are two elements to analysing the employment profile of the West of England. Firstly, the distribution of residents across economic sectors provides an indication of the types of jobs people are employed in, irrespective of where their place of employment is located. Secondly, the sectorial profile of employees gives an insight into the types of businesses that are located in Portishead, Pill and the West of England as a whole, irrespective of where the employees reside. This analysis allows any discrepancies between the types of jobs available in the area and the types of jobs sought by residents to be highlighted.
- 10.2.30 The sectorial profile of residents in the wider study area is broadly similar to the national average (Table 10.13). However, the 2011 Census data suggests that the population of the wider study area is over-represented in high-value industries such as banking, finance and insurance. Similarly, fewer residents are employed in traditionally lower-value industries such as distribution, hotels and restaurants and other services. This evidence suggests that the wider study area is home to a strong and buoyant labour force.
- 10.2.31 The sector profile for the workforce employed in the wider study area is based on BRES (2012). The data, presented in Table 10.14, indicates that the sectorial profile for the workforce is distinct from the residential profile, with higher levels of employment in the banking, finance and insurance sector. However, the manufacturing and construction industries, which typically generate high levels of economic output are under-represented in the workplace employment profile compared to the residential employment profile.

- 10.2.32 As stated previously, in the Labour Market Participation section, those residents who are from an ethnic minority have a lower employment level and tend to be less educated. As the industries in and around Portishead and Pill are more highly skilled and less low skilled, this leaves a disparity of occupation for the less educated within these towns. The inclusion of a passenger rail service as part of the MetroWest Phase 1 will increase accessibility and potential availability of job opportunities for those residents from ethnic minorities without less access to private cars.

Table 10.13. Residential Employment Profile

Industry	Pill	Portishead	West of England	England
1 : Agriculture and fishing (SIC A)	0.6%	0.1%	0.5%	0.8%
2 : Energy and water (SIC B,D,E)	1.4%	1.3%	1.4%	1.4%
3 : Manufacturing (SIC C)	6.5%	8.2%	7.7%	8.8%
4 : Construction (SIC F)	8.1%	7.1%	7.5%	7.7%
5 : Distribution, hotels and restaurants (SIC G,I)	18.7%	19.6%	20.9%	21.5%
6 : Transport and communications (SIC H,J)	10.5%	9.4%	9.1%	9.1%
7 : Banking, finance and insurance, etc (SIC K,L,M,N)	20.3%	20.9%	18.9%	17.5%
8 : Public administration, education & health (SIC O,P,Q)	29.6%	29.1%	29.7%	28.2%
9 : Other services (SIC R,S,T,U)	4.3%	4.2%	4.5%	5.0%
Total	100.0%	100.0%	100.0%	100.0%

Source: Census, 2011

Table 10.14. Workforce Employment Profile

Industry	Pill <sup>22</sup>	Portishead	West of England	England
1 : Agriculture and fishing (SIC A)	0.3%	0.1%	0.1%	1.4%
2 : Energy and water (SIC B,D,E)	0.0%	0.1%	1.0%	1.1%
3 : Manufacturing (SIC C)	14.1%	4.9%	7.4%	8.4%
4 : Construction (SIC F)	4.3%	3.8%	4.6%	4.6%
5 : Distribution, hotels and restaurants (SIC G,I)	4.0%	22.1%	22.1%	22.9%
6 : Transport and communications (SIC H,J)	6.7%	5.6%	8.5%	8.6%

<sup>22</sup> Note that in the case of the workplace employment profile, Pill refers only to Pill Ward and not Pill and Easton-in-Gordano Wards combined, due to data availability

Table 10.14. Workforce Employment Profile

Industry	Pill <sup>22</sup>	Portishead	West of England	England
7 : Banking, finance and insurance, etc (SIC K,L,M,N)	58.0%	22.4%	23.3%	22.0%
8 : Public administration, education & health (SIC O,P,Q)	11.1%	37.0%	29.1%	26.6%
9 : Other services (SIC R,S,T,U)	1.5%	4.1%	4.0%	4.5%
Total	100.0%	100.0%	100.0%	100.0%

Source: (BRES, 2012)

## Deprivation

- 10.2.33 The prevalence of different dimensions of deprivation (e.g. employment, education, skills and training and income) has been considered in this section. The various dimensions are combined and consolidated to create an aggregate measure of deprivation, which represents total deprivation in an area. The extent of aggregate deprivation across the wider study area is illustrated in Figure 10.8, which suggests that outside of inner-city Bristol and areas in Weston-Super-Mare, the West of England does not suffer from extreme deprivation. In particular, the towns of Portishead, Pill and their surrounding areas appear to be relatively affluent and free from significant disadvantage.
- 10.2.34 The relatively low levels of acute deprivation across the wider study area are also reflected in the findings of the 2011 Census, which classifies household deprivation according to the number of dimensions of deprivation each household suffers from (including employment, education, health and housing). The Census data indicate that fewer homes suffer from multiple dimensions of deprivation in the West of England, relative to England as a whole. This emphasises the relatively prosperous socio-economic position of the MetroWest Phase 1 study area.

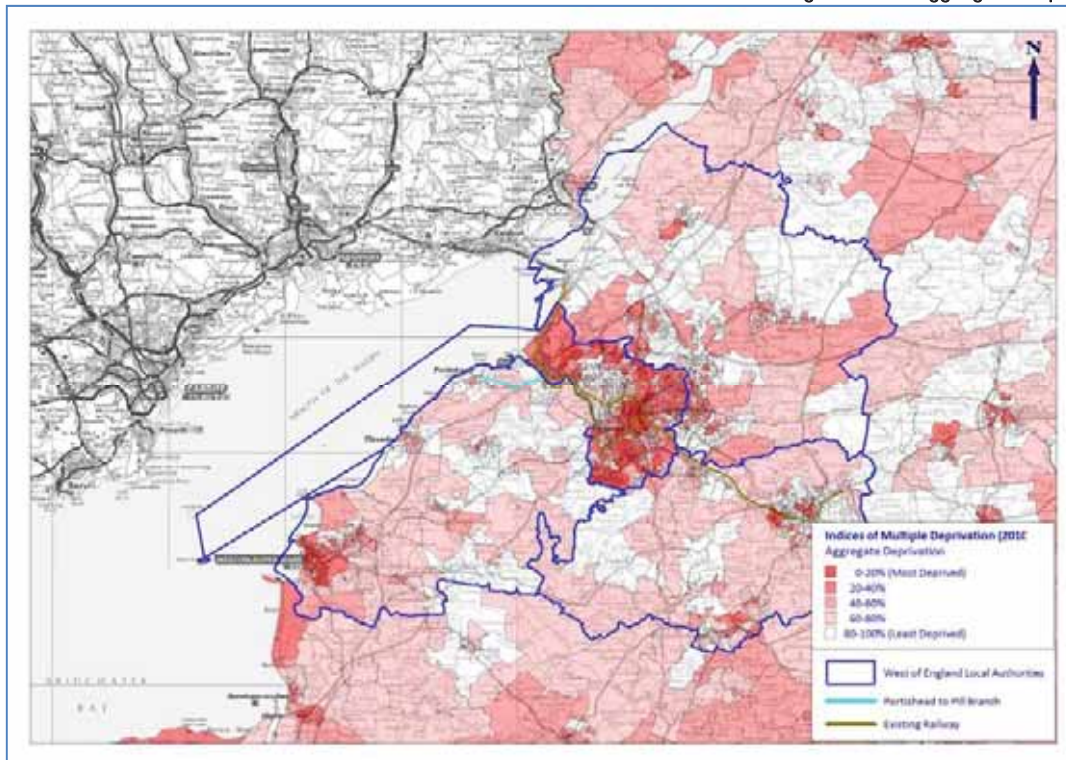
Table 10.15. Household Aggregate Deprivation

Household Deprivation	Pill	Portishead	West of England	England
Household is not deprived in any dimension	50%	56%	46%	43%
Household is deprived in 1 dimension	33%	30%	32%	33%
Household is deprived in 2 dimensions	14%	12%	17%	19%
Household is deprived in 3 dimensions	2%	2%	4%	5%
Household is deprived in 4 dimensions	0%	0%	0%	1%

Source: Census, 2011



Figure 10.8. Aggregate Deprivation



Source: IMD, 2010

## 10.3 Portishead Branch Line (MetroWest Phase 1)

10.3.1 This section provides further commentary on the socio-economic indicators for the town of Portishead. This section should be read in conjunction with section 10.2.

### Demography

10.3.2 The 2011 Census reveals that there were 24,000 residents in the town of Portishead in 2011. Since 2001, the population of Portishead grew by 6,500, reflecting an annual growth rate of 3.30%. The age structure is skewed towards certain vulnerable groups (e.g. young people and elderly; both forming 19% of the total population). The future working age population of Portishead is likely to increase significantly given the current high proportion of young people. These young people are likely to be economically active and MetroWest Phase 1 could provide a viable mode of transport for future commuters in Portishead.

10.3.3 The vast majority of residents in Portishead belong to the white ethnic group (97%) according to the latest Census. Around 1% belong to Asian or mixed ethnic groups and less than 1% belong to black or other ethnic groups. In terms of disability, Portishead has a low proportion of residents for who day to day activities are limited a lot (6.1%) or to some extent (8.6%), relative to England (8.3% and 9.3% respectively). Nevertheless, there remains around 15% of the Portishead population that experience some degree of difficulty in their day to day activities, and would benefit greatly from increased mobility options presented by MetroWest Phase 1.

10.3.4 In summary, the demographic profile of the town of Portishead is reasonably consistent with the profile for the West of England as a whole.

## Travel Patterns

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

## Labour Market Participation

- 10.3.6 Economic activity rates in Portishead are very high (75%), implying a high level of labour market participation by residents of the town (2011 Census) Unemployment rates are also particularly low in Portishead. At 2.4%, the unemployment rate in the town is 2% lower than the national average. At the same time, youth and long-term unemployment is also significantly lower, at 22% and 32% against 27% and 37% respectively (2011 Census). These trends are further confirmed by JSA claimant count data. The proportion of JSA claimants is lower in Portishead than for regional or national averages. However, the overall proportion of JSA claimants in Portishead more than doubled between 2005 and 2014, from 0.6% to 1.4% (Claimant Count Register, 2014). This highlights the ongoing need to improve employment opportunities for residents in Portishead.

## Socio-Economic Classification

- 10.3.7 Portishead has a particularly high proportion of its population with NVQ4+ qualifications (36%), significantly above the equivalent proportion for England as a whole (27%). There is also a lower proportion of residents with no qualifications (15% versus 23%). These trends are reflected in the occupational structure for Portishead, where more than half of residents are concentrated in occupations at the top-end of the occupational structure, in high-value occupations. Further, only 23% of residents in Portishead occupy positions at the low-value end of the occupational structure spectrum compared to 29% nationwide.
- 10.3.8 Consolidation of these trends results in a high proportion of Portishead residents featuring in the top levels of the approximated social grading system (i.e. A/B/C1) (2011 Census).

## Employment Profile

- 10.3.9 The residential employment profile (2011 Census) for Portishead shows a high proportion of residents work in the banking, finance and insurance sector. In addition to the transport and communications sector, circa one-third of residents are employed in these sectors. These are typically high-value industries.
- 10.3.10 Analysis of the workplace employment profile (based on BRES, 2012) reveals a significant level of public administration employment in Portishead. This sector is currently vulnerable to ongoing contraction following the financial crisis of 2008/9. As such, a higher proportion of the context area's workforce is located in industries at high risk of job losses relative to the national average. At the same time, the proportion of the workforce employed in high-value industries (i.e. transport and communications and banking, finance and insurance) is lower for Portishead, than for England. This is the opposite of the trend for the residential employment profile, once again suggesting a high degree of out-commuting from the area.
- 10.3.11 These findings are relevant in the context of MetroWest Phase 1 as the provision of an improved transport network could ease the process of out-commuting or conversely, make Portishead more attractive to high-value industries meaning transport and

communications and banking, finance and insurance businesses increasingly locate in the town, thereby reducing the need for out-commuting from Portishead.

- 10.3.12 The indices of multiple deprivation (IMD, 2010) indicate that Portishead does not suffer from acute deprivation across any of the key socio-economic domains covered. In fact, more than 50% of households are not deprived in terms of any of the dimensions, meaning aggregate deprivation around Portishead is also low.

## Summary and Conclusions

- 10.3.13 The above section outlines the current socio-economic, equality and health profile for MetroWest Phase 1's immediate and wider context areas, defined as the towns of Portishead and Pill and the West of England as a whole respectively. The socio-economic profile of the study area at present and in the future is framed within its economic and planning policy context. The policy documents portray the context area as a relatively prosperous, open economy with high levels of out-commuting and little evidence of self-containment.
- 10.3.14 Policy documents at the national and local level also support the drive towards sustainable economic growth and highlight the role that investment in transport infrastructure can play in achieving economic development. The two themes of transport and economy are related in the sense that improving transport provision can act as a driver for economic growth by increasing connectivity and accessibility to employment markets for businesses and employment opportunities for workers. Transport infrastructure can also make locations more attractive for inward investment and business start-up. Within this context, the suite of local planning policy documents is unequivocal in support of reopening the Portishead line to passenger services and the wider MetroWest Phase 1 in general.
- 10.3.15 The socio-economic analysis and consultation with NSC has identified a number of vulnerable or disadvantaged groups in the context area. These include: disabled, ethnic minorities, young people and elderly, low income groups. However, the analysis suggests that these groups tend to form a smaller than average proportion of the local population in the context area, and that their socio-economic characteristics mean that they may be amongst the biggest beneficiaries of the increased accessibility and connectivity afforded by the MetroWest Phase 1 proposals.
- 10.3.16 The health analysis has identified that the general health of residents in the towns of Portishead and Pill is relatively good, this is conducive to the well-educated and economically prosperous majority of the population of Portishead and Pill, as they are able to afford the requirements for good health. This is in line with the small number of households that are classed as deprived. The data also showed that only a small proportion of the population suffer from severe disabilities, and a large elderly population resides in these towns, and is typical of the region. This is likely to result in an increase in the disabled population and a requirement to travel using alternative means to road based methods. Using previous transport studies for the area, the majority of Portishead and Pill would be in walking distance of the stations and the entirety of the town within cycling distance. The rail service could reduce congestion on the local roads and in the wider area. This will reduce stress for travellers and accidents, and improve local air quality. This supports the major aims of the MetroWest Phase 1 and local planning policies, to reduce road congestion and increase and encourage a healthy life style for the residents in the context area.
- 10.3.17 Trends for skills and qualifications, social grading, wages and occupational structure are more mixed. The general trend for Portishead and the West of England in general are positive, resulting in high levels of employment in high-value industries (including financial and business services) where they are employed in higher end occupations (including senior and managerial professions). However, the patterns for Pill are less positive, with lower levels of educational attainment and a depressed occupational structure relative to

nearby towns such as Portishead. Nevertheless, the trends for Pill still tend to outperform the national average, meaning they do not appear to result in significant disadvantage in the towns. This is reflected in the absence of considerable levels of aggregate deprivation in the towns and across the wider context area in general.

- 10.3.18 The socio-economic baseline for the context area reveals that the MetroWest Phase 1 could align with the policy aspirations of the context area, by on the one hand providing a viable alternative mode of transport to private car use for commuters, but on the other hand, providing incentives for investment and business relocation to Portishead and Pill to support self-containment of the economy. This could assist residents in the context area to secure employment that is commensurate to their relatively high levels of skills, qualifications and social grading, as well as providing an opportunity to rebalance the residential and workforce sectoral profile of employment. More detail on potential impact receptors is provided in the accompanying scoping report.

## 10.4 Recommendations for Further Survey Work

- 10.4.1 The above analysis presents a comprehensive overview of the prevailing socio-economic conditions in the West of England and in the towns of Portishead and Pill in particular. The analysis could be supplemented by further analysis into the business base for the context areas, using data available from the Inter-Departmental Business Register (“IDBR”). These data are only available to Government Departments, devolved administrations and local authorities, and would need to be procured through one of these routes.



# Soils, Agriculture, Land Use, and Assets

## 11.1 Approach

- 11.1.1 This section provides an overview of the soils, land use (including farmland, farm structures and agricultural land quality), and community assets within the vicinity of the Portishead Branch Line (MetroWest Phase 1). The focus of the assessment is the disused section of the railway between Portishead and Pill, as the reinstatement of the disused railway has potential to cause severance to existing farm operations and influence planning developments. The improvements to the section between Pill and Parson Street Junction are mostly confined within the operational railway land, with the exception of new accesses for emergency vehicles, and so are unlikely to have direct effects on soils, agriculture, and land use. All the works for Bedminster, Avonmouth and Bathampton will be confined to the existing operational railway land, and will not directly affect soils, agriculture, land use and community assets.
- 11.1.2 Information on soils and agriculture along the disused section of the Portishead Branch Line has been obtained from the following sources.
- An interview with two agricultural landowners whose farms between Sheepway and The Portbury Hundred (A396) would be directly severed by the reopening of the Portishead to Pill line - information obtained on farm management structures and current movements of machinery and livestock across the railway. There is an ongoing programme of consultation with these landowners to identify suitable alternative means of land access.
  - Google Earth and Microsoft Bing - satellite images of land use in the project corridor taken over a range of years and seasons.
  - 1:250,000 scale Soil Map of South West England published by the Soil Survey of England and Wales in 1983 and the accompanying Regional Bulletin, Soils and their use in South West England.
  - Defra's MAGIC website – information on agricultural land classification (ALC) data.
- 11.1.3 As there will be no permanent land-take outside the railway boundary, no soil and agricultural land classification ("ALC") surveys were carried out.
- 11.1.4 There are no constraints to agricultural data collection in the rail corridor.
- 11.1.5 The land uses surrounding the proposed railway line between Portishead and Pill have been considered in terms of their general use and function; existing land and policy designations and the existence of proposed major developments including the potential for other transport proposals. Major developments are assumed to include major applications determined within the last three years and accompanied by EIA.
- 11.1.6 A buffer zone of approximately 2km around the Portishead Branch Line (MetroWest Phase 1) has been used to locate larger developments, which have the potential to affect or be affected by the project. The 2km buffer includes the full extent of the protected proposed rail corridor and all station options at Portishead.
- 11.1.7 A smaller buffer zone of 300m around the 5.75km of the disused section between Portishead and Pill was used to identify community and commercial uses.
- 11.1.8 Less emphasis has been placed on the prevailing land use and planning conditions in the wider study area for MetroWest Phase 1, given the impacts are considered to be difficult to assess in land use and planning terms.
- 11.1.9 Information on land uses has been obtained from:

- Land and community uses coupled with land designations data for North Somerset was obtained as data sets within 300m of the proposed rail line and its stations between Portishead and Pill.
  - Major applications determined within the last three years - being the most common timescale, restricted by condition, for planning permissions to be implemented – these were identified on the Council’s website.
  - Desk-top information was collected on a desktop basis from publicly available internet based sources: the local authorities of Bristol and NSC, web based mapping, and photographs.
- 11.1.10 No formal consultations were made other than informal telephone contact with NSC’s planning policy team regarding the status of the Core Strategy and Development Management policies local plan.
- 11.1.11 The Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling and Bathampton Turnback are all small scale projects that will be constructed within the existing railway land. The Bedminster Down Relief Line and Severn Beach / Avonmouth Signalling are located within suburban areas and Bathampton Turnback is located in a rural setting. The construction and operation of these projects will not impact directly on soils or the land use (including agriculture) in the surrounding areas. Baseline information on these projects is provided in Appendix B.

## 11.2 Regional Overview

### Soils and Agriculture

- 11.2.1 Portishead Branch Line (MetroWest Phase 1) passes through a significant area of agricultural land between Portishead and Pill. The proposed route between Pill and Parson Street Junction along the Portbury Freight Line crosses a rural landscape, much of it wooded through Avon Gorge, before passing into the commercial and residential suburbs of Bristol.
- 11.2.2 The improvement works proposed along the Portbury Freight Line between Pill and Parson Street Junction are associated with operational railways, so there will be no new severance. However, some land will be required for the emergency access to the tunnels, which includes agricultural land at Pill. The effect of new severance to adjacent farmland has been scoped out of further assessment for this section of the route, although the impacts of temporary and permanent land-take on land use will be assessed.
- 11.2.3 The proposed Bedminster Down Relief Line (MetroWest Phase 1) entails partial reinstatement of a redundant section of track approximately 1km in length. The redundant track and sleepers are to be replaced and the 1km of line will be re-connected to the main line via works to the junctions. The Down Relief line is to be implemented within Network Rail’s operational land. The project is located within a residential area of Bedminster, and as such does not affect agricultural land.
- 11.2.4 The proposed Severn Beach / Avonmouth Signalling (MetroWest Phase 1) project is located on the Severn Beach railway line in the vicinity of Avonmouth on the north shore of the confluence of the River Avon and River Severn. The Severn Beach railway line passes through or alongside urban and industrial land over its entire length. Between the railway and the Severn and Avon rivers, land use is mainly estuarine marsh, woodland and scrub, but with a small amount of grazing for cattle and horses. These grazed areas are reached through underpasses. As the signal is to be implemented within Network Rail’s operational land, the project will not affect agricultural land or access to grazing land.
- 11.2.5 The proposed Bathampton Turnback (MetroWest Phase 1) on the Bath to Bristol Line is located close to Bathampton Junction which comprises of a wide section of existing

railway with quadruple track and signalling, in a rural location. There is no residential or property within the vicinity and limited commercial property. The turnback, comprising of a track crossover, signalling and a short unsurfaced path for train drivers to walk from one end of a train to the other end, is to be constructed within Network Rail's operational land. The project will not directly affect agricultural land.

## Land Use

- 11.2.6 The MetroWest Phase 1 comprises three main rail linkages which, with the exception of Portishead to Pill, largely use existing rail network via Bristol Temple Meads as follows: Portishead to Severn Beach; Severn Beach to Bath Spa, and Bath Spa to Portishead.
- 11.2.7 Owing to its location on the northwest of the built up area of Bristol City, the Severn Beach rail linkage has a more urban metropolitan characteristic when compared to the Bath and Portishead linkages to the South of the city which are comprised of smaller settlements. This line cross-cuts from central Bristol through mature housing and industrial areas at Avonmouth to the settlements at the peripheries of the built-up area. In turn, the city of Bath is more self-sustaining in employment terms than the villages and towns situated in North Somerset, partly owing to their constraining within the strategic Bristol and Bath Green Belt generally.
- 11.2.8 The Portishead Branch Line (MetroWest Phase 1) is afforded protection within the policies and proposals of the Local Transport Plan and the various development plans of North Somerset and Bristol City Councils.

## 11.3 Portishead Branch Line (MetroWest Phase 1)

### *Soils and Agriculture*

- 11.3.1 The Project passes through rural land uses between Portishead and Pill, as described below:
- Portishead to Sheepway: Pasture to the south of the railway line. To the north there is The Park, where footpaths pass through ungrazed wet grassland.
  - Sheepway to Station Road: Agricultural land on either side of the line and a fishing lake to the north.
  - Station Road to Portbury Dock Road: Two fields of pasture to the south of the line and scrub and woodland bordering the remainder.
  - Portbury Dock Road to the M5: Farmland south of the line and dockland to the north.
  - M5 to Pill: Farmland to the south of the line and scrub and wetland to the north.
- 11.3.2 Two farms have internal tracks with three at-grade crossings of the disused line between Portishead and Pill. These are between Sheepway and The Portbury Hundred. Other agricultural holdings will be unaffected by the reopening of the line as they either farm on only one side of the track or use road crossings.
- 11.3.3 The reopening of the Portishead to Pill line will directly affect, through severance, two farms between Sheepway and The Portbury Hundred (A396).
- 11.3.4 The 1:250,000 scale Soil Map of South West England published by the Soil Survey of England and Wales in 1983, accompanied by the Regional Bulletin, Soils and their use in South West England shows the soils within the Project to comprise marine alluvium shown as the Newchurch association of waterlogged calcareous clayey and silty soils. The higher ground has the Whimple 1 association of loamy over clayey soils.

- 11.3.5 The ALC maps available on Defra’s MAGIC website show the alluvial soils to be Grade 4 (poor quality agricultural land) and the higher ground to be Grade 2 (very good quality agricultural land).

## Land Use

- 11.3.6 The key land uses within the Portishead Branch Line (MetroWest Phase 1) are described in the following sections. Further descriptions of the landscape and views are provided in Chapter 7.

### *Portishead*

- 11.3.7 Portishead is primarily a dormitory town for Bristol and the wider south west; although a range of service industries and bulky retail goods uses have developed (as a consequence of a firm planning policy stance on brownfield first development over the last 10-15 years) it is not self-sufficient in employment terms. Off centre retail and commercial uses have been encouraged owing to a surplus of brownfield land to the east of the town centre; to accompany the increased level of residential construction in this period; some of this off-centre retail is partly located on the former Portishead rail station site. The land uses within the built up area surrounding the proposed Portishead railway station and the protected rail corridor are therefore typically low density retail/commercial to the west. To the east of Portishead, the proposed line is abutted on both sides by residential housing estates and a school.
- 11.3.8 Opportunities still exist for the completion of development around the proposed Portishead Station site on surplus vacant land, which is connected with new main roads. There are several major planning permissions associated with the area as detailed in Section 2.6. This land has the potential to be fully accessible by rail, owing to its proximity to the proposed for the Portishead Station. Large sections of recent new build housing sites as well as the mature housing areas surrounding the town centre are also accessible to the proposed Portishead Station.
- 11.3.9 The preferred site for the proposed Portishead Station is located on the eastern side of Portishead and within the Settlement Boundary. The site is primarily vacant land, being mostly the redundant railway corridor, but also crosses parts of the local highway network. The prevailing surrounding land uses are commercial to the north and south west with residential properties immediately to the south and east.

### *Portishead to Pill*

- 11.3.10 The Project between Portishead and Pill lies almost entirely within the confines of the disused rail corridor; and as a consequence, less emphasis is placed on the function of these land uses. This disused rail corridor of approximately 5.6 km (3.5 miles) extends from the proposed Portishead Station to Pill Junction coupled with a short section of track extending to a site for the proposed Pill Station. The majority of the development will be confined to the railway land associated with the original line and its easement within the rail corridor. The railway services were abandoned in 1964.
- 11.3.11 This section of the Project is predominantly a rural setting designated as the Bristol and Bath Green Belt. Towards Pill Junction, the proposed line is closely set between the Royal Portbury Docks and the M5 corridor with its associated junctions. Part of Sustrans Cycle Route No. 26 uses this section of the proposed line. The proposed line also passes next to the former Portbury station, which has now been converted to residential use. Between Portbury docks and Portishead is a local nature reserve situated to the north of the track.
- 11.3.12 A major oil pipeline crosses the disused railway in the vicinity of Sheepway.

### *Pill*

- 11.3.13 The village of Pill has a population of approximately 6,180 (Census, 2011), which grew around a harbour wharf and later expanded in the late 19th century owing to the development of the Bristol to Portishead rail line. Until the construction of the Avonmouth Bridge in 1974 (350m to the west of Portbury junction), there was a ferry crossing from Pill to Shirehampton over the River Avon. The village is surrounded by Green Belt to the south west and the Avon Gorge to the north east. The Royal Portbury Docks are located 1km to the north-west. At Pill, the land uses along the Project and at the location of the proposed station are predominantly mature residential use with a number of recreational spaces and connections within and across the development site. The proposed station site is surrounded by later twentieth century suburban development. The residential and commercial uses within the village will be highly accessible from the proposed Pill Station (within an 800m walking distance).

## 11.4 Recommendations for Further Survey Work

- 11.4.1 No additional survey work is proposed at this stage. The focus of ongoing agricultural work is consultation with the two affected landowners to identify suitable alternative means of access to the severed land.



# Transport, Access and Non-motorised Users

## 12.1 Approach

- 12.1.1 This section describes the desktop data collection and surveys undertaken to date to report the baseline transport conditions affected by MetroWest Phase 1 (see section 12.2) and within the Portishead Branch Line (MetroWest Phase 1) Project.
- 12.1.2 The baseline information will be used to inform the Transport Assessment (“TA”) that will be submitted as part of the ES.
- 12.1.3 The data in this section have been obtained from the following sources:
- MetroWest Phase 1 GRIP 2 – Engineering Feasibility (URS, 2014)
  - MetroWest Phase 1 Preliminary Business Case (WoE Councils, September 2014)
  - Local Transport Plan 3 (West of England Partnership, 2011)
  - Portishead Re-Opening Option Selection Report (GRIP 3) study (Network Rail, 2010)
  - NSC website (<https://www.n-somerset.gov.uk/Transport>).
- 12.1.4 As the project business case evolves including progression through Network Rail’s GRIP stages, more detailed consideration of the transport impacts will be undertaken, which will involve further survey work as appropriate.
- 12.1.5 As this is a transport project, the transport impacts of the project will need to deliver the project objectives. The principal business objectives of the MetroWest Phase 1 project are:
- To support economic growth, through enhancing the transport links to the Temple Quarter Enterprise Zone (TQEZ) and into and across Bristol City Centre, from the Portishead, Bath and Avonmouth/Severn Beach arterial corridors.
  - To deliver a more resilient transport offer, providing more attractive and guaranteed (future proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath & Avonmouth/Severn Beach.
  - To improve accessibility to the rail network with new and re-opened rail stations and reduce the cost of travel for commuters, business and residents.
  - To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors.
- 12.1.6 The MetroWest Phase 1 supporting objectives are:
- To contribute to reducing traffic congestion on the Portishead, Bath and Avonmouth/Severn Beach arterial corridors.
  - To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak.
  - To contribute to reducing the overall environmental impact of the transport network.
- 12.1.7 The transport impacts of the project can be categorised into the following three main elements:
- Trips at new stations (on existing and re-opened lines). Trips will be by foot, cycle, bus, taxi and car (parked and drop off);

- Diversion of existing car and public transport trips to the new stations; and
- Changes in rail demand at existing stations from new or amended services (including suppression of demand by extra station calls).

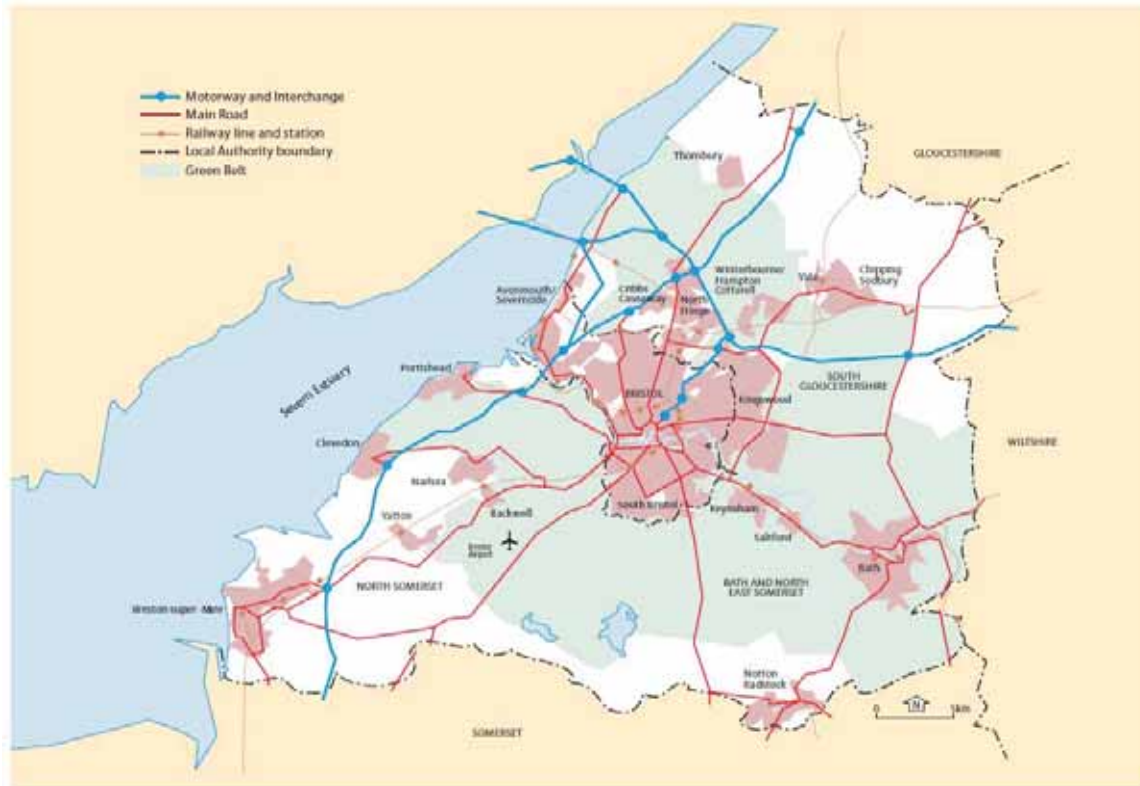
12.1.8 Data are being collected to enable the full range of traffic impacts to be quantified.

## 12.2 Existing Infrastructure and Service Provision

### Existing Infrastructure

12.2.1 Figure 12.1 shows an overview of the existing transport infrastructure in the West of England.

Figure 12.1. Overview of West of England Motorways, Main Roads and Railway



Source: LTP3-West of England Partnership

### Public Transport

#### Rail Services

12.2.2 Figure 12.2 shows a plan of the current railway provision in the West of England. The base pattern of local connections to and across Bristol varies between a half hourly and a two hourly pattern. The service pattern also varies between the AM peak, inter peak, and PM peak. The variation in calling frequencies at different local stations is summarised as follows:

- Filton Abbey Wood has three trains-per-hour to/from Bristol Temple Mead (two to Cardiff, and one Gloucester) ;
- Stapleton Road and Lawrence Hill have two to three trains-per-hour;
- Stations to Weston-super-Mare have two to three trains per hour; except Parson Street, Bedminster and Weston Milton (which have one train per hour) – Weston-super-Mare has one train per hr to/from Taunton (or beyond) and one per hour



terminating Weston-super-Mare every hour (the latter stops at Parson St and Bedminster). London trains are additional, though mostly in the peaks (these do not stop at intermediates in the contra direction) Patchway, Yate have one train-per-hour (to Cardiff and Gloucester respectively);

- Between Bath and Westbury, Trowbridge & Bradford-on-Avon have two trains per hour, with one per hour at Avoncliff and Freshford – one per hour Portsmouth, one per hour Weymouth or terminating Westbury (which stops at Avoncliff and Freshford) and
- St. Andrew’s Road and Severn Beach have a two hourly service to Bristol Temple Meads.

Figure 12.2. Current Railway Provision in the Greater Bristol Area



*Bus Services*

12.2.3 The current service frequency of local and regional bus services is set out in Table 12.1.

Table 12.1. Local Bus Route Summary – Portishead and Pill

Bus Service	Route Summary	Main Hours of Operation and Frequency		
		Monday to Friday	Saturday	Sunday
88	Portishead to Yatton (via Clevedon)	Every 120 minutes	-	-
C5-C8	Portishead to Bristol Parkway (via Cribbs Causeway)	Every 30 minutes (peak only)	-	-

Table 12.1. Local Bus Route Summary – Portishead and Pill

Bus Service	Route Summary	Main Hours of Operation and Frequency		
		Monday to Friday	Saturday	Sunday
X2	Bristol to Portishead (Via Abbots Leigh-Pill-Sheepway-Portishead Dock)	Every 30 minutes	Every 30 minutes	Every 60 minutes
X3	Bristol to Portishead (Via Abbots Leigh-Sheepway-Portishead Dock)	Every 30 minutes	Every 30 minutes	Every 60 minutes
X5	Portishead to Cribbs Causeway	Every 60 minutes	Every 60 minutes	-
X8	Bristol to Portishead (via Nailsea)	Every 60 minutes	Every 60 minutes	-

## 12.3 Existing Highway Conditions

### Description of the Function and Characteristics of the Network

- 12.3.1 The highway hierarchy that serves Portishead and Pill is described below, to understand the importance of the function that each link plays and understand the highway layout and characteristics.

#### External Portishead Links

- 12.3.2 To the west of Bristol the M5 Junctions 18a and 18 in Shirehampton on the north side of the River Avon connect to the A4 into Bristol. Junction 19 Gordano connects with the A369 between Portishead and the centre of Bristol along the south side of the River Avon. A large volume of commuter traffic from Portishead accesses the M5 via Junction 19 and there is a particular issue in the PM peak when traffic queues exiting the M5 block the Junction 19 southbound off slip and queue back on the M5 main line.
- 12.3.3 The A369 Portishead to Bristol corridor suffers congestion and journey time reliability problems. These are summarised as:
- The A369 is the only transport corridor directly linking Portishead with Bristol which is just 10 miles to the east;
  - The capacity constraints on the A369 are exacerbated by the fact that it crosses Junction 19 of the M5. This is one of the busiest parts of the M5 with the Avonmouth Bridge immediately to the north; and
  - The A369 continually suffers from the knock-on effects of incidents on the M5 with high volumes of traffic using a constrained local road corridor with few alternative route options.
- 12.3.4 The B3128 and B3130 provide more circuitous routes into the Bristol via the A370 from Long Ashton and the Park and Ride to the south west of Bristol. South of Portishead, the B3124 links Portishead with Clevedon and other settlements along the North Somerset coast whilst the unclassified Clapton Lane provides a further link to Nailsea.

## Portishead Principal Links

12.3.5 Within Portishead, the main arterials within the town are:

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

## Portishead Local Links

12.3.6 Figure 12.3 shows the local links in the vicinity of the station location.

Figure 12.3. Local Links near the Portishead Station Location (station building identify with a red circle)



12.3.7 The immediate links and land uses surrounding the station include:

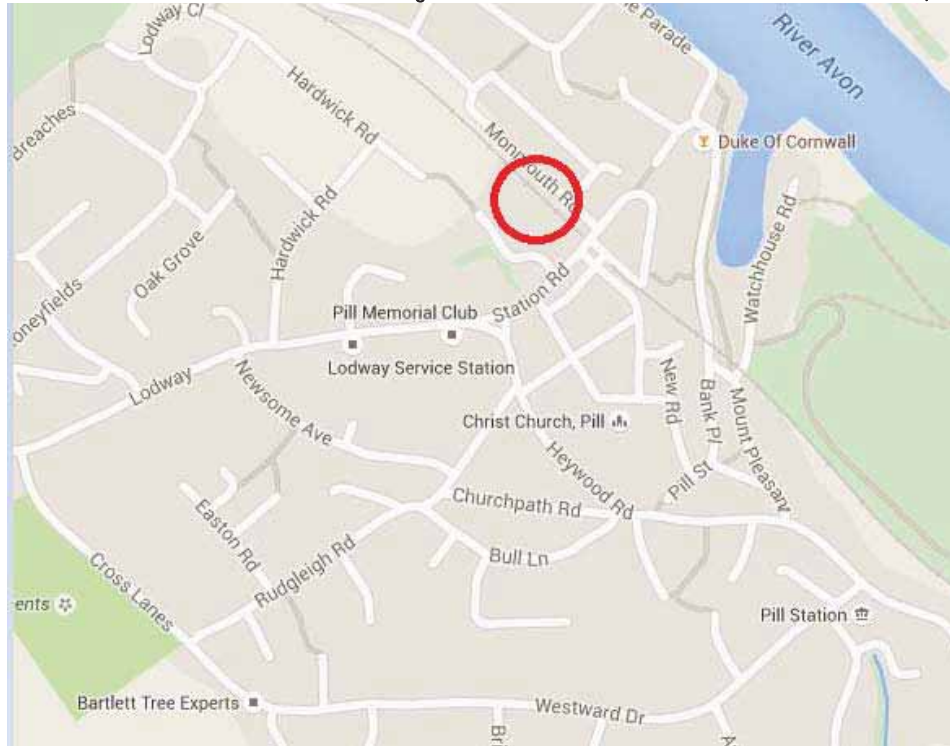
- Port Marine - a largely residential area to the north east of the station site which includes Phoenix Way
- Harbour Road - to the north west of the station site and location of commercial and business uses
- Gordano Gate Business Park - to the south west of the site which includes both a mix of business and retail land uses
- Galligate estate - to the south east, a residential area and smaller business park.

## Pill Links

12.3.8 To the west of the River Avon and the City of Bristol lies the settlement of Pill. Pill is linked to the wider strategic highway network via the A369, which provides the main highway corridor between Portishead and Bristol.

12.3.9 Figure 12.4 provides an overview of the local links surrounding the proposed Pill station.

Figure 12.4. Local Links near the Pill Station Location (red circle)



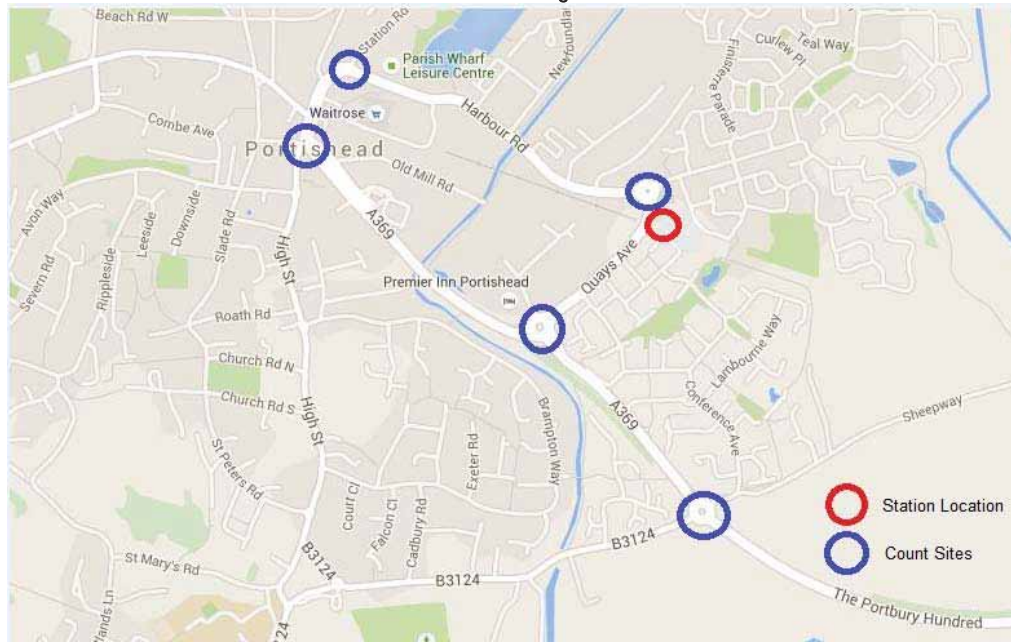
12.3.10 Access to the station location will be principally through Station Road to the south of the site from either Lodway or Heywood Road. Other access can be achieved through Mount Pleasant/Underbanks/Marine Parade to Monmouth Road to the north of the site.

## Existing Highway Flows

### *Portishead*

12.3.11 Figure 12.5 show the complete locations of automatic and manual traffic count locations in Portishead.

Figure 12.5. Traffic Count Locations in Portishead

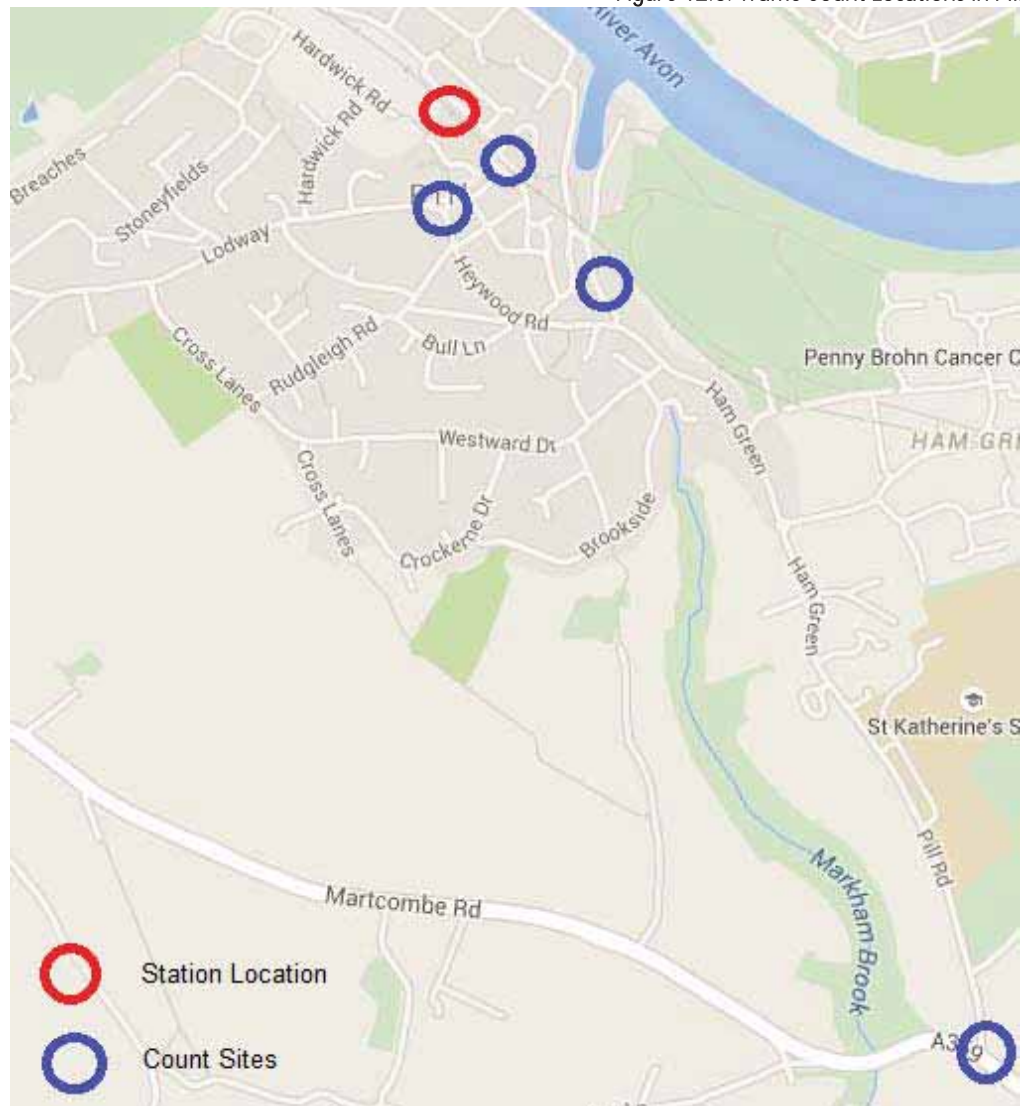


### *Pill*

12.3.12 Figure 12.6 show the locations where traffic count data have been collected in Pill.



Figure 12.6. Traffic Count Locations in Pill



## Count Methodology and Data

12.3.13 The count methodology adhered to the following criteria:

- Undertaken in accordance with DMRB Volume 112: Traffic Appraisal of Roads Schemes - Chapter 6 Section 6.2;
- Continuous for 14 consecutive calendar days excluding school holidays for a two week period;
- Hour flows recorded;
- Undertaken in both directions;
- AM and PM peak hours identified;
- Vehicles classified by length; and
- Summary for each week to give 12, 16, 18 and 24 hour totals as well as 5 and 7 day averages.

12.3.14 The data will be presented in the Transport Assessment.

## 12.4 Existing Parking Conditions

### Portishead

#### *Parking Levels and Provision in Portishead*

- 12.4.1 Given the proposal is to include car park with at least 150 car parking spaces at the station, an understanding of existing parking conditions around the proposed station location is required. This is particularly important given the likelihood of a car park tariff which could result in station users looking to use on street parking on neighbouring streets.
- 12.4.2 As a result, it is important to understand both the provision of parking, including any Traffic Regulation Orders ("TROs") and the level of parking across the day.

#### *Parking Survey in Portishead*

- 12.4.3 A comprehensive parking survey was undertaken throughout a weekday from 0700 to 1900. Figure 12.7 illustrates the proposed parking survey zones and Table 12.2 provides a street listing.

Figure 12.7. Proposed Parking Survey Zones

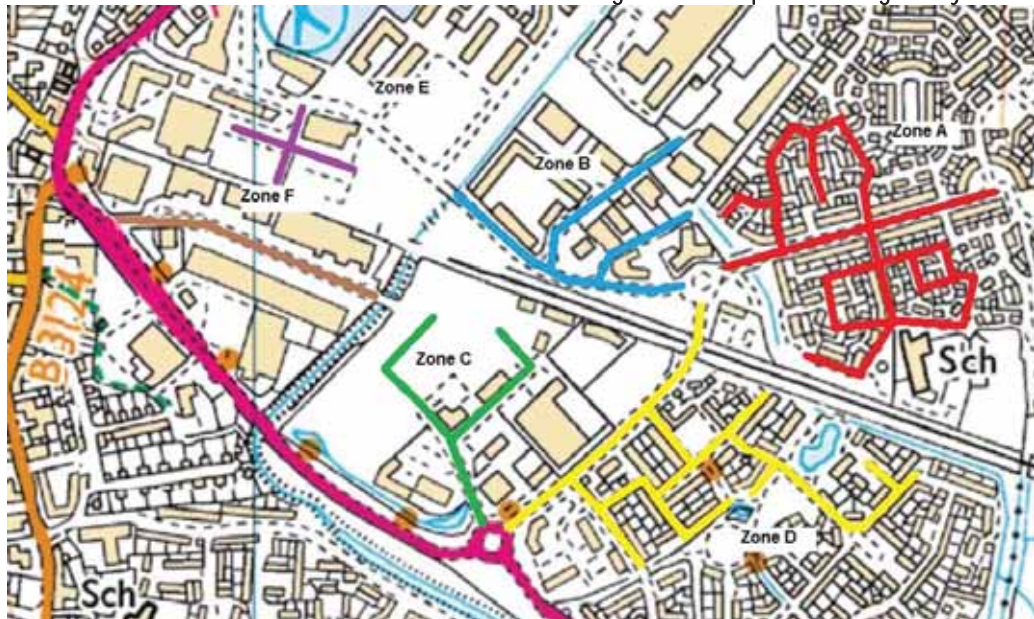


Table 12.2. Extent of the Proposed Parking Survey in Portishead

<b><i>Zone A Port Marine</i></b>	<p>Located to the immediate north east of the station site, Port Marine is an urban extension built from the early 2000s onwards. The residential area has been designed to reduce car use through the limited availability of both on-street and off-street parking spaces. Within this area also is Trinity Primary School which currently has around 400 pupils on roll including a nursery.</p> <p>Biscay Drive Camomile Walk Finisterre Parade (from Phoenix Way to the junction with Malin Parade) Marjoram Way (from Phoenix Way to Trinity Primary School) Malin Parade Phoenix Way (from Quays Avenue to Fennel Road junction) Tansy Lane Wright Row</p>
<b><i>Zone B Harbour Road Industrial Estate</i></b>	<p>Located to the north of the station site, this area largely comprises both commercial and industrial businesses. It is also located near to the Marina Healthcare centre which can lead to spikes in parking demand particularly close to the junction of Phoenix Way, Quays Avenue and Harbour Road.</p> <p>Harbour Road (from Quays Avenue to Portbury Ditch) also including Harbour Road industrial estate Haven View</p>
<b><i>Zone C Gordano Gate Business Park</i></b>	<p>This is located to south west of the station sites and comprises a mix of commercial and industrial uses. A new Sainsbury's food store opened during October 2014 together with an extension to the Premier Inn with further land expected to be developed in future years.</p> <p>Serbert Close Serbert Road Serbert Way Sainsbury's Car Park</p>
<b><i>Zone D Galingate Estate</i></b>	<p>This residential area to the south east of the station site which was largely developed in the early 2000s. The estate has a greater level of both on-street and off-street parking available. The estate is bordered to the south west by a business park although parking demand appears to be catered for by on site provision.</p> <p>Conference Avenue (from Quays Avenue to park area only) Galingate Way Mulberry Avenue Mulberry Close Peartree Field Quays Avenue (from Phoenix Way junction to Sails junction) Tyndman Road</p>



Table 12.2. Extent of the Proposed Parking Survey in Portishead

<i>Zone E Waitrose/Lidl</i>	This retail area is located north west along Harbour Road approximately 400m from the station location options.  Portishead town centre car park
<i>Zone F Old Mill Road</i>	Old Mill Road is a small industrial zone within the town centre area comprising a mix of commercial enterprises. Given the proximity of Old Mill Road to the station locations, there may be a direct impact where existing on-street parking and movements are relatively high.  Old Mill Road  Old Mill Retail Park

12.4.4 The parking survey obtained the following information as shown in Table 12.3.

Table 12.3. Parking Survey Information

Heading	Measurement
Survey times	Weekday morning peak 07-00 to 10-00 Weekday interpeak 11-00 to 13-00 Weekday evening peak 16-00 to 19-00
Frequency	Time segments of every 15 mins
Count information	Number of parked vehicles for each street within each 15 minute time segment. Vehicles only on the public highway should be counted. This should also include vehicles waiting
Other observations	Other observations that are having an impact on the operation and efficiency of the local highway will be recorded. This could include: <ul style="list-style-type: none"> <li>• Partial parking on the footway and cycleway;</li> <li>• Parking on the carriageway that prevents the free flow of opposing traffic;</li> <li>• Any parking restrictions that are not being adhered to;</li> <li>• Parking at junctions that hinder visibility or create risks for vulnerable users;</li> <li>• Any problems arising from deliveries or service vehicles (e.g. difficult HGV manoeuvres as a result of parked vehicles); and</li> <li>• Any particular parking problem that create particular access difficulties (e.g. school drop off or pick up).</li> </ul>

12.4.5 The data will be presented in the Transport Assessment.

### Parking in Pill

12.4.6 The proposal is to include a car park with at least 50 car parking spaces near the station. The road network around Pill, accommodates ad hoc residential and retail parking. Site work is being undertaken to understand the supply of on street parking, and its use.

## 12.5 Existing Accident Data

- 12.5.1 Historical accident data will be collated for a five year period for the locations surrounding the preferred station option. An analysis of the data by severity and cause will be undertaken to determine whether the data shows evidence of any accident cluster and the possible contributory effects such as highway layout. The analysis will also examine any accidents involving vulnerable users such as pedestrians and cyclists.

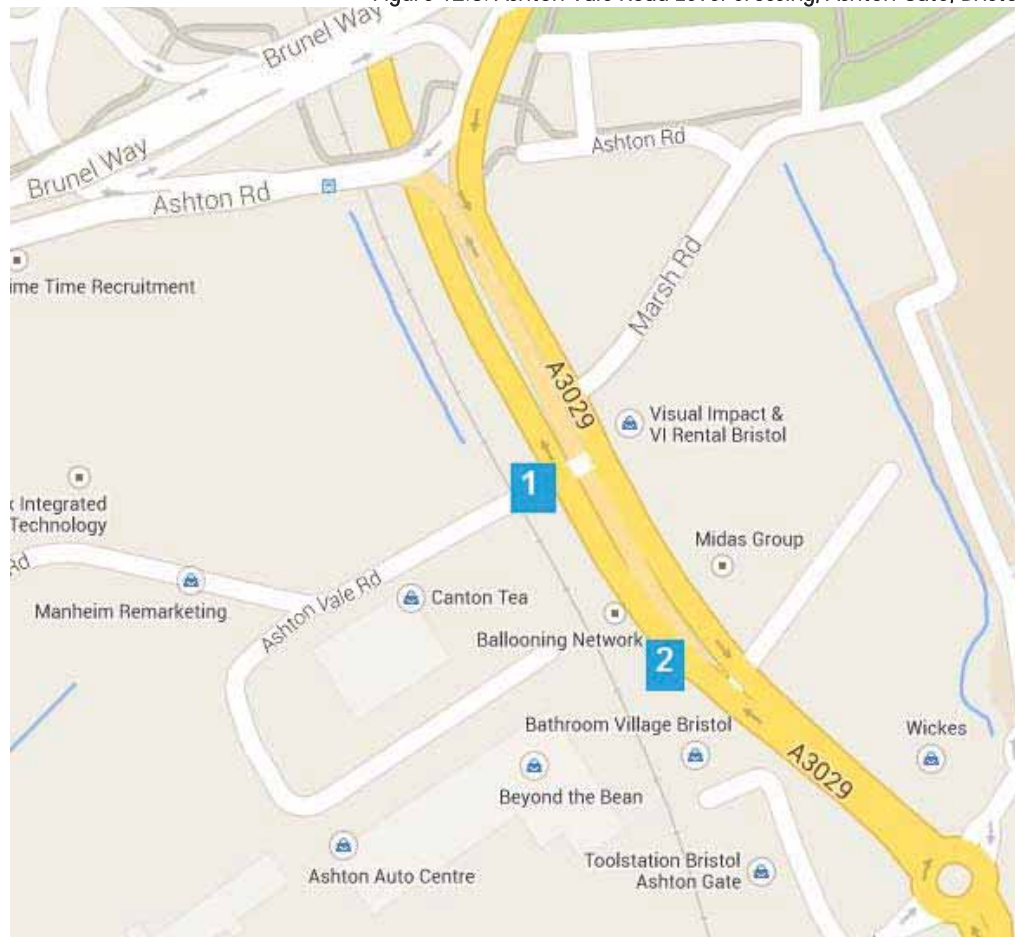
## 12.6 Pedestrian and Cycle Networks

- 12.6.1 The disused railway line from Pill to Portishead has been well protected by planning policy since it closed in 1964. As such no registered public footpaths, bridleways or byways cross the railway on the level according to NSC's definitive map.
- 12.6.2 There is one permissive pedestrian crossing of the dis-used railway line to Trinity Primary School, authorised by the land owner NSC. There are also a number of informal crossings which are more akin to dog walking tracks, some of which require traversing ditches to use them.
- 12.6.3 Moor Lane at Portishead is regarded as a byway on railway records and previously served the Council's tip. Rights to the crossing are held by Bristol City Council. The informal route at Moor Lane - formerly an access road - is unsurfaced, not fully accessible, bounded by vegetation and with poor natural surveillance.
- 12.6.4 The current PRoWs are shown on Figures 12.10 and 12.11 in Appendix A. The main PRoW to pass through areas potentially affected by the Portishead Branch Line (MetroWest Phase 1) Project is the Bridleway (LA 15/21/20) - Sustrans Route 26.
- 12.6.5 Non-motorised user ("NMU") count data were recorded in May 2014 on the Sustrans Route 26, the Sheepway, Quays Avenue and the access to Trinity School in Portishead crossing the railway line. Further NMU count data were recorded in September 2014.

## 12.7 Level Crossing Usage

- 12.7.1 The Portishead Branch Line (MetroWest Phase 1) includes an existing level crossing on Ashton Vale Road over the Portbury Freight Line.
- 12.7.2 There is an existing highway level crossing at Ashton Vale Road, Ashton Gate, on the Portbury Freight Line. The number of phases of the Ashton Vale Road level crossing per day is not static due to the dynamic nature of the freight train operations. Bristol Port have rights to operate 20 freight trains per day in each direction, approximately equivalent to one train per hour in each direction. The actual volume of freight trains operated is driven by the freight markets the Port serves which currently are mainly car imports / exports, containers and coal. Each train movement necessitates the operation of the level crossing lights and lowering of the barriers across the highway. The current average number of freight trains operated per day in each direction together with the current average level crossing phase time, will provide the total closure during the AM peak, inter peak and PM peak.
- 12.7.3 To assess the impact of the increased number of trains at the level crossing on the surrounding local roads, traffic count data have been collated at the following two locations (see Figure 12.8):
- Ashton Vale Road (to the immediate east of the level crossing); and
  - A3029 Ashton Gate Underpass (northbound City Centre bound traffic only, not the 'Weston' lane)

Figure 12.8. Ashton Vale Road Level Crossing, Ashton Gate, Bristol



- 12.7.4 The existing queue lengths either side of the level crossing during barrier down time, have been collated to provide a baseline position in respect of traffic impact.
- 12.7.5 The Ashton Containers pedestrian only crossing, which is approximately 200 meters south of the Ashton Vale Road level crossing, is planned to be closed by the Ashton Vale MetroBus project in 2016 by Bristol City Council. As a result the number of pedestrians using the Ashton Vale Road level crossing is expected to increase marginally.
- 12.7.6 Table 12.4 provides information about the current level crossing usage within the Portishead Branch Line (MetroWest Phase 1) project. These data provide an indication of traffic using the level crossings that could be affected by any potential closures resulting from the Project. Further data are being recorded in February and March 2015.

Table 12.4. Summary of Level Crossing Use

Level Crossing	Details of level crossing closures	Traffic flows AM peak two way flow	Traffic flows PM peak two way flow	Recorded max queue lengths
Ashton Gate	2 closures, both in the peak hours. Average close time 2:38 minutes	232	250	19 vehicles
West Town Gate, Portway LC	21 closures, including 6 in the peak hours. Average close time 2:18 minutes	264	248	13 vehicles

Table 12.4. Summary of Level Crossing Use

Level Crossing	Details of level crossing closures	Traffic flows AM peak two way flow	Traffic flows PM peak two way flow	Recorded max queue lengths
Gloucester Road, Avonmouth Station LC	9 closures, including 2 in the peak hours. Average close time 1:58 minutes	137	119	5 vehicles
King Road Avenue, Avonmouth Dock LC	9 closures, including 2 in the peak hours. Average close time 2.26 minutes	185	175	15 vehicles

*Source: from 2014 count supplied by NSC*

## 12.8 Recommendations for Further Survey Work

- 12.8.1 A Transport Assessment will be undertaken as part of the Environmental Impact Assessment. The local authority Highways Departments will be consulted about Scope of the Transport Assessment.

# Water Resources, Drainage and Flood Risk

## 13.1 Approach

- 13.1.1 The baseline conditions have focused upon aspects of the water environment relating to water quality and water quantity. This includes: surface waters, groundwater, water as a resource and its availability, drainage (including surface and foul drainage), and flood risk.
- 13.1.2 The study area for establishing the existing conditions of the water environment has been taken to include all surface water and groundwater features within 250m of the Portishead Branch Line (MetroWest Phase 1) Project. Flood mapping has been shown within 500m of the railway lines, although issues related to flooding will largely be covered by a separate Flood Risk Assessment ("FRA").
- 13.1.3 A desk-based study of baseline information regarding the site and surrounding area has been based on a review of the following sources:
- Environment Agency, December 2009. River Basin Management Plan ("RBMP"), Severn River Basin District 2009
  - [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk) "what's in your backyard" [http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=\\_e](http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e) (first accessed April 2014, checked February 2015)
  - <http://www.magic.gov.uk/>
  - <https://maps.google.co.uk/maps?hl=en&tab=wl>
  - <http://gridreferencefinder.com/#>
  - OS mapping
  - Landmark Envirocheck report (for the Portishead area)
  - British Geological Survey ("BGS") online mapping tool
  - Data provided by NSC
  - Site walkover of the disused railway between Portishead and Pill undertaken to identify the watercourses and to inform a FRA
  - Environment Agency ("EA") FRA Product 4 data
  - Local flood risk data provided by NSC
  - North Somerset Levels Internal Drainage Board ("IDB"): <http://www.nslidb.org.uk/>
  - MetroWest Phase 1, GRIP 2 Feasibility Report (URS, 2014).
- 13.1.4 A review of the baseline conditions for the Bedminster Down Relief Line, Severn Beach / Avonmouth Signalling, and the Bathampton Turnback has been undertaken based on the EA's website. The results are presented in Appendix B.
- 13.1.5 It is assumed that the data are a true and accurate representation of the water environment at the time it was obtained. Information provided by the EA on their "what's in your backyard" website is subject to periodic updates. It is likely that some data such as that collected by the EA for purposes of the Water Framework Directive<sup>23</sup> ("WFD") and flood mapping may be updated between the time of writing of this report and the time

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<sup>23</sup> [Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy](#)

the project is constructed and operational. It has been assumed that the conditions identified now will still be representative of the situation at the time of operation unless otherwise stated within the relevant section.

## 13.2 Regional Overview

- 13.2.1 MetroWest Phase 1 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 km<sup>2</sup> 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.
- 13.2.2 The Portishead Branch Line (MetroWest Phase 1) Project primarily runs along the coastal plain of the north Somerset coast and the left<sup>24</sup> (south) bank of the River Avon. The River Avon is tidal throughout the study area. The Bedminster Down Relief Line lies to the south of the River Avon in south Bristol, while Severn Beach / Avonmouth Signalling is located on the right hand bank of the River Avon and along the south-east shore of the Severn Estuary. Bathampton Turnback lies south of the River Avon and east of Bath.
- 13.2.3 Further information on the Bedminster, Avonmouth and Bathampton projects are provided in Appendix B, while the remainder of this chapter focuses on the Portishead Branch Line and Portbury Freight Line.

## 13.3 Portishead Branch Line (MetroWest Phase 1)

### Surface Water Features and Drainage

- 13.3.1 The main features of the surface water environment for the Portishead Branch Line and Portbury Freight Line comprise the River Avon, the Severn Estuary and several watercourses and drains which form tributaries of these water features (see Figures 13.1 to 13.5 in Appendix A). There is an extensive network of small drains and ditches, with a number of culverts under the existing railway track. Many of these old culverts, mostly brick lined, are in poor condition. Many of the ditches are also heavily overgrown and with the flat topography, the direction of the drainage may be unclear (from on-site observation). A lot of the watercourses and ponds are un-named and for the purposes of future assessment have been assigned a unique number or name. The water features within the study area are summarised in Table 13.1.

Table 13.1. Water Features within 250m of the Project

Watercourse Name	Description of location
<b>Portishead Banch Line</b>	
Portbury Ditch	Classified as Main River. After passing under the railway line it flows north eastwards in a straight channel for ~1km to enter the Severn Estuary, east of Portishead Pier.
PDT1	Enters Portbury Ditch on the left bank immediately downstream of where Portbury Ditch passes under the railway line.
Portishead Marina	The Marina in Portishead is located at its closest 175m north of the disused railway line. The Marina is not hydrologically connected to Portbury Ditch.
PDRDN1	

<sup>24</sup> The left and right hand banks of a river assume the respondent is facing in the downstream direction.

Table 13.1. Water Features within 250m of the Project

Watercourse Name	Description of location
PDRDS1	These two drains, run parallel to the railway between Portbury Ditch and eastward to Quays Avenue to the north and south respectively.
PDT2/D1	A tributary of Portbury Ditch, known as “The Cut” and classed as an Ordinary Watercourse. It is managed by North Somerset Levels IDB. The ditch takes drainage from the south, flowing northward along the eastern boundary of the Vale estate and then parallel to the south side of the railway line for approximately 275m, flowing westwards before passing in culvert under the railway. After the railway line it flows north westwards.
Pond 0	This is a drainage pond from the Vale Estate that discharges northward through a culvert into The Cut.
D2	A small drain running parallel to The Cut in a northerly direction terminates at the railway line. There is a short link to The Cut.
RDN2	Two drains, flowing parallel to and located north and south of the railway respectively, between Fennel Road and Sheepway.
RDS2	
SG1	Drain flowing southward (?) from Sheepway Gate Farm and under the railway in collapsing culvert.
D3	Between Fennel Road and Sheepway there is also a drain passing under the railway line, flowing northwards.
Pond 1	There are two attenuation ponds/ wetland areas within the new housing estate off Phoenix Way to the east of Fennel Road. One of the ponds is within 250m of the railway.
D4	At the south eastern end of the settlement of Sheepway a ditch (an ordinary watercourse) passes underneath the railway, flowing in a north easterly direction for a further 1km before discharging into the Drove Rhyne.
Pond 2	This pond lies approximately 20m north of the railway line and to the immediate east of where ditch D4 passes under the railway.
Pond 3	A small circular pond located around 145m east of Pond 2 and 10m north of the railway line. Ponds 2 and 3 are believed to be fishing lakes.
D5	Where Station Road from Sheepway crosses the railway line, there is a small section of drain located to the north of the line and east of the road. This drain is less than 10m from the railway.
Pond 4	A balancing pond located between the A369 Portbury Hundred and the M5 (with no drains to or from the pond).
D6	East of Elm Tree Park this section of drain runs parallel and south of the railway, on the northern side of the A369 for approximately 300m.
D7	A tributary of D6.
D8	A tributary of D6.



Table 13.1. Water Features within 250m of the Project

Watercourse Name	Description of location
Pond 5	A small pond located approximately 15m north of the railway line adjacent to D6.
D9	A small circular drain to the immediate east of Pond 5 which discharges into the pond.
Drove Rhyne	The Drove Rhyne flows parallel to the railway line between the road within the Portbury Dock area called The Drove and Royal Portbury Dock Road, for a length of around 600m.
D10	Two drains pass under the railway line and beneath the car park to the immediate north to drain to the Drove Rhyne where the Drove Rhyne runs parallel to the railway line.
D11	
D12	To the immediate east of Royal Portbury Dock Road this watercourse crosses under the railway and the road and flows north westwards into Drove Rhyne.
Pond 6	Adjacent to ditch D12 on the northern side of the railway.
Pond 7	A rectangular shaped pond to the south of the railway within a field.
D13	Located to the immediate east of where Marsh Lane crosses the railway line.
Easton-in-Gordano stream	The stream, classed as an Ordinary Watercourse though and managed by the EA (so this may be considered as a Main River), flows from the south.
D14	Located where the M5 crosses the railway line.
Pond 8	Associated with the western ditch (D14) is a small pond, which is the source of the ditch.
Pond 9	To the west of where the disused railway line joins the Portbury Freight Line there are two large ponds. The first is located approximately 55m north of the disused section of railway line and the second north of this and 90m north of the disused railway line.
Pond 10	
D15	Runs parallel to the western side of the Portbury Freight Line.
River Avon	Located to the north of the railway line and within 250m between Ham Green and Bower Ashton.
Markham Brook	In culvert through Victoria Park in Pill and enters Crockerne Pill.
Chapel Pill	Flows from Ham Green to Chapel Pill Farm.
	<b>Portbury Freight Line</b>
WC1	Originates from Paradise Bottom in Leigh Woods.
Longmoor Brook	Located immediately south of the Police Dog Training Centre.
	<b>(Part of) Portishead Branch Line</b>
Ashton Brook	Located near the junction of Ashton Vale Road and the A3029.

Table 13.1. Water Features within 250m of the Project

Watercourse Name	Description of location
Colliter's Brook	Located near Barons Court.

### *Surface Water Quality*

#### **Current Water Quality**

- 13.3.2 The WFD (2000/60/EC) introduced a new system for monitoring and classifying the quality of surface and ground waters which involves establishing the existing ecological and chemical status of each water body, setting environmental objectives and devising programmes of measures to meet those objectives. The WFD was transposed into English law in 2003 by the *Water Environment (Water Framework Directive) (England and Wales) Regulations (SI 3242/2003)* ("the WFD Regulations"). The WFD sets out a number of key objectives which are detailed in the Severn RBMP.
- 13.3.3 The WFD sets a target of aiming to achieve at least "good status" in all waters and also requires that ecological status or potential does not decline over time. It will be necessary to ensure that the Project does not lead to a deterioration in the current status of any waterbodies or hinder achievement of target status of the waterbodies by the required date. A separate WFD Assessment has been requested by the Environment Agency (their letter reference WX/2014/125769/01-L01 of 28 July 2014 which is appended to the Scoping Report).
- 13.3.4 Ecological status is measured on the scale: high, good, moderate, poor and bad. Chemical status is recorded as good, fail or, where priority pollutants are not discharged, as "does not require assessment". Whilst good ecological status is defined as a slight variation from undisturbed natural conditions in natural water bodies, artificial and heavily modified water bodies are unable to achieve natural conditions. Instead, they have a target to achieve good ecological 'potential', which recognises their important uses whilst making sure ecology is protected as far as possible. For a surface water body to be in overall good status or potential, both its ecological and chemical status must be at least good. Hydromorphology and hydrology are also used to assess the high status water bodies.
- 13.3.5 Surface waterbodies classified under the WFD have been identified using the Environment Agency's online mapping tool ("what's in your backyard"). WFD data from Annex B of the Severn RBMP is presented in Table 13.2 for all WFD surface waterbodies within the study area. Further information is available from <https://www.gov.uk/check-local-environmental-data>.

Table 13.2. Data on Surface Waters within 250m of the Project Classified under the WFD

Waterbody Name	Severn Lower	Bristol Avon	Portbury Ditch - source to confluence with Severn Estuary	Easton in Gordano stream	Markham Brook – source to confluence with River Avon (Bristol)	Un-named tributary – source to By Brook (Chapel Hill)	Colliter's Brook source to confluence with River Avon (Bristol New Cut)
Waterbody ID	GB5309054154 01	GB5309054154 05	GB1090520273 30	GB1090530274 70	GB1090530274 20	GB1090530274 60	GB1090530273 60
Waterbody category	Transitional	Transitional	River	River	River	River	River
Typology Description	Mixed, macro, extensive intertidal	Mixed, macro, extensive intertidal	Low, Small, Calcareous	Low, Extra Small, Calcareous	Low, Extra Small, Calcareous	Low, Extra Small, Calcareous	Low, Small, Calcareous
Hydromorphological Status	Heavily Modified (flood protection)	Heavily Modified (flood protection, navigation and quayline)	Artificial (land drainage)	Artificial (flood protection and land drainage)	Not Designated A/HMWB	Not Designated A/HMWB	Heavily Modified (flood protection, land drainage, urbanisation, water regulation (impoundment release))
Protected Area Designation	Bathing Water Directive, Freshwater Fish Directive,	Freshwater Fish Directive, Natura 2000 (Habitats)	Freshwater Fish Directive, Natura 2000 (Habitats)	Natura 2000 (Habitats and/or Birds Directive)	Not Designated	Nitrates Directive	Not Designated

Table 13.2. Data on Surface Waters within 250m of the Project Classified under the WFD

Waterbody Name	Severn Lower	Bristol Avon	Portbury Ditch - source to confluence with Severn Estuary	Easton in Gordano stream	Markham Brook – source to confluence with River Avon (Bristol)	Un-named tributary – source to By Brook (Chapel Hill)	Colliter's Brook source to confluence with River Avon (Bristol New Cut)
	Natura 2000 (Habitats and/or Birds Directive), Urban Waste Water Treatment Directive	and/or Birds Directive)	and/or Birds Directive)				
Current Ecological Quality	Moderate Potential (invertebrates and Dissolved Organic Nitrogen)	Good Potential	Moderate Potential (Dissolved oxygen- poor)	Good Potential	Moderate Status	Moderate Status	Moderate Potential
Current Chemical Quality	Good	Does Not Require Assessment	Does Not Require Assessment	Does Not Require Assessment	Does not Require Assessment	Does not Require Assessment	Does not Require Assessment
2015 Predicted Ecological Quality	Moderate Potential	Good Potential	Moderate Potential	Good Potential	Moderate Status	Moderate Status	Moderate Potential

Table 13.2. Data on Surface Waters within 250m of the Project Classified under the WFD

Waterbody Name	Severn Lower	Bristol Avon	Portbury Ditch - source to confluence with Severn Estuary	Easton in Gordano stream	Markham Brook – source to confluence with River Avon (Bristol)	Un-named tributary – source to By Brook (Chapel Hill)	Colliter's Brook source to confluence with River Avon (Bristol New Cut)
2015 Predicted Chemical Quality	Good	Does Not Require Assessment	Does Not Require Assessment	Does Not Require Assessment	Does Not Require Assessment	Does Not Require Assessment	Does Not Require Assessment
Status Objectives	Good Ecological Potential by 2027, Good Chemical Status by 2015	Good Ecological Potential by 2015	Good Ecological Potential by 2027	Good Ecological potential by 2015	Good Ecological Status by 2027	Good Ecological Status by 2027	Good Ecological potential by 2027

### Pollution incidents

- 13.3.6 The Environment Agency's online "What's in your backyard" mapping tool records one significant pollution incident within the study area located adjacent to the River Severn near Ashton Gate (NGR ST567721). The pollution incident occurred in June 2009 (Incident Number 685142) and had a significant impact upon water and a minor impact upon land.

### Environmental / Water Designations

- 13.3.7 The European Commission Nitrates Directive (91/676/EEC) requires areas of land that drain into water polluted by nitrates to be designated as a Nitrate Vulnerable Zone ("NVZ") in an attempt to reduce the level of nitrates in drinking water. Artificially elevated levels of nitrate are primarily attributable to farming practices especially runoff. The study area does not lie within a surface water or ground water NVZ.
- 13.3.8 Annex D (Protected Area Objectives) of the Severn RBMP provides a list of designated freshwater fish protected areas within the basin. In accordance with this register, Portbury Ditch is classed as cyprinid fishery with a compliance status of passing the imperative quality standards but failing the more stringent guideline standards.
- 13.3.9 Downstream of Pill, the River Avon forms part of the Severn Estuary SAC, SPA, Ramsar site and SSSI (see Section 5.3.1). These international and national designations for the River Avon represent additional sensitivity to water quality conditions. The project passes through three sites statutorily designated for the purpose of nature conservation - the Avon Gorge Woodlands SAC, Avon Gorge SSSI and Leigh Woods NNR - along the existing Portbury Freight Line between Pill and Ashton Gate. Ashton Court SSSI lies approximately 65m west of the Portbury Freight Line near Ashton Gate/A369 at its nearest location. While these sites are not water-dependent they are likely to include water features as part of their designations.
- 13.3.10 The project passes within 250m of a number Wildlife Sites ("WS") (non-statutory designated sites within North Somerset) and Sites of Nature Conservation Importance ("SNCI") (non-statutory designated sites within the City of Bristol). These are shown on the figures in Appendix C. Some of these sites are water-dependent.
- 13.3.11 Water Protection Zones ("WPZs") will be measures developed under the WFD to strengthen Environment Agency powers to address diffuse water pollution and hydro-morphological degradation that that will lead to failure of WFD objectives. A WPZ will be a defined geographical area in which the Environment Agency will have additional powers to protect water by using measures to manage or prohibit activities which cause or could cause damage or pollution of water. WPZs are currently being trialled in several locations in England, none of which are currently located within the study area.

### Water Environment Permitting

- 13.3.12 Abstraction licence data published on the Environment Agency website shows no abstraction licences within 250m of the project. However there are two groundwater abstractions within 1km of the project: the first is licensed to Siniat Ltd within Portbury Docks (off Marsh Lane), 825m north of the railway line and the second is licensed to Welcome Break Group Ltd located at the motorway service area at Junction 19 of the M5, approximately 450m south of the railway line.
- 13.3.13 Environment Agency data have been obtained for discharge consents located between Portishead and Pill. These data show a number of extant discharge consents within 250m of the railway line and these are presented in Table 13.3.

Table 13.3. Discharge Consents between Portishead and Pill

Licensed holder	Grid reference	Discharge type	Receiving watercourse	Distance and direction from railway line
Wessex Water	ST 47194 76473	Sewage discharge from Portishead Town Pumping Station (storm sewer overflow)	Portbury Ditch	Located within the site and possible location for railway station
		Harbour Road combined/storm sewer overflow	Portbury Ditch	Located within the site and possible location for railway station
Mustad Manufacturing	ST 47110 76352	Sewage - final and treated	Portbury Ditch (left bank)	150m upstream of where Portbury Ditch crosses the railway line
Wessex Water	ST 47616 76398	Sewage discharge from Portishead Town Pumping Station (storm sewer overflow)	Tributary of Portbury Ditch	~65m downstream of where the tributary crosses the railway line; the Pumping station is located on the left bank

## Groundwater

- 13.3.14 The geology and soils underlying the project are described in Section 6.3.1. As groundwater within the underlying strata may represent an important water resource and impact upon surface waters, it is covered in this section in relation to groundwater quality and quantity and the WFD.
- 13.3.15 The Mercia Mudstone is classified as a Secondary B aquifer characterised by 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.
- 13.3.16 The Carboniferous sediments are classified as a Principal aquifer; these are layers of rock having high intergranular and/or fracture permeability and can provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
- 13.3.17 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.
- 13.3.18 Where they occur, the superficial deposits are classified as Secondary A and Secondary undifferentiated. Secondary A aquifers are 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.
- 13.3.19 There are no groundwater Source Protection Zones ("SPZ") within 250m of the Project.
- 13.3.20 The Severn RBMP classifies groundwater bodies within the Severn River Basin District ("RBD"). Each groundwater body has quantitative and chemical components representing its overall status. The study area lies within three groundwater bodies, the status of which are presented in Table 13.4.



Table 13.4. Status of Groundwater Quality within 250m of the Project

Water Body ID	GB40902G805300	GB40901G806800	GB40902G804800
Water Body Name	Portishead Mercia Mudstone	Carboniferous Limestone (Bristol)	Bristol Triassic
Current Quantitative Quality	Good	Good	Good
Current Chemical Quality	Good	Good	Poor
Upward Chemical Trend	No	No	Yes
2015 Predicted Quantitative Quality	Good	Good	Good
2015 Predicted Chemical Quality	Good	Good	Poor
Overall Risk	Probably At Risk	Probably At Risk	At Risk
Protected Area	Yes - Drinking Water Protected Area	Yes- Drinking Water Protected Area	Yes- Drinking Water Protected Area

## Water Resources Availability

- 13.3.21 The *Bristol Avon and North Somerset Streams WFD Management Area Abstraction Licensing Strategy* published in December 2012 by the Environment Agency supersedes the Catchment Abstraction Management Strategies ("CAMS") for these areas and provides information on where water is available and the reliability of the resource. The Environment Agency has confirmed (letter reference WX/2014/125769/01-L01, dated 28 July 2014 and appended to the Scoping Report) that following an assessment of local water resources, there are no issues regarding water resources availability along the proposed route.

## Water Supply and Foul Drainage Assets

- 13.3.22 Bristol Water plc provides public water supplies and Wessex Water is the sewerage undertaker for the area. During an initial site visit, a temporary sewage pump was observed at "Hundred Portbury" Sewage Pumping Station, adjacent to the disused railway, north of Portbury. It is not clear why this was in place, although it is possible that the permanent pumps were undergoing repair. Whilst the proposed Project stations at Portishead and Pill are the only DCO components where sewage will be generated, Wessex Water will be consulted during the design phase to ensure that the existing sewerage system has sufficient capacity to accommodate additional flow.

## Flood Risk

- 13.3.23 Flood risk management in the area is undertaken by the Environment Agency, North Somerset Levels IDB, NSC and BCC. Two consultation meetings have been held with the Environment Agency and other stakeholders (May 2014 and December 2014) to establish

flood risk assessment requirements for the project and available data to support the assessment. Information regarding the consultation is provided in the Scoping Report.

13.3.24 On the basis of readily available information, baseline conditions are described as follows.

- The disused section of the Portishead Branch Line between Portishead and Pill lies partly within the fluvial/tidal floodplain (see Figures 13.6 to 13.10 in Appendix A). The coastline in the vicinity of the project is largely made up of naturally high ground forming a natural tidal flood defence. However, the Portbury Wharf coastline is lower and provides a standard of protection of approximately 2 to 5 years (as reported in NSC's Level 2 Strategic Flood Risk Assessment - "SFRA"). A defence line further inland protects the disused railway from tidal flooding with a standard of protection of approximately 100 years (NSC Level 2 SFRA).
- The Environment Agency Flood Map for Planning shows the Portishead Branch Line between Portishead and Junction 19 of the M5 to intersect Flood Zones 2 and defended Flood Zone 3. Between Junction 19 of the M5 and Pill the railway corridor intersects undefended Flood Zone 3. The NSC Level 2 SFRA only simulates tidal flooding in this area and so does not refine fluvial flood risk mapping. It is not clear from available information whether this is Flood Zone 3a or 3b. This will be established by examining available EA/BCC model data.
- The EA Flood Map for Planning also shows the Portishead Branch Line corridor intersects Flood Zone 3 where it crosses Markham Brook in Pill, the watercourse near Ham Green, and the Portbury Freight Line potentially at several locations where the railway corridor is adjacent to the River Avon. For these areas the Flood Zone definition will be clarified by reviewing available EA/BCC hydraulic model results and undertaking further hydraulic modelling if considered necessary. A section of the Portbury Freight Line to Parson Street lies within Flood Zones 2 and 3 within the floodplain of Ashton Brook and Colliter's Brook.
- The Planning Policy Guidance classifies development types according to Flood Risk Vulnerability. The Flood Risk Vulnerability classifications considered appropriate in Flood Zone 3b are "Essential Infrastructure" (with the Exception Test required) and "Water Compatible Development". The NPPF Flood Risk Vulnerability classification to be applied to the project will be "Less Vulnerable". Following refinement of the definition of Flood Zones along the rail corridor, if parts of the rail corridor are considered to be within Flood Zone 3b it will be necessary to provide justification for the proposed development within Flood Zone 3b.
- High flood/tide levels in the River Avon may exacerbate fluvial flood risk by tide-locking of watercourses draining to the River Avon and to the coast.
- The Environment Agency's Surface Water Flood Map and NSC's North Somerset 2012 Flood Investigations (NSC, 2013), indicate there are localised areas of surface water flood risk in the vicinity of the disused railway. There may be opportunities to alleviate some of these as part of the design.
- The Environment Agency Groundwater Flooding Susceptibility Map shows areas for which groundwater flooding potentially occurs. However, areas shown at risk on the map may not actually experience groundwater flooding and so the map should be supported by anecdotal evidence. Areas shown to be susceptible to groundwater flooding include: Portishead; the area between Portbury and Sheepway; Royal Portbury Dock Road north of the disused railway alignment; the area in the vicinity of the intersection of the railway corridor with the M5; Ashton Gate, and Ashton Vale.

13.3.25 Flood risk is projected to increase in the future as a result of sea level rise and climate change. The dominant increase in flood risk for the project is considered to be tidal flood risk resulting from increased sea levels. However, the Draft Severn Estuary Shoreline

Management Plan Review ("SMP2") considers tide defences in the vicinity of the project will be improved in the future to keep pace with increased tidal flood risk. Fluvial and surface water flood risk are expected to increase as a result of increased extreme rainfall depths, with increased fluvial and surface water flooding extents. Increased sea levels will increase the risk of tide locking of inland watercourses and drainage systems.

## 13.4 Recommendations for Further Survey Work

- 13.4.1 It has not been considered necessary to undertake any site specific surveys to establish the baseline conditions because the publically available information has been considered adequate to support an impact assessment. Further work will be undertaken to inform the flood risk assessment, this will include ongoing consultation to be undertaken with the Environment Agency, North Somerset Levels IDB and NSC as part of the scoping process and EIA. Hydraulic modelling is likely to be required to inform the flood risk assessment and for this topographic survey of key waterways/ditches would be required, for example for Drove Rhyne, which will be undertaken as the project progresses through the engineering design stages.



# Glossary

Term	Meaning
Aggregates	A broad category of coarse particulate material used in construction, including sand, gravel, crushed stone, slag, recycled concrete and geosynthetic aggregates. Aggregates are a component of composite materials such as concrete and asphalt concrete; the aggregate serves as reinforcement to add strength to the overall composite material.
Air Quality Management Area	Local planning authorities are required to designate Air Quality Management Areas (AQMA) where there is a risk that the air quality objectives will not be met by the deadlines determined in the legislation and prepare a Local Air Quality Management Plan to improve air quality.
Air Quality Strategy	Contains standards, objectives and measures for improving ambient air quality.
Alluvium	Unconsolidated clay, silt, and sand deposited by freshwater typically in the lower reaches of a river valley, often producing fertile soil.
Annual Average Daily Traffic	The total volume of vehicle traffic on a motorway or road for a year divided by 365 days.
Annual Survey of Hours and Earnings	Annual Survey of Hours and Earnings provides data on levels, distribution and make-up of earnings and hours worked for UK employees by sex and full-time/part-time status in all industries and occupations.
Approximated Social Grade	The approximated social grade is a socio-economic classification system produced by the Office for National Statistics (“ONS”), based on six categories (A, B, C1, C2, D and E). It applies to every Household Reference Persons (“HRP”) aged 16 to 64.
Asbestos	A naturally occurring mineral that is hazardous to human health.
Assessment	A process by which information about effects of a proposed plan, project or intervention is collected, assessed and used to inform decision-making.
Ballast	Track ballast forms the trackbed upon which railway sleepers are laid. It is used to bear the load from the railroad sleepers, to facilitate drainage of water, and also to keep down vegetation that might interfere with the track structure. This also serves to hold the track in place as the trains roll by. It is typically made of crushed stone.

Term	Meaning
Best Practicable Means	Best practicable means refers to the permitted use of a methodology, approach or equipment having regard to the current state of technical knowledge, the local conditions and circumstances, the financial implications, the means to be employed, compatibility with any duty imposed by law, and compatible with safety and safe working conditions.
Best Practice	A method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark.
Biodiversity	The variety of life forms, the different plants animals and micro-organisms, the genes they contain and the ecosystems they form. Considered at three levels: genetic, species and ecosystem diversity.
Biodiversity Action Plan	Plans that provide actions for targets for the conservation and enhancement of endangered and/or declining species and habitats. BAPs are prepared at different geographical scales – national, regional and local areas - or for the interests of the overseeing organisation such as Highways England’s BAP for their land holdings.
Bridleway	A right of way that the general public can travel on foot and on horse.
Bristol Central Area Plan	The Bristol Central Area Plan is one of the suite of documents that make up the Bristol Local Plan and sets out policies for development in central Bristol.
Business Register and Employment Survey	Business Register and Employment Survey (“BRES”) is the official source of employee and employment estimates by detailed geography and industry. The survey collects employment information from businesses across the whole of the UK economy for each site that they operate. This allows the ONS to produce employee and employment estimates by detailed geography and industry split by full-time/part-time workers and whether the business is public/private.
Byway	A track or path that is a public highway.
Catchment	A drainage/basin area within which precipitation drains into a river system and eventually into the sea; or the population region which is served by a city, town, or village.
Civic Amenity Site	A facility where the public can dispose of household waste and also often containing recycling points. Civic amenity sites are run by the local authority in a given area.
Claimant Count Register	The Claimant Count Register captures those individuals claiming Job Seekers Allowance (“JSA”) at a point in time. This register provides an indicator or proxy for workforce trends.
Climate Change	A large-scale, long-term shift in the planet's weather patterns or average temperatures.

Term	Meaning
Clinical Waste	Wastes arising from medical practice including instruments, swabs and dressing, and human and animal tissue, body fluids, excretions, drugs, etc.
Commercial Waste	Waste arising from premises that are used wholly or mainly for trade, business, sport, recreation or entertainment, excluding household and industrial waste (as defined in Environmental Protection Act 1990, Section 75).
Compensation	Measures taken to offset or compensate for residual adverse effects that cannot be mitigated at the affected site, or for which mitigation cannot entirely be eliminated.
Conservation Areas	An area designated by local planning authorities for its architectural value and subject to statutory protection under the Planning Act 1990. Development within such areas, and affecting the settings of them, are subject to stringent planning controls.
Construction Environmental Management Plan	A plan developed prior to any construction works commence on site, the primary purpose which is to guide environmental management of implementation of the project, as required by the Overseeing Organisation.
Consultation	A process by which regulatory authorities, statutory and non-statutory bodies, and the general public are approached for information and opinions regarding a development proposal.
Consultation Draft (Planning context)	A Consultation Draft is often the name referred to a first or second draft of a planning document published for consultation.
Core Strategy (Planning context)	A Core Strategy is one of a suite of documents that makes up part of the Local Plan and sets out the overall approach for planning development in an authority
Cultural Heritage	Encompasses the qualities and attributes of places that have aesthetic, historic, scientific or social value for past, present or future generations. The cultural heritage resource includes archaeology, historic structures, historic landscapes (including designed parks and gardens) and historic townscapes. This resource can include environmental evidence such as palaeo-environmental material.
Cultural Heritage Designations	Notable sites, areas, buildings or structures protected by planning or other laws. Can be applied at Local, Regional and National and International level. This can include scheduled monuments, listed buildings, locally listed buildings, conservation areas, registered battlefields, registered historic parks and gardens and world heritage sites.
Culvert	A covered channel or pipe designed to prevent the obstruction of a watercourse or drainage path by an artificial construction.
Cumulative Impacts	Combined impacts resulting from multiple related sources.

Term	Meaning
Defence of Britain assets	A cultural heritage asset, such as an archaeological site, which was created to defend the country from foreign invasion.
Definitive Map	Is a legal document maintained by local authorities that records where right of ways are located.
Delivery Strategy (Planning context)	Identifies the means of delivering a Council’s vision, objectives and spatial strategy for different parts of the authority.
Design Manual for Roads and Bridges	Design Manual for Roads and Bridges (DMRB) is a series of documents that provide standards, advice notes and other guidance relating to the design, assessment and operation of strategic roads in the UK.
Designations	Notable sites, areas, buildings or structures protected by planning or other laws. Designations can be applied at the international, national, regional and local level.
Desk-Based Study/ Assessment/ Exercise	A review of secondary information/resources i.e. studies of historical maps and written text.
Determination Date (Planning context)	Date given for when a decision will be made on a planning application.
Development Consent Order	This is the means of obtaining permission for developments, such as energy, transport, water and waste schemes that are categorised as Nationally Significant Infrastructure Projects under the Planning Act 2008.
Economic Activity	Economic activity is an indicator of labour market participation, capturing all individuals who are either in employment or unemployed but actively seeking employment.
Effect	Term used to express the consequence of an impact (expressed as the ‘significance of effect’), which is determined by correlating the magnitude of the impact to the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria. For example, land clearing during construction results in habitat loss (impact), the effect of which is the significance of the habitat loss on the ecological resource.
Embodied Carbon	The embodied carbon of a building is the CO <sub>2</sub> produced during the manufacture of materials, their transport and assembly on site, maintenance and replacement, disassembly and decomposition.
Emerging Plans (Planning context)	Draft documents that have not been formally adopted.
Enhancement	A measure that is over and above what is required to mitigate the adverse effects of a project.



Term	Meaning
Enterprise Zone	An area in which government incentives such as tax concessions and simplified planning permissions are offered to encourage business investment.
Environment	Our physical surroundings, including land, air and water.
Environmental Assessment	A method and a process by which information about environmental effects is collected, assessed and used to inform decision-making. Assessment processes include Strategic Environmental Assessment, Assessment of Implications on European Sites and environmental impact assessment.
Environmental Impact Assessment	A statutory process by which certain planned projects must be assessed through an environmental impact assessment (EIA) before a formal decision to proceed can be made. Involves the collection and consideration of environmental information, which fulfils the assessment requirements of Directive 85/337/EEC (as amended), including the publication of an Environmental Statement.
Environmental Scoping Report	A report documenting the process of identifying the content and extent of the Environmental Information to be submitted to the Competent Authority under the EIA procedure.
Environmental Statement	A document produced to support a planning application for development that is subject to Environmental Impact Assessment, which sets out the likely impacts on the environment arising from the proposed development.
Equalities Impact Assessment	A process designed to ensure that a policy, project or scheme does not discriminate against any disadvantaged or vulnerable people.
Examination (Planning context)	This is the process [in the context of planning] through which a local authority's development plan is considered by an independent planning inspector, appointed by the Secretary of State, and involves testing the document to see if it is 'sound' and meets the requirements of the relevant legislation. Soundness is tested by considering whether the document is justified, effective and consistent with national policy.
Flood Zone 2	Medium probability flood zone with land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-0.1%) in a year.
Flood Zone 3a	High probability flood zone with land assessed having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from sea (>0.5%) in any year.
Flood Zone 3b	Functional floodplain with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood.

Term	Meaning
Forest of Avon	The Forest of Avon is one of 12 Community Forests in England. The initiative intends to form an asset for local people to enjoy and benefit from, as well as off-setting climate change.
GBATS	GBATS (Greater Bristol Area Transport Study model) is a strategic transport demand model of the greater Bristol area and includes both highways and public transport.
Geology	The scientific study of the origin, history, and structure of the earth.
Geological Strata	In geology and related fields, a stratum (plural: strata) is a layer of sedimentary rock or soil with internally consistent characteristics that distinguish it from other layers.
Green Belt	This is a policy and designation designed to prevent urban sprawl by maintaining the openness of land and preventing inappropriate development that would conflict with this purpose, unless very special circumstances can be demonstrated that the benefits from development would outweigh the harm caused.
Greenhouse Effect	Natural process by which the atmosphere traps some of the sun's energy, warming the earth enough to support life.
Greenhouse Gas Emissions	Emissions of gases which trap heat in the atmosphere. The primary greenhouse gases in the Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone.
Green Infrastructure	A network of natural and semi-natural features that provide an ecological framework for social, economic and environmental health.
GRIP	Governance for Railway Investment Projects ("GRIP") is the Network Rail process to manage and control projects which enhance or renew the national rail network.
Hazardous Waste	Waste is generally considered hazardous if it (or the material or substances it contains) are harmful to humans or the environment. Hazardous wastes are wastes that are toxic, ignitable, reactive or corrosive.
[a] Hearing (Planning context)	[In the context of planning] A hearing is part of the Examination process that a local authority's development plan goes through and involves an independently appointed planning inspector inquiring into and leading a discussion with the local planning authority and other invited participants on issues affecting the plan.
Heavy Metals	Refers to any metallic chemical element that has a relatively high density and is toxic or poisonous at low concentrations. Examples of heavy metals include mercury, cadmium, arsenic, chromium, thallium and lead.

Term	Meaning
Historic Environment Record	A database developed and maintained by the local planning authorities to locate and detail archaeological sites, historic structures, artefact find spots and historic landscape areas. The data are based on a variety of sources, including, but not exclusive to, historic maps, historic archaeological work, documentary research and chance finds.
Historic Landscape Characterisation	Historic Landscape Characterisation (“HLC”) is a programme initiated by English Heritage to increase understanding of the wider designed landscape, beyond that of the planned parkland of the country estate. The HLC programme does not restrict itself to historic buildings, ornamental landscapes and purely "archaeological" features, but embraces other man made features such as hedges and managed woodland, historic field patterns, managed watercourses and areas of modern development. It is a useful tool for historical environment research and informs planning decisions.
Household Waste	Waste from domestic properties including waste from caravans, residential homes and premises forming part of an educational establishment and part of a hospital or nursing home.
Husbandry	The care, cultivation, and breeding of crops and animals.
Hydrocarbons	Compounds that contain only carbon atoms and hydrogen atoms obtained from crude oil by fractional distillation.
Hydrogeology	The branch of geology that deals with the occurrence, distribution, and effect of ground water.
Impact	Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact).
[Highway] Improvement	The doing of any act under powers conferred by Part V of the Highways Act 1980 (as amended).
Indices of Multiple Deprivation	The Index of Multiple Deprivation (“IMD”) is a government-run qualitative study into various areas of deprivation and disadvantage, based on criteria relating to Income, employment, health deprivation and disability, education skills and training, barriers to housing and services, crime and living environment.
Industrial Waste	Waste from a factory (within the meaning of the Factories Act 1961) or from any premises used for, or in connection with provision of public transport; public supply of gas, water, electricity or sewerage services; or provision to the public of postal or communication services.
Inert Waste	Waste that does not undergo any significant physical, chemical or biological transformations; also it does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health.

Term	Meaning
Infrastructure	Refers to the fundamental facilities and systems serving a country, city, or area, including the services and facilities necessary for its economy to function. It typically characterises technical structures such as roads, railways, bridges, tunnels, water supply, sewers, electrical grids and telecommunications etc.
Infrastructure Planning Commission	The Infrastructure Planning Commission was a non-departmental public body responsible for examining proposed nationally significant infrastructure projects until its functions were transferred to the Planning Inspectorate in 2012.
JUNCTIONS (8 & 9)	JUNCTIONS is software that assesses the design and operation of junctions and roundabouts.
LA10,T	Acoustic nomenclature indicating that the value is exceeded for 10% of the period (T) of interest. This is normally used to describe road traffic noise.
LA90,T	Acoustic nomenclature indicating that the value is exceeded for 90% of the period (T) of interest. This is normally used to describe the background noise level.
LAeq,T	Acoustic nomenclature indicating that a value is expressed in terms of the Equivalent Continuous Sound Pressure Level, the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
LAmax	The maximum sound level is the highest time-weighted sound level measured during a period.
Landscape	Human perception of the land contained by knowledge, cultural associations and identity with a place. Guidelines for Landscape and Visual Impact Assessment: Third Edition define landscape as “an area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors”.
Landscape Character	The distinct and recognisable pattern of elements that occur consistently in a particular type of landscape, and how this is perceived by people. Character reflects combinations of geology, landform, soils, vegetation, land use and settlement pattern, inferring a sense of place.
Landscape Character Area	Landscape Character Areas are broadly similar areas of land defined by unique combination of landscape, biodiversity, geodiversity and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries.
LINSIG	LINSIG is software that assesses the design and operation of signal controlled junctions.

Term	Meaning
Listed Building	A structure which is protected under the Planning Act 1990 to protect its architectural and historic interest. The levels of statutory protection are set at Grade I, Grade II* and Grade II. Historic England directly handles applications and inquiries for Grade I and II* listed structures, while local planning authorities handle planning inquiries for Grade II designations.
Loamy	Soil composed of a mixture of sand, clay, silt, and organic matter.
Local Air Quality Management	All local authorities regularly review and assess air quality in their areas to determine whether or not air quality objectives are being achieved.
Local Green Space	A designation used to provide special protection against development for green areas of particular importance to local communities.
Locally Listed Buildings	Otherwise known as a ‘local list’ or ‘local register’ these are buildings, or structures, designated by the local planning authority as having some architectural, aesthetic or historic merit. They are not statutorily protected, but often have protection provided through local planning policy.
Local Nature Reserve	Places with wildlife or geological features that are of special interest locally.
Local Plan	A document which sets planning policies in a local authority area.
Local Transport Plan	A strategic document published by local authorities or a group of local authorities to maintain and improve transport in their respective areas.
Main Modifications	Changes requested by an independently appointed planning inspector, as part of the development plan examination process, that materially affect the documents policies in order to make a submitted Local Plan sound and legally compliant.
Main River	Defined in the Water Resources Act 1991 [section 113] as a watercourse shown as such on a main river map. Main river maps are held by Defra.
Major Development	Definition as set out in the Town and Country Planning (Development Management Procedure) (England) Order 2010, meaning development which involves one or more of the following: the winning and working of minerals or the use of land for mineral-working deposits; waste development; the provision of dwelling houses where the number of to be provided is 10 or more; or the development is to be carried out on a site having an area of 0.5 hectares or more; the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or development carried out on a site having an area of 1 hectare or more.

Term	Meaning
Material Considerations	This is a process in planning law in which the decision maker when assessing an application for development must consider in deciding the outcome of an application.
Mitigation	Measures intended to avoid, reduce, remedy and compensate for significant adverse environmental effects.
Nationally Significant Infrastructure Project	Major infrastructure developments in England and Wales identified in the Planning Act 2008, which require a type of consent known as a development consent order and are granted permission by the Secretary of State.
National Forest Inventory Woodland	A Forestry Commission record of the woodlands and forests of Great Britain.
National Monuments Record	The body within Historic England which develops and maintains the national database of historic environment assets, and the acquisition and conservation of historic documents.
National Nature Reserve	National nature reserves are designated by Natural England as key places for wildlife and natural features in England.
National Networks National Policy Statement	Sets out the need and government policies for nationally significant infrastructure rail and road projects for England.
National Planning Policy Framework	The National Planning Policy Framework set out the Government’s planning policies for England. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
National Planning Practice Guidance	A web based resource intended to assist practioners which brings together planning practice guidance in England.
National Policy Statements	National Policy Statements are produced by Government and include the Government’s objectives for the development of nationally significant infrastructure projects in a particular sector. They give reasons for the policy set out in the statement and include an explanation of how the policy takes account of Government policy relating to the mitigation of, and adaptation to, climate change.
Natural Area	Biogeographic zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England.
Natural resources (or material resources)	Stocks of materials that exist in the natural environment that are both scarce and economically useful in production or consumption, either in their raw state or after a minimal amount of processing (e.g. aggregates).

Term	Meaning
Neighbourhood Development Plans	These are local community plans which sit within the framework of a local authority's Local Plan and provide communities with the power to set the priorities for local development in their area.
Nitrate Vulnerable Zone	A Nitrate Vulnerable Zone (NVZ) is designated where surface or groundwater exceeds prescribed water quality standard for nitrate.
Nomis	Nomis is a service offered by the Office for National Statistics (“ONS”), providing free access to the most detailed and up-to-date UK labour market statistics from official sources.
Non-Biodegradable	A substance or chemical that is non-biodegradable cannot be changed to a harmless natural state by the action of bacteria, and may therefore damage the environment.
Non-Hazardous Waste	Waste that is not classified as hazardous waste or inert waste.
Non Motorised User	A collective term to describe pedestrians, cyclists and equestrians.
Non-Registered Park and Garden	Also known as Unregistered Park and Garden, is land designated by North Somerset, which is not on the Registered Park and Garden register, but is deemed to have local value.
Non-Statutory Designations	Sites and areas designated under the local planning system but which do not have statutory protection.
North Somerset Replacement Local Plan	This is North Somerset’s adopted Local Plan which includes detailed policies for regulating development across North Somerset where they have been saved by a Secretary of State Direction. Some policies have been replaced by the adopted Core Strategy.
Occupational Structure	The occupational structure is informed by responses to the 2011 Census, and provides an aggregate distribution of occupations in society, classified according to skill level, economic function, or social status.
Ordinary Watercourse	Defined in the Flood and Water Management Act 2010 as “a watercourse that does not form part of a main river”
Ordnance Survey	Mapping agency of the British Isles.

Term	Meaning
Permitted Development Rights	The Town and Country Planning (General Permitted Development) (England) Order 2015 consolidates, for England, the Town and Country Planning (General Permitted Development) Order 1995 and the 22 instruments that have amended the 1995 Order. Under this Order, the Secretary of State grants planning permission for different types of development in specified circumstances. These permissions are usually subject to certain limitations and conditions, including in some cases a condition that a developer applies to a local planning authority for a determination as to whether their prior approval is required for certain impacts before the development can begin. The permissions granted by this Order are commonly known as permitted development rights. The Order also sets out the circumstances and the procedure (in Article 4 and Schedule 3) where a local planning authority may remove specified national permitted development rights in part of its area.
Phase 1 Habitat Survey	Recognised standard methodology for collating information on the habitat structure of a particular site.
PM <sub>10</sub>	Particulate matter smaller than about 10 micrometers.
Pollution	An increase of matter or energy to a level considered harmful to living organisms or their environment.
Planning Inspectorate	The Planning Inspectorate is an executive agency of the Department for Communities and Local Government (“DCLG”) responsible for deciding on final outcomes of planning appeals, public examination of local development plans and planning applications for nationally significant infrastructure projects.
Policy	A policy is a deliberate system of principles to guide decisions and achieve rational outcomes. It provides a statement of intent and is implemented as a procedure or protocol.



Term	Meaning
Principal and Secondary Aquifers and Unproductive strata	<p>These are designations that the Environment Agency use to identify water bearing strata from which groundwater can be extracted and reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.</p> <p>The designations may be applied both to bedrock (solid consolidated strata, such as sandstone and limestone) or to unconsolidated drift (or superficial) deposits (such as sands and gravels).</p> <p>Principal Aquifers: are layers of bedrock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.</p> <p>Secondary Aquifers: include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:</p> <p>Secondary A: 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.</p> <p>Secondary B: 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.</p> <p>Unproductive Strata: These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.</p>
Principal Superficial Aquifer	<p>These are layers of drift (superficial) deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.</p>
Publication (Planning context)	<p>This is a stage in the process and a version of a Local Plan referred to when a local authority considers the plan is ready for examination. A plan at this stage will undergo its final consultation before being submitted to the Planning Inspectorate for examination.</p>
Public Rights of Way	<p>Public rights of way are paths on which the public have a legally protected right to pass and re-pass.</p>
Ramsar site	<p>Wetlands of international importance designated under the Ramsar Convention.</p>
RDM	<p>Rail Demand Model (“RDM”) is a demand transport model for the rail network used in the West of England area.</p>
Receptor	<p>A defined individual environmental feature usually associated with population, fauna and flora that has potential to be affected by a project.</p>

Term	Meaning
Registered Battlefields	Historic England's Register of Historic Battlefields identifies 46 important English battlefields. Its purpose is to offer them protection through the planning system. The register does not afford them statutory legal protection.
Registered Historic Parks and Gardens	The Historic England Register of Historic Parks and Gardens of special historic interest in England currently identifies, nationally, over 1,600 sites assessed to be of particular significance. The sites are graded I, II* and II, I and are subject to protection within planning policies.
Regulatory Authority	A public authority or government agency responsible for exercising autonomous authority over some area of human activity in a regulatory or supervisory capacity.
Residential Employment Profile	Based on the 2011 Census, the residential employment profile provides employee and employment estimates by detailed geography and industry for the residents of an area.
Resource	A defined but generally collective environmental feature usually associated with soil, water, air, climatic factors, landscape, material assets, including the architectural and archaeological heritage that has potential to be affected by a project.
Restricted Byway	Is a track or path that is a public highway but with specified restrictions on vehicles.
Saved Policies	These are policies in an adopted Local Plan which have been saved by a Secretary of State Direction and have not yet been replaced by new Local Plan policies.
Scheduled Monuments	Scheduling is the designation evolved specifically for sites of an archaeological character. It is the UK's oldest form of heritage protection, dating from the 1882 Ancient Monuments Act. More recently, scheduling derives its authority from the Ancient Monuments and Archaeological Areas Act of 1979. Scheduling is the selection of nationally important archaeological sites. Where development affects the physical integrity of a SM, government Consent would be a requirement.
Scenario	A defined situation or series of events.
Scoping	The process of identifying the issues to be addressed a study. Environmental scoping defines the brief for the environmental impact assessment of a proposed development. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered to be not significant.
Secretary of State	A Cabinet Minister in charge of a Government Department.
Secretary of State Direction	A mechanism through which a Secretary of State can exercise their power.

Term	Meaning
Sensitivity	The extent to which the receiving environment can accept and accommodate change without experiencing adverse effects.
Site Allocations	Site specific proposals for new development which ensure that sufficient land is available and in appropriate locations to meet the growth targets set out in the Local Plan.
Site Allocations and Development Management Policies	A document which identifies site specific proposals for new development and the policies required to manage and deliver development. In this case it refer to a document prepared by Bristol City Council.
Sites and Policies Plan	A document which identifies site specific proposals for new development and the policies required to manage and deliver development. In this case it refers to a document prepared by North Somerset Council
Site of Nature Conservation Interest	A place designated by local authorities in England of substantive local nature conservation and value.
Site of Special Scientific Interest	A conservation designation denoting a protected area in the United Kingdom. SSSIs are the basic building block of site-based nature conservation legislation and most other legal nature/geological conservation designations in Great Britain are based upon them.
Source Protection Zone	The Environment Agency has defined Source Protection Zones (SPZs) around some 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk.
Source Protection Zones – Inner Zone	Defined as the 50 day travel time from any point below the water table to the source. This source has a minimum radius of 50 metres.
Source Protection Zones – Outer Zone	Defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZs as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.
Spatial Strategy	This is a strategy included within a Local Plan or Core Strategy which details how a local authority intends to distribute and manage development and achieve the aspirations set out in its Spatial Vision
Spatial Vision	This details a local authority's aspirations and intentions for future development over a plan's life time.
Special Area of Conservation	Protected sites designated under the EC Habitats Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).

Term	Meaning
Special Protection Area	Protected sites designated under the EC Directive on the Conservation of Wild Birds. Under the Directive, Member States have a duty to safeguard the habitats of migratory birds and certain particularly threatened birds.
Statutory designation	Any site or asset which is legally protected through legislation.
Statutory Development Plan	This is a document or suite of documents that set out the local authority's policies and proposals for development and use of land in their area, and is used by local authorities when determining planning applications to guide and inform decisions.
[environmental] Statutory Organisations	Any principal council for the area where the land is situated, Natural England, English Heritage, the Environment Agency; and any other public authority which has environmental responsibilities and which the Secretary of State considers likely to have an interest in the project.
Strategic Objectives	These are objectives set out in a Local Plan or Core Strategy which identify how the plan's Spatial Strategy and Vision will be delivered and how spatial planning issues will be addressed.
Structure Plan	A Structure Plan is a strategic land use planning document prepared by a local planning authority. Most Structure Plans and their policies have been revoked following the Localism Act 2011, unless saved by a Secretary of State Direction.
Supplementary Planning Guidance	These are documents which provide greater detail and clarity on specific issues or policies within a Local Plan.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable Urban Drainage Systems	An approach to surface water management that combines a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.
TAG	TAG (Transport Appraisal Guidance) is guidance published by the Department for Transport on the process and methodology to be followed for transport projects.
Total Catchment Zone	The area around a source within which all groundwater recharge is presumed to be discharged at the source.
Traffic Regulation Order	A legal document made by a local authority under its powers as a highway authority to support any enforceable traffic or highways measures.

Term	Meaning
Tranquillity	As defined in Guidelines for Landscape and Visual Impact Assessment: Third Edition, tranquillity relates to a sense of quiet and calm, and is an important asset of landscape.
Transport Assessment	A document that is submitted in support of planning applications that assess the transport impacts arising from new developments.
Unemployment Rate	The unemployment rate measures the number of economically active but unemployed individuals as a proportion of the population aged between 16 and 74.
Visual Amenity	As defined in ‘Guidelines for Landscape and Visual Impact Assessment’: Third Edition, visual amenity is the overall pleasantness of a view providing an attractive setting for activities of people.
Visual Receptor	A defined place from where it is possible to obtain a view of the proposals normally defined where people are likely to be rather than where they potentially could be.
Waste	Any substance or object which the holder discards or intends or is required to discard.
Waste Core Strategy	A Waste Core Strategy is one of a suite of documents that makes up part of a County Council Local Plan and sets out the overall approach for planning waste development in the authority.
Waste Local Plan	A Waste Local Plan is one of a suite of documents that makes up part of a County Council Local Plan and sets out the overall approach for planning waste development in the authority.
Watercourse	Includes all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.
Water Protection Zone	These zones will be a regulatory mechanism to address diffuse water pollution and hydro-morphological damage that will lead to failure of WFD objectives. A WPZ will be a defined geographical area in which the Environment Agency will have additional powers to protect water by using measures to manage or prohibit activities which cause or could cause damage or pollution of water. WPZs are currently being trialled in several locations in England.
World Heritage Site	A place (such as a building, city, complex, desert, forest, island, lake, monument, or mountain) that is listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as being of special cultural or physical significance.
Workplace Employment Profile	Based on the BRES, the workplace employment profile provides employee and employment estimates by detailed geography and industry for the workforce in an area.



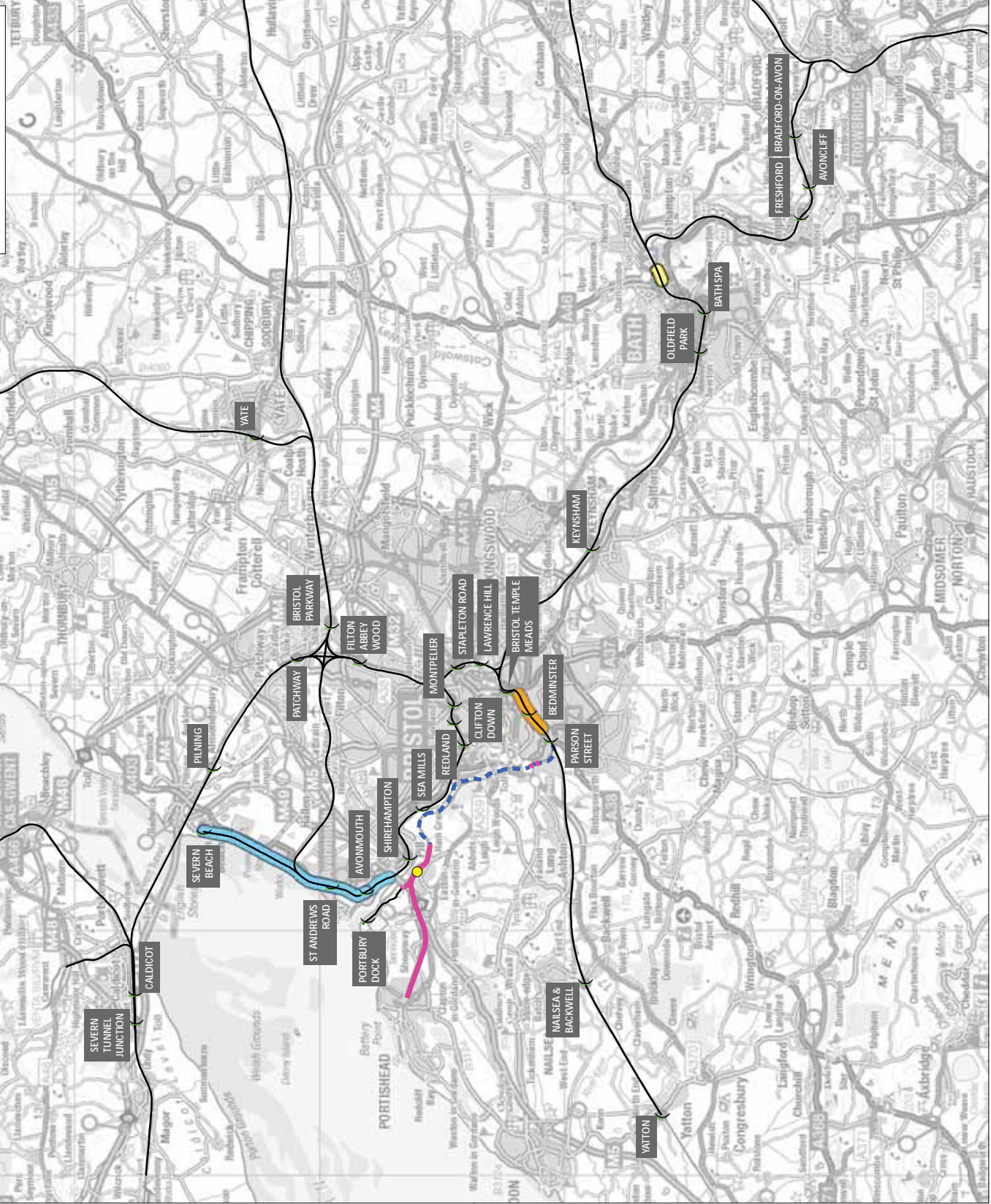
# Appendix A

## Figures





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**KEY**

- ( Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- Pill Railway Station
- Indicative Location of Other Works
- Avonmouth Signal (MetroWest Phase 1) - Option 5B
- Avonmouth Signal (MetroWest Phase 1) - Option 6B
- Bedminster Down Relief Line (MetroWest Phase 1)
- Bathampton Turnback (MetroWest Phase 1)



**CLIENT**  
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 BS23 1UJ

**CONSULTANT**  
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 1.1 - Location Plan

Drawn By:	A Collinson	Date:	19/06/2015
Checked By:	Emily Earing	Date:	19/06/2015
Approved By:	Carolyn Francis	Date:	19/06/2015
Drawing No.:	490327-001-001	Revision	2
Drawing Scale:		1:150,000 @ A3	

## Boundaries

- Local Administrative Boundaries
- 100m Radius

## English Heritage

- Scheduled Monument
- Listed Building

## NSC Local Plan

- Tree Preservation Order (TPO)
- CF4** Safeguarded Site for Proposed Primary School
- Safeguarded Site for Proposed Secondary School
- Proposed Health Care Facilities
- Safeguarded Site for Proposed Community Hall
- Proposed Public Utilities Services
- Proposed Strategic and Structural Open Space
- Proposed Other Unspecified Facilities
- Existing Outdoor Playing Space
- E5** Safeguarded Employment Areas
- E6** Royal Portbury Dock
- ECH1** Amenity
- ECH3** Conservation Areas
- ECH5** Registered Parks & Gardens
- Unregistered Parks & Gardens
- ECH9** Forest of Avon

## ECH12 International Sites of Ecological Importance

- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar Site

## BCC Local Plan

- Site Allocations
  - BCS6** Green Belt
  - BCS9** Regionally Important Geological Sites (RIGS)
  - Site of Nature Conservation Interest (SNCI)
  - Important Open Space
  - BCS10** Safeguarded Transport Links
  - BCS22** Registered Parks & Gardens
- ### Public Rights of Way
- Bridleway
  - Footpath
  - Restricted Byway
  - Existing Quayside Walkways
- ### Bristol County Council
- Tree Preservation Order (TPO)
  - Conservation Areas
  - Park and Ride
  - Surface Water High Risk Areas
  - Wildlife Corridors



**Client**  
North Somerset Council,  
Town Hall, Church Road,  
Wilton, Weston-super-Mare,  
BS23 1JU

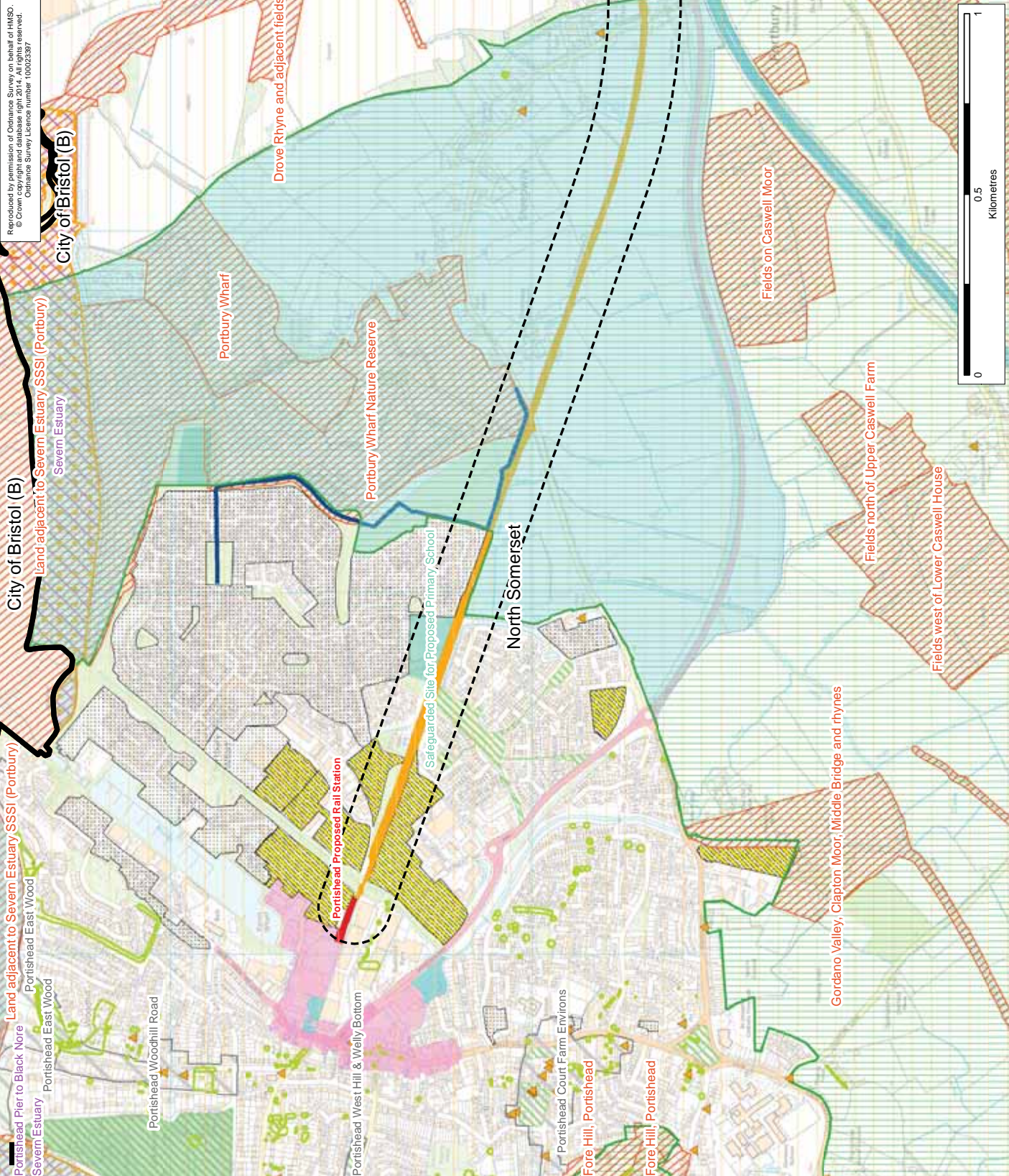
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**Project:** Portishead to Parson Street  
Junction Branch Line  
(MetroWest Phase 1)

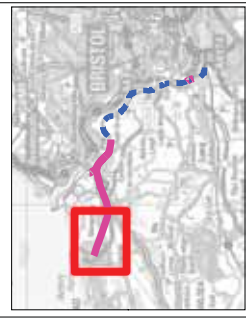
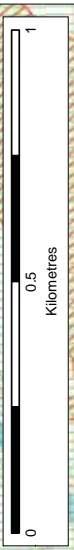
**Drawing:** Environmental and Planning Constraints  
Legend

Drawn By:	Luke Webb	Date:	16/06/2015
Checked By:	Emily Earing	Date:	16/06/2015
Approved By:	Carolyn Francis	Date:	16/06/2015
Drawing No.:	490327-008-002	Revision	2
Drawing Scale: 1:10,000 @ A3			





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 Weston-super-Mare,  
 BS23 1UJ

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 Geospatial  
 Burdett Park, Swindon, SN1 6GD  
 (01793 812089) 2475 Fax: +44  
 www.ch2m.com

**Project:**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:**  
 Figure 2.1: Portishead to Portbury -  
 Planning  
 1 of 5

**Drawn By:** Luke Webb  
**Date:** 18/06/2015

**Checked By:** Emily Earing  
**Date:** 18/06/2015

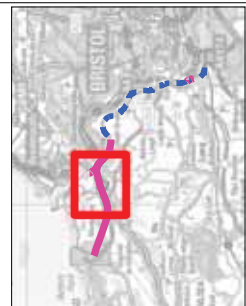
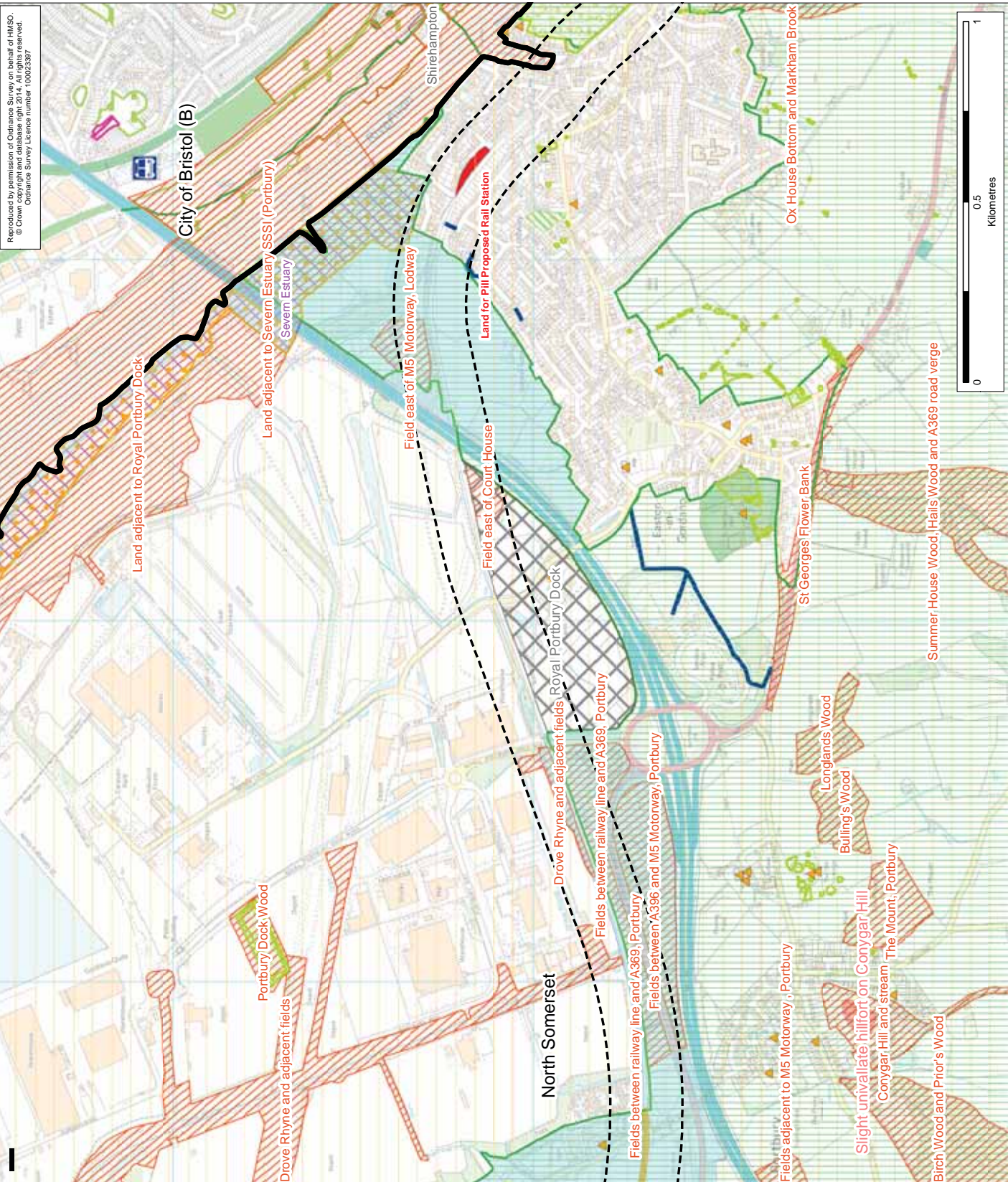
**Approved By:** Carolyn Francis  
**Date:** 18/06/2015

**Drawing No.:** 490327-008-002 - 1  
**Revision:** 2

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**CH2M HILL**  
 Geospatial  
 Burdett Park, Swindon, SN1 6DD  
 (01793 812889) 2475 Fax: +44  
 www.ch2m.com

**Project:**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:**  
 Figure 2.2: Portbury to Pill - Planning  
 2 of 5

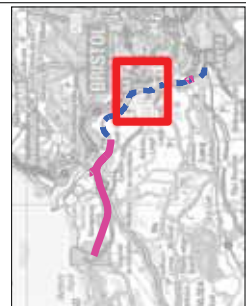
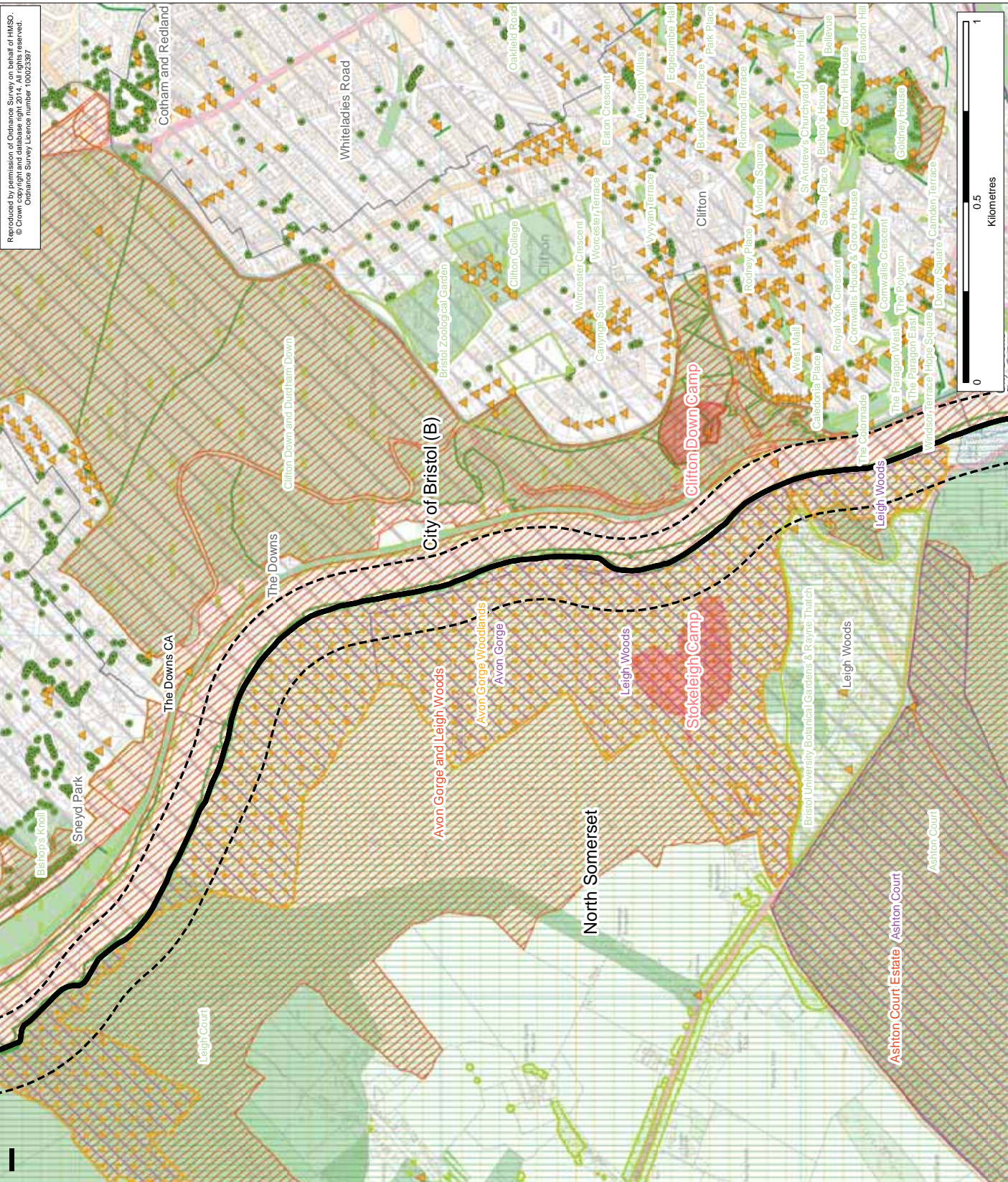
Drawn By:	Luke Webb	Date:	18/06/2015
Checked By:	Emily Earing	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
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Geospatial  
Burdens Park, Swindon, SN1 6GD  
(0)1753 812889 Fax: +44  
www.ch2m.com

**Project:**  
Portishead Branch Line  
(MetroWest Phase 1)

**Drawing:**  
Figure 2.4: Leigh Court to Ashton Gate -  
Planning  
4 of 5

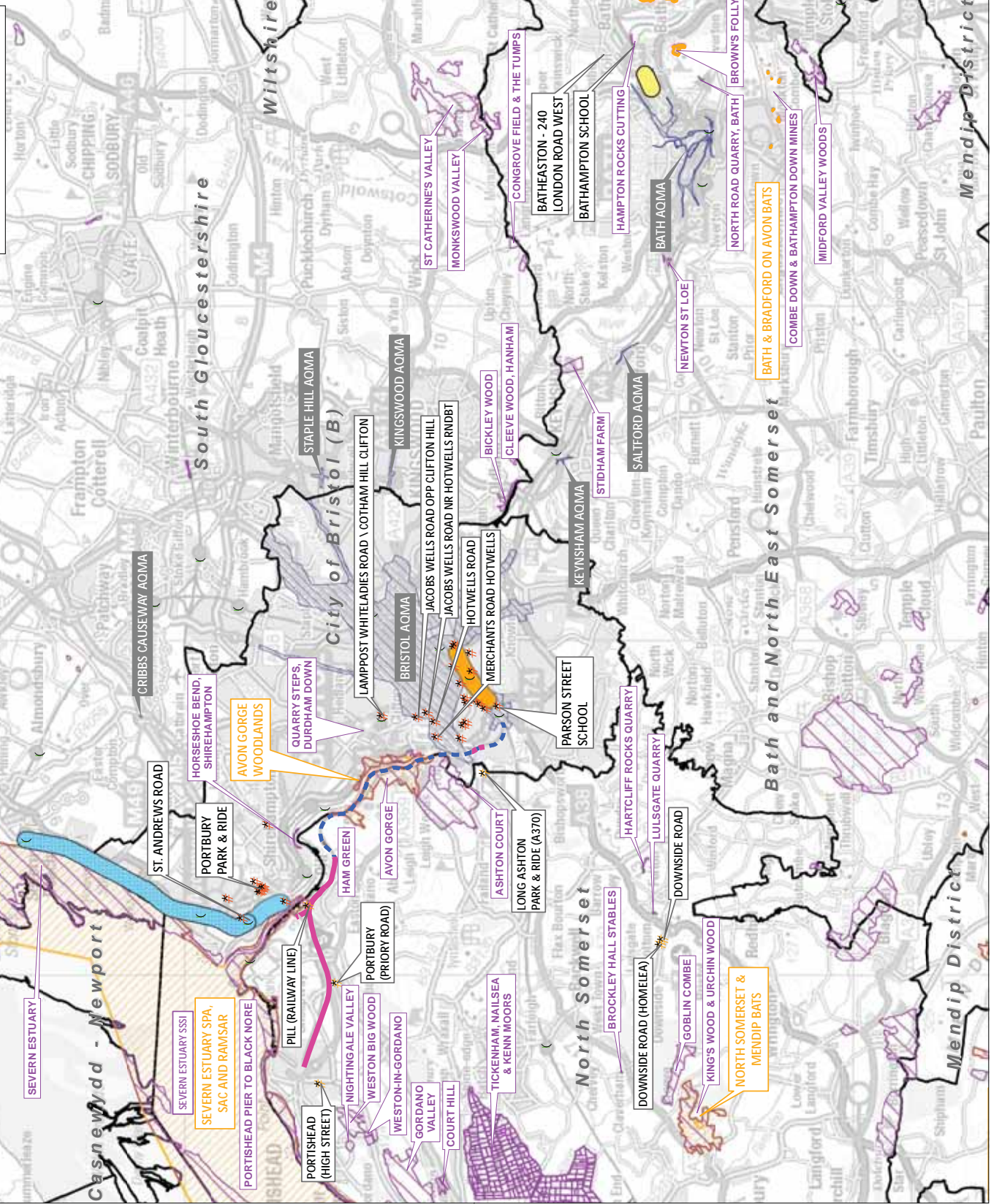
Drawn By : Luke Webb	Date: 18/06/2015
Checked By : Emily Earing	Date: 18/06/2015
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Drawing No. : 490327-008-002 - 4	Revision : 2
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**KEY**

- Existing Railway Station
- DCO Indicative Red Line Boundary
- Network Rail Permitted Development Rights
- Indicative Location of Other Works
- Avonmouth Signal (MetroWest Phase 1) - Option 5B
- Avonmouth Signal (MetroWest Phase 1) - Option 6B
- Bedminster Down Relief Line (MetroWest Phase 1)
- Bathampton Turnback (MetroWest Phase 1)
- Air Quality Management
- Local Authority Boundary
- Air Quality Management Area (AQMA)
- Air Quality Monitoring Locations
- Bristol City Council (BCC)
- North Somerset Council (NSC)
- Bath & North East Somerset (B&NES)
- Nature Conservation Designations
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)

**CLIENT**  
North Somerset Council,  
Town Hall, 25, Broad Street,  
Wells, Somerset BA8 3JU

**CONSULTANT**  
CH2M HILL  
Geospatial  
Burdock Park, Swindon, SN1 6GD  
(01793 812889 | 01793 744  
www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

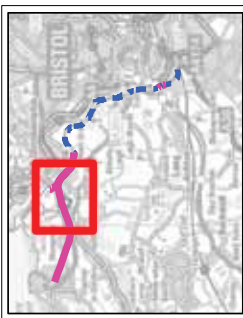
**Drawing:** Figure 3.1: Air Quality Overview

Drawn By:	Luke Webb	Date:	19/06/2015
Checked By:	Gordon Allison	Date:	19/06/2015
Approved By:	Carolyne Francis	Date:	19/06/2015
Drawing No.:	490327-009-001	Revision:	1
Drawing Scale:		1:110,000 @ A3	









**KEY**

- 500m Radius Study Area
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Pill Railway Station
- Cultural Heritage Assets
- ✦ Listed Building
- ⦿ Non-designated historic structure
- ⦿ Monument point (Non-designated)
- ⦿ Monument area (Non-designated)
- Historic Park and Garden (Non-designated)
- Scheduled Monument
- Conservation Areas (CA)

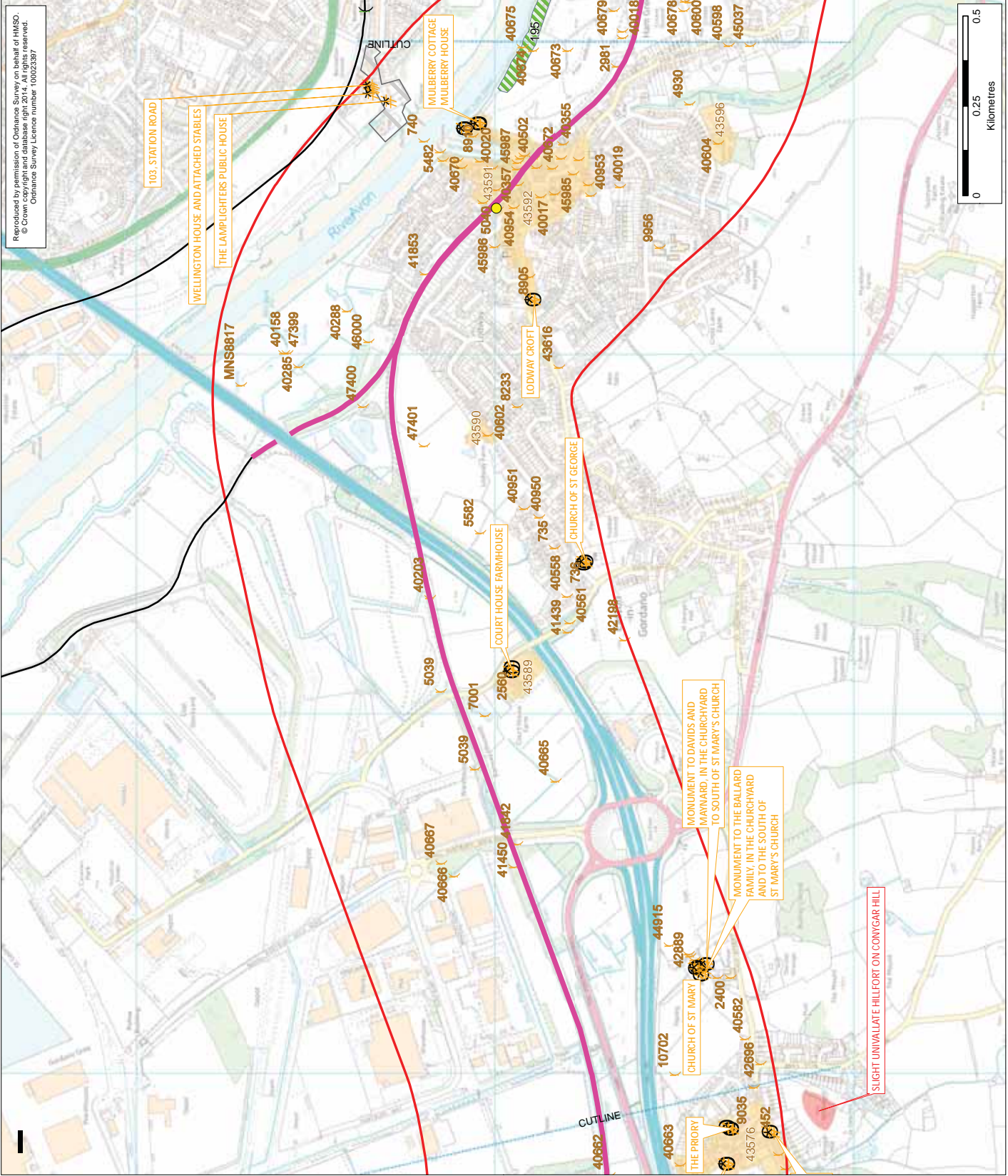
**CLIENT**  
 North Somerset Council,  
 Town Hall, Orchard Road,  
 Weston-super-Mare,  
 BS23 1UJ

**CONSULTANTS**  
 CH2M HILL  
 Geospatial  
 Building Park, Swindon, SN1 0GD  
 (01753 81288) | 5 Lark Lane, W4  
 www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 4.2: Portbury to Pill - Cultural Heritage

Drawn By:	Tim Curtis	Date:	22/06/2015
Checked By:	Emily Earing	Date:	22/06/2015
Approved By:	Carolyn Francis	Date:	22/06/2015
Drawing No.:	490327-004-001 - B	Revision:	2
Drawing Scale:		1:10,000 @ A3	

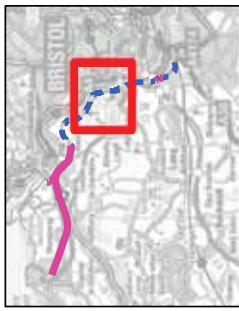


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**KEY**

- 500m Radius Study Area
- Existing Railway Line
- Portishead Branch Line
- Network Rail Permitted Development Rights

**Cultural Heritage Assets**

- ✱ Listed Building
- ⊙ Non-designated historic structure
- ⌋ Monument point (Non-designated)
- Monument area (Non-designated)
- Registered Park & Garden (RP&G)
- Historic Park and Garden (Non-designated)
- Scheduled Monument
- % Scheduled Monument point (Non-designated)
- Conservation Areas (CA)

**Client**  
 North Somerset Council  
 North Somerset House, South Gate  
 Weston-super-Mare  
 BS23 1UJ

**CH22M**  
 Geopac Ltd  
 Geopac Ltd, South Gate, GPO  
 Tel: +44 (0)1759 812479 Fax: +44  
 (0)1759 817089  
 www.ch22m.com

**Project:**  
 Portishead Branch Line  
 (MetroWest Phase 1)

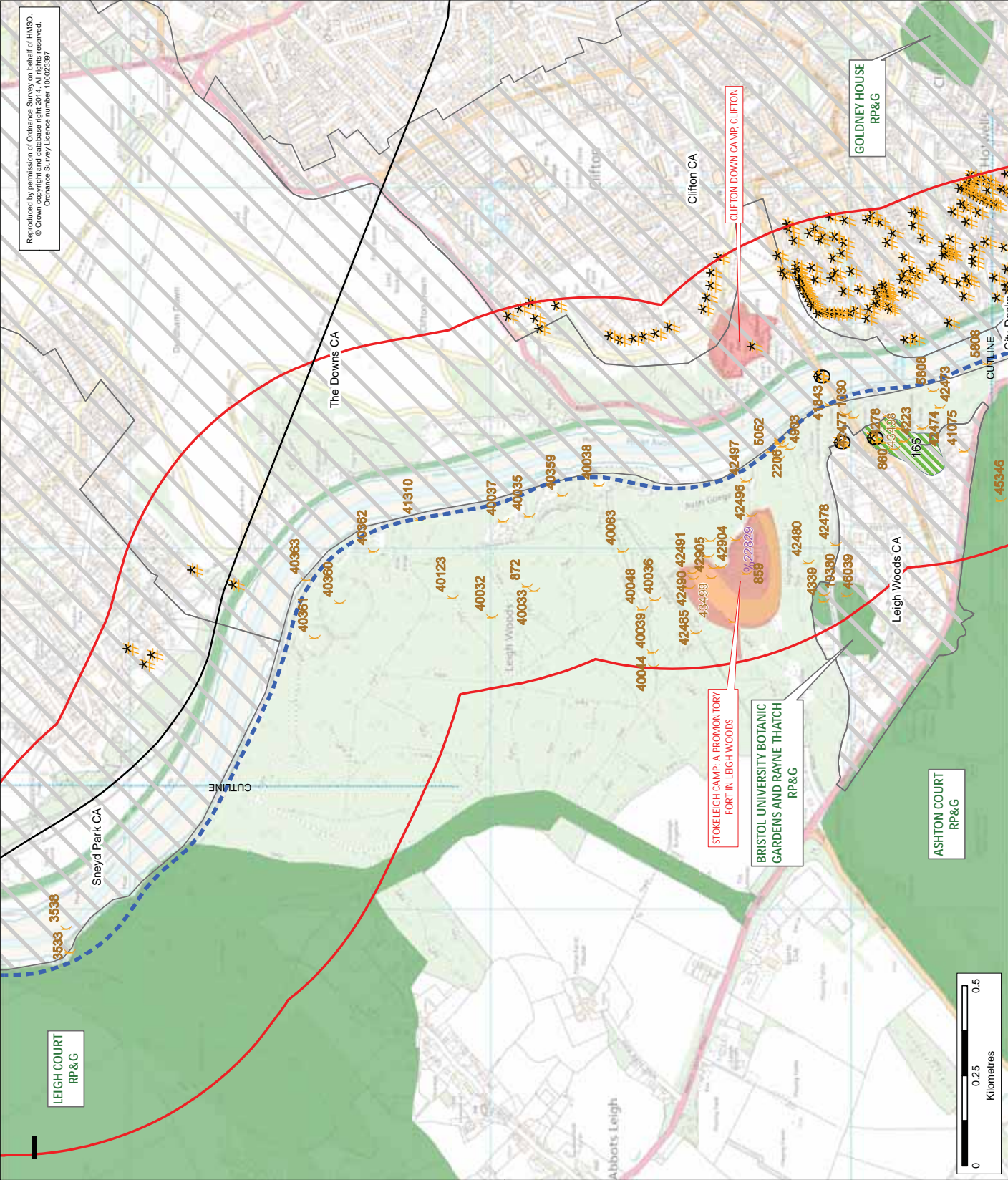
**Drawing:**  
 Figure 4.4: Leigh Court to  
 Ashton Court - Cultural Heritage

**Drawn By:** Tim Curtis  
**Checked By:** Emily Earing  
**Approved By:** Carolyn Francis

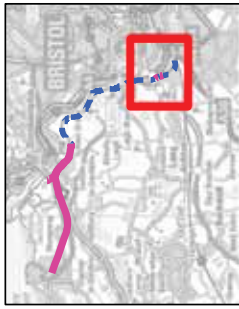
**Date:** 22/06/2015  
**Date:** 22/06/2015  
**Date:** 22/06/2015

**Drawing No.:**  
 490327-004-001 - D  
**Revision:**  
 2

**Drawing Scale:** 1:10,000 @ A3







**KEY**

- 500m Radius Study Area
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights

**Cultural Heritage Assets**

- ✳ Listed Building
- ⌋ Monument point (Non-designated)
- Registered Park & Garden (RP&G)
- Conservation Area (CA)

**Client**  
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 North Somerset House,  
 Weston-super-Mare,  
 BS23 1UJ

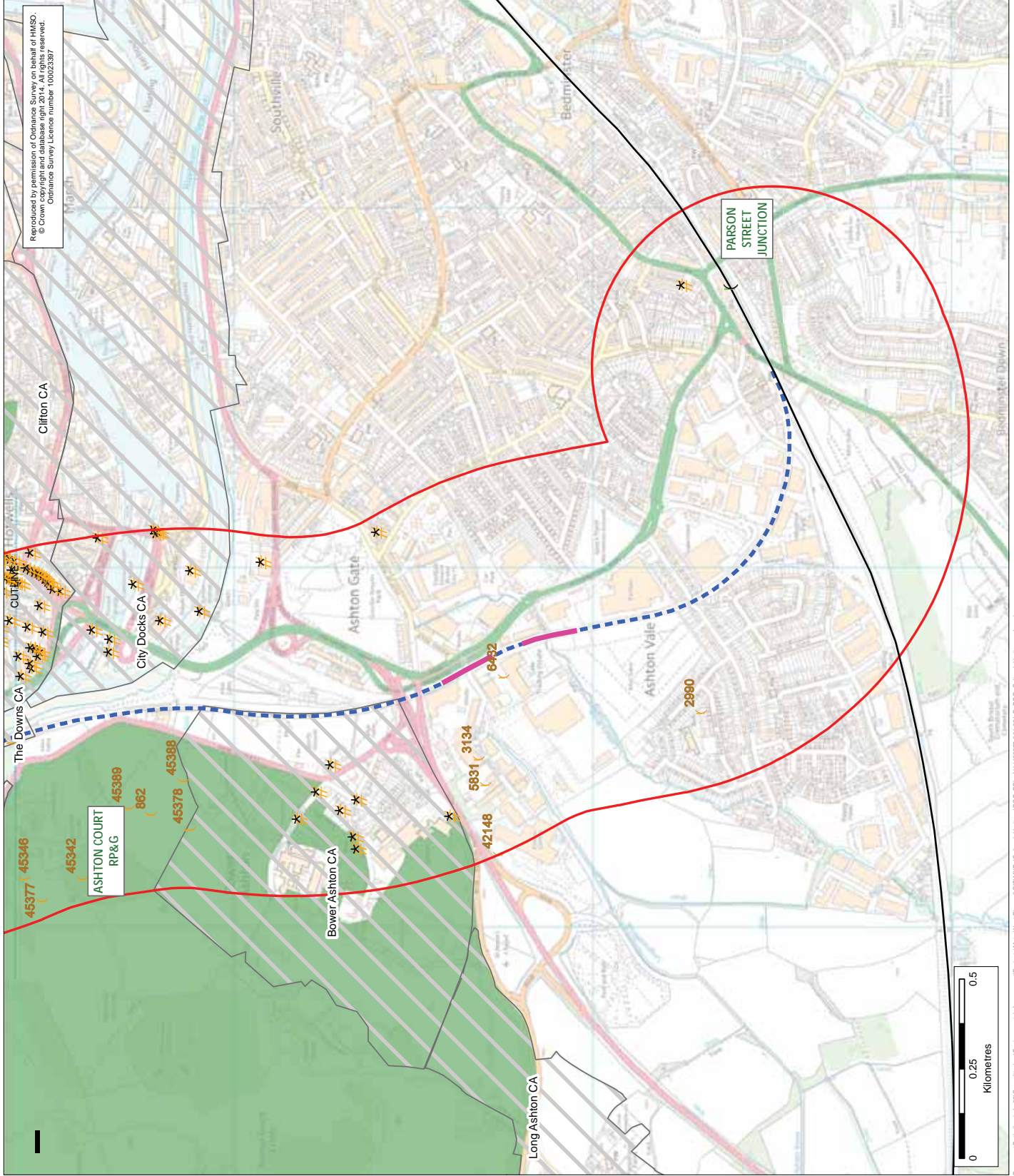
**CH2M HILL**  
 Geopac Ltd, Souths, 5th Floor,  
 100, The Grove Road,  
 Weston-super-Mare,  
 BS23 1UJ

**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 4.5: Ashton Court  
 to Parson Street  
 - Cultural Heritage

**Drawn By:** Tim Curtis    **Date:** 22/06/2015  
**Checked By:** Emily Earing    **Date:** 22/06/2015  
**Approved By:** Carolyn Francis    **Date:** 22/06/2015

**Drawing No.:** 490327-004-001 - E  
**Revision:** 2  
**Drawing Scale:** 1:10,000 @ A3





**KEY**

- 2km Radius Study Area
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line Boundary
- Network Rail Permitted Development Rights
- Pill Railway Station

**Designated Conservation Sites**

- Special Area of Conservation (SAC)
- Ramsar Site
- Special Protection Areas (SPA)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserves (NNR)



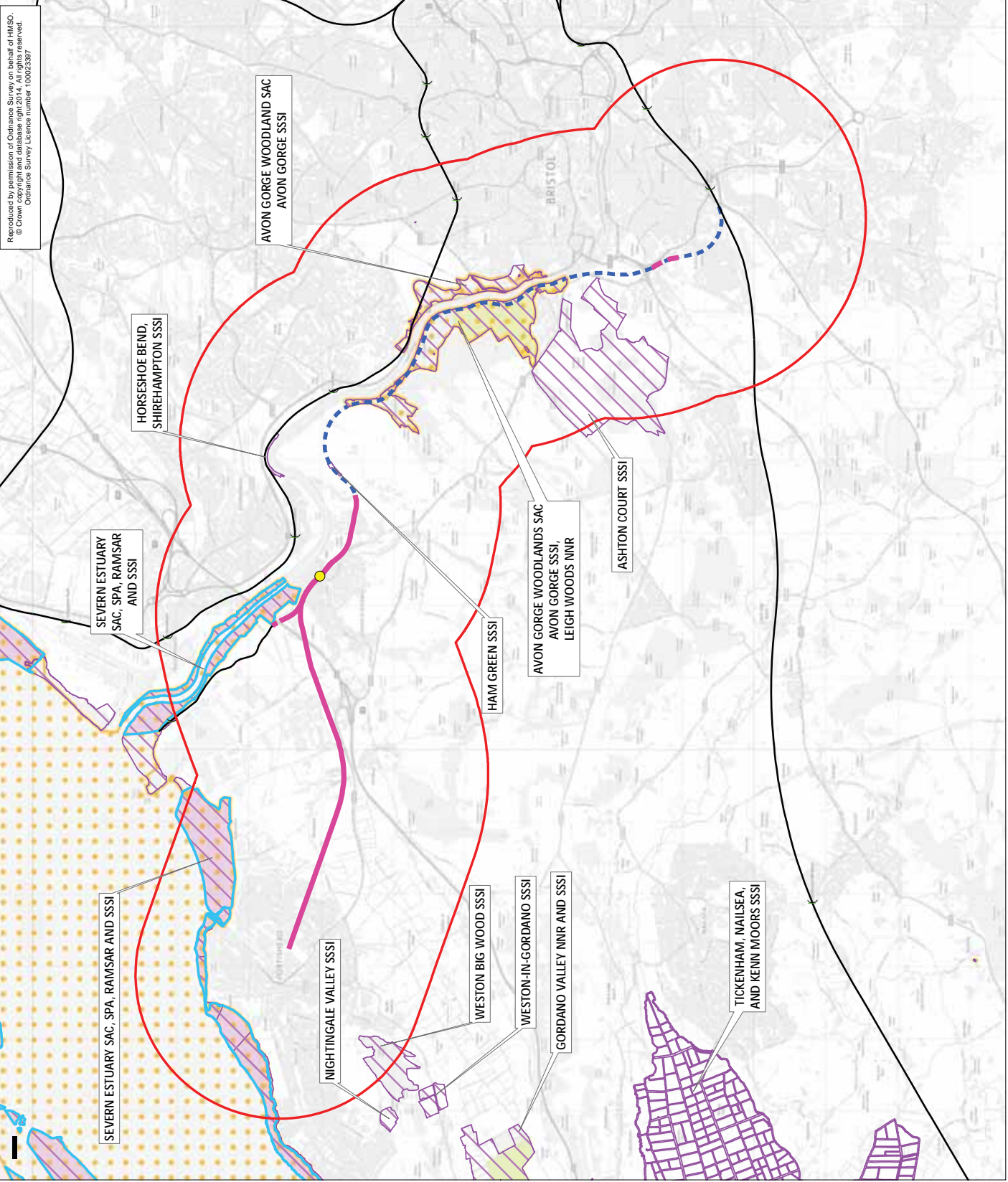
**CLIENT**  
 North Somerset Council,  
 Town Hall, South Street,  
 Weston-super-Mare,  
 BS23 1JU

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 Building Park, Swindon, SN1 6GD  
 (01793 812083 | 01793 2475 Fax: +44  
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**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

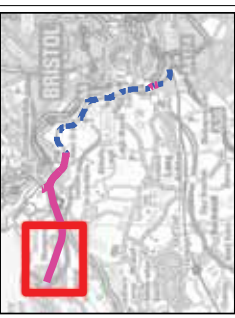
**Drawing:** Figure 5.1: Statutory Designated Sites

Drawn By:	Tim Curtis	Date:	18/06/2015
Checked By:	Emily Earing	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-006-008	Revision	2
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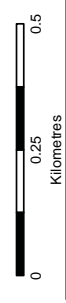


**KEY**

- 500m Radius Study Area
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary

**Landscape Designations**

- National Forest Inventory
- Local Nature Reserve (LNR)
- Conservation Area (CA)
- National Character Areas**
- Bristol, Avon Valley and Ridges
- Severn and Avon Valleys
- Local Character Areas**
- North Somerset Council (NSC) Character Area
- Boundary



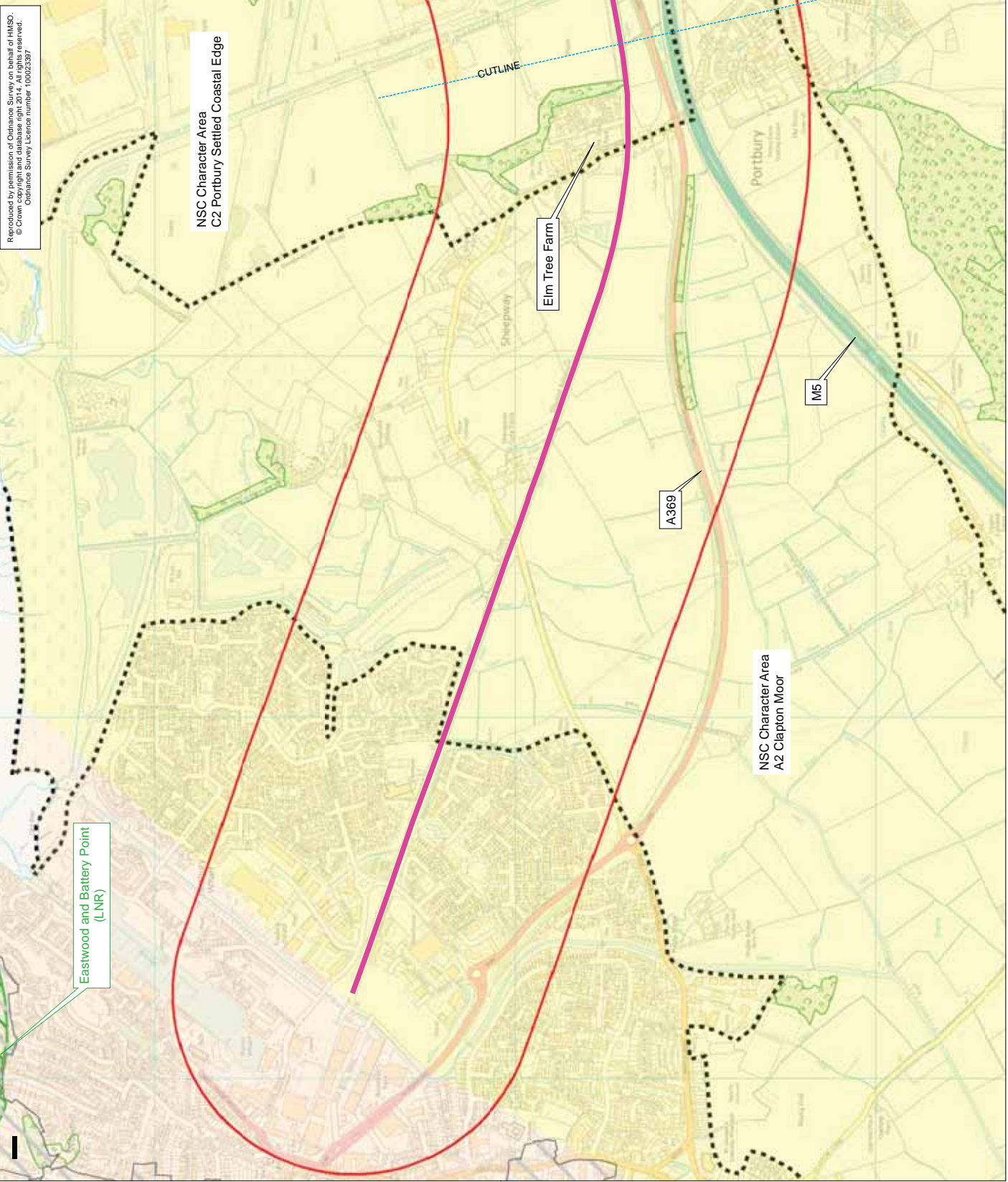
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 BS23 1JU

**CONSULTANT**  
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 Geospatial  
 Building Park, Swindon, SN1 6GD  
 (01793 812089 | 01753 2475 Fax: +44  
 www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

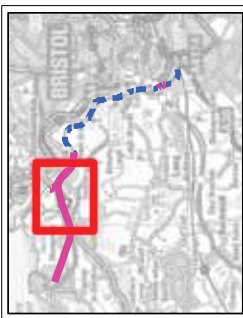
**Drawing:** Figure 7.1: Portishead to Portbury - Landscape Baseline Plan

<b>Drawn By:</b> Tim Curtis	<b>Date:</b> 18/06/2015
<b>Checked By:</b> Emily Earing	<b>Date:</b> 18/06/2015
<b>Approved By:</b> Carolyn Francis	<b>Date:</b> 18/06/2015
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**KEY**

- 500m Radius Study
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line**
- DCO Indicative Red Line boundary
- Pill Railway Station
- Landscape Designations**
- National Forest Inventory
- Local Nature Reserve (LNR)
- Conservation Area (CA)
- National Character Areas**
- Bristol, Avon Valley and Ridges
- Severn and Avon Valleys
- Local Character Areas**
- North Somerset Council (NSC) Character Area Boundary



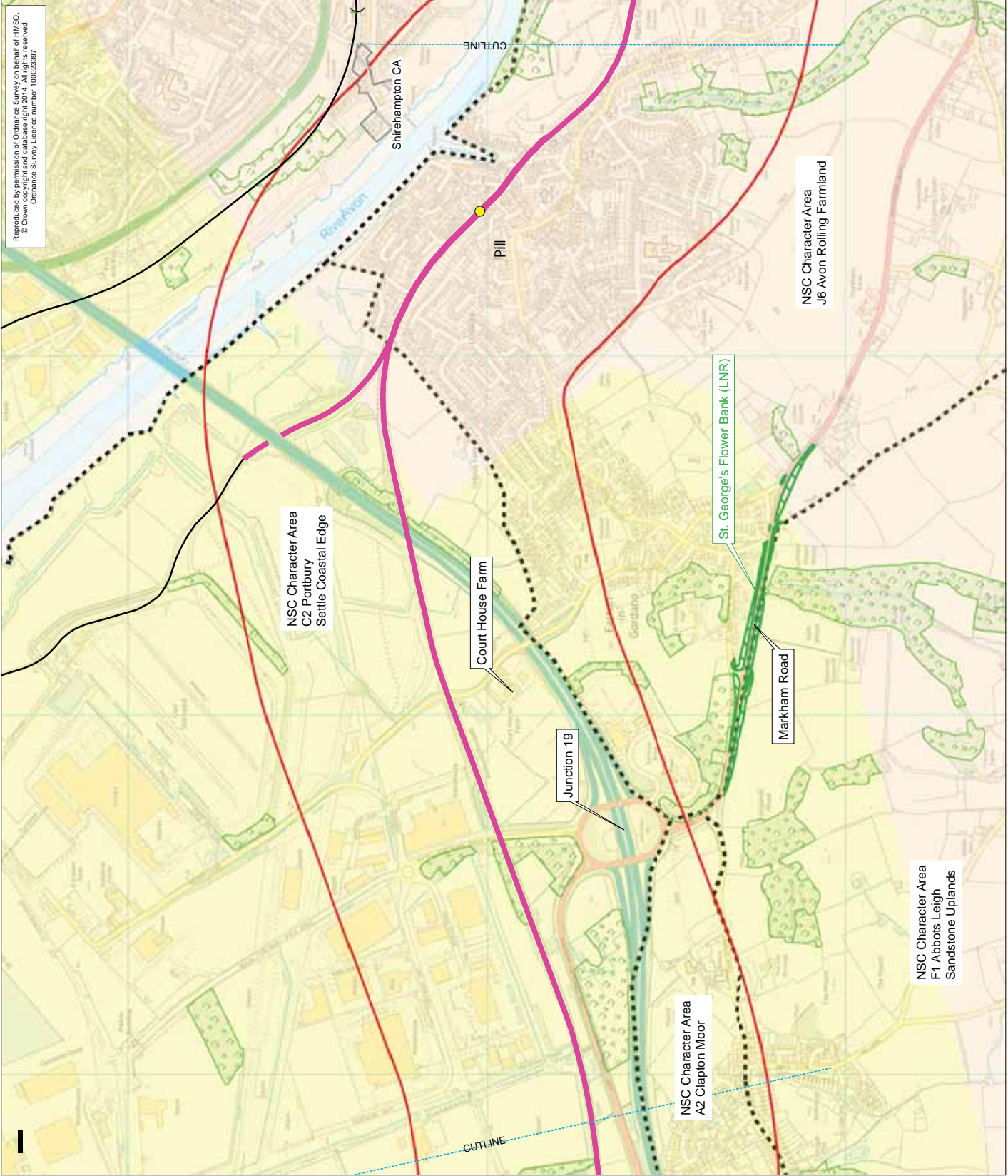
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**CONSULTANT**  
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 (01793 812083 | 01793 2475 Fax: +44  
 www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 7.2: Portbury to Pill - Landscape Baseline Plan

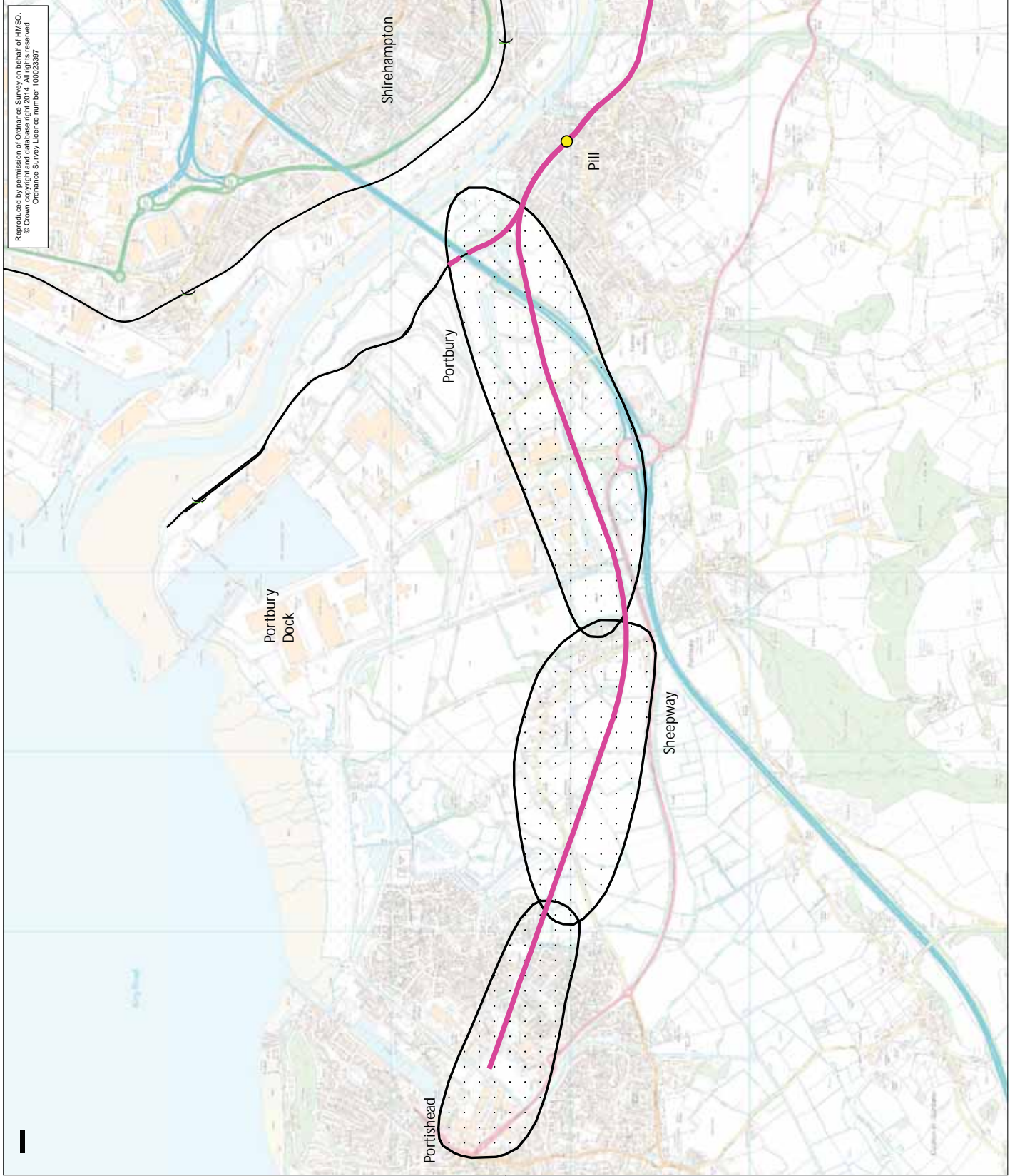
Drawn By:	Tim Curtis	Date:	22/06/2015
Checked By:	Emily Francis	Date:	22/06/2015
Approved By:	Carolyn Francis	Date:	22/06/2015
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**KEY**

- ( Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line boundary
- Pill Railway Station
- ▭ Indicative Site Character Areas



**CLIENT**  
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 Building Park, Swindon, SN1 6GD  
 (01753 812089) 12475 Fax: +44  
 www.ch2m.com

**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 7.3: Portishead to Pill -  
 Indicative Site Character Areas

**Drawn By:** Luke Webb **Date:** 15/06/2015

**Checked By:** Andrew Linford **Date:** 15/06/2015

**Approved By:** Carolyn Francis **Date:** 15/06/2015

**Drawing No.:** 490327-002-005 **Revision:** 2

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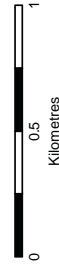
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**KEY**

- ( Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line boundary
- Pill Railway Station

**Visual Attributes**

- Approximate visual envelope
- Long view
- Visual receptor location



**Client**  
North Somerset Council,  
Town Hall, The Quay, West  
Wilton, Weston-super-Mare,  
BS23 1UJ

**CSM HILL**  
Geospatial  
Burdens Park, Swindon, SMT 5GD  
(01753 812888) Fax: +44  
(01753 812889) Email: sales@csmhill.com  
www.csmhill.com

**Project:** Portishead Branch Line  
(MetroWest Phase 1)

**Drawing:** Figure 7.4: Portishead to Pill - Visual  
Envelope and Visual Receptors Plan

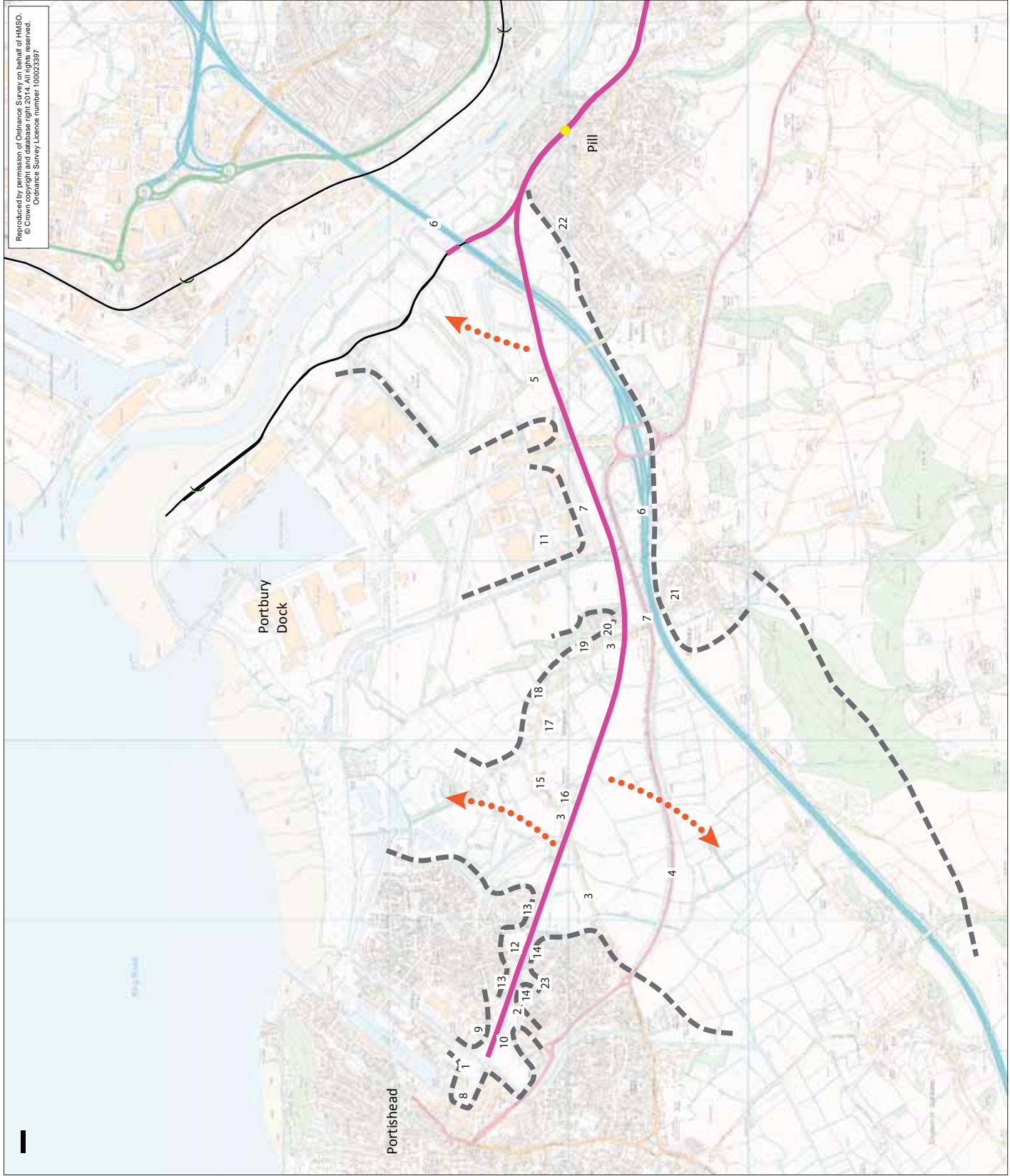
**Drawn By:** Charlotte Partridge Date: 16/06/2015

**Checked By:** Andrew Lindot Date: 16/06/2015

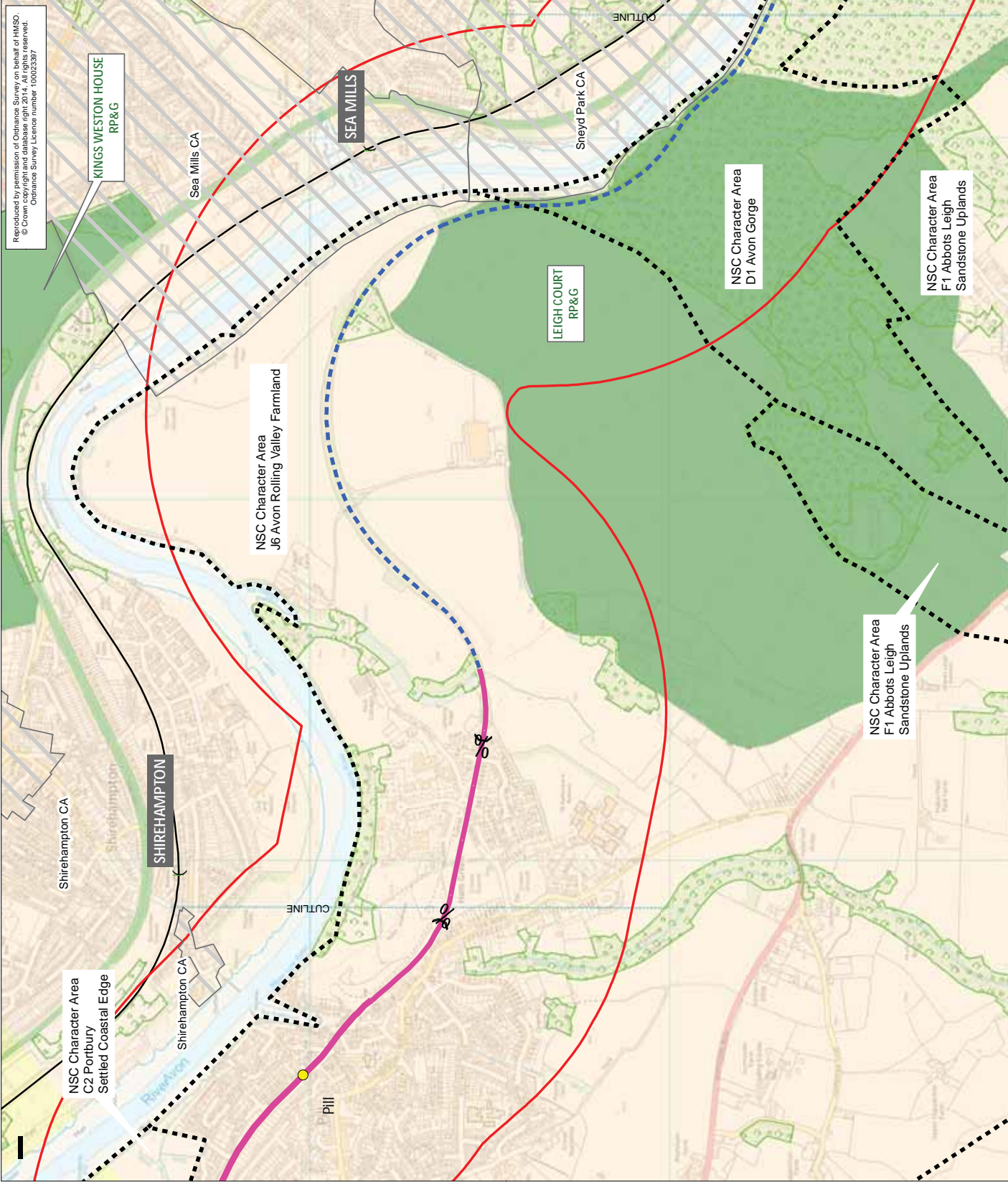
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KINGS WESTON HOUSE  
 RP&G

Sea Mills CA

SEA MILLS

Sneyd Park CA

LEIGH COURT  
 RP&G

NSC Character Area  
 D1 Avon Gorge

NSC Character Area  
 F1 Abbots Leigh  
 Sandstone Uplands

NSC Character Area  
 J6 Avon Rolling Valley Farmland

NSC Character Area  
 F1 Abbots Leigh  
 Sandstone Uplands

NSC Character Area  
 C2 Portbury  
 Settled Coastal Edge

SHIREHAMPTON

P111

Shirehampton CA

Shirehampton CA

Shirehampton CA

CUTLINE

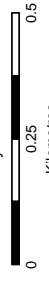
CUTLINE

KEY

- 500m Radius Study Area
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- P111 Railway Station
- P111 Railway Tunnel

- Landscape Designations
- National Forest Inventory
- Registered Park & Garden (RP&G)
- Conservation Areas

- National Character Areas
- Bristol, Avon Valley and Ridges
- Severn and Avon Valleys
- Local Character Areas
- North Somerset Council
- (NSC) Character Area
- Boundary



**Client**  
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 Town Hall, Orchard Road,  
 Weston-super-Mare,  
 BS23 1UJ

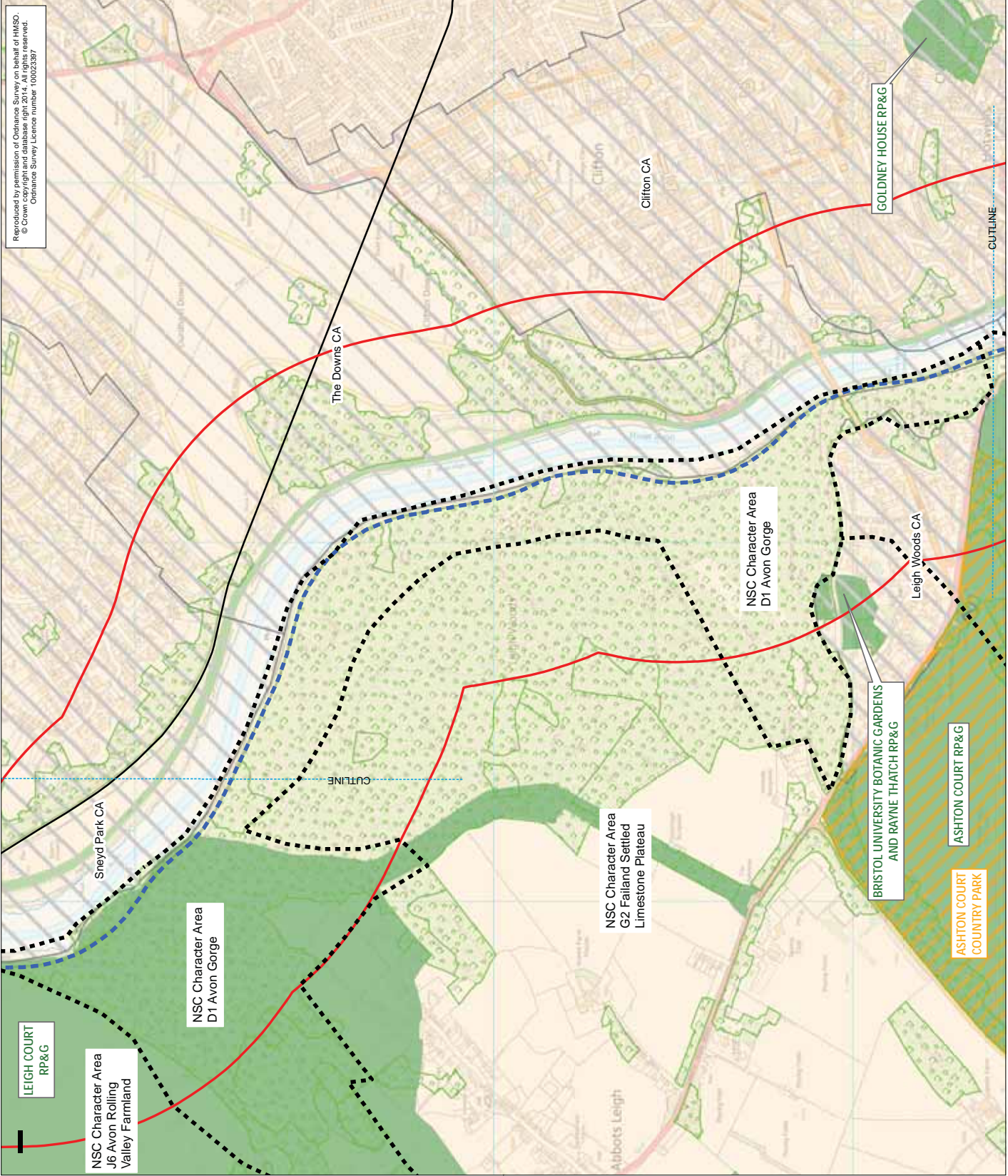
**Contractor**  
 CH2M HILL  
 Geospatial  
 Building Park, Swindon, SN1 6GD  
 (01753 812089 | 01753 812090 | www.ch2m.com)

**Project**  
 Portishead Branch Line  
 (MetroWest Phase 1)

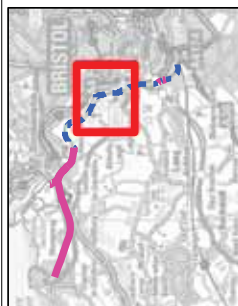
**Drawing:**  
 Figure 7.5: P111 to Leigh Court  
 - Landscape Baseline Plan

Drawn By : Helen Winter	Date: 22/06/2015
Checked By : Charlotte Parridge	Date: 22/06/2015
Approved By : Carolyn Francis	Date: 22/06/2015
Drawing No. : 490327-002-002 - C	Revision : 2
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**KEY**

- 500m Radius Study Area
- Existing Railway Line
- Portishead Branch Line
- Network Rail Permitted Development Rights

**Landscape Designations**

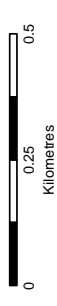
- National Forest Inventory
- Local Nature Reserve
- Country Park
- Registered Park & Garden (RP&G)
- Conservation Area

**National Character Areas**

- Bristol, Avon Valley and Ridges
- Severn and Avon Valleys

**Local Character Areas**

- North Somerset Council (NSC) Character Area
- Boundary



**CLIENT**  
 North Somerset Council,  
 Town Hall, The Quadrant,  
 Weston-super-Mare,  
 BS23 1UJ

**CONSULTANT**  
 Geographical  
 Buildings Park, Swindon, SN1 6GD  
 (01793 812089 | 01793 812090 | www.g3i2m.com)

**PROJECT**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 7.6: Leigh Court  
 To Ashton Court  
 - Landscape Baseline Plan

**Drawn By:** Helen Winter Date: 18/06/2015

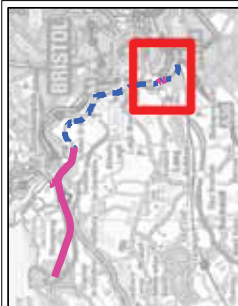
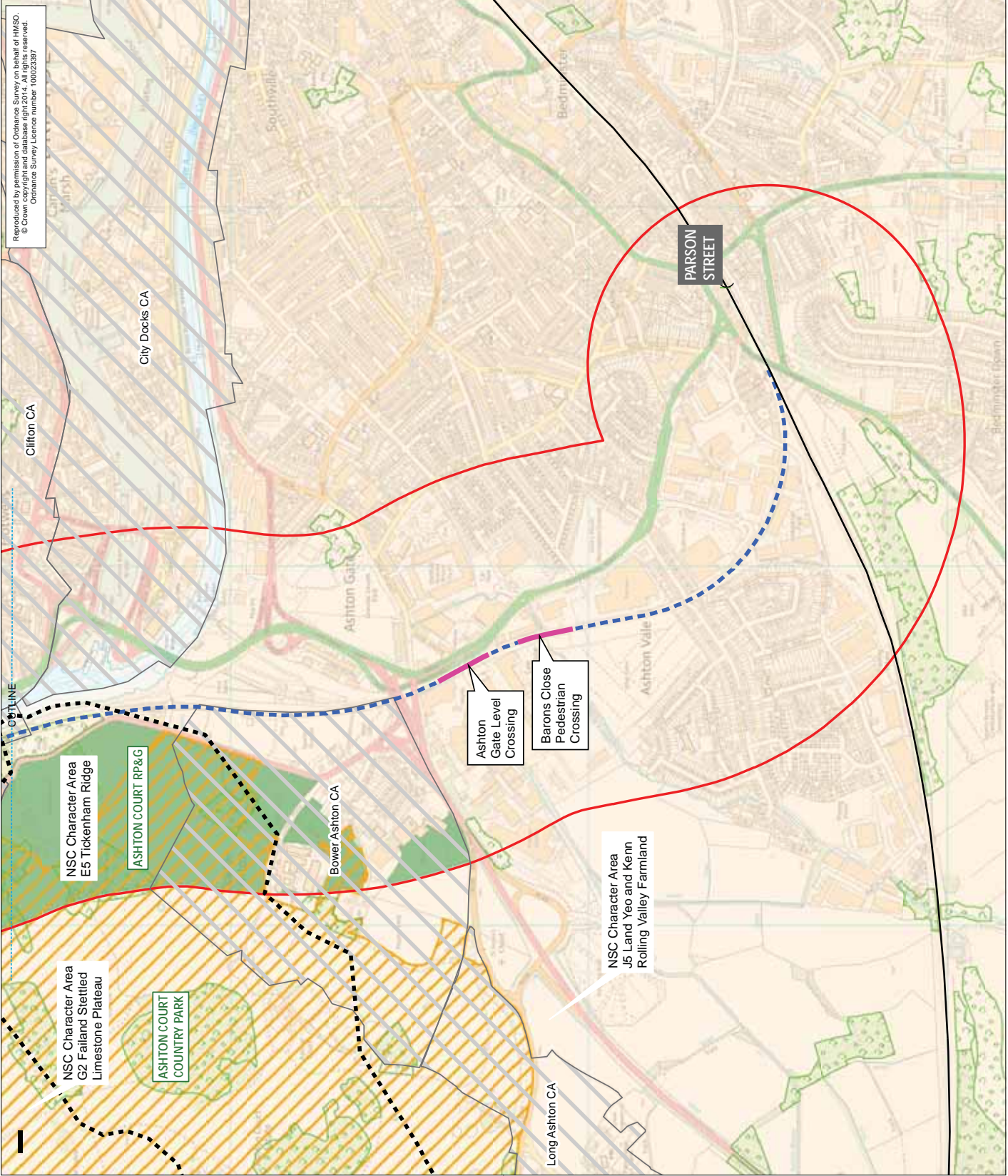
**Checked By:** Charlotte Parridge Date: 18/06/2015

**Approved By:** Carolyn Francis Date: 18/06/2015

**Drawing No.:** 490327-002-002 - D  
**Revision:** 2

**Drawing Scale:** 1:10,000 @ A3





**KEY**

- 500m Radius Study Area
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights

**Landscape Designations**

- National Forest Inventory
- Country Park
- Registered Park & Garden
- Conservation Area

**National Character Areas**

- Bristol, Avon Valley and Ridges

**Local Character Areas**

- North Somerset Council (NSC) Character Area
- Boundary



**Client:**  
North Somerset Council,  
Town Hall, Orchard Road,  
Wilton, Weston-super-Mare,  
BS23 1JU

**Consultant:**  
CH2M HILL  
Geospatial  
Burdock Park, Swindon, SN1 6GD  
(01753 817289 | 01753 2475 Fax: +44  
www.ch2m.com

**Project:**  
Portishead Branch Line  
(MetroWest Phase 1)

**Drawing:**  
Figure 7.7: Ashton Court to Parson Street  
- Landscape Basemap Plan

**Drawn By:** A Collinson  
**Date:** 22/06/2015

**Checked By:** Charlotte Parridge  
**Date:** 22/06/2015

**Approved By:** Carolyn Francis  
**Date:** 22/06/2015

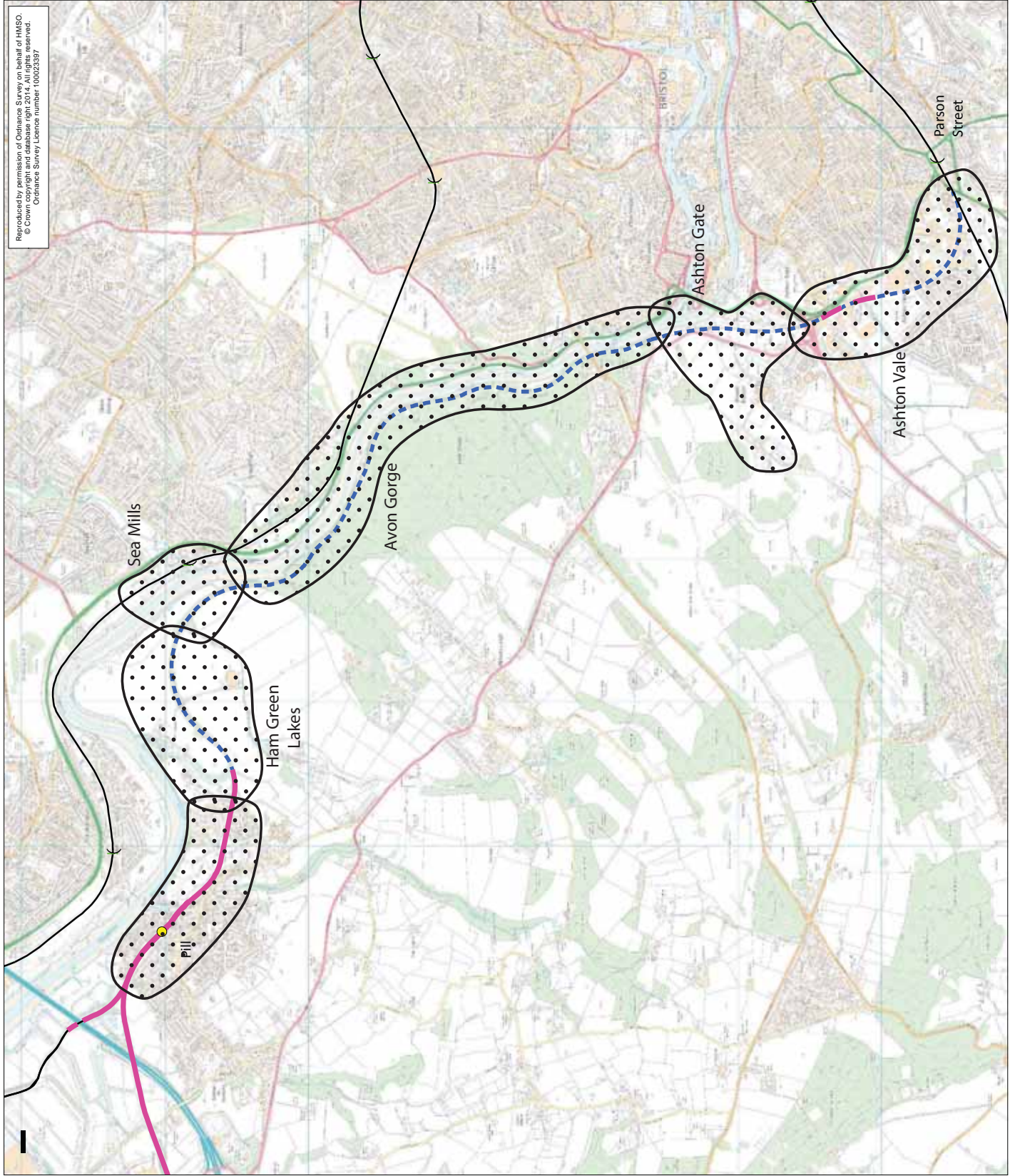
**Drawing No.:** 490327-002-002 - E  
**Revision:** 1

**Drawing Scale:** 1:10,000 at A3

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**KEY**

- ( ) Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line boundary
- - - Network Rail Permitted Development Rights
- Pill Railway Station
- Indicative Site
- Character Areas



**Client**  
 North Somerset Council  
 Town Hall, The Esplanade,  
 Weston-super-Mare,  
 BS23 1UJ

**CH2MHILL**  
 Geospatial  
 Buildings Park, Swindon, SMT 50D  
 Swindon, Wiltshire, SN2 8NF  
 (01793 812888) 01478 Fax: 444  
 www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 7.8: Pill to Parson Street Indicative Site Character Areas

**Drawn By:** Charlotte Partridge Date: 16/06/2015

**Checked By:** Andrew Lindot Date: 16/06/2015

**Approved By:** Carolyn Francis Date: 16/06/2015

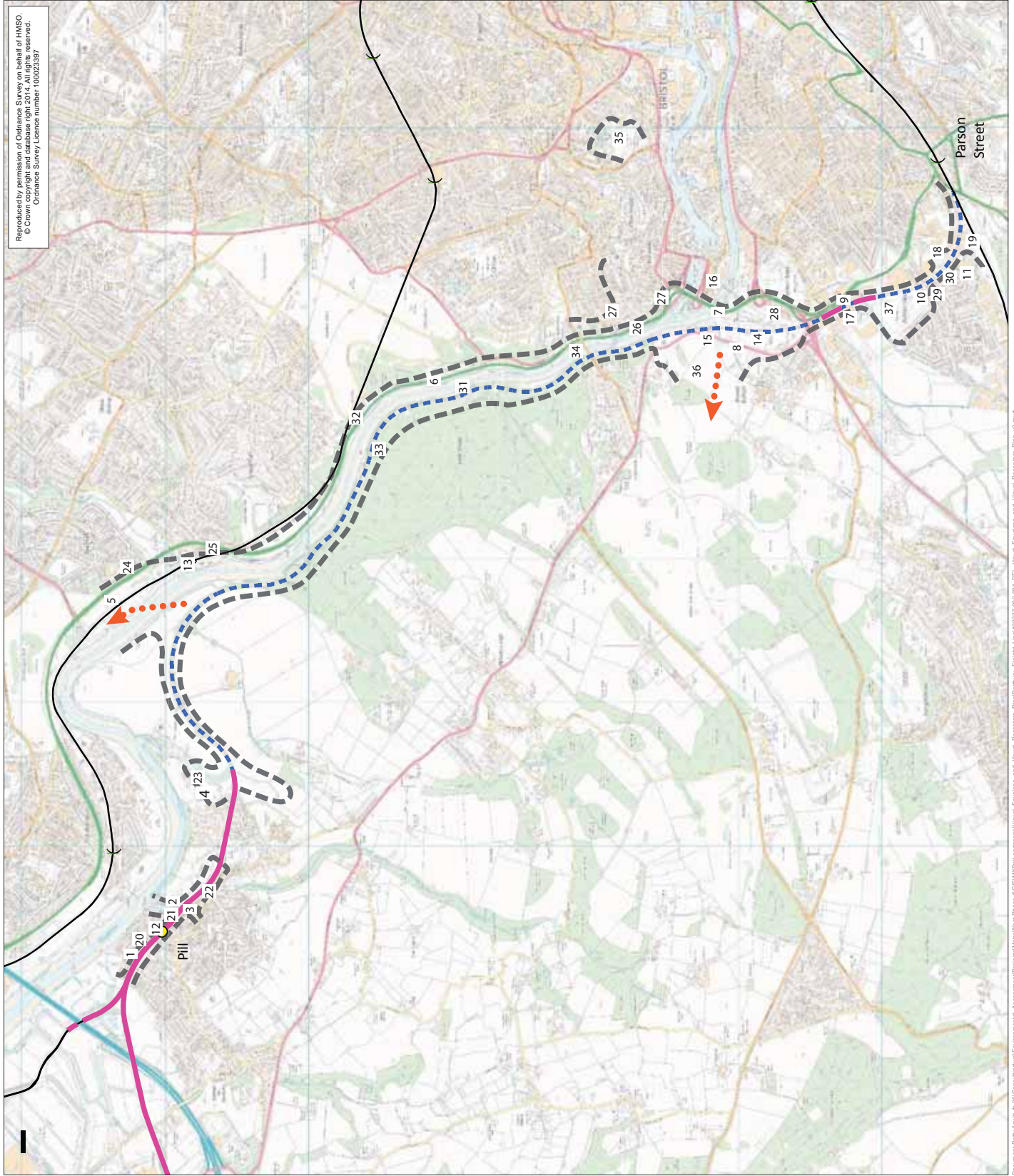
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**Revision:** 2

**Drawing Scale:** 1:25,000 @ A3

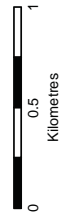


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**KEY**

- ( Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line boundary
- Network Rail Permitted Development Rights
- Pili Railway Station
- Visual Attributes
  - Approximate visual envelope
  - Long view
- 11 Visual receptor location



**Client**  
North Somerset Council,  
Town Hall, The Quay, Glastonbury,  
Wiltshire, BA4 7JQ

**Consultant**  
GOSMILL  
Burdens Park, Swindon, Wiltshire, SN1 1SD  
(01793 812889) 01475 Fax: 444  
www.gosmill.com

**Project**  
Portishead Branch Line  
(MetroWest Phase 1)

**Drawing**  
Figure 7.9: Pili to Parson Street  
Visual Envelope and Visual Receptors Plan

**Drawn By** : Charlotte Partridge **Date** : 16/09/2015

**Checked By** : Andrew Lindot **Date** : 16/09/2015

**Approved By** : Carolyn Francis **Date** : 16/09/2015

**Drawing No.** : 490327-002-004 **Revision**

**Revision** : 2

**Drawing Scale** : 1:25,000 @ A3

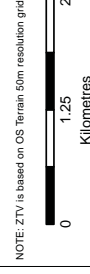


**KEY**

- ( ) Existing Railway Station
- Railway Tunnel
- Existing Railway Line
- - - 3km visibility zone
- Portishead Branch Line
- DCO Indicative Red Line Boundary
- - - Network Rail Permitted Development Rights
- Pill Railway Station

**Zone of Theoretical Visibility (ZTV)**

- Not visible
- Visible



NOTE: ZTV is based on OS Terrain 50m resolution grid

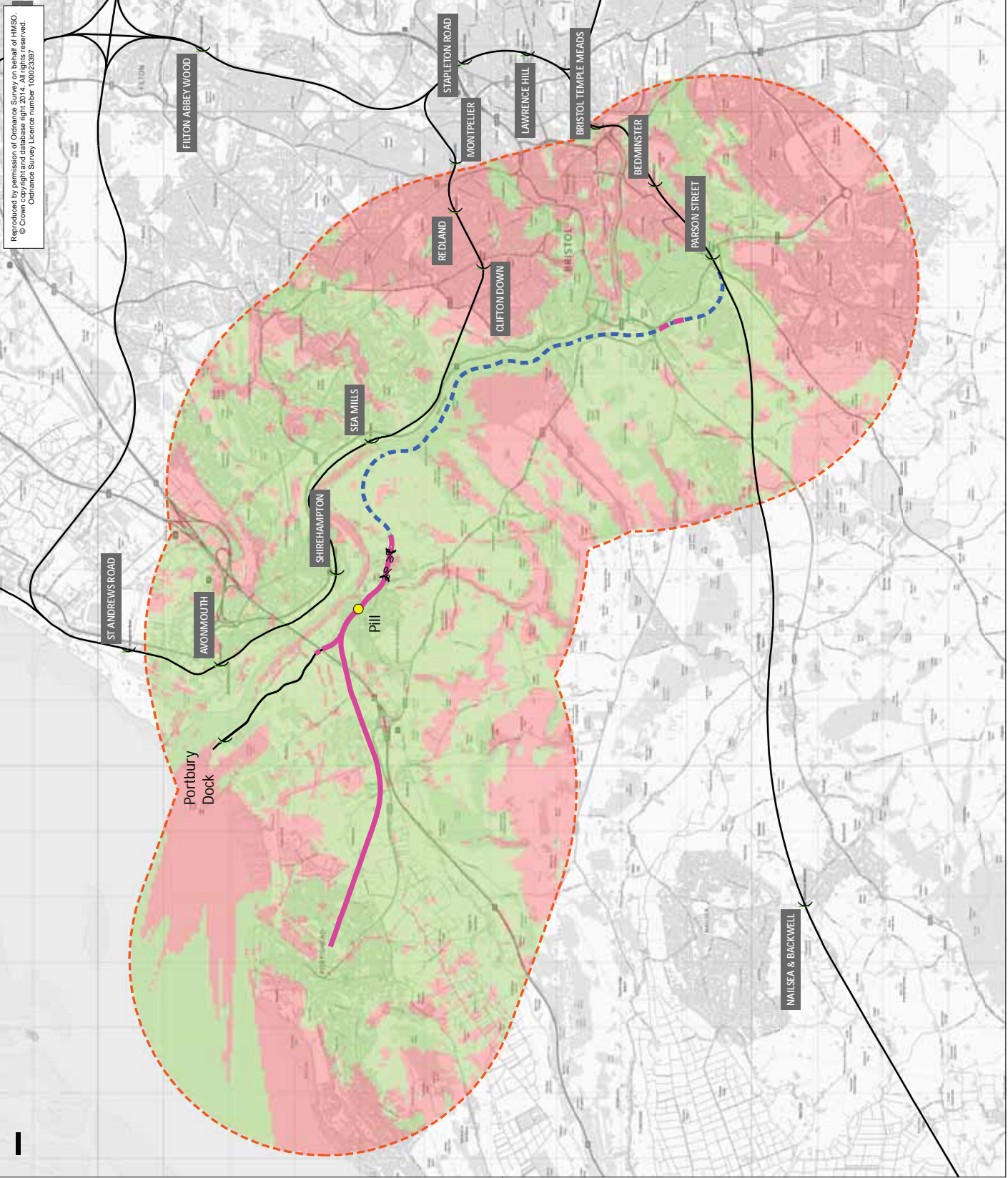
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 7.10: Visual Baseline ZTV

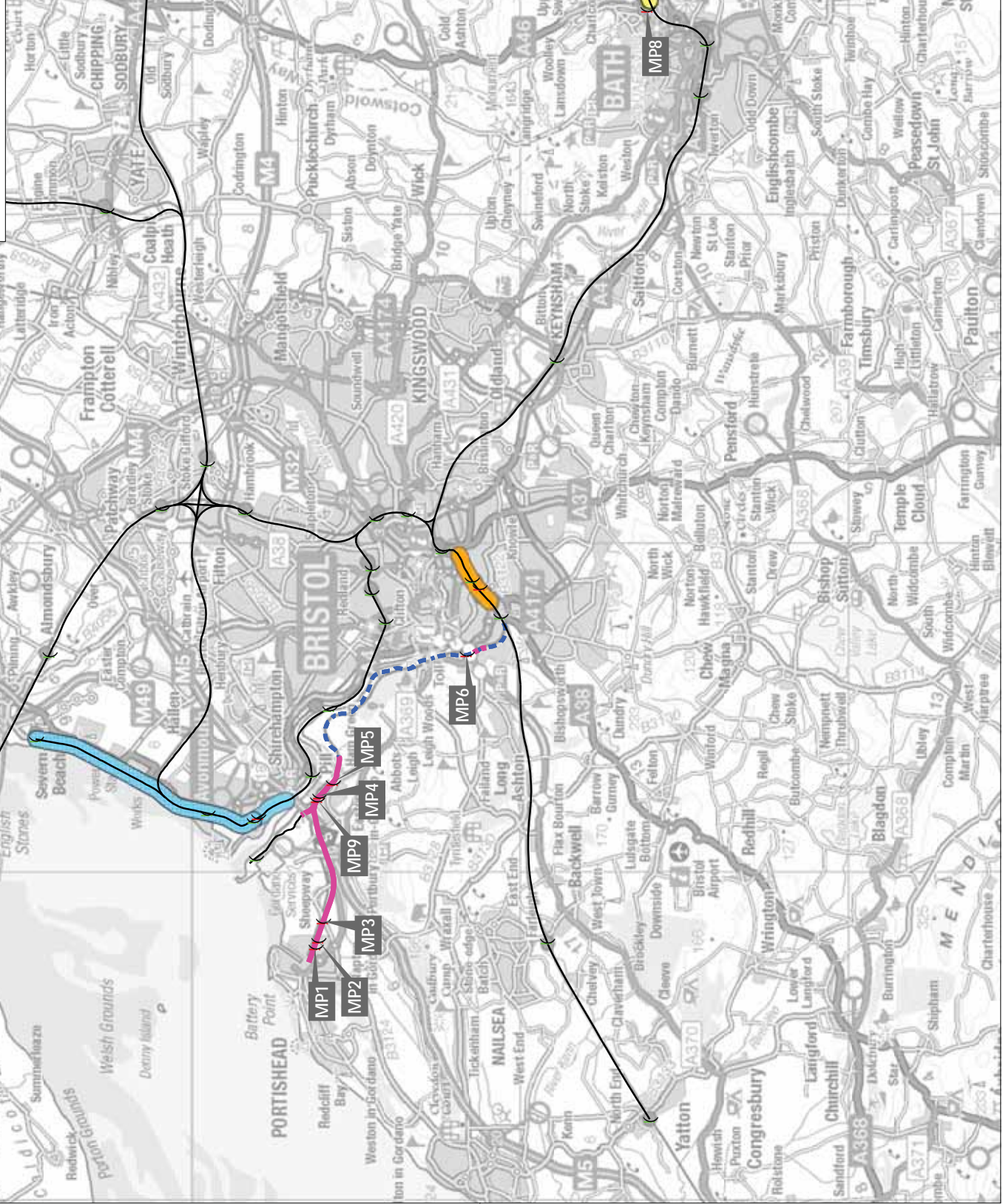
Drawn By:	Tom Barker	Date:	18/06/2015
Checked By:	Andy Colman	Date:	18/06/2015
Approved By:	Carylyn Francis	Date:	18/06/2015
Drawing No.:	490327-002-003	Revision	2
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**KEY**

- ( Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- Indicative Location of Other Works
- Avonmouth Signal (MetroWest Phase 1) - Option 5B
- Avonmouth Signal (MetroWest Phase 1) - Option 6B
- Bedminster Down Relief Line (MetroWest Phase 1)
- Bathampton Turnback (MetroWest Phase 1)
- Noise Survey
- Noise Measurement Positions



**Client**  
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 BS23 1UJ

**CSM Hill**  
 Geospatial  
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 (01793 812089) 2475 Fax: +44  
 www.cshill.com

**Project:**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:**  
 Figure 9.1: Noise Measurement  
 Positions

Drawn By :	Luke Webb	Date:	19/06/2015
Checked By :	Richard Strat	Date:	19/06/2015
Approved By :	Carolyne Francis	Date:	19/06/2015
Drawing No.:	490327-007-001	Revision	2
Drawing Scale :		1:113,395 @ A3	





**KEY**

- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line**
- DCO Indicative Red Line
- Boundary
- Pill Railway Station
- Public Rights of Way**
- Bridleway
- Footpath
- Restricted Byway
- National Cycle Network
- Traffic free route not on the National Cycle Network



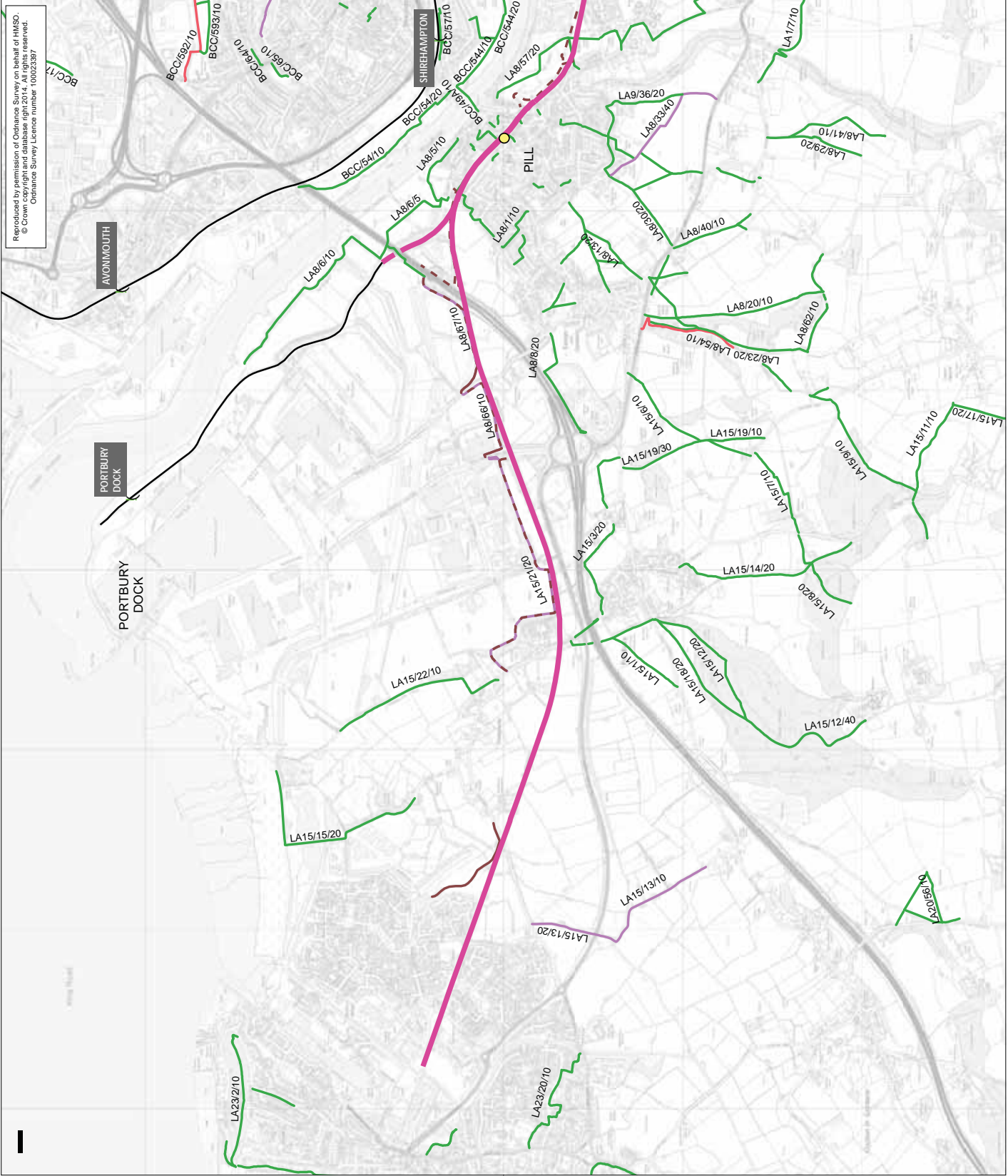
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 North Somerset Council,  
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 Weston, Somerset, TA12 9JF,  
 BS23 1UJ

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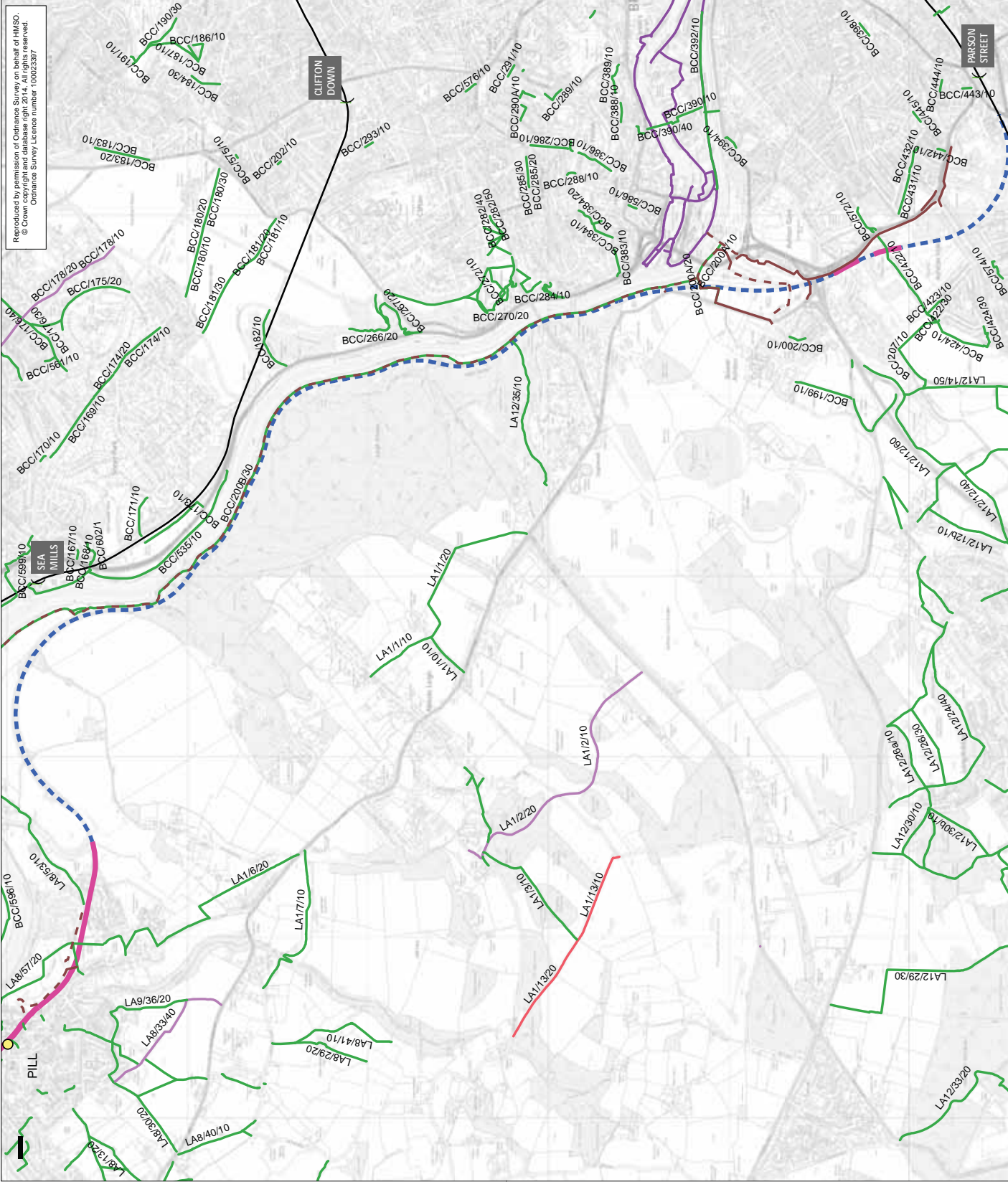
**Project:**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 12.10 -  
 Portishead to Pill  
 Public Rights of Way

Drawn By:	Heleen Winter	Date:	18/06/2015
Checked By:	Heleen Spackman	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-010-001	Revision	2
Drawing Scale:		1:20,000 @ A3	



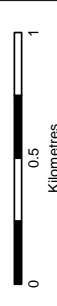
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- KEY**
- ( ) Existing Railway Station
  - Existing Railway Line
  - Portishead Branch Line
  - DCO Indicative Red Line
  - Boundary
  - Network Rail Permitted Development Rights
  - Pill Railway Station
  - Public Rights of Way
  - Bridleway
  - Footpath
  - Restricted Byway
  - National Cycle Network
  - Traffic free route not on the National Cycle Network
  - Quayside Walkways



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 North Somerset Council,  
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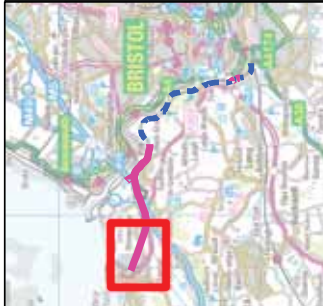
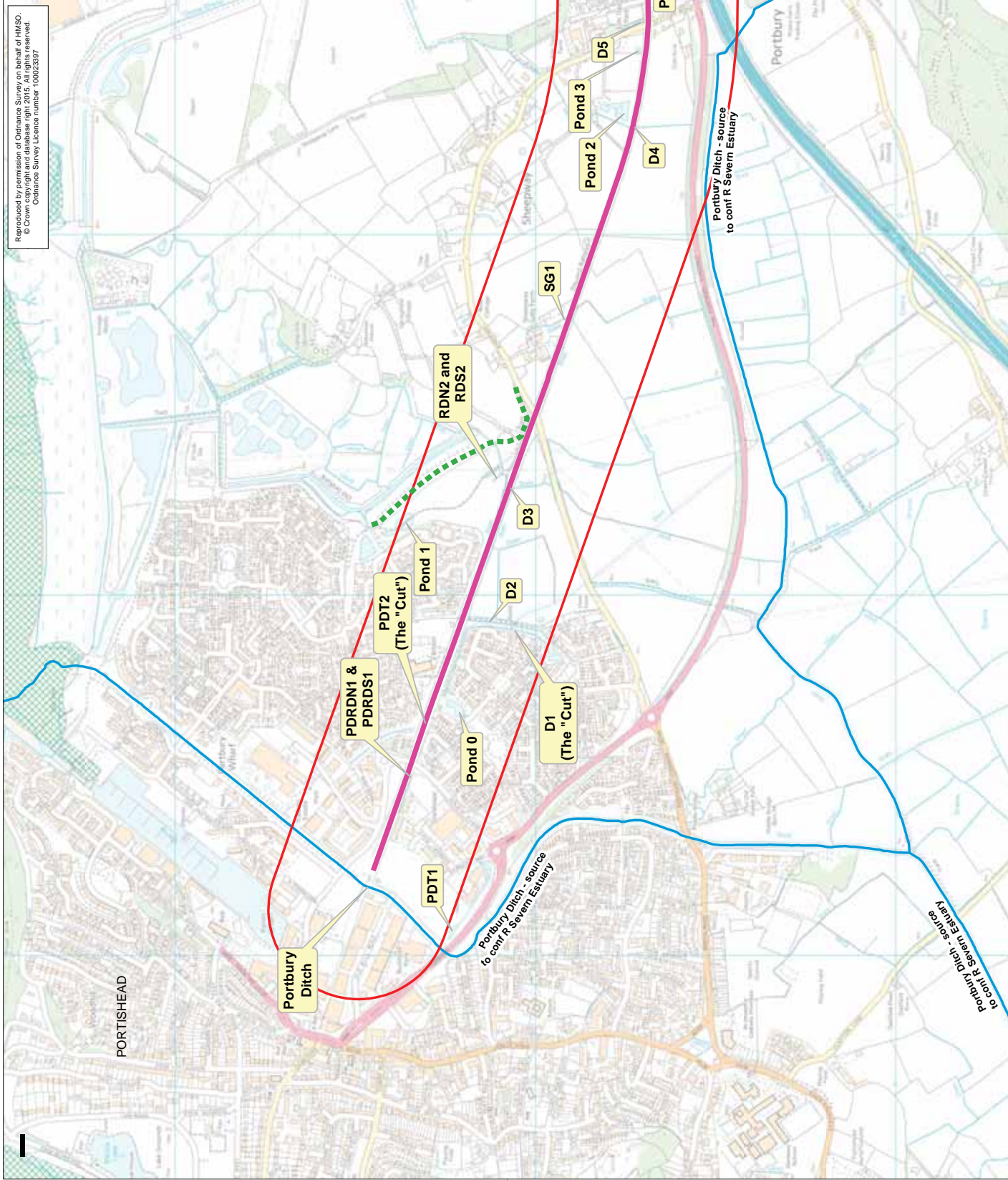
**Project:**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:**  
 Figure 12.11 -  
 Pill to Parsons Street  
 Public Rights of Way

Drawn By : A Callison	Date: 18/06/2015
Checked By : Helen Spackman	Date: 18/06/2015
Approved By : Carolyn Francis	Date: 18/06/2015
Drawing No. : 490327-010-001	Revision : 2
Drawing Scale : 1:20,000 @ A3	



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**KEY**

- 250m Radius
- Existing Railway Station
- Portishead Branch Line
- DCO Indicative Red Line Boundary
- Water Framework Directive - River Waterbody
- Water Framework Directive - Transitional Waterbodies
- 18 tonne slew. Access to inland bund & vertical wall.
- Need to retain access



**Client**  
 North Somerset Council,  
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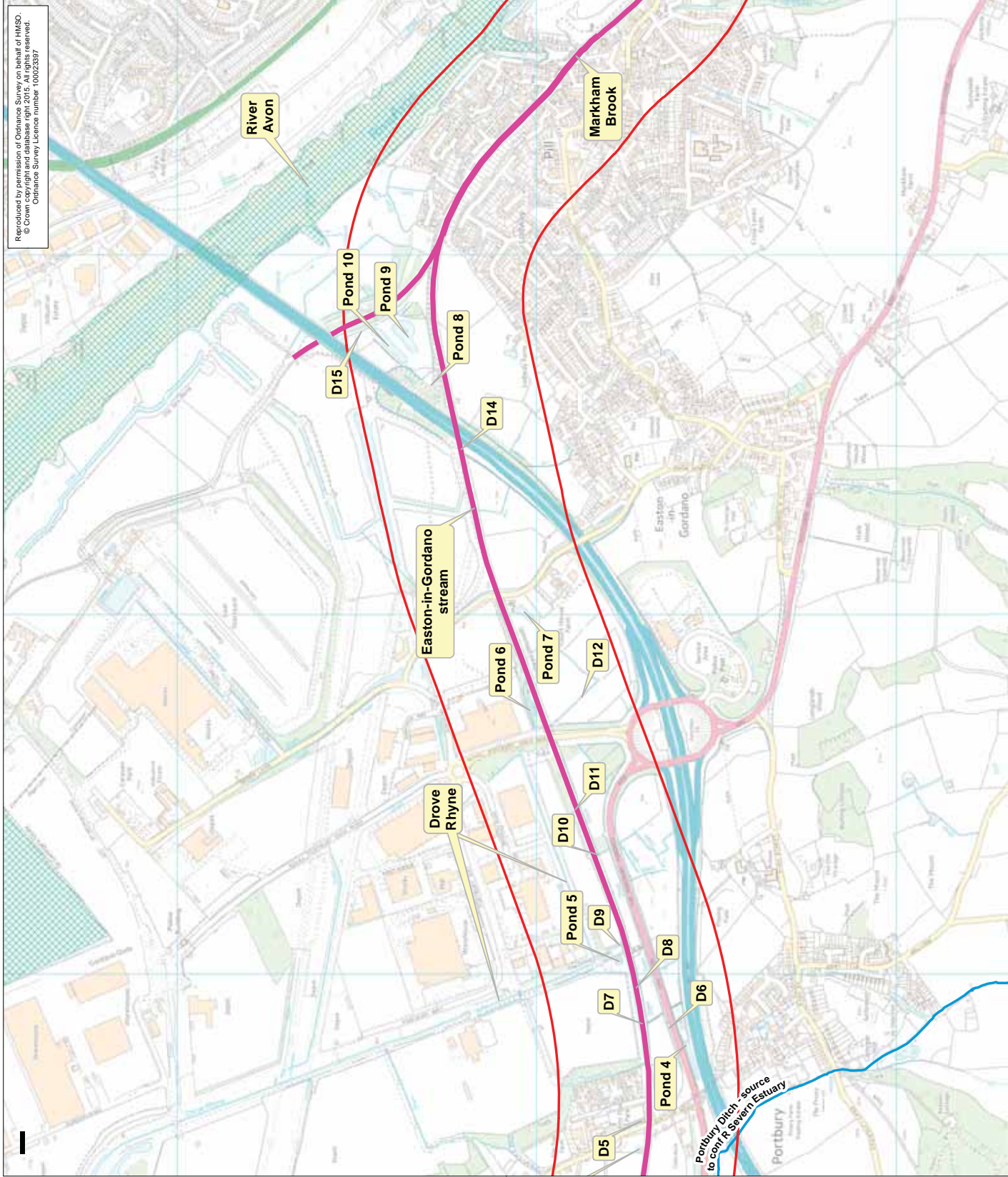
**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 13.1: Water Features - Portishead to Portbury

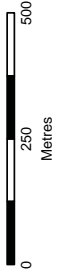
Drawn By:	Martin Costello	Date:	18/06/2015
Checked By:	Andrew Wilkins	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-004 - 1	Revision	2
Drawing Scale:		1:10,000 @ A3	



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- KEY**
- 250m Radius
  - Existing Railway Station
  - Portishead Branch Line
  - DCO Indicative Red Line
  - Boundary
  - Water Framework Directive - River Waterbody
  - Water Framework Directive - Transitional Waterbodies



**Client**  
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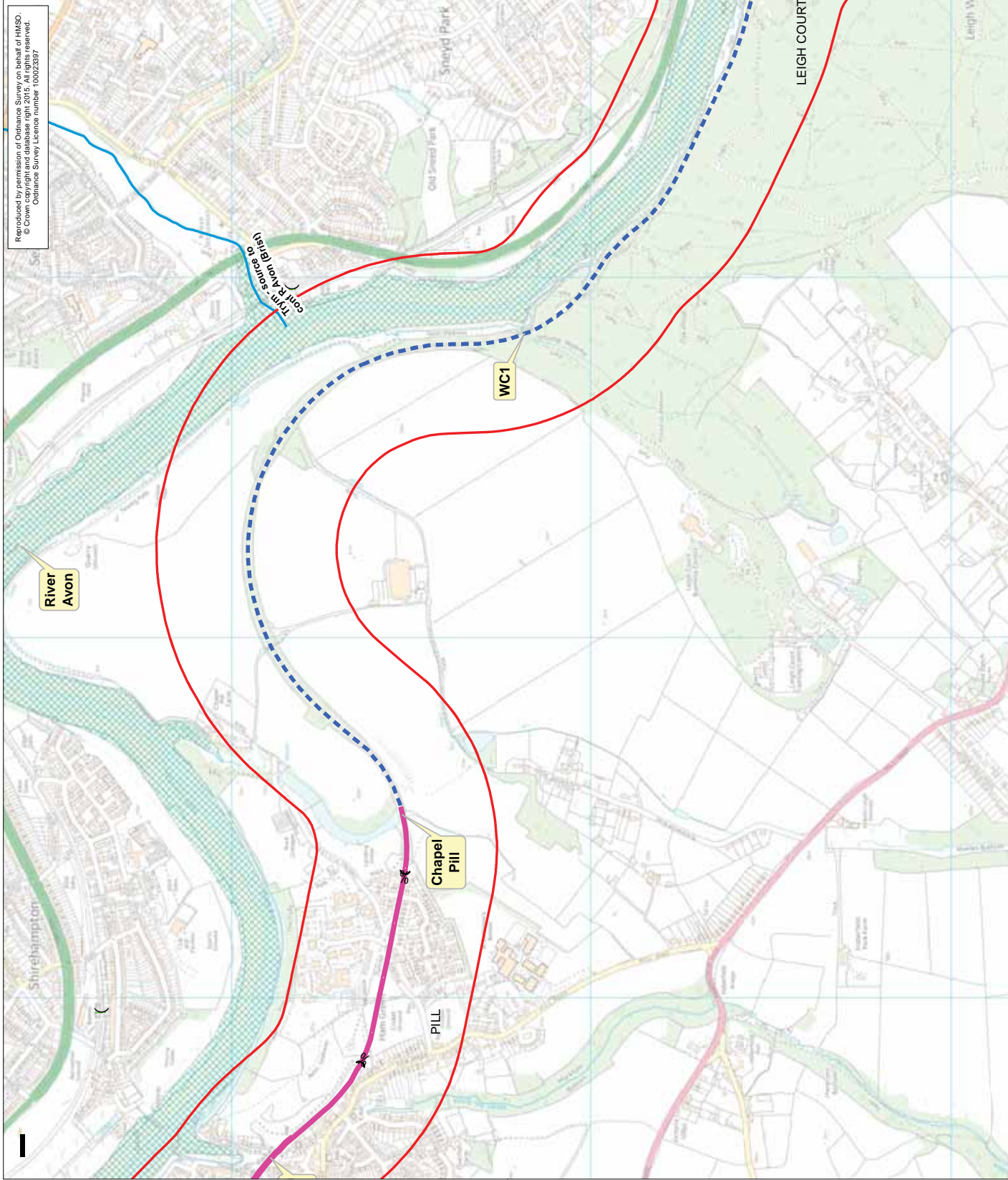
**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 13.2: Water Features - Portbury to Pili

Drawn By:	Martin Costello	Date:	18/06/2015
Checked By:	Andrew Wilkins	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-004 - 2	Revision	2
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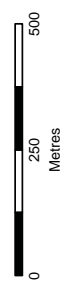


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**KEY**

- 250m Radius
- Existing Railway Station
- Railway Tunnel
- Portishead Branch Line
- DCO Indicative Red Line
- Network Rail Permitted Development Rights
- Water Framework Directive - River Waterbody
- Water Framework Directive - Transitional Waterbodies



**Client**  
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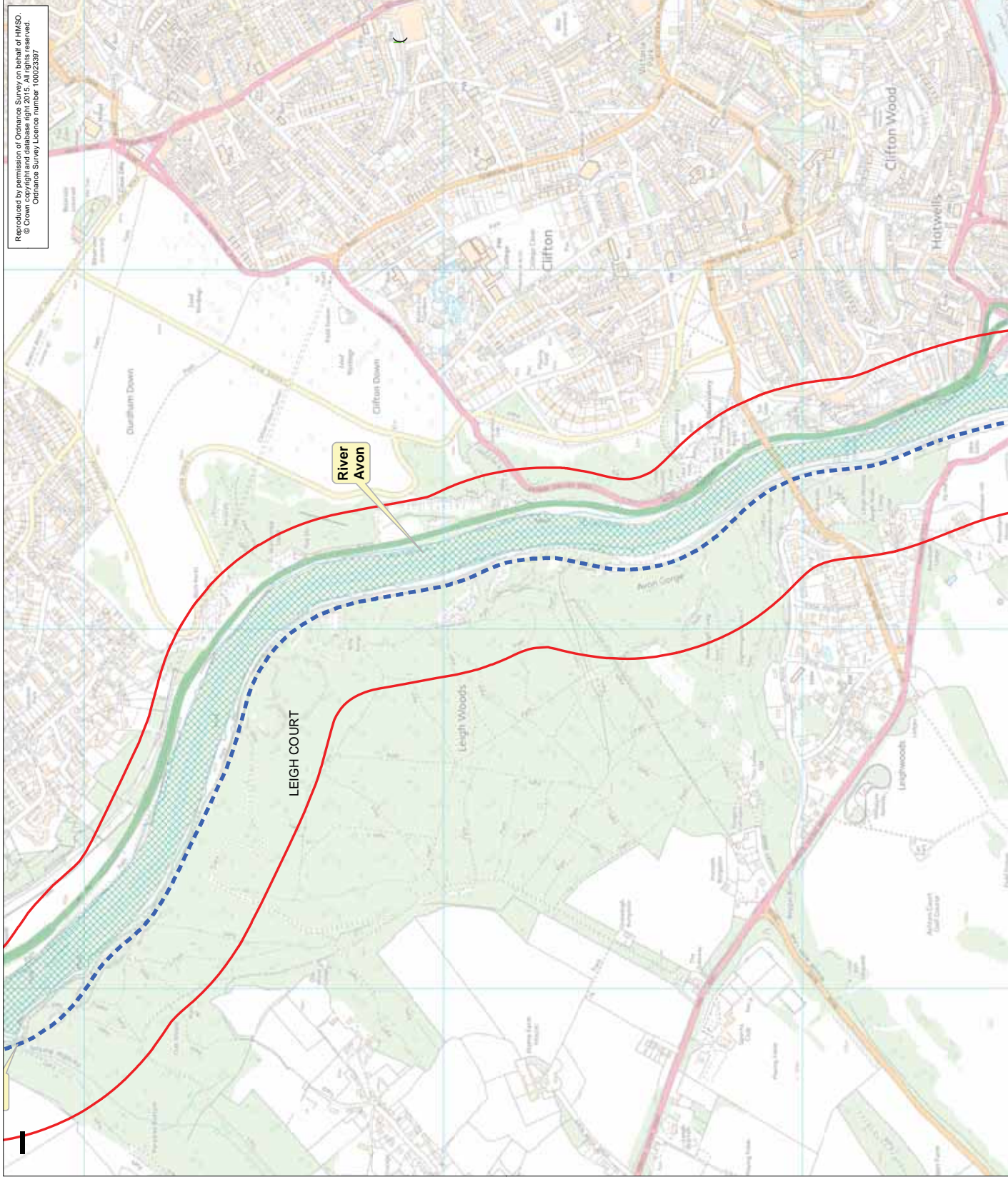
**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 13.3: Water Features - Pill to Leigh  
 Court

Drawn By:	Martin Costello	Date:	18/06/2015
Checked By:	Andrew Wilkins	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-004 - 3	Revision	2
Drawing Scale:		1:10,000 @ A3	

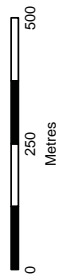


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**KEY**

- 250m Radius
- ( Existing Railway Station
- Portishead Branch Line
- Network Rail Permitted Development Rights
- Water Framework Directive - River Waterbody
- Water Framework Directive - Transitional Waterbodies



**CLIENT**  
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 www.c3i2m.com

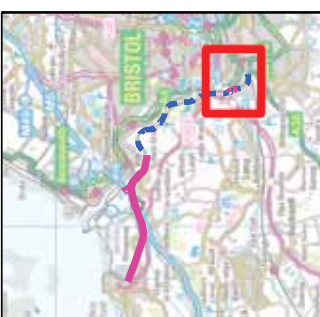
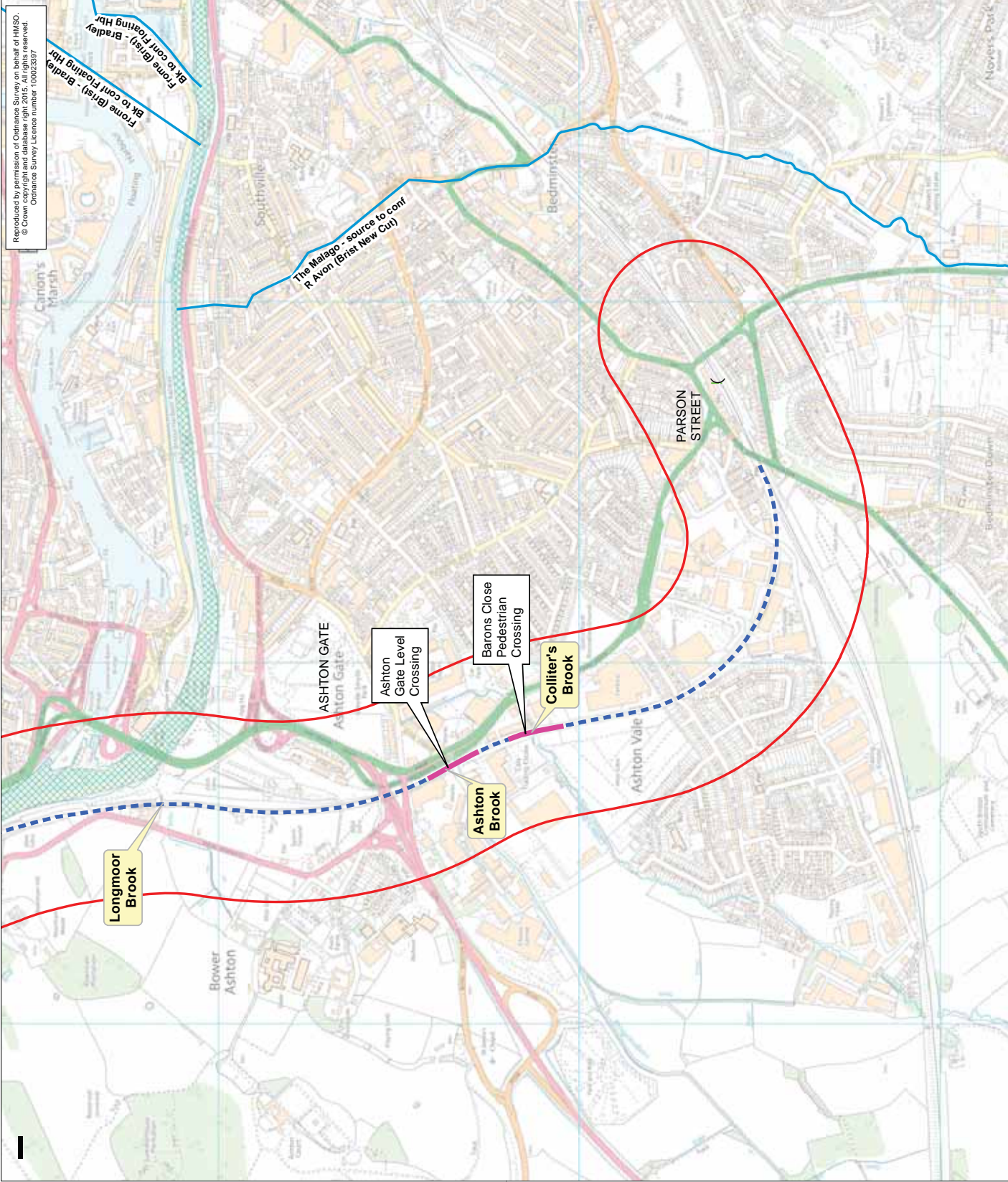


**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 13.4: Water Features - Leigh Court  
 to Ashton Gate

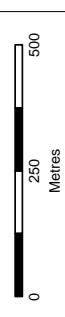
Drawn By:	Marin Costello	Date:	18/06/2015
Checked By:	Andrew Wilkins	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-004 - 4	Revision	2
Drawing Scale:		1:10,000 @ A3	





**KEY**

- 250m Radius
- Existing Railway Station
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- Water Framework Directive - River Waterbody
- Water Framework Directive - Transitional Waterbodies



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**Project:** Portishead Branch Line (MetroWest Phase 1)

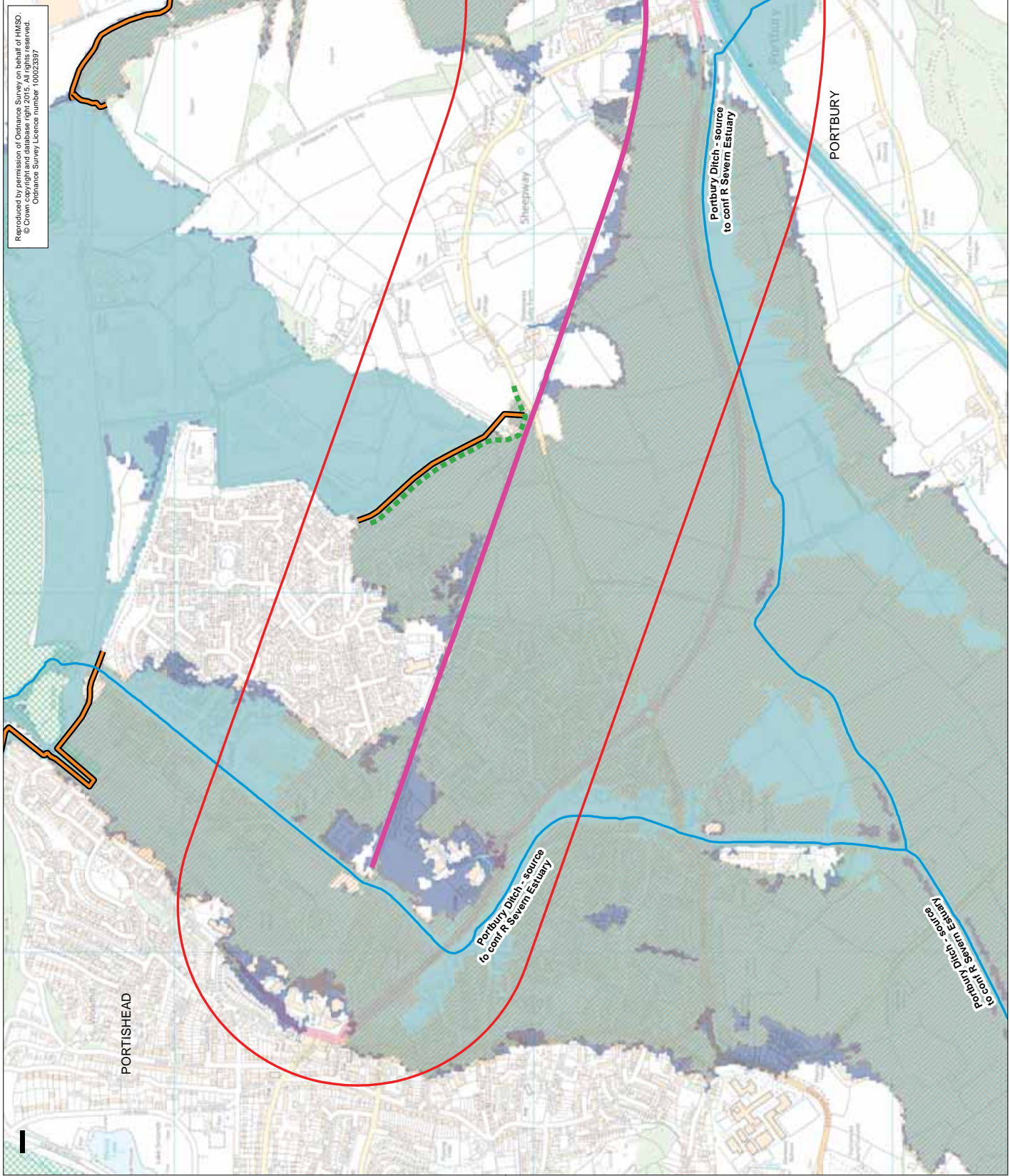
**Drawing:** Figure 13.5: Water Features - Ashton Gate to Parson Street

Drawn By:	Marin Costello	Date:	18/06/2015
Checked By:	Andrew Wilkins	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-004 - 5	Revision:	2
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**KEY**

- 500m Radius
- Portishead Branch Line**
- DCO Indicative Red Line
- Boundary
- Flood Zone Features**
- Water Framework Directive - Transitional Waterbodies
- Water Framework Directive - River Waterbody
- Flood Defences
- Flood zone 2
- Flood zone 3
- Areas Benefiting from Defence
- 18 tonne slew. Access to inland bund & vertical wall.
- Need to retain access



**Client**  
 North Somerset Council,  
 Town Hall, Civic Road,  
 Weston-super-Mare,  
 BS23 1UJ

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 (01793 812089) 5 2475 Fax: +44  
 www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 13.6: Flood Zones and Water Resources - Portishead to Portbury

Drawn By:	Tom Barker	Date:	18/06/2015
Checked By:	Emily Earing	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-003-1	Revision	2

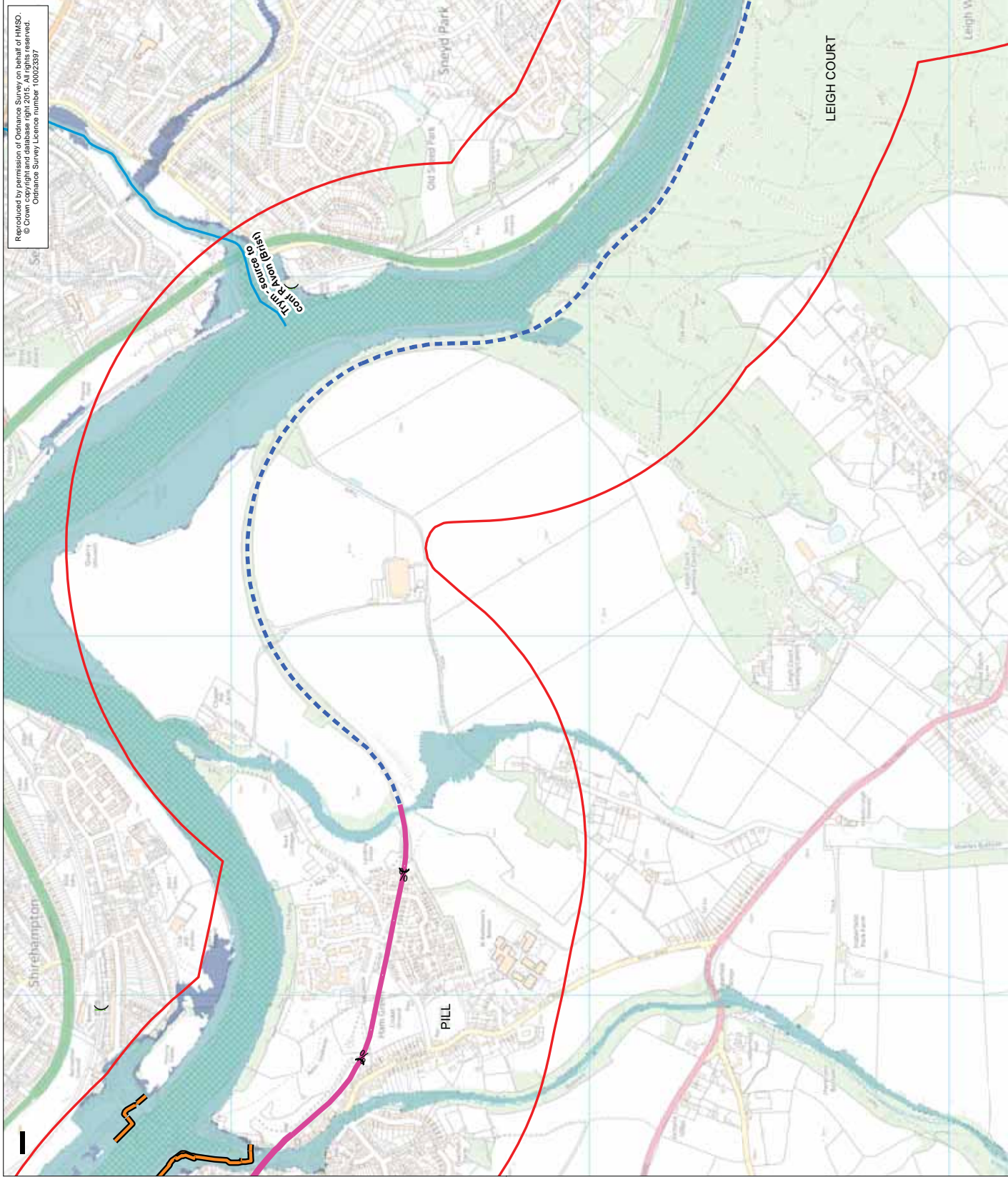
Drawing Scale: 1:10,000 @ A3





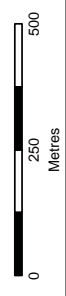


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**KEY**

- 500m Radius
- ( Existing Railway Station
- ) Railway Tunnel
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- Flood Zone Features**
- Water Framework Directive - Transitional Waterbodies
- Water Framework Directive
- River Waterbody
- Flood Defences
- Flood zone 2
- Flood zone 3



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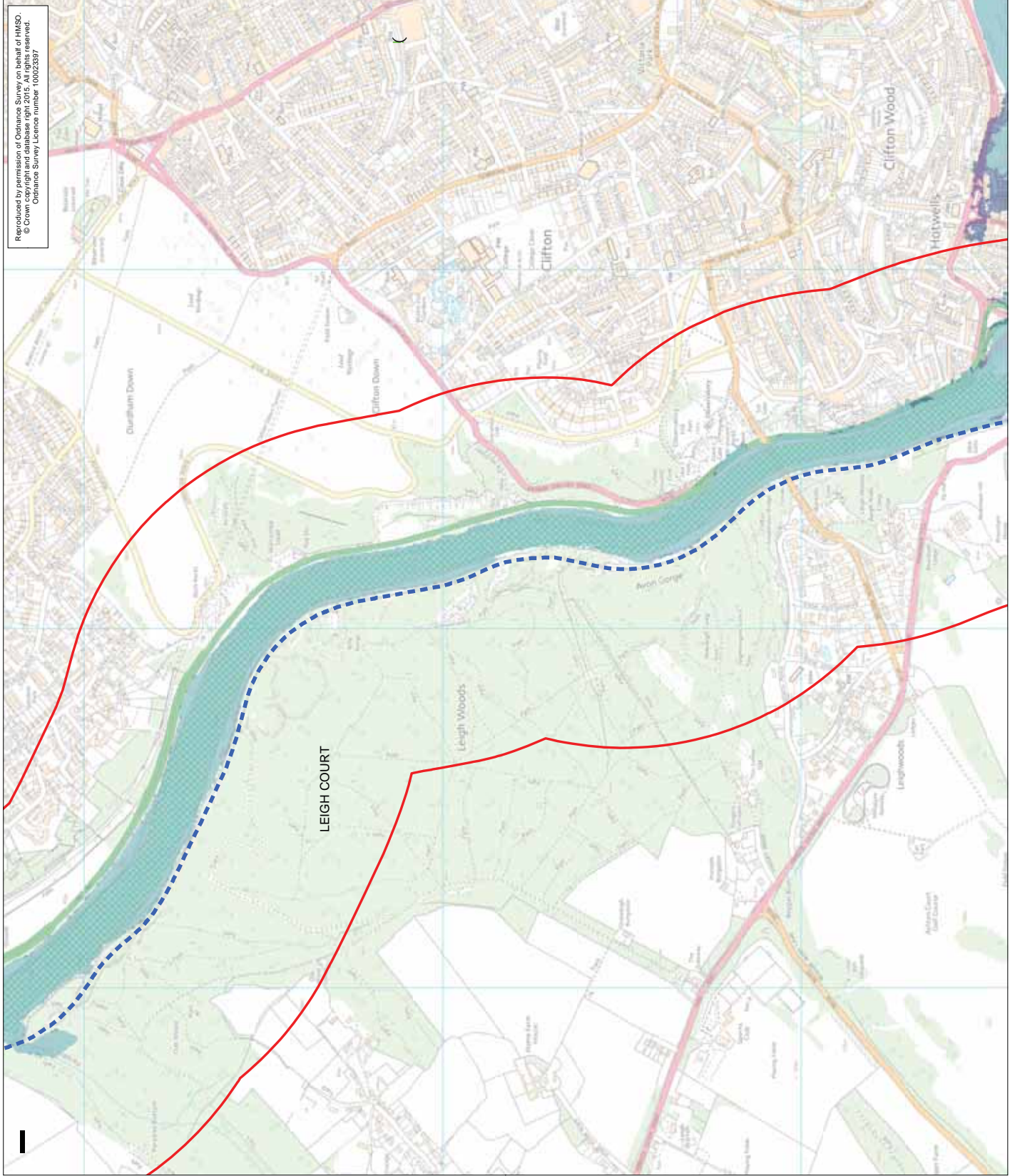
**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure 13.8: Flood Zones and Water Resources - Pill to Leigh Court

Drawn By:	Tom Barker	Date:	18/06/2015
Checked By:	Emily Earing	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-003-3	Revision	2
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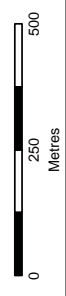


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**KEY**

- 500m Radius
- Existing Railway Station
- Portishead Branch Line
- Network Rail Permitted Development Rights
- Flood Zone Features
- Water Framework Directive - Transitional Waterbodies
- Flood zone 2
- Flood zone 3



**Client**  
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 Weston-super-Mare,  
 BS23 1UJ



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**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Resources - Leigh Court to Ashton Gate

Drawn By:	Tom Barker	Date:	18/06/2015
Checked By:	Emily Earing	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-005-003-4	Revision	2

Drawing Scale: 1:10,000 @ A3





**KEY**

- 500m Radius
- Existing Railway Station
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights

**Flood Zone Features**

- Water Framework Directive - Transitional Waterbodies
- Water Framework Directive - River Waterbody
- Flood Defences
- Flood zone 2
- Flood zone 3

**Scale:** 0 250 500 Metres

**Client:** North Somerset Council, Town Hall, Orchard Road, Weston-super-Mare, BS23 1UJ

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www.ch2m.com

**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 13.10: Flood Zones and Water Resources - Ashton Gate to Parson

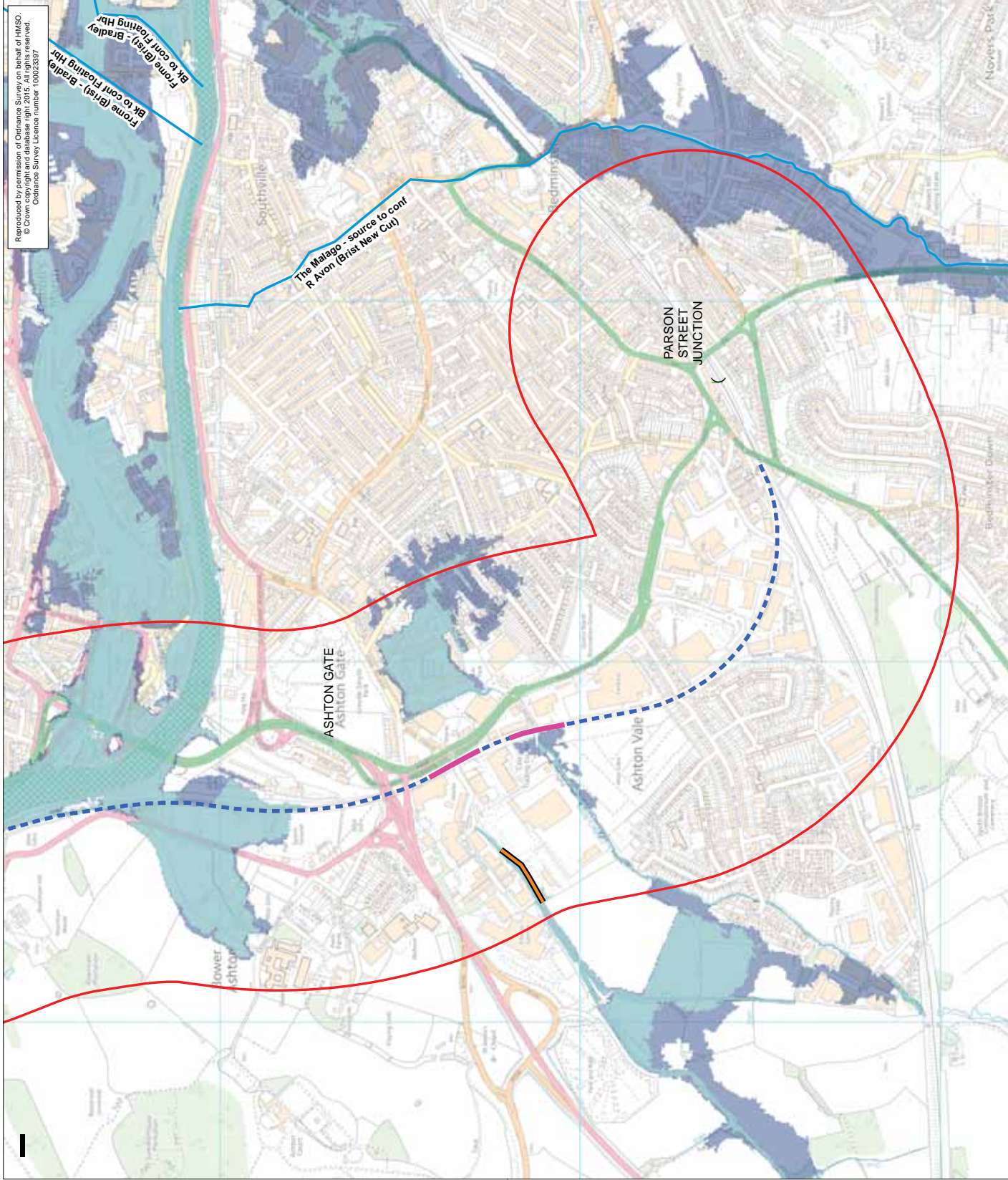
**Drawn By:** Tom Barker **Date:** 18/06/2015

**Checked By:** Emily Earing **Date:** 18/06/2015

**Approved By:** Carolyn Francis **Date:** 18/06/2015

**Drawing No.:** 490327-005-003-5 **Revision:** 2

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# Appendix B

## Baseline for Other Works



# Appendix B: Baseline for Other Works

## Contents

Appendix B.1: Existing Environment at Bathampton Turnback (MetroWest Phase1)

Appendix B.2: Existing Environment at Severn Beach / Avonmouth Signalling (MetroWest Phase 1)

Appendix B.3: Existing Environment for the Bedminster Down Relief Line (MetroWest Phase 1)





Appendix B.1: Existing Environment  
at Bathampton Turnback  
(MetroWest Phase1)



# Appendix B.1: Existing Environment at Bathampton Turnback (MetroWest Phase 1)

---

## 1.1. Introduction

- 1.1.1. The “Bathampton Turnback (MetroWest Phase 1)” Project is a relatively small scale project which is required to provide increased local train services between Bristol and Bath under MetroWest Phase 1. The Project involves constructing a crossing between the up and down main lines between London and Bristol, and a siding with a short platform to allow the train driver to alight and walk to the other end of the train. All the works will be located within the operational railway land.
- 1.1.2. The Bathampton Turnback (MetroWest Phase 1) Project is located on the mainline railway, part way between Bath and Bathampton. The A4 and River Avon lie to the north of the Scheme and the Kennet and Avon Canal and Warminster Road to the south (Figure B1.1).
- 1.1.3. The site is located in a relatively rural area associated with the River Avon floodplain and wooded hills to the south. The outer suburbs of Bath, Larkhall and Bathwick, lie to the north east and south east respectively, while Batheaston lies to the north east, and Bathampton to the east. The University of Bath lies south of the project.

## 1.2. Local planning framework

- 1.2.1. Bathampton Turnback (MetroWest Phase 1) lies within the jurisdiction of the Bath and North East Somerset Council (“B&NES”). The statutory development plan for B&NES comprises the following suite of documents, which are used alongside the National Planning Policy Framework (“NPPF”) to guide development.
  - The Bath & North East Somerset Core Strategy (Adopted July 2014): The Core Strategy sets out the overall approach and spatial strategy for future planning development in Bath and North East Somerset and provides the overarching strategic policy and guidance to deliver sustainable economic growth across the District. The Core Strategy replaces a number of strategic policies saved from the 2007 Local Plan.
  - Bath & North East Somerset Local Plan Saved Policies (2007): A number of policies from the Local Plan have been saved by a Secretary of State Direction and remain a material consideration until replaced. Whilst the Core Strategy has replaced a number of saved policies, there are still saved policies that remain extant and relevant to the scheme.
  - West of England Joint Waste Core Strategy (2011): the Joint Waste Core Strategy supersedes all 2007 Local Plan policies on Waste apart from Policies WM.4 and WM.9.
- 1.2.2. Other policy considerations include the emerging Placemaking Plan, which will complement the strategic framework in the Core Strategy by setting out detailed development principles for development sites and other management policies across Bath and North East Somerset. The Placemaking Plan is still in the early stages in the statutory plan preparation process and therefore very little weight can currently be attributed to it at this stage. The Council consulted on an Options document in November 2014. The Plan is due to be submitted to the Secretary of State in January 2016, with adoption expected to take place in September 2016.
- 1.2.3. Of these plans, the policies within the Core Strategy and the saved policies of the Local Plan are of particular relevance to the Bathampton Turnback (MetroWest Phase 1) Project and are discussed further in the Baseline Report in Chapter 2.

## 1.3. Air quality

- 1.3.1. The Local Air Quality Management (LAQM) process, as set out in Part IV of the Environment Act 1995 and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007,

places an obligation on all local authorities regularly to review and assess air quality in their areas, and to determine whether or not air quality objectives are being achieved.

- 1.3.2. The UK government is responsible to the European Commission (“EC”) for ensuring that it complies with the provisions of the European Union (“EU”) Directives. The UK government and governments of other Member States are currently in negotiations with the EC over breaching limit values for particulate matter (“PM<sub>10</sub>”) and nitrogen dioxide (“NO<sub>2</sub>”). The air quality strategy objectives are presented in Table B.1.1, showing the objectives in units of microgrammes per cubic metre (µg/m<sup>3</sup>) with the number of exceedances in each year that are permitted (where applicable).

**Table B.1.1. Air Quality Strategy Objectives**

<b>Pollutant</b>	<b>Concentration</b>	<b>Measured as</b>	<b>Date to be achieved by</b>
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004 31.12.2010
	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	
	40 µg/m <sup>3</sup>	Annual mean	31.12.2004

- 1.3.3. Where it is anticipated that an air quality objective will not be met, it is a requirement of the Environment Act 1995 that an Air Quality Management Area (“AQMA”) be declared, for which the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.
- 1.3.4. B&NES has declared one AQMA in the centre of Bath, which extends along the main roads including Warminster Road and London Road. The Bath AQMA is located approximately 500m from the Bathampton Turnback project and has been declared for NO<sub>2</sub> (1-hour mean and annual mean objectives). The location of the AQMA is provided on Figure 3.1 in Appendix A of the Baseline Report.
- 1.3.5. B&NES operates seven continuous monitoring stations and a further 76 diffusion tube sites for NO<sub>2</sub> measurements. Annual mean bias adjusted NO<sub>2</sub> measurements for the sites closest to the Bathampton Turnback are shown in Table B.1.2 for 2009 to 2012 (all of which are based on diffusion tube measurements).



**Table B.1.2. Results of Non-Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective**

ID	Location	X	Y	Site Type	Data Capture for 2011 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
						(Bias adjustment factor = 0.96) 2009	(Bias adjustment factor = 0.90) 2010	(Bias adjustment factor = 0.89) 2011	(Bias adjustment factor = 0.95) 2012
DT59	Bathampton School	377781	166567	Suburban	100	20	20	17	20
DT58	Batheaston, 240 London Road West	377643	167365	Roadside	100	35	33	35	34
DT57	Batheaston, High St 3	377628	167369	Roadside	100	26	24	28	26

*Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup>*

Source: B&NES, August 2013. Air Quality Progress Report for Bath and North East Somerset Council

- 1.3.6. No PM<sub>10</sub> monitoring data are available near the proposed Bathampton Turnback (MetroWest Phase 1). The nearest NO<sub>2</sub> monitoring site is DT59, located in Bathampton School approximately 50m southwest of the proposed project. The data from all three nitrogen dioxide (NO<sub>2</sub>) diffusion tube locations show that the NO<sub>2</sub> concentrations are well below the annual mean objective for NO<sub>2</sub> at each site.

## 1.4. Cultural heritage

### Statutory designations

- 1.4.1. Cultural heritage assets in the vicinity of Bathampton Turnback (MetroWest Phase 1) are shown in Figure B1.2. There are no scheduled monuments, registered battlefields, registered historic parks and gardens or conservation areas within a 500 m buffer area of Bathampton Turnback (MetroWest Phase 1).
- 1.4.2. The Bath World Heritage Site (“WHS”) covers the Roman city of Aquae Sulis and the medieval wool-producing town that followed on from the Romano-British era. This is an international designation and is accorded a **very high** value. The WHS comes within 500 m of Bathampton Turnback (MetroWest Phase 1) and the north eastern edges of the WHS designation are visible from the Scheme.
- 1.4.3. There are 34 listed buildings within 500 m of the Project, of which three lie along the railway track or immediately adjacent to the existing railway line.
- Meadow Farmhouse: located approximately 40 m north of the railway line, is a coursed rubble-built house dating to 1826.
  - Bridge over the Railway, to the north of the Kennet and Avon Canal Bridge: a three-arched brick structure dating from 1840 and engineered by Isambard Kingdom Brunel.
  - Bridge over the Kennet and Avon Canal: this listed structure dates to 1805-10.
- 1.4.4. These buildings are all Grade II listed and are accorded a **medium** value.
- 1.4.5. There are concentrations of listed buildings running roughly parallel to the railway line on the Bathampton and London Roads, 250 m and 400 m to the south and north respectively. There is a third listed railway bridge on Mill Lane, which is outside the 500m buffer area.

### Non-designated assets

- 1.4.6. There are two known archaeological monuments within the 500 m buffer area ([www.pastcape.org.uk](http://www.pastcape.org.uk)):
- 203259 – A granite Neolithic axe head was found in Bathampton parish prior to 1914. The Neolithic axe head has been removed from its original context and therefore has no heritage value as a receptor.
  - 1359734 – The Bradford upon Avon Branch Railway. The branch line to Bradford from Staverton on the Wiltshire, Somerset and Weymouth line was originally authorised in 1845 as part of that scheme. The line from Staverton was nearly completed in 1848, Bradford station was ready, and only the rails needed to be laid when labour was suddenly withdrawn by the Great Western Railway (“GWR”). In 1854, the GWR asked for powers to extend the route through to Bathampton, and this was completed in 1857 as a single track railway. The railway is accorded a **low** heritage value.

### Recommendations for further survey work

- 1.4.7. A review of ground investigation results within the general construction zone would inform the need for detailed archaeological assessment and investigation. However, given the proposed design, the likelihood of buried archaeology being affected is low.

- 1.4.8. The presence of listed buildings within and adjacent to the Project is of more relevance with respect to historic environmental impacts. It is recommended that a heritage statement is prepared in order to quantify the potential impacts on historic railway structures, both designated and non-designated. This is in accordance with conditions within the NPPF.

## 1.5. Ecology and biodiversity

### Approach

- 1.5.1. A desk study was conducted for a search area encompassing the site and surrounding land within a 0.5 km buffer from the site for all records and local sites, within 2.5 km for bats and nationally designated sites, and within 5 km for internationally designated sites. This area was considered to be sufficient to cover the likely zone of influence of the proposed scheme. Data sources consulted during the desk study were:
- the Multi-Agency Geographic Information for the Countryside website (“MAGIC”); and
  - Bristol Regional Environmental Records Centre (“BRERC”), for protected, notable species data, descriptions for Local Nature Reserves, non-statutory designated sites and Wildlife Trust reserves.
- 1.5.2. Where applicable, information supplied by these organisations has been incorporated into the following account with due acknowledgement where they are particularly informative or relevant.
- 1.5.3. An extended Phase I Habitat Survey was undertaken from Candy Bridge on Meadow Lane by two experienced ecologists on 14 March 2014, as access on to the track was not possible. The survey followed the methodology of the Joint Nature Conservation Committee (“JNCC”) standard Phase 1 habitat survey (JNCC, 2010<sup>1</sup>). The scope and detail of the survey undertaken follow the recommendations made by the Guidelines for Preliminary Ecological Appraisal (IEEM, 2012<sup>2</sup>).
- 1.5.4. As the survey was conducted from Candy Bridge, signs of protected species or valued species of flora may have been missed. Populations of animals and plants are often transient in nature and a single survey visit can only provide a general indication of species present on site. The survey was carried out in early spring when some animals and plants would not be apparent, although the plants recorded are representative of the habitats present and any omissions are considered unlikely to be of significance. Therefore, although evidence of a species may not be recorded it does not mean that the species may not be present at more favourable times of year.
- 1.5.5. The habitats and species evaluations are based on the guidance from the Institute of Ecology and Environmental Management (IEEM, 2006<sup>3</sup>). The level of value of specific ecological receptors is assigned using a geographic frame of reference, i.e. international value being most important, then national, regional, county, district, local and lastly, within the immediate zone of influence of the proposals only.
- 1.5.6. Value judgments are based on various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity. These include site designations (such as Sites of Special Scientific Interest (“SSSI”)), or for undesignated features,

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<sup>1</sup> Joint Nature Conservation Committee (2010) *Handbook for Phase I Habitat Survey – a Technique for Environmental Audit*, reprinted 2010, JNCC, Peterborough

<sup>2</sup> Institute of Ecology and Environmental Management (2012) *Guidelines for Preliminary Ecological Appraisal*. Revised 2nd Edition. IEEM. Winchester. Joint Nature

<sup>3</sup> Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment within the United Kingdom*. IEEM. Winchester

the size, conservation status (locally, nationally or internationally), and the quality of the ecological resource. In terms of the latter, 'quality' can refer to habitats (for instance if they are particularly diverse, or a good example of a specific habitat type), other features (such as wildlife corridors or mosaics of habitats) or species populations or assemblages.

## Designated sites




- 1.5.7. There is one internationally designated site within a 5km radius of Bathampton Turnback (MetroWest Phase 1), namely, the Bath and Bradford-on-Avon Bats Special Area of Conservation ("SAC"), which comprises several locations (Figure B1.3).
- 1.5.8. The Bath and Bradford-on-Avon Bats SAC lies at a minimum distance of 950 m from Bathampton Turnback. The SAC is designated for hibernating greater horseshoe bat *Rhinolophus ferrumequinum* and Bechstein's bat *Myotis bechsteini*.
- 1.5.9. There are no national designations within the Bathampton Turnback project, but there are four designations within a 2.5 km radius (Figure B1.4). Two of these designated sites, Hampton Rocks Cutting SSSI and North Road Quarry Bath SSSI have been designated for their geological interest. Combe Down and Bathampton Down Mines SSSI comprise underground stone workings which have been colonised by hibernating bats. The SSSI forms part of the Bradford-on-Avon SAC mentioned above. Brown's Folly SSSI is a nationally important wintering roost for bats and supports a calcareous grassland community with a restricted distribution in England. The site lies about 1 km east of the Scheme.
- 1.5.10. There are no locally designated Sites of Nature Conservation Importance ("SNCI") within the Project. One SNCI is located immediately adjacent to the Scheme boundary, namely, BN249 the Kennet and Avon Canal and a further five SNCIs are located within the 0.5 km search area (Figure B1.5).
  - BN249 the Kennet and Avon Canal: standing water with associated marginal habitats, semi-natural broadleaved woodland, semi-improved neutral grassland and tall ruderal communities, with potential to support water vole.
  - BN292 the River Avon: running water with associated marginal habitats which may support otter.
  - BN190 Kensington Meadows: flat marshy grassland with local importance for wildlife.
  - BN250 Fields by the canal and railway (Hampton Row): a variety of habitats including wetland vegetation, unimproved / semi-improved limestone grassland, semi-improved neutral grassland and broadleaved woodland.
  - BN259 Bathwick Slopes: calcareous grassland and scrub woodland supporting a diverse limestone flora.
  - BN263 Bathampton Down and Woodlands SNCI: mix of unimproved and semi-improved calcareous grassland, ancient woodland, scrub, semi-natural broad leaved woodland and stream.

## Habitats

- 1.5.11. The results of the Phase 1 Habitat Survey are shown on Figure B1.6 and the target notes and photographs are shown in Table B.1.3. The following habitats are found within the study area and the immediately adjacent habitats.
  - **Scrub** – both scattered and dense scrub comprised of bramble *Rubus fruticosus agg.*, hawthorn *Crataegus monogyna*, beech *Fagus sylvatica* and willow *Salix sp.* saplings.
  - **Semi-improved grassland** – narrow strips of grassland alongside the railway track.

- **Tall ruderals** – In-between scrub habitat and a stand by itself on a bank next to the track, dominated by common nettle *Urtica dioica* and rosebay willowherb *Chamerion angustifolium*.
- **Trees** – There are a number of mature pedunculate oak *Quercus robur* and sycamore *Acer pseudoplatanus* trees within the site.

Table B.1.3. Phase 1 Habitat Survey

Target Note & Photograph Number	Description	Photograph
1	Looking south-west from Candy's Bridge scrub lines either side of the track are vegetated with scrub habitats which include bramble <i>Rubus fruticosus</i> agg., butterfly-bush <i>Buddleja davidii</i> with narrow areas of semi-improved grassland.	
2	Looking north-east from Candy's Bridge, scrub habitat dominates on the steep banks, comprising bramble, willow <i>Salix</i> sp. saplings, butterfly-bush, beech <i>Fagus sylvatica</i> and ivy <i>Hedera helix</i> . To the south are a line of mature pedunculate oak <i>Quercus robur</i> and sycamore <i>Acer pseudoplatanus</i> trees.	
3	A mature tree covered with ivy with the potential to support sites suitable for roosting bats.	



## Protected species

- 1.5.12. A number of protected species records have been received for this site. The following species and/ or their habitats have been confirmed as present within or in habitat immediately adjacent to the Project.

### Amphibians

- 1.5.13. Two water bodies have been identified within 120 m of the Network Rail boundary to the north of the site. There is potential for these water bodies to support great crested newt and for individuals to be using the track and adjacent habitats for foraging and hibernation.

### Badgers

- 1.5.14. No signs of badger were identified during the 2014 survey. BRERC has one record of a badger sett within 500 m of the Project.

### Bats

Numerous records for bats were received by BRERC, the nearest record is for pipistrelle *Pipistrellus pipistrellus* within 500m of the site. No signs of bats were identified during the survey. Candy's Bridge was not assessed for the potential presence of bats as access to the railway track was not available. A mature tree to the east of Candy's bridge has the potential **to support sites suitable for roosting bats.**

### Water vole

- 1.5.15. BRERC has numerous records for water vole from 2003 and 2005 along the Kennet and Avon Canal, which lies c20m at its closest point to the Project boundary.

### Birds

- 1.5.16. There are numerous opportunities for nesting and foraging exist within the Project boundary and adjoining areas.

### Reptiles

- 1.5.17. Potentially suitable habitats for reptiles are present on the northern banks of the track, where adjacent to grassland, tall herb and scrub mosaics.

### Plants

- 1.5.18. BRERC data held numerous records for invasive and protected species. The records which are of most relevant to this site are listed below.
- Two records of the invasive species Himalayan balsam *Impatiens glandulifera* within a 0.1 km square, are located within the Scheme, with four other records within 0.5 km.
  - Two records of the invasive species Japanese knotweed *Fallopia japonica* lie within 0.5 km of the site, one of which appears to be within the Network Rail boundary.
  - A hedgerow to the north of the track, to the west of Candy's Bridge, and the hedgerow to the south of the track, to the east of Candy's bridge have been identified as 'Important'.

## Evaluation and recommendations for further survey work

### Habitats

- 1.5.19. The continuous scrub and ruderal vegetation on site are considered to be of **Local** value for nature conservation due to the value of the linear corridor of vegetation as providing habitat connectivity. The habitats also provide shelter and foraging opportunities for animals and nesting opportunities for birds.
- 1.5.20. Mature trees are important habitats in themselves and are only replaceable in the long-term. The adjacent landscape is relatively flat and open and the mature trees on this site are considered to be of up to **Local** value for nature conservation.

- 1.5.21. It is recommended that continuous belts of scrub or linear woodland to either side of the tracks are maintained, where possible, to retain the habitat on site and to preserve connectivity of the green corridor. It is also recommended that mature trees are retained where possible.
- 1.5.22. Grasslands within the site boundary are not species-rich and are considered to be of value for the structural diversity they introduce to habitats and for foraging opportunities for animals. However this habitat is narrow and relatively small in extent and, therefore, considered to be of value within the **immediate zone of influence only**.
- 1.5.23. It is recommended that where grasslands are retained or created within the Project that these are enhanced to develop species-rich swards using locally sourced seeds or plants. For optimal structural diversity for the benefit of invertebrates, it is recommended that grassland/tall ruderal/scrub interfaces are maintained around the site perimeter.

### **Species**

- 1.5.24. *Amphibians* – As two water bodies were identified from GoogleEarth within 120 m of the Network Rail boundary, it is recommended that a habitat suitability index (HSI) assessment for great crested newts is undertaken. This survey can be undertaken at any time of the year. Based on the findings of the HSI, a survey for great crested newts may be required, which would involve a minimum of four survey visits between mid-March and mid-June.
- 1.5.25. *Badgers* – An assessment of use of the site by badgers could not be undertaken as access was not available. Badgers could be present within the Network Rail boundary and immediately adjacent to the site, as good foraging habitat and scrub areas where setts may be located are present. It is recommended that a badger survey is undertaken where any works are proposed, to include a 30m buffer on adjacent land. It may not be possible to confirm the presence of setts without clearance of vegetation using power tools. A mitigation strategy will be required for any setts that fall within approximately 30 m of construction or areas to be accessed by heavy machinery. Should any setts need to be closed this must be carried out under licence from Natural England. A two month period should be allowed for the licence application process.
- 1.5.26. *Bats* - A tree has been highlighted as having potential for bats. If works are likely to affect the tree (e.g. felling, tree surgery and additional lighting), it is recommended that a bat roost assessment survey is undertaken. If roosting bats are found, any works affecting the roost will need to be undertaken under a Natural England licence for a European Protected Species. The licence application will need to be accompanied by a method statement, which will set out the mitigation measures that will be implemented for bats as part of the proposals. The type and level of mitigation is dependent on several factors, including the type of impact and the nature of the roost. As an overall enhancement measure, it is recommended that bat boxes are erected on retained mature trees within the Scheme, where associated with suitable foraging habitat.
- 1.5.27. *Birds* - Any works which will involve the removal or disturbance of scrub, ruderal vegetation, grassland and mature trees, should be undertaken outside the main bird breeding season (mid-February to August inclusive). If the removal of such features has to occur during the bird breeding season, a survey by an experienced ecologist will be necessary immediately in advance of the works to check for nesting birds.
- 1.5.28. *Reptiles* – Potentially suitable habitats for reptiles are present on the northern banks of the track, where adjacent to grassland, tall herb and scrub mosaics. A reptile survey would only be necessary if the areas identified as having potential for reptiles are to be disturbed. A survey would be undertaken in April-May or September, to ascertain the presence of reptile, the population present and to inform a reptile mitigation strategy to prevent killing or injury to reptiles during construction.

- 1.5.29. In conclusion, it is considered that subject to the implementation of the recommended measures set out above in relation to avoiding or mitigating for potential impacts and subject to recommendations of any detailed species surveys, that the proposed development of the site could be implemented without significant adverse ecological impacts and be in accordance with relevant legislation and planning policy.

## 1.6. Geology, ground conditions and contaminated land

### Geology and hydrogeology

- 1.6.1. The Bathampton Turnback (MetroWest Phase 1) Project is located on Charmouth Mudstone Formation of the Jurassic Period overlain with alluvium and river terrace deposits. The Jurassic sediments around Bathampton are classified as Secondary A aquifers, capable of supplying local water supply or river baseflow.
- 1.6.2. There are no nationally protected geological sites within the Project location, but there are two SSSIs designated for geological reasons within 2.5 km of the Project. However, as the Project will not affect those sites, they are not considered further.

### Land use history

- 1.6.3. The railway corridor was established along its present route prior to the first edition of the Ordnance Survey map in the 1880s. No changes to land use within the railway corridor have occurred since that time.

### Potentially contaminative land uses

- 1.6.4. The route is an established railway corridor and as such there is potential for the underlying ground to be affected by contaminants associated with railway use. However, the proposals will have no effect on ground conditions along the active railway corridor.

## 1.7. Landscape and visual amenity

### Landscape character

- 1.7.1. The Bathampton Turnback (MetroWest Phase 1) Project sits within the Natural England National Character Area 107 Cotswolds and within the local character area defined by B&NES as Landscape Character Area 16 Cotswolds Plateaux and Valleys.
- 1.7.2. The Cotswolds Plateaux and Valleys Character Area stretches from Bathampton to Claverton Down, approximately 2km from Candy's Bridge. The landform of the Cotswolds Plateaux and Valleys is one of a steep scarp, with exposed Oolitic Limestone and associated valleys. To the top of the scarp is an open plateau with straight roads, large arable and pastoral farmland, stone walls and few trees. To the valley sides winding lanes, woodland, and smaller, irregular pastoral fields bounded by hedges predominate. Limestone has been used as a primary building material for buildings and walls. There are many local beauty spots and landmarks, notably the late prehistoric site at Solsbury Hill near Batheaston.

### Visual amenity

- 1.7.3. The potential visual receptors and views were identified through desk study and use of Google Streetview and are presented in Table B.1.4. A site visit has not been undertaken.

Table B.1.4. Summary of Key Receptors near and Views to the Bathampton Turnback

No.	Location	View
1	A4 Bridge	View looking southeast across the low lying valley landscape towards the railway line and its associated vegetation. Limited views through vegetation in the summer and partial views through vegetation in the winter.
2	Kensington Meadows (Playing Fields)	View looking across the open meadow to the heavily vegetated River Avon, which screens views to the railway line beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
3	Grosvenor Bridge	View along bridge to railway line and associated vegetation beyond. Limited views through vegetation in the summer and partial views through vegetation in the winter.
4	Grosvenor	View from flats across garden and the River Avon towards the railway line and its associated vegetation. Limited views through vegetation in the summer and partial views through vegetation in the winter.
5	Meadow Farm	View from building across garden to the railway line and its associated vegetation. Limited views through vegetation in the summer and partial views through vegetation in the winter.
6	Lambridge House	View from building across garden and the River Avon towards the railway line and its associated vegetation. Limited views through vegetation in the summer and partial views through vegetation in the winter.
7	Bathampton	View from residential properties across gardens and the Somerset Coal Canal towards the railway line and its associated vegetation. Limited views through vegetation in the summer and partial views through vegetation in the winter.

## 1.8. Materials and waste

- 1.8.1. The use of material resources and waste generation associated with the operational maintenance of this section of the existing Bath to Bristol line was unknown at the time of writing however this is likely to be negligible (by material / waste type and quantity) given the geographic extent of the proposed works to construct new turn back facilities at Bathampton. It has been assumed that any rolling stock, using this section of the existing Bath to Bristol line, will be maintained at existing railway depots outside of the project boundary.

## 1.9. Noise and vibration

- 1.9.1. Bathampton Turnback (MetroWest Phase 1) is located within existing operational railway land, on the main railway line between Bristol and London. After the initial site visit, noise sensitive receptors were identified to establish the sampling locations, and these are described in Table B.1.5. The noise survey was conducted on 4 April 2014, with short-term measurements recorded at two locations, MP7 and MP8, which are located on Figure 9.1 in Appendix A. Daytime temperatures during the survey ranged from 10 to 15°C, while wind speed varied between 5.5 and 10.8 m/s. Table B.1.6 presents a summary of the operational daytime ambient noise measurements at the two noise monitoring locations MP7 and MP8 on 4 April 2014.

TABLE B.1.5. Description of the Measurement Locations

Location	Coordinates		Description
	Latitude	Longitude	
MP7	51.393599	-2.3321271	This position is considered to be acoustically representative of the existing ambient noise levels at the residential premises to the south of the Bathampton Turnback. Operational day-time were recorded at this location. The sound level meter was located in Meadow Lane. The dominant noise sources at this location were road traffic noise from the A4 and also the A36, together with train noise. Passing trains were observed between every 5 and 10 minutes. Noise from birds singing constantly and aircraft also contributed to the noise climate.
MP8	51.393857	-2.3426950	This position is considered to be acoustically representative of the existing ambient noise levels at the residential premises the north of the Bathampton Turnback. Operational day-time noise levels were recorded at this location. The sound level meter was located in the southern boundary of Grosvenor. The dominant noise source at this location was train noise, with trains passing between every 5 and 10 minutes. Noise from birds singing constantly and aircraft also contributed to the noise climate.

TABLE B.1.6. Ambient Noise Survey Results – Operational Daytime

<i>Operation Daytime</i>					
Position	Start time	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A10, T</sub> dB	L <sub>A90, T</sub> dB
<i>MP7</i>	11:57:02	52.6	68.8	54.5	49.2
	12:55:45	54.1	65.1	56.5	50.5
	14:23:04	55.0	72.9	57.2	50.8
<i>MP8</i>	12:27:06	52.9	69.6	56.6	42.1
	13:23:13	49.5	66.9	51.0	41.8
	13:51:04	48.8	66.0	51.0	41.3

The noise levels recorded are typical of suburban areas.

## 1.10. Socio-economics, regeneration, health and equality

### Introduction

- 1.10.1. This section provides further commentary on the socio-economic indicators for the area surrounding the Bathampton Turnback project (defined as Bathavon North ward). This section should be read in conjunction with section 10.2 of the Baseline Report, which provides a more general overview of prevailing socio-economic indicators across the West of England sub-region and nationally.



## Demography

- 1.10.2. The 2011 Census reveals that there were almost 11,000 residents in Bathavon North in 2011. This figure represents a significant increase on the population recorded by the 2001 Census (c. 7,000), with an average annual rate of population growth of 4.2% achieved. The age structure demonstrates that the area is home to an elderly population, with 24% of residents aged 65 and over. Less than 17% of the population is aged under 16, meaning the current below average level of working age residents could fall further in future years.
- 1.10.3. Bathavon North is overwhelmingly white according to the latest Census, with more than 96% of residents belonging to this ethnic group. Around 1% belong to Asian or mixed ethnic groups and a negligible number belong to black or other ethnic groups. In terms of disability, Bathavon North has a similar proportion of residents for who day to day activities are limited a lot (7.5%) or to some extent (9.4%), relative to England (8.3% and 9.3% respectively). This could be related to the fact that the area is home to a significant concentration of elderly residents. This implies that there is a significant section of the Bathavon population that experience some degree of difficulty in their day to day activities, and would benefit greatly from increased mobility options presented by MetroWest Phase 1.

## Travel Patterns

- 1.10.4. The West of England trend for high rates of private car ownership is magnified in Bathavon North where only 14% of households (2011 Census) do not have access to a private vehicle. This emphasises the over-reliance on private car ownership in the area. These patterns are reflected in the very high proportion of residents who travel to work via private vehicles (as car/motorcycle drivers or passengers). At 72%, the proportion of commuters travelling by private vehicle is considerably above both the West of England (69%) and nationwide averages (66%). That said, 4.4% of commuters already use rail services (2011 Census), suggesting there is an established market for rail travel locally that could be expanded with delivery of the MetroWest scheme.

## Labour Market Participation

- 1.10.5. Economic activity rates in Bathavon North are consistent with the national average at 70% (Census, 2011) However, unemployment rates are very low in the town, and at 2.5%, are around two percentage points lower than the national average. At the same time, youth unemployment is also significantly lower at 20%. On other hand, trends in long-term unemployment are the same for Bathavon North and England (37%, 2011 Census). These trends are further confirmed by JSA claimant count data. The proportion of JSA claimants is lower in the area than for regional or national averages. The proportion of claimants has fluctuated around 1% over the past decade (Claimant Count Register, 2014). Although current rates are marginally above rates at the start of the period. This highlights the ongoing need to improve employment opportunities for residents in Bathavon North.

## Socio-Economic Classification

- 1.10.6. Bathavon North has a particularly high proportion of its population with NVQ4+ qualifications (45%), significantly above the equivalent proportion for England as a whole (27%). There is also a lower proportion of residents with no qualifications (15% versus 23%). These trends are reflected in the occupational structure for Bathavon North, where nearly 60% of residents are concentrated in occupations at the top-end of the occupational structure, in high-value occupations. Further, only 16% of residents in the area occupy positions at the low-value end of the occupational structure spectrum; almost half of the nationwide figure of 29%.
- 1.10.7. Consolidation of these trends results in nearly three quarters of residents featuring in the top levels of the approximated social grading system (i.e. A/B/C1) (2011 Census).

## Employment Profile

- 1.10.8. The residential employment profile (2011 Census) demonstrates that Bathavon North residents are over-represented in the banking, finance and insurance sector. This is typically a high-value, high-skilled industry. A high proportion of residents also work in public administration, although the manufacturing sector is under-represented.
- 1.10.9. Analysis of the workplace employment profile (based on Census 2012) reveals a significant level of public administration employment in the area, in line with the high concentration of residents employed in this sector. However, this sector is currently vulnerable to ongoing contraction following the financial crisis of 2008/9. As such, a higher proportion of the context area's workforce is located in a sector that is at high risk of job losses relative to the national average. At the same time, the proportion of the workforce employed in high-value industries such as banking, finance and insurance is lower than the national average in Bathavon North. This is the opposite of the trend for the residential employment profile, implying a high degree of out-commuting from the area by residents of Bathavon North.
- 1.10.10. These findings are relevant in the context of MetroWest Phase 1 as the provision of an improved transport network could ease the process of out-commuting or conversely, make the Bathavon North area more attractive to high-value industries meaning banking, finance and insurance businesses increasingly locate in the town, thereby reducing the need for out-commute.

## Deprivation

- 1.10.11. The indices of multiple deprivation (IMD, 2010) indicate that Bathavon North does not suffer from acute deprivation across any of the key socio-economic domains covered. In fact, around 55% of households are not deprived in terms of any of the dimensions, meaning aggregate deprivation is also low.

## 1.11. Soils and agricultural land

- 1.11.1. The Bathampton Turnback (MetroWest Phase 1) Project is located entirely within operational railway land. The surrounding land use is predominantly pasture, lying within the floodplain of the River Avon.

## 1.12. Transport, access and non-motorised users

- 1.12.1. The Bathampton Turnback (MetroWest Phase 1) Project comprises track crossover and signalling to allow trains to turnaround at Bath off the main line. The construction approach for this infrastructure has not been finalised, but it is assumed that road access, and thus a transport assessment, will not be required.

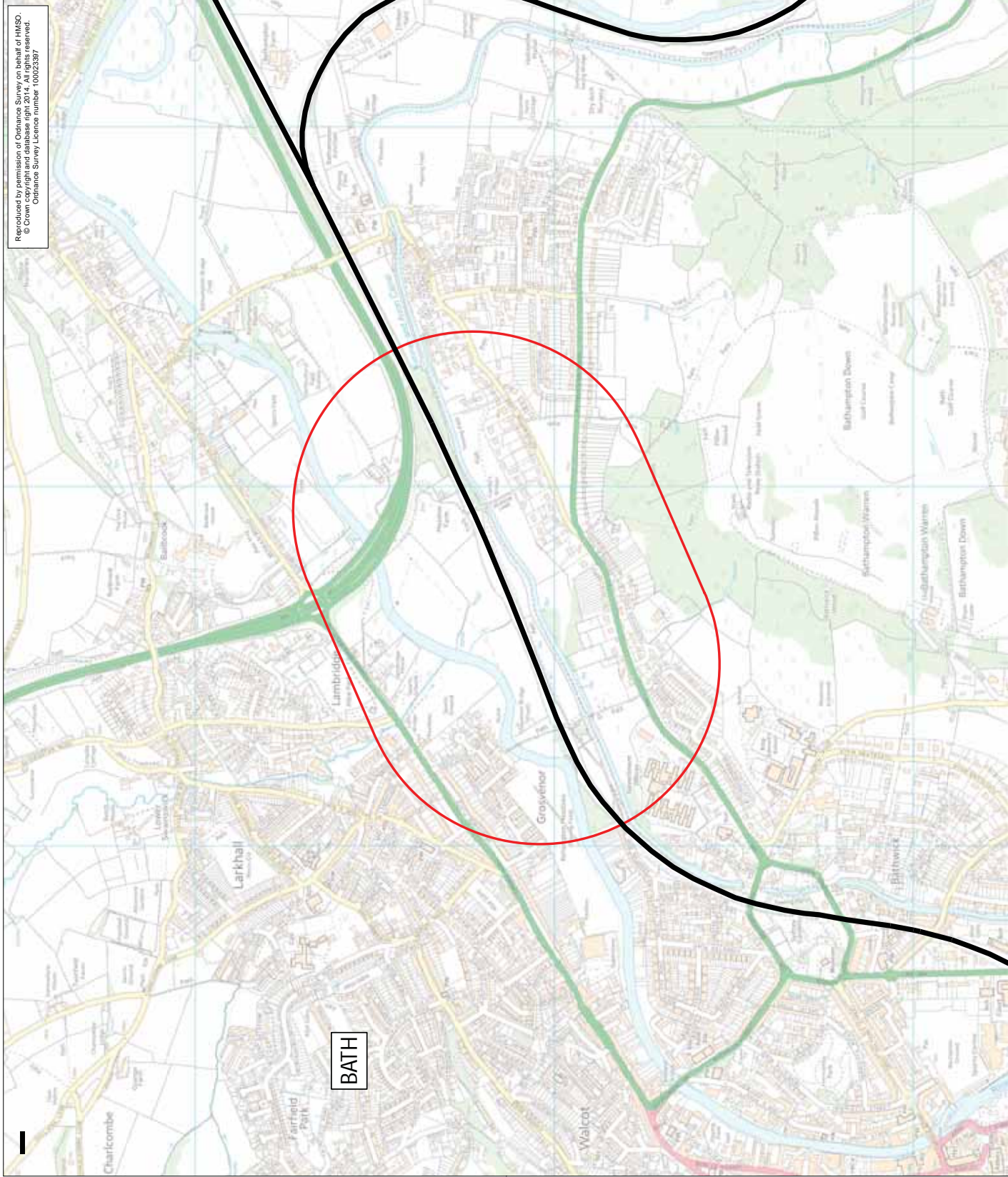
## 1.13. Water resources

- 1.13.1. The Bathampton Turnback (MetroWest Phase 1) Project is located entirely within operational railway land. The River Avon lies to the north and the Kennet and Avon Canal to the south.
- 1.13.2. The main flood risk is associated with overbanking of the River Avon onto its floodplain, with Flood Risk Zones 3 (highest) and 2 in the Avon Valley. Flood Risk zone 2 lies along the northern boundary of railway land in the vicinity of the Bathampton Turnback (MetroWest Phase 1) Project. The railway lies on an embankment across the floodplain, which provides some degree of flood protection.
- 1.13.3. No information is available at present on the existing drainage arrangements and outfalls from the operational railway to surface or groundwaters.



Appendix B.1: Existing Environment  
at Bathampton Turnback  
(MetroWest Phase1) Figures



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**KEY**

-  Existing Railway Line
-  (MetroWest Phase 1) 500m Radius



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 North Somerset Council,  
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**Project:**  
 Bathampton Turnback  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B1.1: Location Plan

**Drawn By:** Tim Curtis  
**Date:** 18/06/2015

**Checked By:** Emily Earing  
**Date:** 18/06/2015

**Approved By:** Carolyn Francis  
**Date:** 18/06/2015

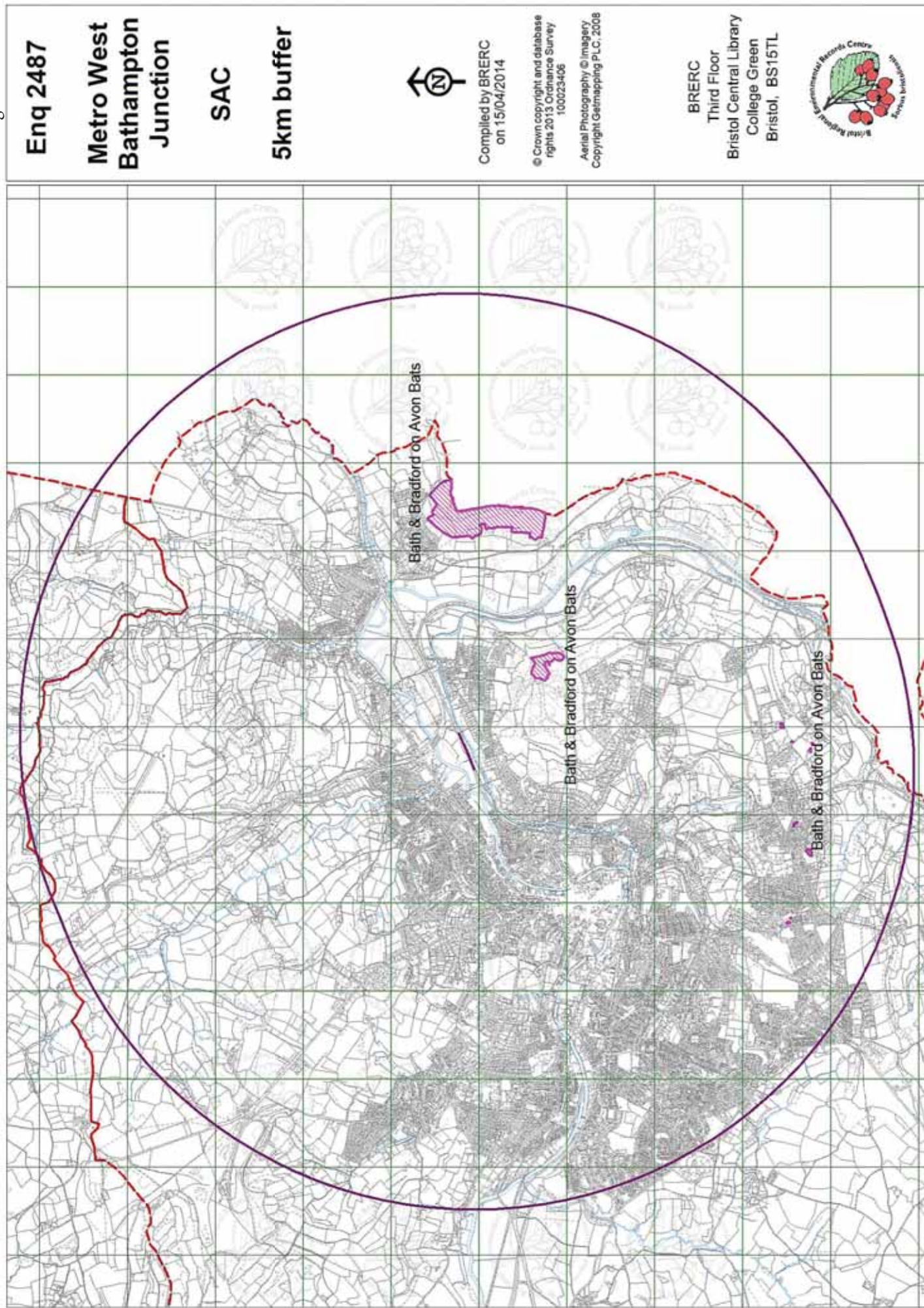
**Drawing No.:** 490327-001-002  
**Revision:** 2  
**Drawing Scale:** 1:10,000 @ A3







Figure B1.3



**Enq 2487**

**Metro West  
Bathampton  
Junction**

**SAC**

**5km buffer**



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Figure B1.4

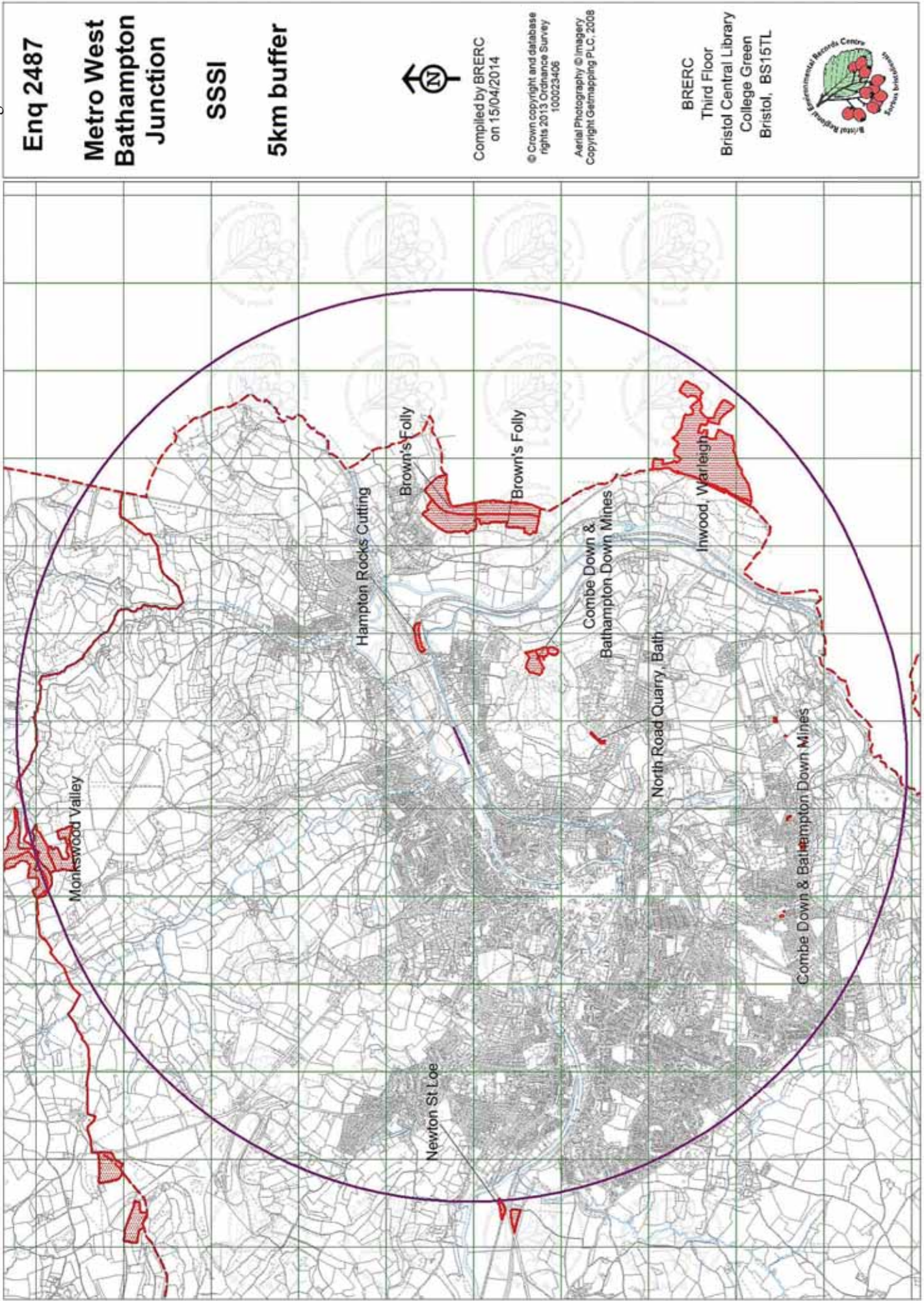
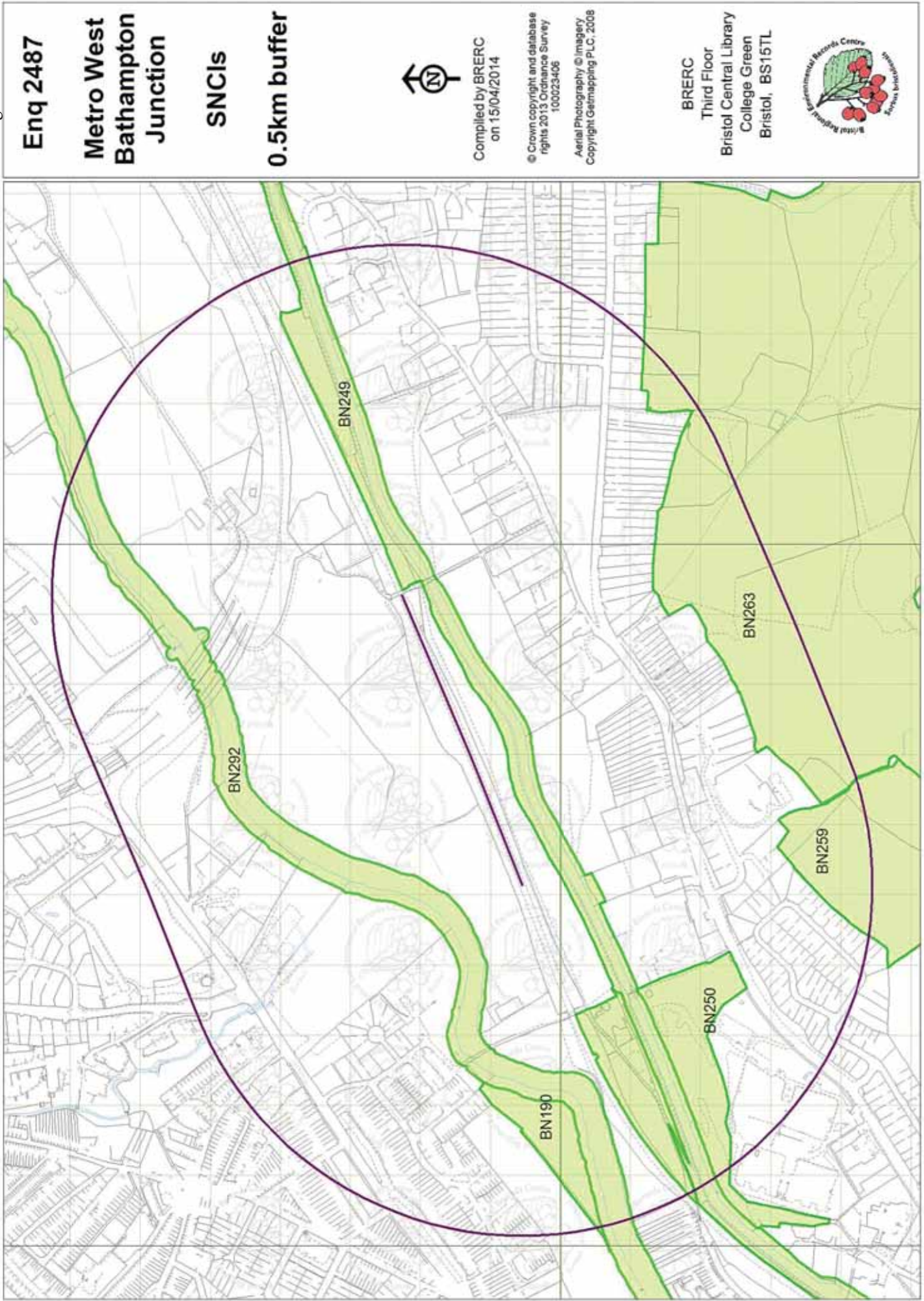




Figure B1.5



**Enq 2487**

**Metro West  
Bathampton  
Junction**

**SNCIs**

**0.5km buffer**



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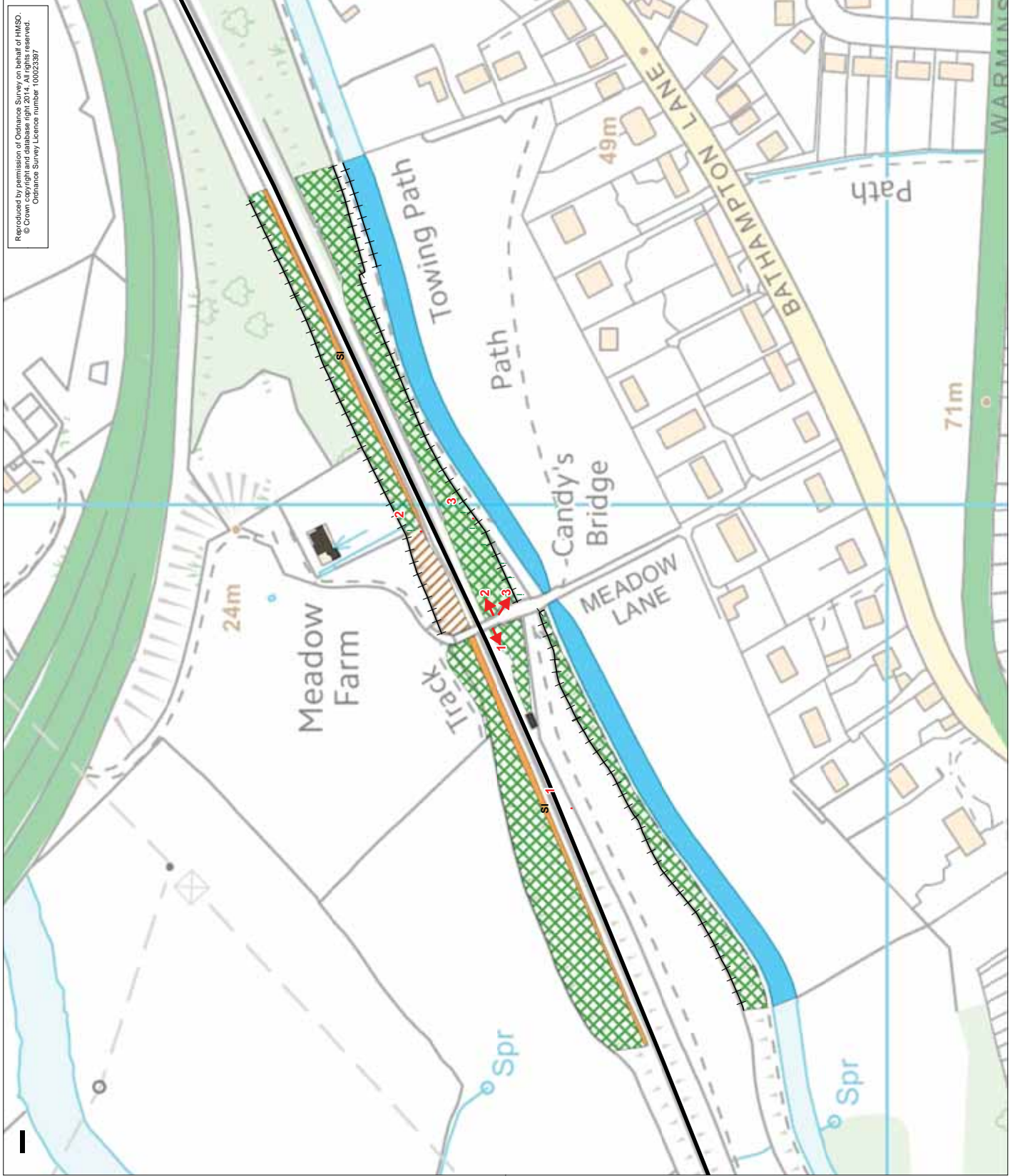
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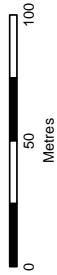


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**KEY**

- Existing Railway Line
- A2.1, Scrub - dense/continuous
- A3.1, Broadleaved Parkland/scattered trees
- B2.2, Neutral grassland - semi-improved
- C3.1, Other tall herb and fern - ruderal
- G2, Running water
- J2.4, Fence
- J3.6, Buildings
- Photo Number and Direction
- Target Note



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 Bathampton Lane  
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**CH22001-HILL**

**Project:**  
 Bathampton Tumback  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B1.6: Phase 1 Habitat Survey

Drawn By:	Heleen Winter	Date:	16/06/2015
Checked By:	Carmina Harding	Date:	16/06/2015
Approved By:	Carolyn Francis	Date:	16/06/2015
Drawing No.:	490327-006-002	Revision:	2
Drawing Scale:		1:2,000	



Appendix B.2: Existing Environment  
at Severn Beach / Avonmouth  
Signalling (MetroWest Phase 1)



# Appendix B.2: Existing Environment at Severn Beach/ Avonmouth Signalling (MetroWest Phase 1)

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## 1.1. Introduction

- 1.1.1. The “Severn Beach/ Avonmouth Signalling (MetroWest Phase 1)” is required to facilitate terminating trains at Avonmouth station. The location of these works is shown in Figure B.2.1 (Option 6B) and Figure B.2.2 (Option 5B).
- 1.1.2. The precise location of the signal will depend on the confirmation of the train service pattern. Two train services patterns known as option 5B and option 6B are being developed and a decision on which is to be delivered is expected to be made in spring 2016. For option 5B the additional signal is located north of Avonmouth station, while for option 6B two additional signals are proposed between the M5 bridge and Avonmouth station. These works will be constructed within Network Rail’s operational boundary and will be implemented using their General Permitted Development rights.

## 1.2. Local planning framework

- 1.2.1. Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) lies within the jurisdiction of the Bristol City Council (“BCC”). The statutory development plan for BCC is the Bristol Local Plan which comprises the following suite of documents, which are used alongside the NPPF to guide development in the city:
  - Bristol Core Strategy (Adopted June 2011): The Bristol Core Strategy is part of the Local Plan (formerly the Local Development Framework), which sets out the overall approach and spatial strategy for future development in Bristol and provides the overarching strategic policy and guidance to deliver sustainable communities and economic growth across the City. The Core Strategy replaces a number of strategic policies saved from the 1997 Plan.
  - Site Allocations and Development Management Policies (Adopted July 2014): This document incorporates site allocations for development, policy designations and development management policies. It forms part of the Bristol Local Plan and will seek to deliver the policies of the Core Strategy. It also replaces a number of saved policies from the 1997 Plan.
  - Bristol City Council Local Plan Saved Policies (1997): A number of policies from the 1997 Plan have been saved by a Secretary of State Direction and remain a material consideration within the Bristol Central Area until replaced by the adoption of the Bristol Central Area Plan.
  - West of England Joint Waste Core Strategy: The Joint Waste Core Strategy guides decisions about where waste management facilities should be located within the West of England.
- 1.2.2. Other planning policy considerations include:
  - Bristol Central Area Plan Publication Version (February 2014): The Publication Version was submitted to the Secretary of State on 4 July 2014 for independent examination. Following the hearing in October 2014, consultation has taken place on the proposed Main Modifications. All consultation responses are now with the Inspector for consideration before confirmation will be given on the soundness of the document. This document includes site allocations, spatial policies and development management policies specifically for the centre of Bristol, and once adopted will replace any relevant saved policies of the 1997 Plan. Whilst, it has not yet been adopted, given its advanced nature, it carries significant weight and as such will need consideration.
  - Supplementary Planning Guidance

- PAN 2 - Conservation Area Enhancement Statements (November 1993) – seeks to protect and enhance whole areas with architectural or historic character and details the Clifton Conservation Area and is accompanied by the Conservation Area 5 - Clifton & Hotwells Character Appraisal & Management Proposals.
- 1.2.3. Of these plans, the policies within the Core Strategy, Site Allocations and Development Management Policies and those saved in the Local Plan are considered to be of particular relevance to the proposed scheme and are discussed further in the Baseline Report in Chapter 2.
- 1.2.4. Much of Avonmouth is designated as Principal Industrial and Warehousing Areas (Policies BSC8 and DM13). There is a Site of Nature Conservation Interest (Policy BCS9 and DM19) to the south of the Avonmouth railway line and small areas of Important Open Space (BSC9 and DM17) around Richmond Terrace and Andrew’s Gate Roundabout. A section of railway land north of Andrew’s Gate Roundabout is safeguarded for Rail Infrastructure (BCS 10 and SM24) for a bulk transfer station. The construction of a new signal on railway operating land is unlikely to prejudice any of these designations.

### 1.3. Air quality

- 1.3.1. The Local Air Quality Management (“LAQM”) process, as set out in Part IV of the Environment Act 1995 and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, places an obligation on all local authorities regularly to review and assess air quality in their areas, and to determine whether or not air quality objectives are being achieved.
- 1.3.2. The UK government is responsible to the European Commission (“EC”) for ensuring that it complies with the provisions of the European Union (“EU”) Directives. The UK government and governments of other Member States are currently in negotiations with the EC over breaching limit values for particulate matter (“PM<sub>10</sub>”) and nitrogen dioxide (“NO<sub>2</sub>”). The air quality strategy objectives are presented in Table B.2.1, showing the objectives in units of microgrammes per cubic metre (µg/m<sup>3</sup>) with the number of exceedances in each year that are permitted (where applicable).

**Table B.2.1. Air Quality Strategy Objectives**

<b>Pollutant</b>	<b>Concentration</b>	<b>Measured as</b>	<b>Date to be achieved by</b>
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004 31.12.2010
	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	
	40 µg/m <sup>3</sup>	Annual mean	31.12.2004

- 1.3.3. Where it is anticipated that an air quality objective will not be met, it is a requirement of the Environment Act 1995 that an Air Quality Management Area (“AQMA”) be declared, for which the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.



- 1.3.4. Bristol City Council (“BCC”) has declared one AQMA covering the city centre of Bristol, which extends along the main radial roads including the M32, and has been declared for NO<sub>2</sub> (1-hour mean and annual mean objectives). The BCC AQMA is located approximately 7.5 km from Avonmouth. The location of the AQMA is provided on Figure 3.1 in Appendix A of the Baseline Report.
- 1.3.5. BCC operates seven continuous monitoring stations and a further 100 diffusion tube sites for NO<sub>2</sub> measurements. Annual mean bias adjusted NO<sub>2</sub> measurements for the sites within 1 km of the proposed Avonmouth Signal (MetroWest Phase 1) are shown in Table B.2.2 for 2010 to 2013 (all of which are based on diffusion tube measurements).

Table B.2.2. Results of Non-Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

ID	Location	X	Y	Site Type	Data Capture for 2011 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
						(Bias adjustment factor = <b>0.88</b> ) <b>2010</b>	(Bias adjustment factor = <b>0.91</b> ) <b>2011</b>	(Bias adjustment factor = <b>0.87</b> ) <b>2012</b>	(Bias adjustment factor = <b>0.94</b> ) <b>2013</b>
7	St Andrews Road	351706	178250	Roadside	91	30.2	37.7	27.9	27.7
13	Ferndown Close	354493	177489	Urban Back-ground	100	31.1	19.4	18.1	18.8
16	Thirdway	352287	178698	Roadside	99	35.1	35.8	36.4	33.3
321	Monitor Trailer Portway Park and Ride	352275	177008	Roadside	100	28.9	24.0	24.6	24.6
397	Façade Avonmouth Road underpass - house to SE	352578	177637	Roadside	90	38.4	35.9	34.0	34.4
398	Avonmouth Rd No 31 on fascia	352501	177698	Roadside	100	<b>40.1</b>	34.9	31.8	34.0
483	Avonmouth Road - No 37	352484	177735	Kerbside	100	-	-	38.5	36.5
484	Avonmouth Road - School Sign Opposite Hse No 16	352620	177639	Roadside	79	-	-	<b>40.2</b>	37.2
485	Avonmouth Road - No 4	352654	177602	Roadside	90	-	-	<b>41.2</b>	35.7
486	Barracks's Lane	352785	177858	Roadside	100	-	-	<b>41.5</b>	38.2

*Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup>*

Source: BCC, May 2014. Air Quality Progress Report for Bristol City Council (Notes: The objective exceedences are highlighted in bold. The number of exceedences of 200 µg m<sup>-3</sup> as a 1-hour mean concentration shown in parentheses.)

- 1.3.6. No PM<sub>10</sub> monitoring data are available within 1km of the proposed Severn Beach/ Avonmouth Signalling (MetroWest Phase 1). The nearest NO<sub>2</sub> monitoring site is site 321, located in the Portway Park and Ride approximately 400 m from the proposed Severn Beach/ Avonmouth Signalling (MetroWest Phase 1). The data from this monitoring site is well below the annual mean objective for NO<sub>2</sub>.
- 1.3.7. All other nitrogen dioxide (NO<sub>2</sub>) diffusion tube measurements show that the NO<sub>2</sub> concentrations exceed the annual mean objective for NO<sub>2</sub> at four sites near Avonmouth, but the closest monitoring available (Portway Park and Ride) is not exceeding the air quality objectives for NO<sub>2</sub>.

## 1.4. Cultural heritage

### Statutory and non-statutory designations

- 1.4.1. Cultural heritage assets in the vicinity of Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) area are shown in Figure B.2.3 (Option 6B) and Figure B.2.4 (Option 5B). There are no scheduled monuments, registered battlefields, registered historic parks and gardens or conservation areas within a 500 m buffer area of Option 6B or Option 5B.
- 1.4.2. There are three listed buildings within 500 m of the Scheme, none of which are directly adjacent to the existing railway line:
- Houses and Garden Walls on Poole Street (ref 1202433) located c.200 m to the north east of the existing railway line.
  - Bristol Tramways Company Avonmouth Depot (ref 1203646), located c.250 m to the north east of the existing railway line.
  - Houses and Royal Hotel on Gloucester Road (ref 1203646), located c.100 m to the south-west of the existing railway line.
- 1.4.3. These buildings are all Grade II listed and are accorded a **medium** value.
- 1.4.4. No 111 to 117 Beach Road Severn Beach, Pilning (16631) is a locally listed building. This is not a statutory designation; it is a local designation covered by local planning policy.

### Non-designated assets

- 1.4.5. There are 54 non designated monuments recorded on the Bristol and South Gloucestershire Historic Environment Record ("HER") as the route straddles the Bristol-South Gloucestershire county boundary. The majority represent extant buildings and structures. These include railway infrastructure such as Avonmouth Dock Signal box (ref 1892M); Avonmouth Docks Station (ref 2013M); Avonmouth GWR station (ref 2015M); and a railway turntable to the south of Green Lane (ref 2100M). Other sites include a former ICI plant (16633, 17339 and 17340) a current ICI plant (13954) Defence of Britain remains (19088 and 19089) and a deserted settlement (5319) within a former farm (9259 and 9626).

### Recommendations for further survey work

- 1.4.6. A review of ground investigation results within the general construction zone would inform the need for detailed archaeological assessment and investigation. However, given the proposed design, the likelihood of buried archaeology being affected is low.

## 1.5. Ecology and biodiversity

### Approach

- 1.5.1. A desk study was conducted for the two options encompassing the site and surrounding land along the railway corridor (see Figures B.2.5 and B.2.6). A 0.5 km buffer from the site was applied for protected species records and locally designated sites, a 2.5 km buffer for bats and nationally designated sites and a 5 km for internationally designated sites. This area was

considered to be sufficient to cover the likely zone of influence of the proposed scheme. Data sources consulted during the desk study were:

- The Multi-Agency Geographic Information for the Countryside website (“MAGIC”); and
  - Bristol Regional Environmental Records Centre (“BRERC”), for protected, notable species data, descriptions for Local Nature Reserves, non-statutory designated sites and Wildlife Trust reserves.
- 1.5.2. Where applicable, information supplied by these organisations has been incorporated into the following account with due acknowledgement where they are particularly informative or relevant.
- 1.5.3. This report summarises the findings of the desk study and observations from aerial mapping. Therefore signs of protected species or valued species of flora on the ground will not have been observed.
- 1.5.4. The habitats and species evaluations are based on the guidance from the Institute of Ecology and Environmental Management (IEEM, 2006<sup>1</sup>). The level of value of specific ecological receptors is assigned using a geographic frame of reference, i.e. international value being most important, then national, regional, county, district, local and lastly, within the immediate zone of influence of the proposals only.
- 1.5.5. Value judgments are based on various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity. These include site designations (such as Sites of Special Scientific Interest (“SSSI”)), or for undesignated features, the size, conservation status (locally, nationally or internationally), and the quality of the ecological resource. In terms of the latter, ‘quality’ can refer to habitats (for instance if they are particularly diverse, or a good example of a specific habitat type), other features (such as wildlife corridors or mosaics of habitats) or species populations or assemblages.

### Designated sites

- 1.5.6. There are four internationally designated sites within a 5 km radius of the proposed Avonmouth Signal (MetroWest Phase 1) Project, three of these are all components of the Severn Estuary Special Area of Conservation (“SAC”), Special Protection Area (“SPA”) and Ramsar site. The fourth is the Avon Gorge Woodland SAC located approximately 2 km south of Shirehampton.
- 1.5.7. The Severn Estuary SAC, SPA and Ramsar site lies at its closest point within 10 m from the railway line in Avonmouth.
- 1.5.8. There are no national designations within the Project footprint, but the Severn Estuary SSSI falls within 10 m of the Project at its closet point and Horseshoe bend, Shirehampton SSSI within 1 km distance. Avon Gorge SSSI lies within 2 km of the Project.
- 1.5.9. There are eight locally designated Sites of Nature Conservation Importance (“SNICs”) within 0.5 km of the Project:
- BC31 Gloucester Road Railway Sidings are located next to the railway line just south of Avonmouth station. The site is an area of dense scrub and open grassland which provides rich wildlife habitat within a densely urban and industrial area.
  - BC34 Hallen Marsh Junction is located next to the railway line approximately 0.5 km north of St. Andrew’s Road station. The site is formed of grassland, scrub, limestone ballast, pools and areas of reed and supports a variety of plants and bird species.

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<sup>1</sup> INSTITUTE OF ECOLOGY AND ENVIRONMENTAL MANAGEMENT (2006) *GUIDELINES FOR ECOLOGICAL IMPACT ASSESSMENT WITHIN THE UNITED KINGDOM*. IEEM. WINCHESTER

- BC81 Lamplighter's Marsh lies along the River Avon in west Bristol, to the south-east of the M5 motorway flyover. The site is bisected lengthways by the Bristol-Severn Beach railway line just west of Shirehampton station. There are areas of saltmarsh-influenced grassland, as well as ruderal communities, grassland, scrub and secondary woodland. The site is known to host plants such as Sea Aster *Aster tripolium* and Sea Beet *Beta vulgaris* ssp. *maritima*, invertebrates and breeding birds, particularly warblers.
  - BC47 River Avon (part of) traverses the City from east to west, flowing through the Avon Gorge, and is largely surrounded by urban areas.
  - BC76 Salt Rhine and Moorhouse Rhine. The two Rhines are made up of brackish Rhine and bankside vegetation and are known to support a variety of wetland plants, water vole *Arvicola amphibius*, dragonflies, molluscs and water beetles.
  - BC77 St. Andrew's Road Rhine is situated in Avonmouth close to St Andrew's Station. The site comprises a Rhine with open water, reeds, tall ruderal, scrub and planted shrubs and is known to support water voles.
  - SG38 Gypsies Platt is situated to the east of Shirehampton station and is a neutral grassland with species rich hedgerows.
  - SG266 Severn Estuary SSSI (part of) with saltmarsh, mudflats and species interest.
- 1.5.10. In addition there are 25 Wildlife Network Sites and one Strategic Nature Area (Gorge & Downs) located within 0.5 km of the railway line between Shirehampton and Severn Beach.

## Habitats

- 1.5.11. The habitats within the site are dominated by bare ground and railway infrastructure along with railway verge comprising a mix of hedgerow, trees and grass embankment. Parks, fields and gardens dominate the adjacent habitat between Shirehampton station and the M5 and a wide section of woodland and scrub south of Avonmouth station. Hedge lined fields and Rhines border the railway line north of St Andrew's Road to Severn Beach. Based on Phase 1 habitat types and using aerial photography the following habitats are found within the study area and the immediately adjacent habitats.
- **Scrub** – both scattered and dense scrub.
  - **Semi-improved grassland** – narrow strips of grassland alongside the railway track.
  - **Tall ruderals** – In-between scrub habitat and a stand by itself on a bank next to the track.
  - **Trees** – There are a number of mature trees within the site.
  - **Standing waterbodies** – There are a number of ditches, Rhines, and ponds close to the railway line, the closest being a large water body between the line and the estuary at Stuppill Gout (ST528818), St Andrew's Rhine (ST52105 80042) and two ponds close to Severn Beach (ST538840 and ST539843).

## Protected species

- 1.5.12. A number of protected species records have been received for this site. The following species and/ or their habitats have been confirmed as present within or in habitat immediately adjacent to the project.

### Amphibians

- 1.5.13. A number of water bodies have been identified within 250 m of the Network Rail boundary. There is potential for these water bodies to support great crested newt *Triturus cristatus* and for individuals to be using habitats adjacent to the railway for foraging and hibernation. Records of great crested newt, common frog *Rana temporaria*, common toad *Bufo bufo* and smooth newt *Lissotriton vulgaris* have been received from BRERC within 0.5 km of the Project.



### **Badgers**

- 1.5.14. BRERC has several record of badgers within 0.5 km of the Project and adjacent habitat and embankments offer suitable foraging habitat and potential for sett construction.

### **Bats**

- 1.5.15. The linear habitat on sites offers suitable foraging habitat for bats and mature trees and structures could provide opportunities for roosting bats.
- 1.5.16. Numerous records for bats were received by BRERC, the nearest record is for pipistrelle *Pipistrellus pipistrellus* within 0.5 km of the site. Other species recorded within 2.5 km include: Leisler's bat *Nyctalus leisleri*, lesser horseshoe bat *Rhinolophus hipposideros*, Natterer's bat *Myotis nattereri*, Daubenton's bat *Myotis daubentonii*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus* and soprano pipistrelle *Pipistrellus pygmaeus*. A number of roost records within 2.5km of the site were also received and included records for lesser horseshoe bat and brown long-eared bat *Plecotus auritus*.

### **Water vole**

- 1.5.17. BRERC has numerous records for water vole within 0.5 km of the project with a stronghold located in the St Andrew's Road Rhine close to the train station.

### **Birds**

- 1.5.18. Numerous opportunities for bird nesting and foraging exist within the project boundary and adjoining areas. Due to the close proximity of the estuary a large number of records were received from BRERC which include protected species such as Cetti's Warbler *Cettia cetti*, Black Redstart *Phoenicurus ochruros*, and Peregrine *Falco peregrinus*.

### **Reptiles**

- 1.5.19. Potentially suitable habitats for reptiles are present on the banks of the track particularly where these are adjacent to grassland, tall herb and scrub mosaics. BRERC records confirm that slow worms *Anguis fragilis* and grass snakes *Natrix natrix* have been sighted within 0.5 km of the Project.

### **Plants**

- 1.5.20. BRERC data held numerous records for invasive and protected species. The records which are of most relevant to this site are listed below.
- Records of the invasive species Japanese knotweed *Fallopia japonica* and Parrot's Feather *Myriophyllum aquaticum* have been identified within 0.5 km of the site.
  - Numerous records of notable and locally rare plant species have been recorded in the area within 0.5 km of the Project.

### **Other Notable Species**

- 1.5.21. Records for hedgehog *Erinaceus europaeus* and water shrew *Neomys fodiens* which are listed under section 41 the 2006 Natural Environment and Rural Communities Act are known from within 0.5 km of the Project.

## **Evaluation and recommendations for further survey work**

### **Habitats**

- 1.5.22. The continuous scrub and ruderal vegetation on site are considered to be of **Local** value for nature conservation due to the value of the linear corridor of vegetation as providing habitat connectivity. The habitats also provide shelter and foraging opportunities for animals and nesting opportunities for birds.
- 1.5.23. Mature trees are important habitats in themselves and are only replaceable in the long-term. The adjacent landscape is relatively flat and open and any mature trees on site would be

considered to be of up to **Local** value for nature conservation. It is therefore recommended that mature trees are retained where possible.

- 1.5.24. It is recommended that continuous belts of scrub or linear woodland to either side of the tracks are maintained where possible to retain wildlife habitats and to preserve the connectivity of the green corridor.
- 1.5.25. It is not known if grasslands within the site boundary are species-rich however they are likely to be considered to be of value for the structural diversity and as foraging habitat for wildlife. It is recommended that where grasslands are retained or created within the project that these are enhanced to develop species-rich swards using locally sourced seeds or plants. For optimal structural diversity for the benefit of invertebrates, it is recommended that grassland/tall ruderal/scrub interfaces are maintained around the site perimeter.

### **Species**

- 1.5.26. *Amphibians* – As water bodies were identified within 250 m of the Network Rail boundary, it is recommended that a habitat suitability index (HSI) assessment for great crested newts is undertaken should the works fall within these distances. This survey can be undertaken at any time of the year. Based on the findings of the HSI, a survey for great crested newts may be required, which would involve a minimum of four survey visits between mid-March and mid-June.
- 1.5.27. *Badgers* – An assessment of use of the site by badgers could not be undertaken as access was not available. Badgers could be present within the Network Rail boundary and immediately adjacent to the site, as good foraging habitat and scrub areas where setts may be located are present. It is recommended that a badger survey is undertaken where any works are proposed, to include a 30m buffer on adjacent land. It may not be possible to confirm the presence of setts without clearance of vegetation using power tools. A mitigation strategy will be required for any setts that fall within approximately 30 m of construction or areas to be accessed by heavy machinery. Should any setts need to be closed this must be carried out under licence from Natural England. A two month period should be allowed for the licence application process.
- 1.5.28. *Bats* – If significant vegetation removal or impacts to mature trees and/ or structures are required it is recommended that a bat roost assessment survey is undertaken. If roosting bats are found, any works affecting the roost will need to be undertaken under a Natural England licence for a European Protected Species. The licence application will need to be accompanied by a method statement, which will set out the mitigation measures that will be implemented for bats as part of the proposals. The type and level of mitigation is dependent on several factors, including the type of impact and the nature of the roost. As an overall enhancement measure, it is recommended that bat boxes are erected on retained mature trees within the Project, where associated with suitable foraging habitat.
- 1.5.29. *Birds* – Any works which will involve the removal or disturbance of scrub, ruderal vegetation, grassland and mature trees, should be undertaken outside the main bird breeding season (mid-February to August inclusive). If the removal of such features has to occur during the bird breeding season, a survey by an experienced ecologist will be necessary immediately in advance of the works to check for nesting birds.
- 1.5.30. *Reptiles* – Potentially suitable habitats for reptiles are present on the northern banks of the track, where adjacent to grassland, tall herb and scrub mosaics. A reptile survey would only be necessary if the areas identified as having potential for reptiles are to be significantly disturbed. A survey would be undertaken in April-May or September, to ascertain the presence of reptile, the population present and to inform a reptile mitigation strategy to prevent killing or injury to reptiles during construction.
- 1.5.31. In conclusion, it is considered that subject to the implementation of the recommended measures set out above in relation to avoiding or mitigating for potential impacts and subject

to recommendations of any detailed species surveys, that the proposed development of the site could be implemented without significant adverse ecological impacts and be in accordance with relevant legislation and planning policy.

## 1.6. Geology, ground conditions and contaminated land

### Geology and hydrogeology

- 1.6.1. The Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) Project is located on undifferentiated mudstone, siltstone and sandstone rocks of the Triassic Period overlain with alluvium of silt sand and clay. The Triassic sediments around the project are classified as Secondary B aquifers, 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.
- 1.6.2. There are no nationally protected geological sites within the Project location, but there are two SSSIs designated for geological reasons within 3 km of the Project, namely Ham Green and Quarry Steps at Durdham Down in Clifton. However, as the Project will not affect those sites, they are not considered further.

### Potentially contaminative land uses

- 1.6.3. The route is established railway corridor and as such there is potential for the underlying ground to be affected by contaminants associated with railway use. However, the Project proposals will have no effect on ground conditions along the active railway corridor.

## 1.7. Landscape and visual amenity

### Landscape character

- 1.7.1. The Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) project sit within the National Character Area 106 Severn and Avon Vales. This character area encompasses the lower valleys of the rivers Severn and Avon which dominate "*this low lying open agricultural vale landscape*". Industrial development is an important and defining element of this character area. This is particularly evident at Avonmouth. Its flat landscape and proximity to the river Severn has benefited development, creating landscape characterised by industrial and commercial land uses, and power stations alongside the river. The M5 and M49 motorways bisect the landscape.
- 1.7.2. The rivers of the Avon and Severn, and their associated floodplains contribute to the character of the NCA. The Severn Estuary has the second largest tidal range in the world, exposing large areas of mudflats at low tide which support a rich feeding grounds for waterfowl and wading birds. The Severn SPA and Ramsar site designations reflect the importance of this area for birds.
- 1.7.3. In the south of the NCA, the low lying coastal plains with peat deposits in the Gordano Valley create characteristic wetlands. Productive soils occur east of the Severn and within the Avon Valley, as a result of the underlying Lias clay.
- 1.7.4. The character of the Avonmouth landscape is primarily urban with a complex mix of docks, large scale industrial areas, some residential, and large scale roads.
- 1.7.5. The landform is primarily flat with any variations generally levelled out and hidden under the build form, in particular the large scale industrial premises. St Andrew's Road to the north and Avonmouth Way from the main roads with large scale industrial and commercial development set off these in a broadly rectilinear pattern. The housing to the north of the railway line is primarily set out in terraces of two storey buildings. A series of high speed loops and large roundabouts link the M5, M49 and the A4 Portway and cut through the landscape as dominant features.

- 1.7.6. The railway line runs between the industrial buildings to the north of the M5 before it opens out with Portview Road to the north and an open landscape area to the south.

### Visual amenity

- 1.7.7. The potential visual receptors and views were identified through desk study and use of Google Streetview and are presented in Tables B.2.3 and B.2.4. A site visit has not been undertaken.

Table B.2.3. Summary of Key Receptors near and Views to Severn Beach/ Avonmouth Signalling Option 6B

No.	Location	View
1	Properties on Portview Road	Views across the road to the high brick wall on the opposite side of the road with views from first floor windows over the wall and onto the track. Views to the back of the station shelter building by Portview Road and views to existing signals visible above the wall.
2	Properties on Napier Road	View looking south along the line of the road with an oblique road towards the railway line with the high brick wall and trees behind. Limited views to the existing signal.
3	Portview Road	View along the road with the brick wall between the motorist and the track.

Table B.2.4. Summary of Key Receptors near and Views to Severn Beach/ Avonmouth Signalling Option 5B

No.	Location	View
1	Portview Road	Railway screened behind existing industrial buildings.
2	Victoria Road	Railway screened behind existing industrial buildings.

## 1.8. Materials and waste

- 1.8.1. The use of material resources and waste generation associated with the operational maintenance of this section of the existing Severn Beach line was unknown at the time of writing however this is likely to be negligible (by material / waste type and quantity) given the geographic extent of the proposed works to construct a new signal(s) at Avonmouth. It has been assumed that any rolling stock, using the existing Severn Beach line, will be maintained at existing railway depots outside of the project boundary.

## 1.9. Noise and vibration

- 1.9.1. The Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) project (Option 6B) is located near to an existing industrial estate at Avonmouth. The closest noise sensitive receptors towards the rail line are located along Portview Road to the east of the existing track, with the closest dwellings being about 15m away. This location is likely to be dominated by road traffic noise from the M5 and local roads, railway noise from passenger and freight trains, and also industrial noise from the nearby industrial estate during the day.
- 1.9.2. After the initial site visit, noise sensitive receptors were identified to establish the sampling locations, and these are described in Table B.2.5. The noise survey was conducted on 22 May 2015, with a one-hour short-term measurement recorded at one location, MP11, which is shown on Figure 9.1 in Appendix A. Daytime temperatures during the survey ranged from 17 to 19°C, while wind speed varied between 0.3 and 1.5 m/s.

- 1.9.3. Table B.2.6 presents a summary of the operational daytime ambient noise measurement at the noise monitoring location MP11 on 22 May 2015.

**TABLE B.2.5: Description of the Measurement Location**

Location	Coordinates		Description
	Latitude	Longitude	
MP11	51.49891	-2.69771	This position is considered to be acoustically representative of the existing ambient noise levels at the residential premises close to the proposed Avonmouth Signal (Options 6B). Operational day-time noise was recorded at this location. The sound level meter was located on Portview Road, being close to the Avonmouth station. The dominant noise sources at this location were industrial noise from the nearby industrial estate, road traffic noise from Portview Road together with railway noise from passenger trains. Passing trains were observed every 15 minutes. Noise from birds singing constantly also contributed to the noise climate.

**TABLE B.2.6: Ambient Noise Survey Results – Operational Daytime**

Operation Daytime					
Position	Start time	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A10, T</sub> dB	L <sub>A90, T</sub> dB
MP11	10:04:46	56.3	82.7	59	46.2

## 1.10. Socio-economics, regeneration, health and equality

### Introduction

- 1.10.1. This section provides further commentary on the socio-economic indicators for the area surrounding the Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) Project (defined as Avonmouth ward). This section should be read in conjunction with section 10.2 of the Baseline Report, which provides a more general overview of prevailing socio-economic indicators across the West of England sub-region and nationally.

### Demography

- 1.10.2. The 2011 Census<sup>2</sup> reveals that there were almost 12,500 residents in Avonmouth in 2011. This figure was marginally above the 2001 Census figure of around 12,000, reflecting an average annual rate of population growth of 0.3%. The age structure demonstrates a relatively youthful population, with 20% of residents aged below 16 and less than 16% aged above 64. These trends point towards a high proportion of working age residents in Avonmouth which is likely to increase further in the future given the youthful population. This could be reflected in an expanding labour supply in the area.
- 1.10.3. Avonmouth is predominantly white according to the latest Census (2011), with more than 94% of residents belonging to this ethnic group. Around 2% belong to Asian, Black or mixed ethnic groups. In terms of disability, the area has a high proportion of residents for who day to day activities are limited a lot (9.9%) or to some extent (10.0%), relative to England (8.3% and 9.3% respectively). This implies that one-in-five residents in Avonmouth experience some degree of

<sup>2</sup> Office for National Statistics, 2011 Census: Aggregate data (England and Wales) [computer file]. UK Data Service Census Support.



difficulty in their day to day activities, and would benefit greatly from increased mobility options presented by MetroWest Phase 1.

### Travel patterns

- 1.10.4. The West of England trend for high rates of private car ownership is not reflected in Avonmouth where 26% of households do not have access to a private vehicle – this is in line with the national average. Therefore there is a requirement to provide a suitable public transport offer in the area to support the relatively high proportion of residents without access to a private vehicle. Improving the MetroWest service would enhance the public transport offer in Avonmouth and could encourage an increase in the current proportion of local residents who use rail to commute to work (2.1%). The relatively low proportion of households with cars implies that there is latent demand for improved public transport services; delivering the project could ensure that this demand is realised.

### Labour market participation

- 1.10.5. Economic activity rates in Avonmouth are above the national average at 73%<sup>2</sup>. However, unemployment rates are marginally above the national average (4.7% versus 4.4%). At the same time, youth and long-term unemployment rates – estimated at 33% and 38% of all unemployment respectively) – are significantly above the national average. These negative trends are further confirmed by Job Seeker's Allowance (JSA) claimant count data. The proportion of JSA claimants in Avonmouth is above the national and regional averages and has fluctuated at around 4% since the height of the economic crisis in 2008/9. The sustained high rates of JSA claimants over the past decade emphasises the need to improve employment opportunities in Avonmouth and accessibility to areas of labour demand.

### Socio-economic classification

- 1.10.6. Avonmouth suffers from a low proportion of its population with National Vocational Qualification Level 4+ (NVQ4+) qualifications (15%). This is almost half of the national average (27%). Almost one-third of residents have no qualifications; a considerably higher proportion than England (30% versus 23%). These trends are reflected in the occupational structure for Avonmouth, which suggest only a quarter of residents are concentrated in occupations at the top-end of the occupational structure, in high-value occupations. Further, two-in-five residents in the area occupy positions at the low-value end of the occupational structure spectrum; well above the nationwide figure of 29%.
- 1.10.7. Consolidation of these trends results in less than 40% of residents featuring in the top levels of the approximated social grading system (i.e. A/B/C1)<sup>2</sup>.

### Employment profile

- 1.10.8. The residential employment profile<sup>2</sup> demonstrates that Avonmouth residents are over-represented in the lower skilled sectors such as distribution hotels and restaurants. There is an under-representation of employment in high skilled, high-valued sectors such as banking, finance and insurance.
- 1.10.9. Analysis of the workplace employment profile (based on Census 2011) mirrors these trends. Around 30% of jobs in Avonmouth are in the distribution hotels and restaurants sector compared to 23% nationally. At the same time, the proportion of the workforce employed in high-value industries such as banking, finance and insurance is 10%, significantly below the national average (22%). These trends imply that residents in Avonmouth are disadvantaged in terms of employment: they are concentrated in typically low quality jobs and most jobs in the area are also low quality. Provision of MetroWest Phase 1 could improve accessibility to better quality jobs across the West of England sub-region or act to attract high-value industries to Avonmouth.

## Deprivation

- 1.10.10. The various socio-economic trends outlined above depict Avonmouth as disadvantaged in many ways. These findings are reflected in the indices of multiple deprivation<sup>3</sup> which implies a concentration of deprived neighbourhoods in close proximity to the area, measured across the range of socio-economic domains. It is also reflected in the fact that two-thirds of households in Avonmouth are deprived in terms of at least one dimension of deprivation, pointing towards above average levels of aggregate deprivation.

## 1.11. Soils and agricultural land

- 1.11.1. The Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) project will be located entirely within operational railway land, and will not directly affect the soils and access to grazing marshes near the coast.

## 1.12. Transport, access and non-motorised users

- 1.12.1. The Severn Beach/ Avonmouth Signalling (MetroWest Phase 1), is required to aid turnaround of trains. The construction approach for this infrastructure has not been finalised, but it is assumed that road access, and thus a transport assessment, will not be required.

## 1.13. Water resources

- 1.13.1. The two proposed locations for the Severn Beach/ Avonmouth Signalling (MetroWest Phase 1) are located entirely within operational railway land. For Option 6B, the two signals are located to the north of the River Avon, between about 250m and 290m from the river, and about 240m from Avonmouth Dock. Avonmouth Dock discharges to the Severn Estuary. The proposed location for the signal for Option 5B will be considered during GRIP 3.
- 1.13.2. There are no surface watercourses in the vicinity of the proposed location. No information is available at present on the existing drainage arrangements and outfalls from the operational railway to surface or groundwaters. It is likely that surface water runoff in both locations is drainage via the surface water sewer system.
- 1.13.3. The River Avon at Avonmouth (the Bristol Avon ID GB530905415405) is classified under the Water Framework Directive ("WFD") as a being a heavily modified estuarine waterbody with Good Ecological Potential. The River Avon enters the Severn Estuary (Severn Lower ID GB530905415401) which is also a heavily modified estuarine waterbody. The Severn Lower has a classification of Moderate Ecological Potential and Good chemical quality. The Avonmouth Docks are also considered to be a part of the Severn Lower waterbody.
- 1.13.4. The proposed signal locations for Option 6B are located within or close to Flood Zone 3 (highest risk), however the area is afforded protection from overbanking of the River Avon by flood defences.
- 1.13.5. The site is located within the Bristol Triassic Groundwater body (GB40902G804800) and under the WFD is considered to have Good qualitative quality and Poor chemical quality. There are no Source Protection Zones or abstraction licences within the vicinity of the proposed signal locations.

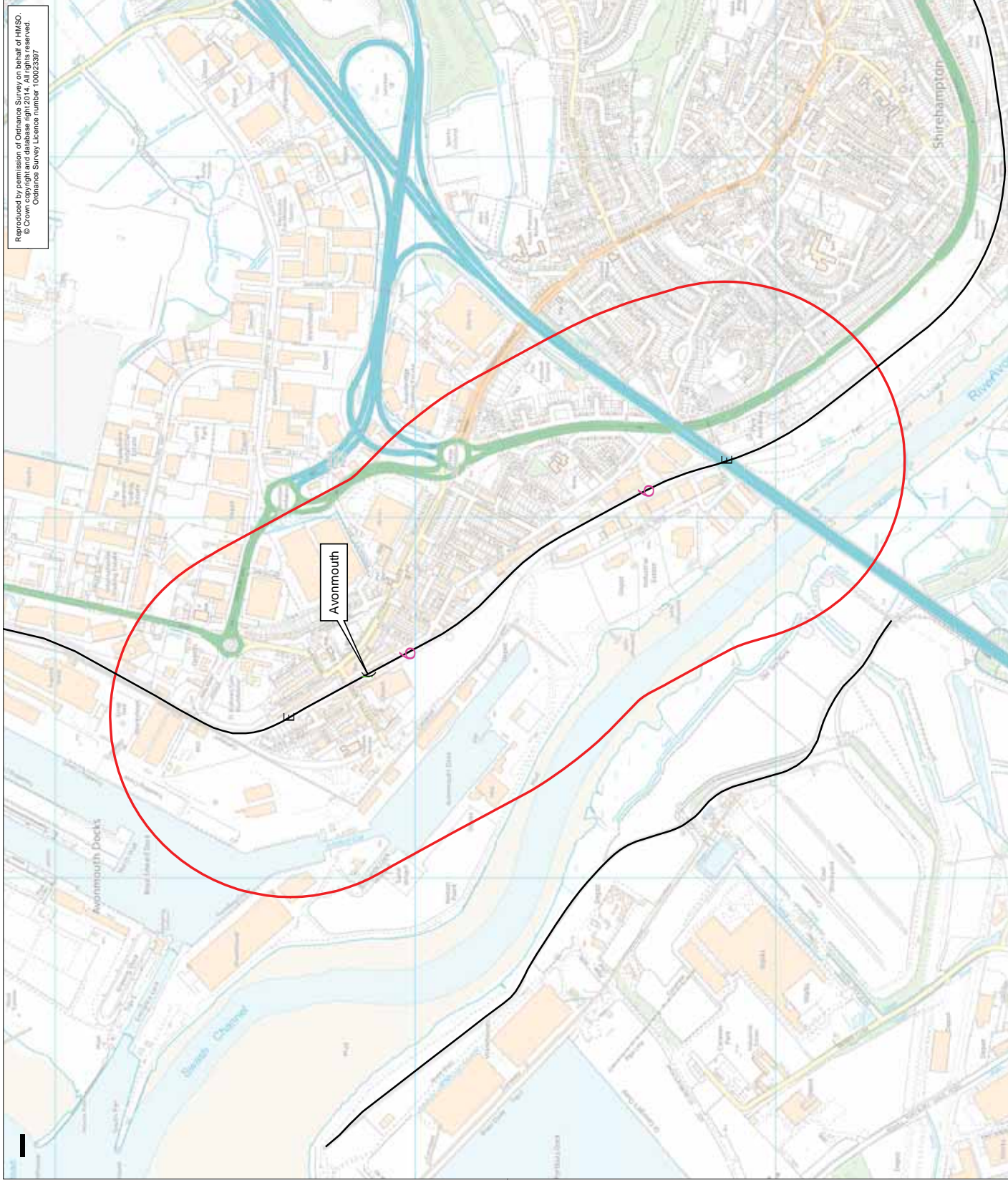
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<sup>3</sup> Indices of Multiple Deprivation, 2010. Department for Communities and Local Government © Crown Copyright, 2011

Appendix B.2: Existing Environment  
at Severn Beach / Avonmouth  
Signalling (MetroWest Phase 1)  
Figures



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**KEY**

- ( Avonmouth Railway Station
- 6 Proposed Signals
- Existing Railway Line
- E Limits of the scheme
- Avonmouth Signals (MetroWest Phase 1) 500m Radius



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**Project:**  
 Avonmouth Signal  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B.2.1: Location Plan for  
 Option 6B

**Drawn By:** Tom Barker  
**Date:** 18/06/2015

**Checked By:** Emily Earing  
**Date:** 18/06/2015

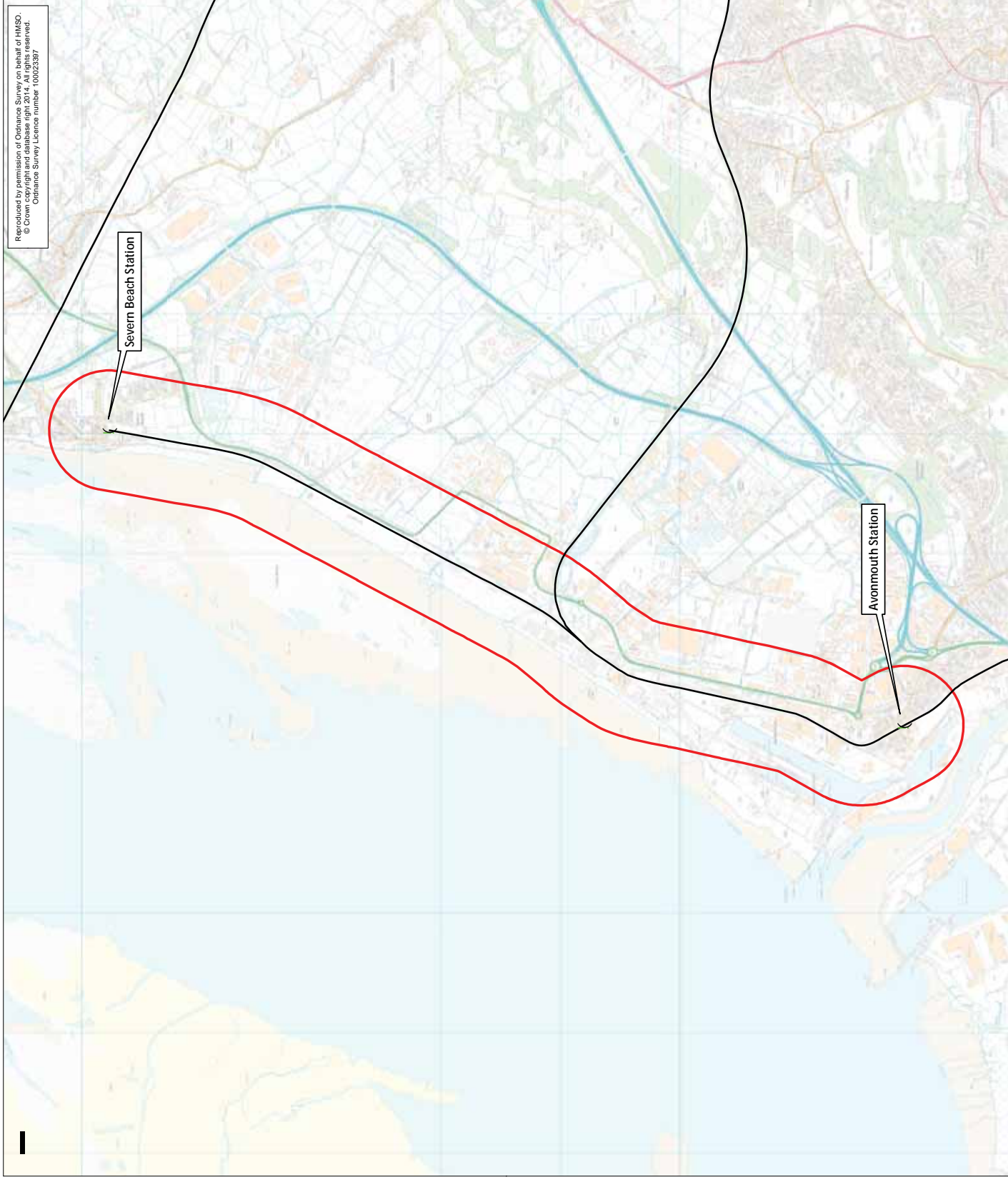
**Approved By:** Carolyn Francis  
**Date:** 18/06/2015

**Drawing No.:** 490327-001-003  
**Revision:** 2




**Drawing Scale:** 1:10,000 @ A3



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**KEY**

-  Railway Station
-  Existing Railway Line
-  Avonmouth to Severn Beach (MetroWest Phase 1) 500m Radius



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**Project:**  
 Avonmouth to Severn Beach  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B.2.2: Location Plan for  
 Option 5B

**Drawn By:** Tom Barker  
**Date:** 18/06/2015

**Checked By:** Emily Earing  
**Date:** 18/06/2015

**Approved By:** Carolyn Francis  
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**KEY**

- ( Avonmouth Railway Station
- 6 Proposed Signals
- Existing Railway Line
- E Limits of the scheme
- Avonmouth Signal (MetroWest Phase 1) 500m Radius
- Monument point (Non-designated)
- Listed Buildings
- Conservation Areas (CA)
- Registered Parks & Gardens (RP&G)
- Scheduled Monument (SM)
- Conservation Areas (CA)



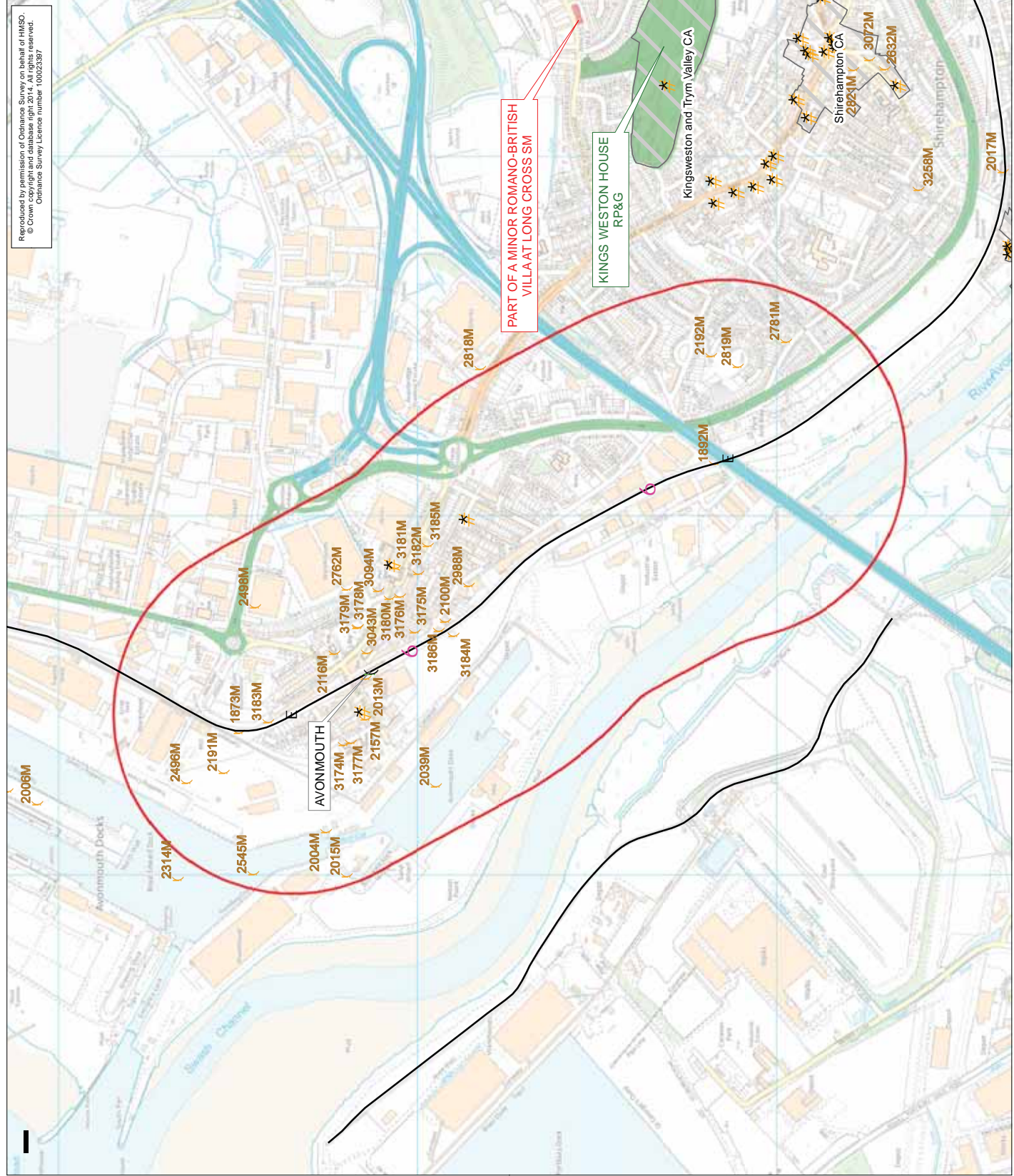
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**Project:**  
 Avonmouth Signal  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B.2.3: Cultural Heritage for  
 Option 6B

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Checked By :	Emily Earing	Date:	18/06/2015
Approved By :	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-004-004	Revision	2
Drawing Scale :		1:10,000 @ A3	





**KEY**

- ( ) Railway Station
- Existing Railway Line
- Avonmouth to Severn Beach (MetroWest Phase 1) 500m Radius
- ( ) Archaeological Monument
- ( ) Archaeological Intervention
- ( ) Listed Buildings
- Conservation Areas (CA)
- Registered Parks & Gardens (RP&G)
- Scheduled Monument (SM)
- Conservation Areas (CA)



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**Project:**  
 Avonmouth to Severn Beach  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B.2.4: Cultural Heritage for  
 Option 5B

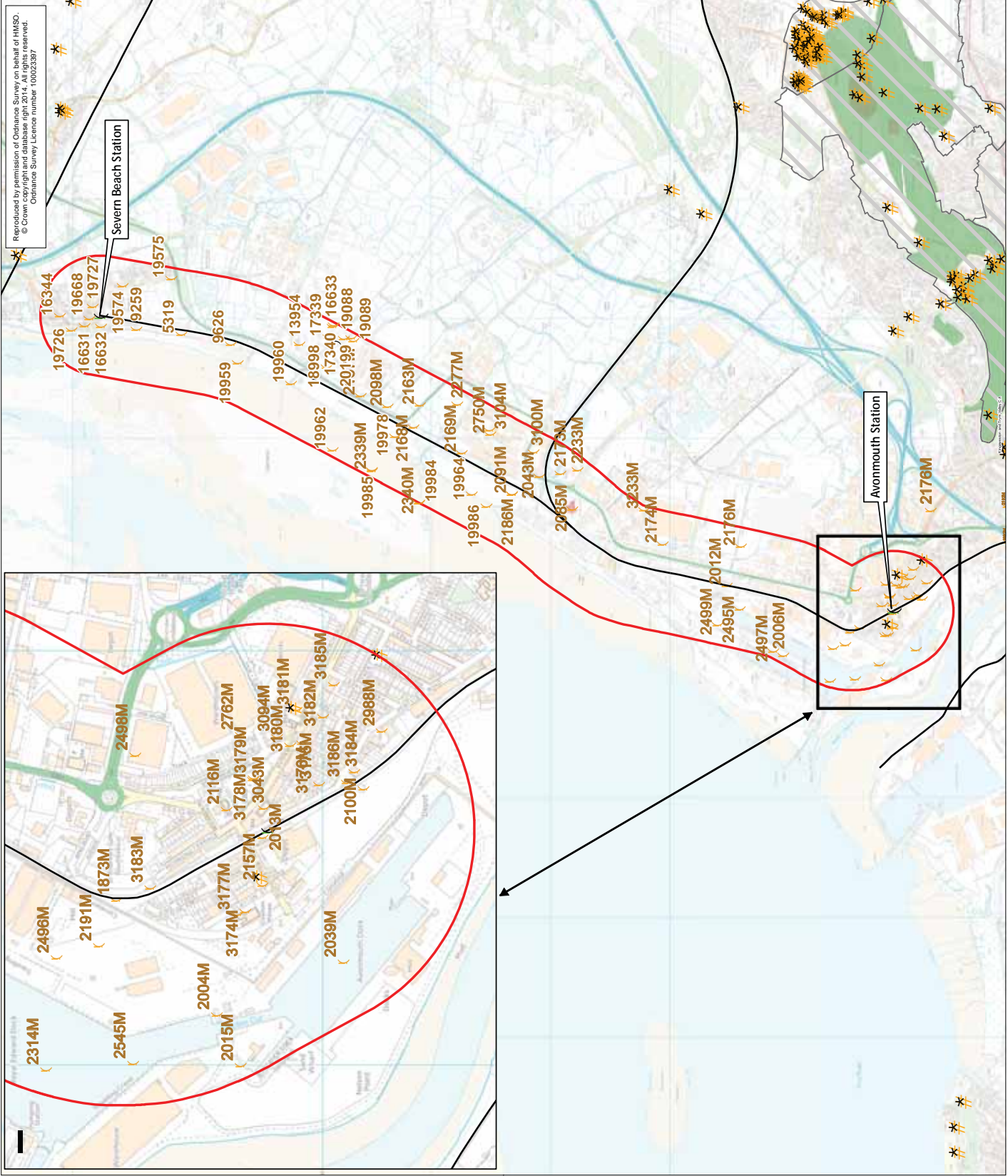
**Drawn By:** Tim Curtis  
**Date:** 19/06/2015

**Checked By:** Emily Earing  
**Date:** 19/06/2015

**Approved By:** Carolyn Francis  
**Date:** 19/06/2015

**Drawing No.:** 490327-004-004  
**Revision:** 2

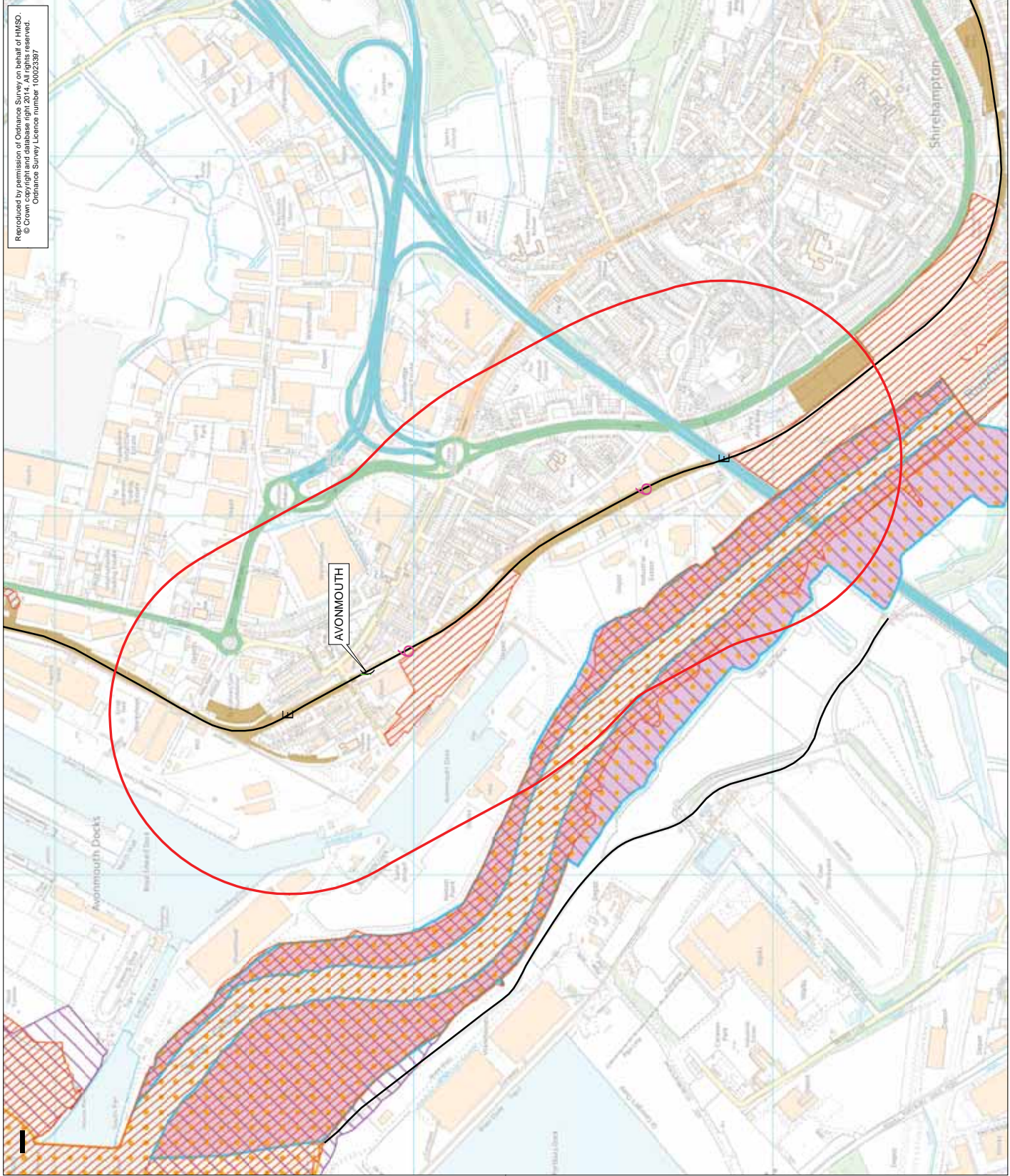
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**KEY**

- ( ) Railway Station
- 6 Proposed Signals
- Existing Railway Line
- E Limits of the scheme
- ◻ Avonmouth Signal (MetroWest Phase 1) 500m Radius
- ◻ Special Protection Area (SPA)
- ◻ Special Area of Conservation (SAC)
- ◻ Ramsar
- ◻ Site of Special Scientific Interest (SSSI)
- ◻ Wildlife Network Sites
- ◻ Site of Nature Conservation Interest (Bristol)



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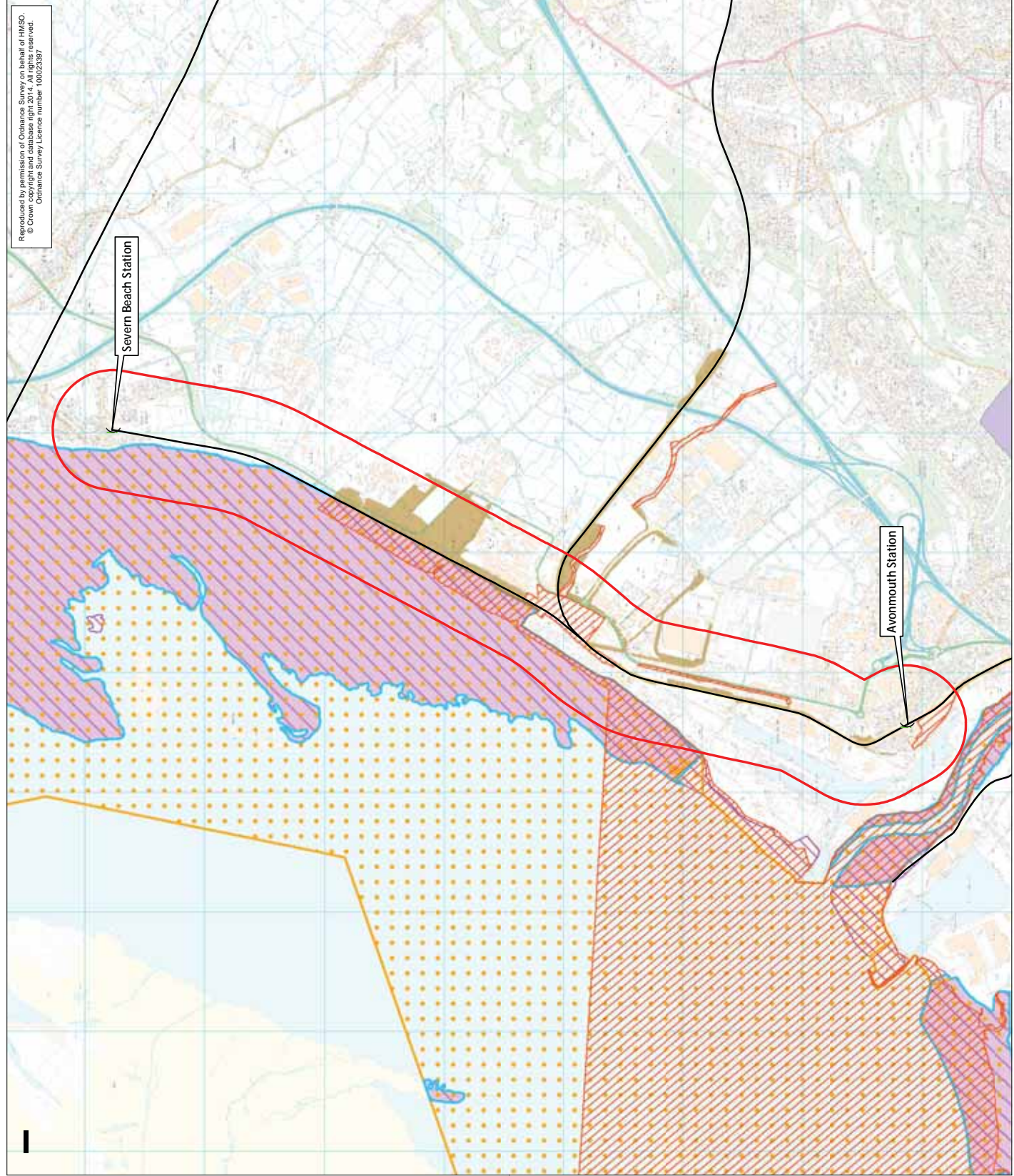
**PROJECT**  
 Avonmouth Signal  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B.2.5: Nature Conservation for  
 Option 6B

Drawn By:	Tim Curtis	Date:	18/06/2015
Checked By:	Emily Earing	Date:	18/06/2015
Approved By:	Carolyn Francis	Date:	18/06/2015
Drawing No.:	490327-006-011	Revision	2
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**KEY**

- Avonmouth to Severn Beach (MetroWest Phase 1) 500m Radius
- Railway Station
- Existing Railway Line
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar
- Site of Special Scientific Interest (SSSI)
- Wildlife Network Sites
- Site of Nature Conservation Interest (SNCI)
- Strategic Nature Areas



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Project: Avonmouth to Severn Beach  
(MetroWest Phase 1)

Drawing:  
Figure B.2.6: Nature Conservation for  
Option 5B

Drawn By : Tim Curtis	Date: 16/06/2015
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Appendix B.3: Existing Environment  
for the Bedminster Down Relief Line  
(MetroWest Phase 1)



# Appendix B.3: Existing Environment for the Bedminster Down Relief Line (MetroWest Phase 1)

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## 1.1. Introduction

- 1.1.1. The “Bedminster Down Relief Line (MetroWest Phase 1)” is required to enable the regulation of freight trains in the southbound direction (returning to Royal Portbury Dock) on the busy south west main line prior to moving off onto the Portbury freight line. The project involves rebuilding and bringing back into use a section of dis-used railway near Bedminster station. The Bedminster Down Relief Line is located south of Bristol on the Bristol to Taunton line (Figure B.3.1) and up line from Parson Street Station which marks the terminus of the Portishead to Parson Street Junction Branch Line (MetroWest Phase 1) project.
- 1.1.2. The section of dis-used railway is approximately 1 km in length and is located on the alongside (outer edge of) the existing Bristol to Taunton main line, in the southbound direction. The works will include the reinstatement of a crossover (a section of track linking two tracks together) and associated signalling. These works are within Network Rail’s operational boundary and will be implemented using their General Permitted Development rights.

## 1.2. Local planning framework

- 1.2.1. The Bedminster Down Relief Line (MetroWest Phase 1) Project lies within the jurisdiction of Bristol City Council (“BCC”). The statutory development plan for BCC is the Bristol Local Plan which comprises the following suite of documents, which are used alongside the NPPF to guide development in the city:
- Bristol Core Strategy (Adopted June 2011): The Bristol Core Strategy is part of the Local Plan (formerly the Local Development Framework), which sets out the overall approach and spatial strategy for future development in Bristol and provides the overarching strategic policy and guidance to deliver sustainable communities and economic growth across the City. The Core Strategy replaces a number of strategic policies saved from the 1997 Plan.
  - Site Allocations and Development Management Policies (Adopted July 2014): This document incorporates site allocations for development, policy designations and development management policies. It forms part of the Bristol Local Plan and will seek to deliver the policies of the Core Strategy. It also replaces a number of saved policies from the 1997 Plan.
  - Bristol City Council Local Plan Saved Policies (1997): A number of policies from the 1997 Plan have been saved by a Secretary of State Direction and remain a material consideration within the Bristol Central Area until replaced by the adoption of the Bristol Central Area Plan.
  - West of England Joint Waste Core Strategy: The Joint Waste Core Strategy guides decisions about where waste management facilities should be located within the West of England.
- 1.2.2. Other planning policy considerations include:
- Bristol Central Area Plan Publication Version (February 2014): The Publication Version was submitted to the Secretary of State on 4 July 2014 for independent examination. Following the hearing in October 2014, consultation has taken place on the proposed Main Modifications. All consultation responses are now with the Inspector for consideration before confirmation will be given on the soundness of the document. This document includes site allocations, spatial policies and development management policies specifically for the centre of Bristol, and once adopted will replace any relevant saved policies of the 1997 Plan. Whilst, it has not yet been adopted, given its advanced nature, it carries significant weight and as such will need consideration.

- Supplementary Planning Guidance
  - PAN 2 - Conservation Area Enhancement Statements (November 1993) – seeks to protect and enhance whole areas with architectural or historic character and details the Clifton Conservation Area and is accompanied by the Conservation Area 5 - Clifton & Hotwells Character Appraisal & Management Proposals.
- 1.2.3. Of these plans, the policies within the Core Strategy, Site Allocations and Development Management Policies and those saved in the Local Plan are considered to be of particular relevance to the proposed Project and are discussed further in the Baseline Report in Chapter 2.
- 1.2.4. The Site Allocations and Development Management Policies Map shows a narrow corridor designated as Important Open Space along the main line railway (BSC9, CM17). There are several areas of Principal Industrial and Warehousing Areas (BSC8, DM13) adjoining or close to the project. Two of these lie at the southern end of the project, around Sheene Way on the north side of the main line railway and between the railway and Cotswold Road on the south side. A third site lies to the north of Bedminster station around Whitehouse Lane and Philip Street. The Windmill Hill area, to the north east of the project, is designated as a local historic park and garden (BCS, DM31). Part of the railway line from approximately opposite Windmill Hill Close going towards Bristol Temple Meads is safeguarded for Rail infrastructure (BSC10, DM24).

### 1.3. Air quality

- 1.3.1. The Local Air Quality Management (“LAQM”) process, as set out in Part IV of the Environment Act 1995 and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, places an obligation on all local authorities regularly to review and assess air quality in their areas, and to determine whether or not air quality objectives are being achieved.
- 1.3.2. The UK government is responsible to the European Commission (“EC”) for ensuring that it complies with the provisions of the European Union (“EU”) Directives. The UK government and governments of other Member States are currently in negotiations with the EC over breaching limit values for particulate matter (“PM<sub>10</sub>”) and nitrogen dioxide (“NO<sub>2</sub>”). The air quality strategy objectives are presented in Table B.3.1, showing the objectives in units of microgrammes per cubic metre (µg/m<sup>3</sup>) with the number of exceedances in each year that are permitted (where applicable).

**Table B.3.1. Air Quality Strategy Objectives**

Pollutant	Concentration	Measured as	Date to be achieved by
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004 31.12.2010
	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	
	40 µg/m <sup>3</sup>	Annual mean	31.12.2004



- 1.3.3. Where it is anticipated that an air quality objective will not be met, it is a requirement of the Environment Act 1995 that an Air Quality Management Area (“AQMA”) be declared, for which the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.
- 1.3.4. BCC has declared one AQMA covering the city centre of Bristol, which extends along the main radial roads including the M32, which has been declared for NO<sub>2</sub> (1-hour mean and annual mean objectives). The Bedminster Down Relief Line is located within the Bristol City AQMA. The location of the AQMA, together with the air quality monitoring locations, is shown on Figure B.3.2.
- 1.3.5. BCC has an extensive air quality monitoring network. They operate 7 continuous monitoring stations and a further 100 diffusion tube sites for NO<sub>2</sub> measurements. Only one automatic monitoring site is located within 1 km of the proposed Bedminster Down Relief Line (MetroWest Phase 1) Project, at Rupert Street. Annual mean automatic monitoring is shown in Table B.3.2 for 2010 – 2013.

**Table B.3.2. Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective**

ID	Location	X	Y	Site Type	Data Capture for 2013 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
						2010	2011	2012	2013
206	Rupert Street	358667	173108	Urban Centre	89.7	<b>94.3</b> <b>(81)</b>	<b>86.2</b> <b>(46)</b>	<b>89.3</b> <b>(52)</b>	<b>85.1</b> <b>(56)</b>
<i>Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup></i>									

Source: BCC, May 2014. Air Quality Progress Report for Bristol City Council (Notes: The objective exceedances are highlighted in bold. The number of exceedances of 200 µg m<sup>-3</sup> as a 1-hour mean concentration shown in parentheses.)

- 1.3.6. Table B.3.2 shows that the annual mean air quality objective for NO<sub>2</sub> was exceeded at the monitoring stations on Rupert Street between 2010 and 2013. The 1-hour mean objective for NO<sub>2</sub> was also breached at the monitoring site on Rupert Street in each of these years. No automatic monitoring sites within 1 km of the proposed Bedminster Down Relief Line (MetroWest Phase 1) Project measure PM<sub>10</sub>.
- 1.3.7. Table B.3.3 shows the annual mean bias adjusted diffusion tube NO<sub>2</sub> measurements for the sites within 1 km of the Bedminster Down Relief Line (MetroWest Phase 1) Project.
- 1.3.8. The results show widespread exceedances of the annual mean air quality objective at eight roadside locations. Measured concentrations exceed 60 µg m<sup>-3</sup> in York Road, Bedminster Parade and Three Lamps, which suggests that the 1-hour mean objective may also be exceeded at these sites (Defra, 2009).

**Table B.3.3. Results of Non-Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective**

ID	Location	X	Y	Site Type	Data Capture for 2013 (%)	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )			
						(Bias adjustment factor = 0.88) 2010	(Bias adjustment factor = 0.91) 2011	(Bias adjustment factor = 0.87) 2012	(Bias adjustment factor = 0.94) 2013
420	North Street/Dean	358277	171562	Roadside	80	<b>53.9</b>	<b>55.2</b>	<b>51.8</b>	38.9
422	North Street/Langton	358168	171525	Roadside	90	<b>43.4</b>	<b>41.2</b>	39.8	39.0
123	York Road	359214	171917	Roadside	89	<b>62.9</b>	<b>66.5</b>	<b>63.0</b>	<b>73.0</b>
5	Bedminster Parade	358723	171704	Roadside	90	<b>66.6</b>	<b>57.2</b>	<b>54.6</b>	<b>58.7</b>
8	Higham Street	359836	171903	Urban Background	89	29.8	25.7	25.6	26.8
105	Victoria Park	359097	171368	Roadside	90	26.0	19.9	20.4	21.2
472	Jamiesons Autos	358226	171284	Roadside	90	<b>52.4</b>	<b>47.4</b>	<b>46.5</b>	<b>48.2</b>
473	B&B Snax West Street	358105	171124	Roadside	90	<b>49.2</b>	<b>43.1</b>	<b>44.6</b>	<b>43.5</b>
474	Martial Arts West Street	357991	170979	Roadside	90	<b>45.1</b>	39.7	37.9	39.1
417	St Johns Lane	359635	171413	Roadside	90	<b>51.3</b>	<b>45.6</b>	<b>44.1</b>	<b>42.1</b>
4	Three Lamps	359903	171850	Roadside	89	<b>62.3</b>	<b>59.8</b>	<b>58.4</b>	<b>60.6</b>

*Annual mean AQS for NO<sub>2</sub> = 40 µg/m<sup>3</sup>*

Source: BCC, May 2014. Air Quality Progress Report for Bristol City Council (Notes: The objective exceedances are highlighted in bold. The number of exceedances of 200 µg m<sup>-3</sup> as a 1-hour mean concentration shown in parentheses.)

## 1.4. Cultural heritage

### Statutory designations

- 1.4.1. Cultural heritage assets in the vicinity of the Bedminster Down Relief Line (MetroWest Phase 1) Project are shown on Figure B.3.3. There are no scheduled monuments, registered battlefields, or registered historic parks and gardens within a 500 m buffer area surrounding the Project.
- 1.4.2. The Bedminster Conservation Area extends within 500m of the project and 16 listed buildings lie within 500 m of the Project (Table B.3.4). None of these lies within 200 m of the existing railway line.

**Table B.3.4. Listed buildings within 500 m of the Bedminster Down Relief Line (MetroWest Phase 1) Project**

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1202013	Albert cottage
1202193	Bristol south baths and attached railings and gates
1202195	North view cottage and the annexe and attached railings to steps
1202215	Wills number 1 factory
1202598	St Mary Redcliffe and Temple School House and attached walls and railings
1202720	Numbers 60, 62 and 64 and attached front basement area railings
1202721	Numbers 74 to 80 (even) and attached front basement area railings
1204061	Bedminster library
1204068	Old Police Station
1206353	Regent House
1207518	Zion House and attached railings and gateways
1208813	St Mary Redcliffe and Temple School and attached sheds
1281405	National Westminster bank and attached front railings
1282036	Numbers 42 to 58 (even) and attached front basement area railings
1282251	Hebron chapel and attached railings, gates and piers
1282391	50 and 52, Bedminster parade

- 1.4.3. These buildings are all Grade II listed and are accorded a **medium** value. However, given their relative distance from the existing railway line it is unlikely that there will be any visual impact from the scheme.

### Non-designated assets

- 1.4.4. There are 71 known archaeological monuments within the 500 m buffer area recorded on the Historic Environment Record (“HER”). The majority of these lie over 150 m to the north of the existing railway line. These generally relate to extant buildings and warehouses, plus ecclesiastical structures. The vast majority date from the later post medieval periods. Closer to the railway line Bedminster Station is recorded (ref 2027M) as well as various post medieval engineering works and warehouses. The historical settlement core of Bedminster dates from the early medieval period, however given the extent of modern development it is unlikely that the proposed works would have much potential to uncover early remains.

## Recommendations for further survey work

- 1.4.5. A review of ground investigation results within the general construction zone would inform the need for detailed archaeological assessment and investigation. However, given the proposed design, the likelihood of buried archaeology being affected is low.

## 1.5. Ecology and biodiversity

### Approach

- 1.5.1. A desk study was conducted for a search area encompassing the site and surrounding land within a 0.5 km buffer from the site for all records and local sites, within 2.5 km for bats and nationally designated sites, and within 5 km for internationally designated sites. This area was considered to be sufficient to cover the likely zone of influence of the proposed scheme. Data sources consulted during the desk study were:
- The Multi-Agency Geographic Information for the Countryside website (“MAGIC”); and
  - Bristol Regional Environmental Records Centre (“BRERC”), for protected, notable species data, descriptions for Local Nature Reserves, non-statutory designated sites and Wildlife Trust reserves.
- 1.5.2. Where applicable, information supplied by these organisations has been incorporated into the following account with due acknowledgement where they are particularly informative or relevant.

### Designated sites

- 1.5.3. There is one internationally designated site within a 5 km radius of the Bedminster Down Relief Line, namely, the Avon Gorge Woodlands Special Area of Conservation (“SAC”). This site lies at approximately 2,490 m from Bedminster Down Relief Line. The SAC is designated for its *Tilio-Acerion* forests in south-west England on the limestone cliffs and screes of a large river gorge and also supports high concentration of small-leaved lime *Tilia cordata*, compared with other sites in the region, the presence of rare whitebeams *Sorbus* spp., including two unique to the Avon Gorge (*S. bristoliensis* and *S. wilmottiana*), and other uncommon plants, such as green hellebore *Helleborus viridis*. Other characteristic species include soft shield-fern *Polystichum setiferum* and hart’s-tongue *Phyllitis scolopendrium*. Species-rich transitions to scrub and grasslands are associated with the woodland. Small groves of yew *Taxus baccata* also occur on some of the stonier situations. The SAC is also designated for two species of bat, the lesser horseshoe bat *Rhinolophus hipposideros* and the greater horseshoe bat *R. ferrumequinum*. Bats are highly mobile and can range over extensive distances.
- 1.5.4. There are no national designations within the Bedminster Down Relief Line, however there are two designations, within a 2.5 km radius of the site, the Avon Gorge Site of Special Scientific Interest (“SSSI”) and Ashton Court SSSI.
- 1.5.5. The Avon Gorge SSSI is co-incident with the Avon Gorge Woodlands SAC designation described above. The SSSI citation refers to the natural cliffs and quarry exposures of Carboniferous limestone, which are of great geological interest and, together with the screes, scrub, pockets of grassland and adjacent woodland, support an exceptional number of nationally rare and scarce plant species.
- 1.5.6. Ashton Court SSSI is important for its rich saproxylic (dependent on dead and decaying matter) invertebrate fauna including many species which are nationally scarce due to a significant concentration of ancient oak pollards. Elsewhere ancient trees occur as open parkland trees either singly or in small groups and also as single trees within relatively modern plantations.
- 1.5.7. There are four locally designated Wildlife Network Sites within 0.5 km of Bedminster Down Relief (Figure B.3.4) Line.
- St. John’s Burial Ground



- Cotswold Road Open Space
- Railway between A38 road crossing and Bath Rd, and
- Victoria Park

## Habitats

- 1.5.8. The habitats within the Bedminster Down Relief Line were identified through the MAGIC website and include:
- Scrub – Bramble *Rubus fruticosus* scrub with hawthorn *Crataegus monogyna*. Butterfly bush *Buddleja davidii* is also likely to be present towards the edges of the site.
  - Tall ruderal vegetation – The commonest species are common nettle *Urtica dioica* with rosebay willowherb *Chamerion angustifolium* and cleavers in areas which have been disturbed in the past.
  - Trees – Trees border the railway land.
  - Waterbodies - Malago stream passes under the site at its southern end. There is also one pond within 110 m to the north of the site.

## Protected species

- 1.5.9. A number of protected species records have been received from BRERC for this site. The following species and/ or their habitats have been confirmed as present within or in habitat immediately adjacent to the project.

### Amphibians

- 1.5.10. One pond was identified from MAGIC within 110 m of the Network Rail boundary and BRERC has recorded three ponds within 500 m of the site. There is potential for these water bodies to support great crested newt and for individuals to be using the track and adjacent habitats for foraging and hibernation. BRERC also returned records of common frog *Rana temporaria*, smooth newt *Lissotriton vulgaris* and common toad *Bufo bufo* within the search area.

### Bats

- 1.5.11. Numerous records for bats were received by BRERC. The nearest record of a bat roost is for lesser horseshoe bat *R. hipposideros* approximately 1 km from the site.

### Birds

- 1.5.12. BRERC returned records of 45 species of birds. Of these, seven are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended): firecrest *Regulus ignicapilla*, redwing *Turdus iliacus*, kingfisher *Alcedo atthis*, peregrine *Falco peregrinus*, whimbrel *Numenius phaeopus*, brambling *Fringilla montifringilla* and black redstart *Phoenicurus ochruros*. Numerous opportunities for nesting and foraging exist within the project boundary and adjoining areas.

### Reptiles

- 1.5.13. BRERC returned one record of slow worm *Anguis fragilis* in the search area. Potentially suitable habitats for reptiles are present in the project area, with trees, scrub and tall ruderal habitats present.

### Plants

- 1.5.14. BRERC data held numerous records for invasive and protected species. The records which are of most relevant to this site are listed below.
- Three records of the invasive species Himalayan balsam *Impatiens glandulifera*

- 27 records of the invasive species Japanese knotweed *Fallopia japonica*
- One record of the invasive species giant hogweed *Heracleum mantegazzianum*
- Two records of bluebell *Hyacinthoides non-scripta*, which is listed under Schedule 8 of the WCA
- Veteran black poplar trees have been recorded in Victoria Park.

## Evaluation and recommendations for further survey work

### Habitats

- 1.5.15. Scrub and ruderal vegetation are considered to be of **Local** value for nature conservation due to the value of the linear corridor of vegetation as providing habitat connectivity. The habitats also provide shelter and foraging opportunities for animals and nesting opportunities for birds.
- 1.5.16. Mature trees are important habitats in themselves and are only replaceable in the long-term. Mature trees on this site are considered to be of up to **Local** value for nature conservation.
- 1.5.17. It is recommended that continuous belts of scrub or linear woodland to either side of the tracks are maintained, where possible, to retain the habitat on site and to preserve connectivity of the green corridor. It is also recommended that mature trees are retained where possible.

### Species

- 1.5.18. *Amphibians* – It is recommended that a Habitat Suitability Index (HSI) assessment for great crested newts is undertaken for ponds within 250 m of the scheme. This survey can be undertaken at any time of the year. Based on the findings of the HSI, a survey for great crested newts may be required, which would involve a minimum of four survey visits between mid-March and mid-June.
- 1.5.19. *Badgers* – An assessment of use of the site by badgers could not be undertaken as no site visit has been undertaken to date. Badgers could be present within the Network Rail boundary and immediately adjacent to the site, as the habitat appears suitable for badgers. It is recommended that a badger survey is undertaken where any works are proposed, to include a 30 m buffer on adjacent land. It may not be possible to confirm the presence of setts without clearance of vegetation using power tools. A mitigation strategy will be required for any setts that fall within approximately 30m of construction or areas to be accessed by heavy machinery. Should any setts need to be closed this must be carried out under licence from Natural England. A two month period should be allowed for the licence application process.
- 1.5.20. *Bats* – The trees may have potential for roosting bats. If works are likely to affect the tree (e.g. felling, tree surgery and additional lighting), it is recommended that a bat roost assessment survey is undertaken. If roosting bats are found, any works affecting the roost will need to be undertaken under a Natural England licence for a European Protected Species. The licence application will need to be accompanied by a method statement, which will set out the mitigation measures that will be implemented for bats as part of the proposals. The type and level of mitigation is dependent on several factors, including the type of impact and the nature of the roost. As an overall enhancement measure, it is recommended that bat boxes are erected on retained mature trees within the project, where associated with suitable foraging habitat.
- 1.5.21. *Birds* – Any works which will involve the removal or disturbance of scrub, ruderal vegetation, grassland and mature trees, should be undertaken outside the main bird breeding season (mid-February to August inclusive). If the removal of such features has to occur during the bird breeding season, a survey by an experienced ecologist will be necessary immediately in advance of the works to check for nesting birds.

- 1.5.22. *Invasive plants* – There are records of invasive plants within the search area. It is recommended that a survey of invasive plants is undertaken within the project boundary and access routes. If invasive plants are present within the working areas measures must be employed to prevent any spread of invasive plants.
- 1.5.23. *Reptiles* – Potentially suitable habitats for reptiles are present in the project area, with trees, scrub and tall ruderal habitats present. A reptile survey would only be necessary if the areas identified as having potential for reptiles are to be disturbed. A survey should be undertaken in April-May or September, to ascertain the presence of reptile, the population present and to inform a reptile mitigation strategy to prevent killing or injury to reptiles during construction.
- 1.5.24. In conclusion, it is considered that subject to the implementation of the recommended measures set out above in relation to avoiding or mitigating for potential impacts and subject to recommendations of any detailed species surveys, that the proposed development of the site could be implemented without significant adverse ecological impacts and be in accordance with relevant legislation and planning policy.

## 1.6. Geology, ground conditions and contaminated land

### Geology and hydrogeology

- 1.6.1. The Bedminster Down Relief Line (MetroWest Phase 1) Project is located on Mudstone and Halite-stone rocks of the Mercia Mudstone Group of the Triassic Period with no recorded superficial deposits. The Triassic sediments around the project are classified as Secondary B aquifers, 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.
- 1.6.2. There are no nationally protected geological sites within 3 km of the project.

### Potentially contaminative land uses

- 1.6.3. The route is established railway corridor and as such there is potential for the underlying ground to be affected by contaminants associated with railway use. However, the proposals will have no effect on ground conditions along the active railway corridor.

## 1.7. Landscape and visual amenity

### Landscape character

- 1.7.1. Bedminster Down Relief Line (MetroWest Phase 1) sits within the National Character Area of Bristol, Avon Valleys and Ridges which “*encompasses the City of Bristol with its historic port, and the surrounding area including the Chew and Yeo valleys, Keynsham, Clevedon, Portishead and parts of the Cotswolds and Mendip Hills AONB. The area is characterised by alternating ridges and broad valleys, with some steep, wooded slopes and open rolling farmland*”.
- 1.7.2. The NCA includes both urban and rural areas, with the City of Bristol and infrastructure such as the M5 contributing to the considerable amount of urban development. Pressures for development around the City of Bristol and M5, present a considerable challenge.
- 1.7.3. From a historic perspective, this character area has a wealth of significant buildings and landscapes. Pennant sandstone has historically been used as a building material to the south-west of the character area.
- 1.7.4. The character of the Bedminster landscape is primarily dense urban residential with some industrial and commercial development on the north side of the railway line and to the west of Parson Street Station on Winterstoke Road. The houses are a mix of terraces and semi-detached, with some corner shops and other small scale commercial premises scattered within. There are some street trees, notably on Parson Street and alongside the railway line itself.

## Visual amenity

- 1.7.5. The potential visual receptors and views were identified through desk study and use of Google Streetview and are presented in Table B.3.5.

Table B.3.5. Summary of Key Receptors near and Views to Bedminster Down Relief Line (MetroWest Phase 1)

No.	Location	View
1	Brighton Crescent	Views from the rear of the properties down to the railway line with the properties of Hall Street on the other side
2	Stanley Terrace, Argus Court, Hope Road	Views from the rear of the properties to the railway line as it rises out of cutting.
3	Honeywick Close	Views to the tall timber fence between the road and railway lines
4	Hall Street	Views from the rear of the properties to the railway line set above the level of the back gardens
5	Parson Street	Glimpsed views from the bridge, mostly screened by the bridge parapet
6	St John's Lane	Views down the line of the road to the railway bridge with its advertising hoardings.

## 1.8. Materials and waste

- 1.8.1. The Bedminster Down Relief Line, which historically extended from Temple Meads Station to the west of Parson Street Station, is not in operational use and therefore any existing use of materials or waste generation resulting from the project is likely to be negligible (by material / waste type and quantity). The GRIP 2 Feasibility Report (URS, 2014) suggests that some 950 m of the former railway line is considered to be good serviceable continuous welded rail on concrete/steel sleepers which could be potentially be utilised in the proposed as-built reinstatement works.

## 1.9. Noise and vibration

- 1.9.1. Bedminster Down Relief Line (MetroWest Phase 1) is located within a residential area. Sensitive receptors are located both to the south and north of the line, with the closest dwellings at 1m. This location is likely to be dominated by railway noise from the existing track used by passenger and freight trains, being close to Bedminster station. Traffic noise from the A38 is also likely to be dominant in the area, as the road is within 150m of the railway track.
- 1.9.2. During an initial site visit, noise sensitive receptors were identified and a position established for the sampling location, and this is described in Table B.3.6. The noise survey was conducted on 22 May 2015, with one-hour short-term measurement recorded at one location, MP10, which is located on Figure 9.1 in Appendix A. Daytime temperatures during the survey ranged from 18 to 20°C, while wind speed varied between 0.3 and 1.5 m/s.
- 1.9.3. Table B.3.7 presents a summary of the operational daytime ambient noise measurement at the noise monitoring location MP10 on 22 May 2015.



**TABLE B.3.6: Description of the Measurement Locations**

Location	Coordinates		Description
	Latitude	Longitude	
MP10	51.43878	-2.59614	This position is considered to be acoustically representative of the existing ambient noise levels at the residential premises to the Bedminster Down Relief Line. Operational day-time was recorded at this location. The sound level meter was located off Cotswold Road in line with the rear of the houses that face the railway line. The dominant noise source at this location was railway noise. Passing trains were observed between every 5 and 10 minutes. Noise from birds singing constantly, road traffic noise from Cotswold Road and aircraft also contributed to the noise climate.

**TABLE B.3.7: Ambient Noise Survey Results – Operational Daytime**

Operation Daytime					
Position	Start time	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A10,T</sub> dB	L <sub>A90,T</sub> dB
MP10	12:41:55	52.5	73.1	52.6	45.6

## 1.10. Socio-economics and economic regeneration

### Introduction

- 1.10.1. This section provides further commentary on the socio-economic indicators for the area surrounding the Bedminster Down Relief Line (MetroWest Phase 1) Project (defined as Windmill Hill ward). This section should be read in conjunction with section 10.2 of the Baseline Report, which provides a more general overview of prevailing socio-economic indicators across the West of England sub-region and nationally.

### Demography

- 1.10.2. The 2011 Census<sup>1</sup> reveals that there were around 13,000 residents in Windmill Hill in 2011, an increase of around 2,000 on the population in 2001. As a result, the average annual rate of population growth was estimated at 1.6%. The age structure is heavily weighted towards the working-age population cohort of 16 to 64 year olds, accounting for three-quarters of all residents. These residents are likely to comprise the labour force in the area and would therefore benefit from any intervention to increase access to employment.
- 1.10.3. Windmill Hill is more ethnically diverse than most areas within the West of England, although the white ethnic group still dominates by representing 86% of the population. Around 5% of residents are Asian, 4% are from Black or mixed ethnic backgrounds. In terms of disability, the area has a low proportion of residents for who day to day activities are limited a lot (6.4%) or to some extent (7.8%), relative to England (8.3% and 9.3% respectively). Despite this low proportion, the figures still indicate that around 15% of residents in Windmill Hill experience some degree of difficulty in their day to day activities, and would benefit greatly from increased mobility options.

<sup>1</sup> Office for National Statistics, 2011 Census: Aggregate data (England and Wales) [computer file]. UK Data Service Census Support.

## Travel patterns

- 1.10.4. The West of England trend for high rates of private car ownership is not reflected in Windmill Hill where 30% of households do not have access to a private vehicle – this is above the national average of 26%. Therefore there is a clear need to provide a suitable public transport offer in the area to support the high number of residents without access to a private vehicle. Improving the MetroWest service would enhance the public transport offer in Windmill Hill and could encourage an increase in the current proportion of local residents who use rail to commute to work. Currently, 4.5% of residents in the area commute via rail, indicating that there is an established market for rail travel that could be expanded with an improvement to services.

## Labour market participation

- 1.10.5. Economic activity rates in Windmill Hill are much higher than the national average at almost 80%<sup>1</sup>. However, unemployment rates are also above the national average (4.7% versus 4.4%). That said, youth and long-term unemployment rates – estimated at 26% and 35% of all unemployment respectively – are marginally below the national average. Claimant count data suggest that the proportion of Job Seeker's Allowance ("JSA") claimants in the area doubled in the wake of the economic crisis in 2008/9 and subsequently remained at around 4% for a number of years. However, the most recent data indicate that the claimant rate has fallen in the last year and are approaching pre-economic crisis levels. Overall, the claimant count trends for Windmill Hill have broadly matched the national trends over the past decade.

## Socio-economic classification

- 1.10.6. Windmill Hill benefits from a low proportion of its population with National Vocational Qualification Level 4+ (NVQ4+) NVQ4+ qualifications (43%). This is well above the national average (27%). Only 16% of residents have no qualifications; well below the average for England (23%). These trends are reflected in the occupational structure for Windmill Hill, which suggest 50% of residents are concentrated in occupations at the top-end of the occupational structure, in high-value occupations. Further, less than a quarter of residents in the area occupy positions at the low-value end of the occupational structure spectrum; significantly below the nationwide figure of 29%.
- 1.10.7. Consolidation of these trends results in around 60% of residents featuring in the top levels of the approximated social grading system (i.e. A/B/C1)<sup>1</sup>.

## Employment profile

- 1.10.8. The residential employment profile (2011 Census) demonstrates that Windmill Hill residents are over-represented in the high-skilled sectors such as banking, finance and insurance. There is also a concentration of employment in public administration, accounting for nearly one-third of employment for Windmill Hill's residents.
- 1.10.9. Analysis of the workplace employment profile (based on Census 2011) implies a significant mismatch between the types of employment opportunities available in Windmill Hill relative to the employment profile of its residents. Noticeably, the proportion of the workforce employed in high-value industries such as banking, finance and insurance is 17%, significantly below the national average (22%). This implies that the high proportion of residents employed these industries would be required to commute out of Windmill Hill to find appropriate employment.

## Deprivation

- 1.10.10. In general, the socio-economic trends outlined above portray Windmill Hill as relatively prosperous with a highly skilled workforce employed in high value jobs. These findings are reflected in the indices of multiple deprivation<sup>2</sup> which do not suggest any significant

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<sup>2</sup> Indices of Multiple Deprivation, 2010. Department for Communities and Local Government © Crown Copyright, 2011

concentrations of deprivation in proximity to Windmill Hill. It is also reflected in the fact that 50% of households in the area are not deprived across any dimensions of deprivation.

## 1.11. Soils, agricultural land and land use

- 1.11.1. The Bedminster Down Relief Line is located in a residential suburb of Bedminster. There is no agricultural land in the vicinity.

## 1.12. Transport, access and non-motorised users

- 1.12.1. The partial reinstatement of the Bedminster Down Relief Line (MetroWest Phase 1) is required to aid the regulation of freight trains in the southbound (down) direction toward Portbury dock. The construction approach for this infrastructure has not been finalised, but it is assumed that road access will not be required, and thus a transport assessment will not be required.

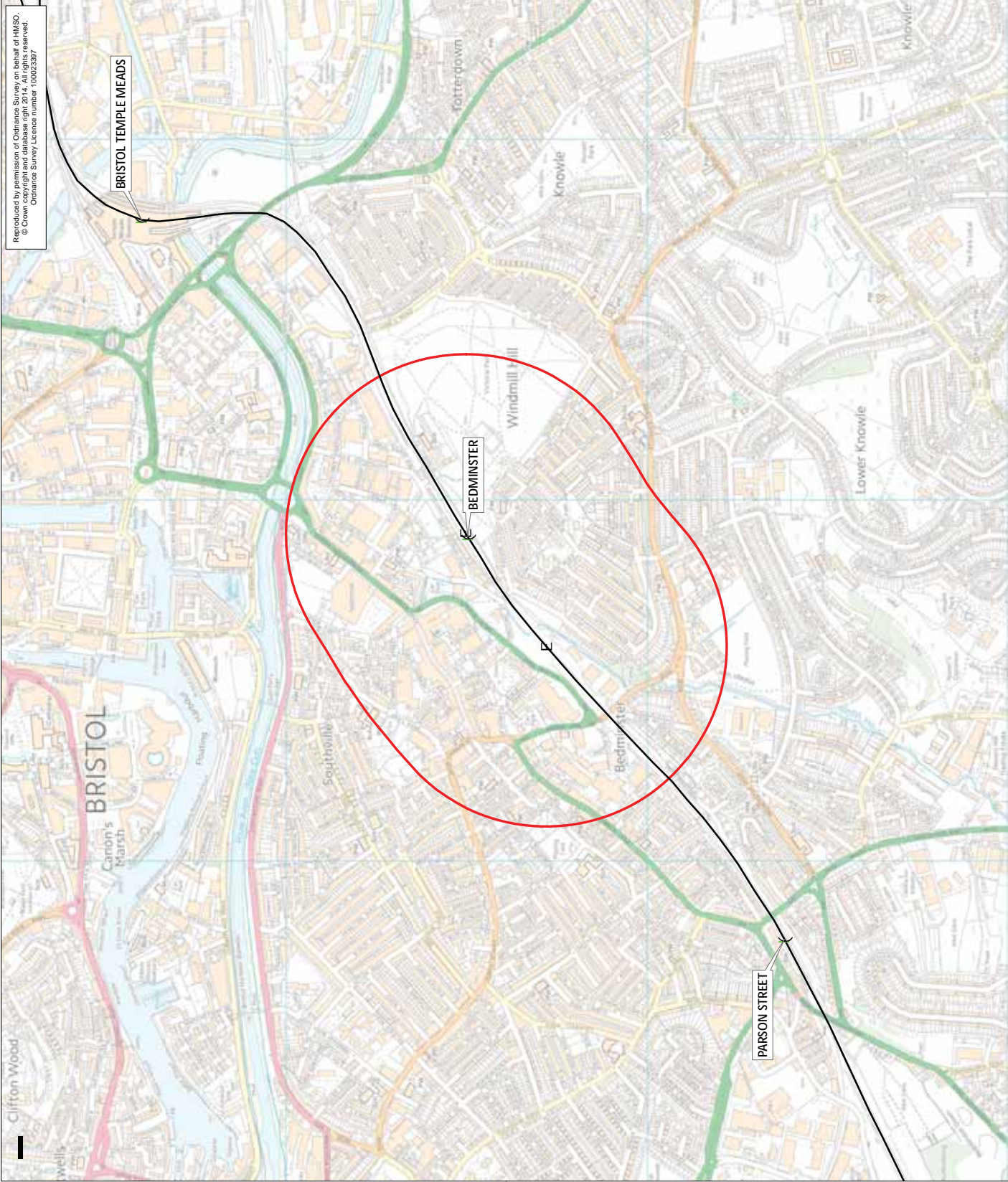
## 1.13. Water resources

- 1.13.1. A watercourse called The Malago passes under the railway line in culvert from south east to north west approximately 200 m south west of Bedminster Station at NGR ST 586 713,. The Malago flows north east, where it is culverted for the majority of its length and enters the River Avon in the centre of Bristol. This watercourse, which is designated as Main River, is not classified under the Water Framework Directive (“WFD”).
- 1.13.2. No information is available at present on the existing drainage arrangements and outfalls from the operational railway to surface or groundwaters.
- 1.13.3. The River Avon at Avonmouth (the Bristol Avon ID GB530905415405) is classified under the WFD as being a heavily modified estuarine waterbody with Good Ecological Potential. The River Avon enters the Severn Estuary (Severn Lower ID GB530905415401) which is also a heavily modified estuarine waterbody. The Severn Lower has a classification of Moderate Ecological Potential and Good chemical quality. The Avonmouth Docks are also considered to be a part of the Severn Lower waterbody.
- 1.13.4. The Bedminster Down Relief Line crosses the floodplain associated with The Malago, with land to the north and south of the railway line being located within Flood Zone 2 (Medium risk). However the railway is raised above the floodplain on an embankment in the location of the project.
- 1.13.5. The site is located within the Bristol Triassic Groundwater body (GB40902G804800) and under the WFD is considered to have Good qualitative quality and Poor chemical quality. There are no Source Protection Zones or abstraction licences within the vicinity of the railway line in this location.

Appendix B.3: Existing Environment  
for the Bedminster Down Relief Line  
(MetroWest Phase 1) Figures







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**KEY**

- ( ) Railway Station
- Existing Railway Line
- E Limits of the scheme
- Bedminster Down Relief Line (MetroWest Phase 1) 500m Buffer



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**Project:**  
 Bedminster Down Relief Line  
 (MetroWest Phase 1)

**Drawing:**  
 Figure B.3.1: Location Plan

**Drawn By:** Helen Winter  
**Date:** 18/06/2015

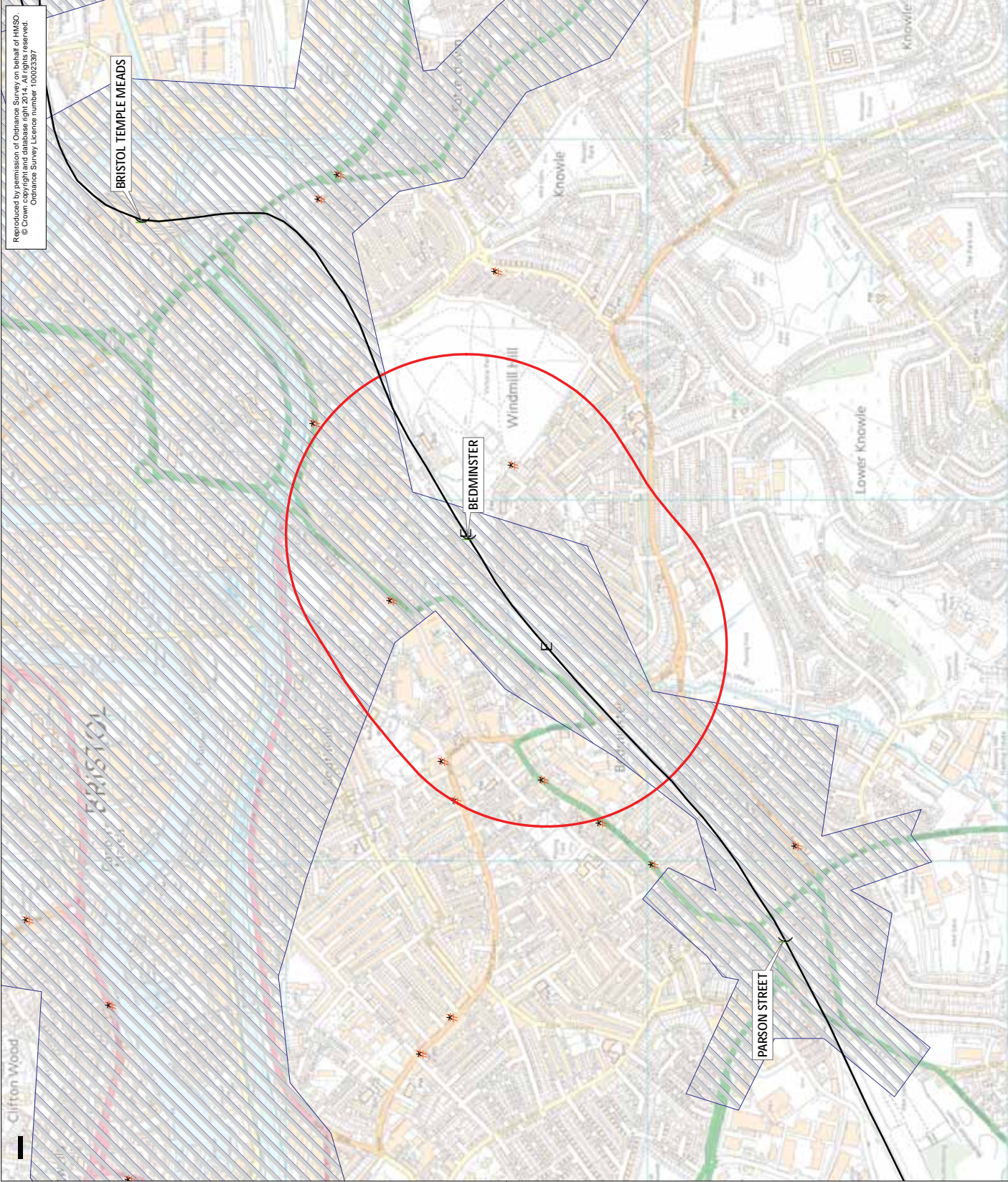
**Checked By:** Emily Earing  
**Date:** 18/06/2015

**Approved By:** Carolyn Francis  
**Date:** 18/06/2015

**Drawing No.:** 490327-001-004  
**Revision:** 2

**Drawing Scale:** 1:10,000 @ A3





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**KEY**

- Railway Station
- Existing Railway Line
- Limits of the scheme
- Bedminster Down Relief Line (MetroWest Phase 1) 500m Buffer

**Air Quality Monitoring Station**

- Bristol City Council (BCC)
- Air Quality Management Area (AQMA)



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**Drawing:** Figure B.3.2: Air Quality

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**Approved By:** Carolyn Francis **Date:** 18/06/2015

**Drawing No.:** 490327-009-002 **Revision:** 2

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# Appendix C

## Ecology





# Appendix C: Ecology

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Appendix C.1: Ecological Appraisal Report

Appendix C.2: Preliminary Bat Survey Report

Appendix C.3: Wintering Bird Survey



# Appendix C.1: Ecological Appraisal Report





# Portishead Branch Line (MetroWest Phase 1) Project

*Prepared for*

North Somerset Council

June 2015



Burderop Park  
Swindon  
SN4 0QD



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**Figure C.1. Statutory Designated Sites**

**Figure C.2. Phase 1 Habitat Mapping (19 sheets)**

## Annex

**Annex 1 – Target Notes**





# Acronyms and Abbreviations

BAP	Biodiversity Action Plan
BCC	Bristol City Council
BDF	Bristol Development Framework
BRERC	Bristol Regional Environmental Records Centre
ES	Environmental Statement
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
IEEM	Institute of Ecology and Environmental Management
JNCC	Joint Nature Conservation Committee
LNC	Local Nature Reserve
MAGIC	Multi-Agency Geographic Information for the Countryside website
NPPF	National Planning Policy Framework
NERC	Natural Environment and Rural Communities Act 2006
NNR	National Nature Reserve
NSC	North Somerset Council
RLP	Replacement Local Plan
SAC	Special Area of Conservation
SNA	Strategic Nature Area
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WCA	Wildlife and Countryside Act 1981
WS	Wildlife Site



# Executive Summary

CH2M HILL has been commissioned by North Somerset Council ("NSC") to undertake a Phase 1 Habitat Survey and report for the Portishead Branch Line (MetroWest Phase 1) Project. The survey was undertaken for the whole length of the railway corridor between Portishead and Parson Street Junction, covering the Portishead Branch Line (MetroWest Phase 1) Project and the Portbury Freight Line.

This report concludes that important habitats and protected species are present within and adjacent to the Project. The main constraints are as follows.

- A 3.8km section of the line runs through Avon Gorge Woodland Special Area of Conservation ("SAC"), Avon Gorge Site of Special Scientific Interest ("SSSI") and Leigh Woods National Nature Reserve ("NNR"), which are statutory protected sites.
- The Severn Estuary SAC, Special Protection Area ("SPA") and Ramsar site is located within 80m of the Project at its nearest location.
- Water voles are present within Portbury Wharf Nature Reserve which runs adjacent to the site and is a sensitive wetland.
- A good population of dormice are known from the Leigh Woods NNR adjacent to the Portbury Freight Line and are also likely to use habitat associated with the railway corridor.
- A number of habitat opportunities for reptiles and bats exist within the boundaries of the railway.
- Three sections of the invasive species Japanese knotweed have been identified within the railway corridor.

The report makes a number of recommendations for general best practice working methods, mitigation and further surveys.

## 1.1 Background to the Project

- 1.1.1 CH2M HILL has been commissioned by North Somerset Council (“NSC”) to update a previous Ecological Appraisal report (Halcrow, 2011) and to undertake an ecological appraisal for the Portishead Branch Line (MetroWest Phase 1) Project, incorporating the proposed permitted development works on the Portbury Freight Line. The study area extends from Portishead to Parson Street Junction and hereafter is referred to as “the Project”.
- 1.1.2 The Project comprises a number of improvements to the rail network from Portishead to Parson Street Junction in Bristol which is being considered to open as a passenger line running hourly trains between Portishead and Bristol Temple Meads. This report covers:
- The Portishead Branch Line (MetroWest Phase 1) comprising:
    - the disused section of track beginning from Harbour Road, Portishead, North Somerset (OSGR ST471765), to Pill, North Somerset (OSGR ST520762),
    - the section of new railway line through Pill to Pill Junction, where the new railway will join the Portbury Freight Line west of Pill Viaduct, and on to the eastern portal of Pill Tunnel,
    - a new emergency and maintenance access to Pill Tunnel, and
    - two short sections in the outskirts of Bristol for Ashton Gate Level Crossing and Barons Close Pedestrian Crossing.
  - The existing Portbury Freight Line from Pill Tunnel to Parson Street Junction, in Bristol (OSGR ST575705), where the freight line joins the Bristol to Taunton main line.
- 1.1.3 The location of the Project and the statutory designated sites within 2km of the Project are shown in Figure C1.

## 1.2 Purpose and Structure of this Report

- 1.2.1 The purpose of this report is to review the existing baseline data for the Project, present the results of the Phase 1 Habitat Survey, and provide initial feedback on further survey work required and recommendations for mitigation.
- 1.2.2 The report is structured as follows:
- Section 2 – Methodology. This section summarises the methodology used for undertaking the desk study and field surveys. In addition it describes the basis for the evaluation of ecological features.
  - Section 3 – Legislation, Planning Policy and Biodiversity Action Plan Context. This section sets out the considerations made while undertaking the ecological appraisal and informs the recommendations set out in Section 5.
  - Section 4 – Baseline Conditions. This section describes the findings and context of the site with respect to the Natural Area profile, designated sites, habitats and flora and fauna. In addition, it identifies any actual or potential protected/notable habitat or species issues which have been found.
  - Section 5 – Evaluation and Recommendations. This section sets out the conclusions and recommendations of the ecological appraisal in relation to relevant legislation, planning policy and nature conservation strategies as set out in Section 3.



## 2.1 Desk Study

- 2.1.1 A desk study was conducted for a search area encompassing the site and surrounding land within a 0.5 km buffer from the site for all records (and within 2.5 km for bats), within 2 km for statutory nature conservation designations, and within 5 km for internationally designated sites. This area was considered to be sufficient to cover the likely zone of influence of the proposed Project. Data sources consulted during the desk study were:
- The Multi-Agency Geographic Information for the Countryside website (“MAGIC”); and
  - Bristol Regional Environmental Records Centre (“BRERC”), for protected, notable species data, descriptions for Local Nature Reserves (“LNR”), non-statutory designated sites and Wildlife Trust reserves.
- 2.1.2 This consultation exercise is valuable in identifying past records and nature conservation designations. Understanding nature conservation issues within the wider area helps in the assessment of the ecological value of a site and the habitats and species that a site supports.
- 2.1.3 Where applicable, information supplied by these organisations has been incorporated into the following account with due acknowledgement where they are particularly informative or relevant.

## 2.2 Field Survey

- 2.2.1 An extended Phase I Habitat Survey was undertaken by two experienced ecologists on 13 and 14 March and on the 1 and 2 April 2014. The methodology followed the Joint Nature Conservation Committee (“JNCC”) standard Phase 1 habitat survey (JNCC, 2010). The scope and detail of the survey undertaken follow the recommendations made by the *Guidelines for Preliminary Ecological Appraisal* (IEEM, 2012).
- 2.2.2 Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats with the aim of providing a record of habitats likely to have ecological importance. The dominant plant species present are recorded, with the habitats classified and mapped. In addition, note was taken of the more conspicuous fauna and any evidence of or potential for the presence of protected, notable or Biodiversity Action Plan (“BAP”) priority species was recorded within and immediately adjacent to the site. Nomenclature for plant species follows that of Stace 2010.
- 2.2.3 The weather conditions on the first three survey dates were dry with hazy sunshine and temperatures between 10°C and 19°C. The fourth day was overcast with rain showers and temperatures between 9°C and 15°C.

## 2.3 Limitations

- 2.3.1 Populations of animals and plants are often transient in nature and a single survey visit can only provide a general indication of species present on site. The survey was carried out in early spring when some animals and plants would not be apparent, although the plants recorded are representative of the habitats present and any omissions are considered unlikely to be of significance. Therefore, although evidence of a species may not be recorded it does not mean that the species may not be present at more favourable times of year.
- 2.3.2 Every attempt was made to gain access the whole length of the site. However in some sections (namely Ashton Vale Road to Parson Street Junction) access to the railway line was not possible and hence observations could only be made from off-site where views permitted. Certain sections of the railway were walked at a quicker pace due to narrowness of the operational railway land and operating trains, therefore some sections were not surveyed in as much detail as would have been desired. Some sections either side of tunnels were also missed as the ecological surveyors had to walk around the tunnels to the next access point for safety reasons.

- 2.3.3 Detailed inspection of habitat and areas of very dense scrub was not always possible and details such as plant species and mammal holes may have not been identified.
- 2.3.4 In some locations in cutting, adjacent habitats and land uses could not be identified and are therefore not represented on the habitat plans.
- 2.3.5 The recommendations made within this report take full account of these limitations.

## 2.4 Evaluation

- 2.4.1 The habitats and species evaluations are based on the guidance from the Institute of Ecology and Environmental Management (IEEM, 2006). The level of value of specific ecological receptors is assigned using a geographic frame of reference, i.e. international value being most important, then national, regional, county, district, local and lastly, within the immediate zone of influence of the proposals only.
- 2.4.2 Value judgements are based on various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity. These include site designations (such as Sites of Special Scientific Interest (“SSSI”)), or for undesignated features, the size, conservation status (locally, nationally or internationally), and the quality of the ecological resource. In terms of the latter, ‘quality’ can refer to habitats (for instance if they are particularly diverse or a good example of a specific habitat type), other features (such as wildlife corridors or mosaics of habitats), or species populations or assemblages.

# Legislative, Planning and Biodiversity Action Plan Context

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## 3.1 Legislative Framework

- 3.1.1 Specific habitats and species receive legal protection in the UK under various pieces of legislation, including:
- The Wildlife and Countryside Act 1981 (as amended);
  - The Protection of Badgers Act 1992;
  - The Wild Mammals (Protection) Act 1996;
  - The Hedgerow Regulations 1997;
  - Natural Environment and Rural Communities Act 2006 (“NERC Act”); and
  - The Conservation of Habitats and Species Regulations 2010 (as amended).
- 3.1.2 The NERC Act 2006 states that “*Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity*” (Section 40).
- 3.1.3 Section 41 (“S41”) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. These are all the habitats and species in England that were identified as requiring action in the UK Biodiversity Action Plan (“UK BAP”) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.
- 3.1.4 Where relevant, the ecological appraisal takes account of the legislative protection afforded to specific habitats and species.

## 3.2 Planning Policy

### National Planning Policy Framework

- 3.2.1 The National Planning Policy Framework (“NPPF”) was published on 27 March 2012 and supersedes the previous guidance. The document sets out the Government’s planning policies for England and provides guidance on how these policies are expected to be applied.
- 3.2.2 The NPPF includes a chapter on biodiversity, *Chapter 11 – Conserving and Enhancing the Natural Environment*. In addition to being concerned with the protection of statutorily designated sites, the Chapter outlines ways in which the planning system is required to contribute to and enhance the local environment and sets out guidance for public bodies and local authorities in respect of the consideration of biodiversity and green infrastructure. The NPPF is a material planning consideration.

### Local Plans

- 3.2.3 *North Somerset Council Core Strategy 2013- 2026* sets out policies to guide the future development of the area. It is made up of a number of formal documents prepared by NSC and a proposals map. This core strategy has replaced a number of policies in other local plans and is the main planning document for North Somerset. It guides development choices and decisions on planning applications, as well as setting out strategic objectives, strategies and policies for conservation and development in the district up to 2026. The policy of relevance to biodiversity is:
- **CS4 Nature Conservation.** “*The biodiversity of North Somerset will be maintained and enhanced by:*
    - *seeking to meet local and national Biodiversity Action Plan targets taking account of climate change and the need for habitats and species to adapt to it;*

- *seeking to ensure that new development is designed to maximise benefits to biodiversity, incorporating, safeguarding and enhancing natural habitats and features and adding to them where possible, particularly networks of habitats. A net loss of biodiversity interest should be avoided, and a net gain achieved where possible;*
- *seeking to protect, connect and enhance important habitats, particularly designated sites, ancient woodlands and veteran trees;*
- *promoting the enhancement of existing and provision of new green infrastructure of value to wildlife;*
- *promoting native tree planting and well targeted woodland creation, and encouraging retention of trees, with a view to enhancing biodiversity."*

3.2.4 *The North Somerset Replacement Local Plan ("RLP")* is part of NSC's Local Development Framework and was adopted in 2007. This local plan includes detailed policies for regulating development across North Somerset. Some policies have been replaced by the core strategy. Those policies which have been saved that are of relevance to biodiversity are:

- **ECH 11 Protected species and their habitats.** *"Development which could harm, directly or indirectly, nationally or internationally protected species of flora or fauna or the habitats used by such species will not be permitted unless that particular harm could be avoided or mitigated and the species protected by the use of planning conditions or planning obligations."*
- **ECH 12 Wildlife sites of international importance.** *"Development which would be likely to have a direct or indirect adverse effect or which conflicts with the conservation objectives of a potential, candidate or designated Special Protection Area, Special Area of Conservation, or Ramsar Site will not be permitted."*
- **ECH 13 Sites of special scientific interest and national nature reserves.** *"Development within or near a Site of Special Scientific Interest (SSSI) or National Nature Reserve that is likely to have a direct or indirect adverse effect on its biodiversity or geological interest will not be permitted unless other material considerations outweigh the loss of biodiversity or geological value of the site concerned and any broader impact upon the national network of SSSIs."*

3.2.5 Supplementary Planning Advice is also provided for biodiversity and trees. This provides information on the hierarchy of wildlife sites, protected species and a five-point approach that: *"(i) Avoids, wherever possible, the adverse effects on wildlife species and habitats (ii) Compensates to offset any residual harm (iii) Identifies opportunities to provide new benefits for wildlife (iv) Mitigates in order to minimise any adverse effects and (v) Seeks information on the potential effects of development."*

3.2.6 *The Bristol Development Framework Core Strategy* is being prepared by Bristol City Council ("BCC"). The Bristol Development Framework ("BDF") is a series of documents which will eventually replace the Bristol Local Plan that was adopted in 1997. The BDF will consider how the City will develop over the next 15 to 20 years. The BDF documents will form part of the statutory Development Plan for the City. The Development Plan is used to help direct a range of implementation plans and decisions on planning applications. The Core Strategy is the primary document in the BDF. Policies relevant to nature conservation and biodiversity are:

- **Policy BCS9 Green Infrastructure**  
The integrity and connectivity of the strategic green infrastructure network will be maintained, protected and enhanced. Opportunities to extend the coverage and connectivity of the existing strategic green infrastructure network should be taken. Individual green assets should be retained wherever possible and integrated into new development. Loss of green infrastructure will only be acceptable where it is allowed for as part of an adopted Development Plan Document or is necessary, on balance, to achieve the policy aims of the Core Strategy. Appropriate mitigation of the lost green infrastructure assets will be required. Development should incorporate new and/or

enhanced green infrastructure of an appropriate type, standard and size. Where on-site provision of green infrastructure is not possible, contributions will be sought to make appropriate provision for green infrastructure off site.

#### *Open Space*

3.2.7 Open spaces which are important for recreation, leisure and community use, townscape and landscape quality and visual amenity will be protected. Some areas of open space may be released, through the development plan process, for appropriate development where:

- They are no longer important for recreation, leisure and community use, townscape and landscape quality and visual amenity;
- Development of all or part of an open space would result in improved urban form or an enhancement to existing open space areas.

3.2.8 New development should incorporate, or contribute towards, the provision of an appropriate level and quality of open space.

#### *Biological and Geological Conservation*

3.2.9 Internationally important nature conservation sites are subject to statutory protection. National and local sites of biological and geological conservation importance will be protected having regard to the hierarchy of designations and the potential for appropriate mitigation. The extent to which a development would contribute to the achievement of wider objectives of the Core Strategy will be carefully considered when assessing their impact on biological and geological conservation. Where development would have an impact on the Bristol Wildlife Network it should ensure that the integrity of the network is maintained or strengthened.

- **Policy BCS23 Pollution**

Development should be sited and designed in a way as to avoid adversely impacting upon:

- Environmental amenity or biodiversity of the surrounding area by reason of fumes, dust, noise, vibration, smell, light or other forms of air, land, water pollution, or creating exposure to contaminated land.
- The quality of underground or surface water bodies.

3.2.10 In locating and designing development, account should also be taken of:

- The impact of existing sources of noise or other pollution on the new development; and
- The impact of the new development on the viability of existing uses by reason of its sensitivity to noise or other pollution.

3.2.11 Water quality and associated habitat of surface watercourses should be preserved or enhanced.

## 3.3 Biodiversity Action Plans

### UK Post 2010 Biodiversity Framework

3.3.1 The *UK Post-2010 Biodiversity Framework* (JNCC and Defra, 2012) succeeded the UKBAP in July 2012. The post-2010 framework is underpinned by the biodiversity and environment strategies of the four countries of the UK and sets out their common purpose and shared priorities. The UKBAP list of priority species, however, remains as a reference source and has been used to help draw up statutory lists of priorities.

3.3.2 *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* (Defra, 2011) is the most recent biodiversity strategy for England, and has as its mission to halt overall biodiversity loss, support healthy well-functioning ecosystems, and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.

### Action for Nature North Somerset Biodiversity Action Plan

3.3.3 The current local BAP for North Somerset is presented in the *Action for Nature North Somerset Biodiversity Action Plan* (NSC 2005). The aims of Action for Nature are:



- To protect and enhance the biodiversity of North Somerset by maximising the wildlife value of habitats, open spaces, industrial estates and gardens;
- To raise awareness of the importance of biodiversity;
- To encourage community action as an integral part of the biodiversity process;
- To create green wildlife corridor links between different blocks of habitat to facilitate species movement;
- To fulfil obligations to protect habitats and species of national and international importance; and
- To achieve favourable condition of all nationally designated sites by 2011.

3.3.4 Habitat action plans have been completed for ten habitat types, including:

- A variety of woodlands, such as ancient woodlands, the mixed deciduous woods like Big Weston Wood, wet woodlands in the Gordano Valley, the upland mixed ashwoods as found in the Avon Gorge, and the veteran trees and parkland at Ashton Court;
- Species rich grasslands, including the calcareous grasslands found in the Avon Gorge;
- Coastal and floodplain grazing marsh as found along the shores of the Severn estuary and the rhines and ditches of the Gordano valley and the Avon valley; and
- Rivers and streams.

### The Bristol Biodiversity Action Plan

3.3.5 The *Bristol Biodiversity Action Plan for People and Wildlife* published by Bristol City Council aims to:

- Provide a strategic overview for biodiversity conservation in Bristol
- Highlight priority habitats and species that are of particular value in Bristol, both within the national and local context
- Highlight threats and issues affecting these priority habitats and species, together with objectives, targets and actions to address them
- Encourage a common approach to biodiversity conservation and sharing of best practice
- Encourage education and community action and involvement as a key part of the biodiversity process
- Promote biodiversity conservation as an essential element of sustainable development
- Promote the importance of Bristol's biodiversity at a local, regional and national level
- Develop Bristol as a centre of excellence for urban biodiversity conservation

3.3.6 The Bristol Biodiversity Action Plan considers habitat action plans for eight habitat types, including species rich grassland, woodlands, estuarine habitats, and rivers and rhines, which are found along the River Avon and in the Avon Gorge. The Bristol Biodiversity Action Plan also includes species action plans for water vole, otter, hedgehog and house sparrow.

3.3.7 Both the UK biodiversity framework and local BAPs were considered during the preparation of the ecological appraisal for this report.

# Baseline Conditions

## 4.1 Context

- 4.1.1 The railway corridor between Portishead in the west and Parson Street Junction in the east is approximately 14.8 km long. The Project passes through (from west to east): a currently disused section of railway bordered by commercial and residential areas in Portishead; through rural fields, moving into the residential areas of Pill; where the site joins a freight line, moving into commercial areas with numerous industrial estates and infrastructure associated with the freight line; along the edge of the River Avon and through the Avon Gorge Special Area of Conservation ("SAC") and SSSI; then into residential areas on the outskirts of Bristol to Parson Street Junction.
- 4.1.2 The majority of the Project is bounded by fences and walls along both side. There are numerous road bridges, culverts and underpasses crossing the alignment, Pill viaduct, and four railway tunnels along the Portbury Freight Line. The majority of the terrain around the eastern half of the freight line comprises steep woodland and exposed cliffs where the railway line runs through the Avon Gorge. Elsewhere, the Project passes through relatively flat terrain.
- 4.1.3 The following sections describe the habitats, flora and fauna along the Project. The statutory designated sites are shown in Figure C1. The Phase 1 habitat maps are presented in Figure C2 Sheets 1 to 19 and the accompanying target notes and photographs are provided in Annex 1. Figures C3 to C6 present locally designated sites.

## 4.2 Natural Areas

### Natural Areas

- 4.2.1 Natural England has mapped the natural areas in the country. The Project crosses two such natural areas, the Severn and Avon Vales Natural Area (Number 56) and the Bristol, Avon Valleys and Ridges Natural Area (Number 62).
- 4.2.2 The Severn and Avon Vales NA extends over the undulating low-lying land in North Somerset. The river floodplains regularly flood in winter, including seasonally flooded washland and there are relict wetland sites and features such as old pollards, wet pastures, ditches and tall hedges. The Gordano Valley is the only part of the Natural Area overlying significant peat deposits, providing a link in character with the Somerset Levels.
- 4.2.3 The Bristol, Avon Valleys and Ridges NA extends over the eastern half of North Somerset, and includes the higher land along the coastal strip between Portishead and Clevedon. This NA 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. The gorge supports screes, scrub, pockets of grassland and adjacent woodland with an exceptional number of nationally rare and scarce plant species. 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.

### Strategic Nature Areas

- 4.2.4 A Strategic Nature Area ("SNA") is a large tract of landscape containing a mosaic of habitats and other land uses sympathetic to wildlife, amongst which multiple patches of a given UK priority habitat, each of at least a defined minimum area, occur at a prescribed concentration necessary to allow ecological functionality for constituent biodiversity across the entire landscape tract. The following areas have been identified.
- Gordano SNA No. 581. This SNA covers an area of about 1300ha in the Gordano Valley mostly lying between Portishead and Clevedon. The main habitat type is coastal and floodplain grazing marsh, with purple moor grass and rush pasture.

- Gorge and Downs SNA No. 456. This SNA covers an area of about 1000ha located in the Avon Gorge and the western outskirts of Bristol. The main habitat type is woodland, including upland ash woods, lowland mixed deciduous woodland and wet woodland, with calcareous grassland and neutral grassland.
- Abbots Leigh SNA No. 571. This SNA covers an area of about 2700ha to the south of the River Avon, between Portishead, Nailsea and Bristol. The main habitat type is woodland, including upland ash woods, lowland mixed deciduous woodland and wet woodland, with calcareous grassland and neutral grassland.

## 4.3 Designated Sites

### International (European) Designations

- 4.3.1 There are four internationally designated sites located within 2 km of the site, the Severn Estuary SAC, Special Protection Area ("SPA") and Ramsar site and the Avon Gorge Woodlands SAC (Figure C1).
- 4.3.2 The Severn Estuary SAC, SPA and Ramsar site is located in the Severn Estuary and the lower reaches of the River Avon. The SPA and Ramsar designations are largely co-incident and in the vicinity of the Project are located along the north Somerset coast and the River Avon. The SAC designation covers an area of almost 74,000ha, extending across the Severn Estuary and connecting with designated sites in Wales.
- 4.3.3 The Severn Estuary is designated for the following features.
- SAC - Annex I habitats (primary reason for designation); estuaries, mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows *Glauco-Puccinellietalia maritimae*. Annex I habitats (not primary reason for selection but is a qualifying feature); sandbanks which are slightly covered by sea water all the time; and reefs.
  - SAC - Annex II species (primary reason for designation). Sea lamprey *Petromyzon marinus*, River lamprey *Lampetra fluviatilis*, Twaité shad *Alosa fallax*.
  - SPA - Over-wintering assemblage and numbers of Tundra swan *Cygnus columbianus bewickii*, White-fronted goose *Anser albifrons*, Shelduck *Tadorna*, Gadwall *Anas strepera*, Dunlin *Calidris alpina*, and Redshank *Tringa totanus*.
  - Ramsar (General overview) - "*The estuary's classic funnel shape, unique in Britain, is a factor causing the Severn to have the second-largest tidal range in the world (after the Bay of Fundy, Canada). This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide swept sand and rock. A further consequence of the large tidal range is the extensive intertidal zone, one of the largest in the UK, comprising mudflats, sand banks, shingle, and rocky platforms. Glassworts and annual sea-blite colonise the open mud, with beds of all three species of eelgrass Zostera occurring on more sheltered mud and sandbanks.*" (JNCC website).
- 4.3.4 The Severn Estuary SAC, SPA and Ramsar site is dependent on the high tidal range in the area, and would be threatened by any large scale developments such as a tidal barrage that would affect the tidal regime. The Severn Estuary SAC, SPA and Ramsar site lies about 1km to the north of the disused section of the Portishead Branch Line (MetroWest Phase 1) Project and comes within 80m of the Project in the vicinity of Pill on the southern shore of the River Avon.
- 4.3.5 The Avon Gorge Woodlands SAC is located on both sides of the River Avon on the western outskirts of Bristol. The 152 ha site is predominantly broad-leaved deciduous woodland (70%), with areas of rocks and scree (10%), coniferous (5%) and mixed (5%) woodland, heath (4%), dry grassland (4%), and humid grassland (2%). The site is designated for the following features.
- Annex I Habitats: (a) Semi-natural dry grasslands and scrubland facies on calcareous substrates *Festuco-Brometalia* and, (b) *Tilio-Acerion* forests of slopes, scree and ravines.

- Annex II Species: Lesser horseshoe bat *Rhinolophus hipposideros* and Greater horseshoe bat *Rhinolophus ferrumequinum*.

4.3.6 The SAC citation does not identify any significant threats to the Annex I habitat, but does note the need to assess the presence of non-native trees throughout the site and the scrub invasion on the calcareous grasslands. The Site Improvement Plan by Natural England prioritises six threats: invasive species, undergrazing, public access and disturbance, disease, changes in species distribution, and air quality. Under air quality, nitrogen deposition is stated to exceed the site-relevant critical loads for the habitat type. The site lies close to the major city of Bristol, the Portbury Freight Line passes through the SAC for approximately 3.8 km and there are nearby heavily trafficked roads including the Portway, and industrial areas in Avonmouth and Severnside. According to the SIP, NE intends to work with landowners and other parties to improve the condition of the site.

### National Designations

4.3.7 There are seven nationally designated SSSIs within a 2 km radius of the Project (see Figure C1), namely:

- The Severn Estuary SSSI;
- Weston Big Wood SSSI;
- Ham Green SSSI;
- Horseshoe Bend SSSI;
- Avon Gorge SSSI;
- Quarry Steps, Durdham Down SSSI; and
- Ashton Court SSSI.

4.3.8 The Severn Estuary SSSI is largely co-incident with the international designations SPA and Ramsar sites described above. The SSSI citation identifies the range of habitat types to be found in the area, comprising intertidal zone mudflats, sand banks, rocky platforms and saltmarsh. The estuarine fauna includes internationally important populations of waterfowl, invertebrate populations, and large populations of migratory fish. Given the proximity of the site to the Project, the main features of interest are the large numbers of over-wintering and passage wading birds and their food source found in the inter-tidal zone and mudflats along the shore of the estuary. Key bird species include Curlew *Numenius arquata*, Redshank *Tringa totanus*, Ringed Plover *Charadrius hiaticula* and Grey Plover *Pluvialis squatarola*. Other waders which occur in significant numbers in the SSSI include Common Snipe *Gallinago gallinago*, Knot *Calidris canutus*, Whimbrel *Numenius phaeopus* and Turnstone *Arenaria interpres*. The SSSI is also internationally important for Dulin *Calidris alpina*.

4.3.9 Weston Big Wood SSSI is a mixed deciduous woodland with a rich variety of plant species which lies to the south west of Portishead. Its shape, name, the heterogeneous structure of the oaks and the presence of ancient-woodland indicator species, together with historical records for the site, all suggest that this is a remnant of an ancient forest. The trees are dominated by Pedunculate Oak *Quercus robur*, which occur as open canopy mature standards together with coppice and maiden Ash. There are also blocks of Wild Cherry *Prunus avium*, Wych Elm *Ulmus glabra*, and Lime *Tilia sp.* Ancient woodland indicators include Small-leaved Lime *Tilia cordata*, Wild Service Tree *Sorbus torminalis*, and the rare Whitebeams *Sorbus rupicola* and *S. eminens*. The ground flora includes two colonies of Purple Gromwell *Buglossoides purpureoacerulea*, which is a Red Data book species.

4.3.10 Ham Green SSSI is designated for its geological exposures along the cutting slopes of the Portbury Freight Line. This site is not considered further in this ecology report, but is discussed in the Baseline Report in Chapter 6 Geology, Hydrogeology, Ground Conditions and Contaminated Land.

4.3.11 Horseshoe Bend SSSI is located on the right hand bank of the River Avon about 780m north of the Project. The site comprises a wooded river cliff and a narrow fringe of saltmarsh. The site supports the largest known English population of the nationally rare Service-tree *Sorbus domestica*. Other trees found on site include the nationally rare Whitebeams *S. eminens* and *S. anglica* and the nationally scarce Large-leaved lime *Tilia platyphyllos*. Other species of interest include Field garlic *Allium oleraceum* and Pale St John's wort *Hypericum montanum*. The saltmarsh at the foot of the cliff is dominated by Sea aster *Aster tripolium* and English scurvygrass *Cochlearia angelica*. There are

also two nationally scarce plants Slender hare's-ear *Bupleurum tenuissimum* and Long-stalked orache *Atriplex longipes*.

- 4.3.12 Avon Gorge SSSI is co-incident with the international SAC designation described above. The Gorge 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 Leigh Woods National Nature Reserve ("NNR") is an area of ancient woodland, archaeology and flower rich limestone grassland set within the Avon Gorge SSSI. 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*. 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*. The 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 bristolensis* and *S. wilmottiana*. National rarities are *S. anglica* and *S. eminens*, and the nationally scarce *S. porrigentiformis* occur. Other species of note include Wild Service Tree *S. torminalis* and the introduced Swedish Whitebeam *S. intermedia*.
- 4.3.13 Quarry Steps, Durdham Down SSSI is designated for geological reasons comprising the last remnant of an extensively quarried area around Durdham Down where the first reptile-bearing fissure deposits were discovered in the early 19<sup>th</sup> century. This site is located some 1.3km north east of the Project in Bristol. The site will not be directly or indirectly affected by the Project and is not considered further.
- 4.3.14 Ashton Court SSSI is a 210 ha site designated for its rich saproxylic invertebrate fauna, that is invertebrates that are dependent on decaying or dead wood (or on other organisms that are themselves dependent on dead wood). A deer park was first established at the site in the 14<sup>th</sup> century, with extensions in the 16<sup>th</sup> and 17<sup>th</sup> centuries, and major tree planting in the 19<sup>th</sup> century. Clarkencombe Wood supports the richest variety of saproxylic Coleoptera (beetles) due to the significant concentration of ancient oak pollards. Ancient trees also occur as open parkland trees either singly or in small groups and as single trees within relatively modern plantations. The ancient trees include Oak *Q. robur*, Ash *Fraxinus excelsior*, Wych Elm *Ulmus glabra* and Beech *Fagus sylvatica*. The continuity of parkland and woodland cover over centuries with large over-mature timber has enabled a very specialised saproxylic invertebrate fauna to survive. Such habitats are now very rare in the UK. Ashton Court SSSI lies within 80m west of the Portbury Freight Line at its nearest extent.

### Local Designations

- 4.3.15 There are no Local Nature Reserves within 0.5 km of the site.
- 4.3.16 There are numerous Wildlife Sites ("WS") and Sites of Nature Conservation Importance ("SNCI"), which are non-statutory designated sites within the North Somerset ("NS") and the Bristol City ("BC") respectively, within 0.5 km of the Project (see Figures C3 to C6). Eight of these sites are located immediately adjacent to the Project.
- NS143 Portbury Wharf Nature Reserve and WS (also an Avon Wildlife Trust Nature Reserve): Marshy grassland, open water and associated habitats (Figures C3 and C4).
  - NS59 Drove Rhyne and adjacent fields WS: Swamp, standing water (ditches), and semi-improved neutral grassland (Figure C4).
  - NS79 Fields between railway line and A369 Portbury WS (part of which is Priory Farm Avon Wildlife Trust Nature Reserve): Marshy grassland (Figure C4).



- NS67 Field east of Court House WS: Unimproved neutral grassland (Figure C4).
- NS68 Field east of M5, Lodway WS: Marshy grassland and semi-improved neutral grassland (Figure C5).
- BS137 River Avon (part of): Running water and marginal habitat (Figure C6).
- BC41 Avon Gorge: Unimproved calcareous grassland, ancient woodland and semi-natural broad leaved woodland (Figure C6).
- NS9 Avon Gorge and Leigh Woods: Ancient semi-natural and semi-natural broad-leaved woodland, with mixed broad-leaved plantation, unimproved and semi-improved calcareous and neutral grasslands (Figure C6).
- BC13 Bower Ashton Mineral Railway (disused): A disused railway line supporting scrub, ruderal communities and grassland (Figure C6).

## 4.4 Habitats

### Introduction

4.4.1 This section summarises the findings of the Phase 1 habitat survey undertaken in March and April 2014. This section should be read in conjunction with the Phase 1 habitat maps presented in Figure C2 Sheets 1 to 19 and the target notes and photographs in Annex 1.

### 4.4.2 Ephemeral/short perennia

4.4.3 Some sections of railway ballast along the Portbury Freight Line track (target notes 100 and 125) are distinctly species-rich and include species such as, bristly ox-tongue *Helminthotheca echioides*, white clover *Trifolium repens*, purslane *Claytonia sibirica*, germander speedwell *Veronica chamaedrys*, common groundsel *Senecio vulgaris*, herb Robert *Geranium robertianum*, barren strawberry *Potentilla sterilis*, hedge bindweed *Calystegia sepium*, ivy *Hedera helix*, common valerian *Valeriana officinalis*, tufted vetch *Vicia cracca* and wood sedge *Carex sylvatica*. None of the rare plants found within the Avon Gorge Woodlands SAC was identified within the Project boundaries.

### Grassland

4.4.4 Within the disused section of the Project between Portishead and Pill grassland only occurs occasionally within the railway corridor, in places where scrub has not yet colonised, possibly due to rabbit grazing or where there are farm crossings (target notes 34, 40, and 73). The exceptions are two large area of semi-improved grassland, one to the west of Quays Avenue in Portishead (colt's-foot *Tussilago farfara* and sedge *Carex* sp. present with bramble and butterfly bush encroaching) and one at the far western end near Pill (species include cock's-foot *Dactylis glomerata*, common bent *Agrostis capillaris*, ribwort plantain *Plantago lanceolata*, teasel *Dipsacus fullonum*, broadleaved dock *Rumex obtusifolius*, vetch *Lathyrus* sp., white clover and creeping cinquefoil *Potentilla reptans*) where patches of bare ground are present and bramble is starting to develop within the sward. Most of the grassland is semi-improved, although tightly mown amenity grassland is present particularly at the western end of the Project adjacent to roads in Portishead. Semi-improved grassland pasture is present in fields immediately adjacent to much of the disused section of the Portishead Branch Line.

4.4.5 Within the Portbury Freight Line section there is very little grassland habitat within the railway corridor as most of the habitat is shaded by woodland or dominated by scrub. There is a bank of grassland at the southern-most point of the section which is south-facing. There was no access to the bank but due to its location and observed plant diversity it is considered to be poor semi-improved grassland. Most of the grassland adjacent to the Project is semi-improved rural pasture, with an area of semi-improved neutral grassland south of Ashton Vale Road (target note 130) which is dense with Canadian goldenrod *Solidago Canadensis* and bramble patches.

## Ponds

- 4.4.6 Ponds or standing water in ditches within the Portishead Branch Line corridor are all shallow and shaded, of small extent and often covered with duckweed *Lemna minor* (target notes 49, 50, and 54).
- 4.4.7 However, there are a number of ponds beyond the site boundary particularly along the disused section:
- On the far side of a rough grassland field is a pond where great crested newts have been previously recorded (target note 7).
  - Within a residential area east of Quays Avenue the pond (target note 18) has broad vegetation margins and good habitat structure for pond-life.
  - North of the railway close to Station Road is a coarse fishing pond (target note 43).
  - West of Marsh Lane is a pond in a field with limited marginal vegetation (target note 55).
  - East of Marsh Lane is a small pond under heavy shade to the north of the railway (target note 57).
  - North of the railway and east of the M5 (target note 70) at Field east of M5 Motorway WS, is a large wetland with open water.
  - Two ponds approximately 50m from the site (target note 81).
- 4.4.8 Habitat suitability of these features for great crested newt *Triturus cristatus* is discussed in Section 5.3.1.
- 4.4.9 Ham Green Lakes partially run under the site and likely to be connected to the River Avon during high tide and flooding. These lakes are known fishing lakes and have wildfowl present.

## Reedbed and Wetlands

- 4.4.10 At the time of the survey, many of the stands of common reed *Phragmites australis* within the Portishead Branch Line railway corridor along the disused section were dry, except reed growing immediately east of Portbury Dock Road, which was associated with a wet ditch. Reed stands were species-poor and generally small in extent. Large stands of reed are present immediately adjacent to the railway around The Drove, to the south of the railway west of the M5, and north of the railway across a track to the east of the M5 (target note 70).

## Scrub

- 4.4.11 Within the disused section of the Portishead Branch Line between Portishead and Pill, bramble *Rubus fruticosus* scrub with hawthorn *Crataegus monogyna* is the dominant habitat type, tending to be most dense to the sides of the tracks, however regularly covering the whole of the railway corridor. Willow *Salix* sp. scrub is also frequent, where it is rooted in drainage ditches. Other frequently occurring species are self-sown silver birch *Betula pendula* and ash *Fraxinus excelsior* saplings, the latter usually on ballast in the centre of the tracks and particularly found around Sheepway Lane bridge area and to the east of the M5.
- 4.4.12 Self-sown butterfly bush *Buddleja davidii* occurs frequently and is especially abundant towards the western end of the Portishead Branch Line in Portishead. Recently planted scrub is present at both ends of the disused railway corridor and comprises hawthorn, blackthorn *Prunus spinosa*, rose *Rosa* sp., privet *Ligustrum* sp. and dogwood *Cornus sanguinea*.
- 4.4.13 The Portbury Freight Line section supports scrub, which is dominant in the more urban areas with bramble and hawthorn most prevalent and sections of blackthorn. Butterfly-bush was recorded at a number of locations but is most dominant at the extremities of this section, in particularly dense areas of scrub next to industrial units and residential gardens.

## Structures

- 4.4.14 There are no intact buildings within the railway corridor.

- 4.4.15 A small brick building is located immediately adjacent to the Portishead Branch Line at target note 46; two derelict buildings are present at target notes 51 (Portishead Branch Line) and 120 (Portbury Freight Line); and a very small concrete building adjacent to exposures of inland rock within the Avon Gorge Woodlands SAC at target note 102 (Portbury Freight Line).
- 4.4.16 Along the disused section of the Portishead Branch Line between Portishead and Pill significant structures present include five bridges over the railway at; Sheepway Lane, Station Road, Portbury Dock Road, Marsh Lane and the M5, and other brick railway bridges over watercourses (target note 4) or farm access (target note 62). Sheepway Lane and Marsh Lane road bridges have voids in the brickwork and mortar (target notes 32, 33 and 56) which offer potential for bats.
- 4.4.17 The Portbury Freight Line section crosses a viaduct at Pill and has four tunnels. There are also several over-bridges and under-passes across the railway (target notes 78, 84, 85, 90, 96, 97, 104, 107, 108, 114, 118, 121 and 122). Most of the structures are stone or brick and mortar and some tunnels are carved within the limestone and sandstone of the ridge.
- 4.4.18 A number of houses with tiled roofs are present within 50m of the site, such as Sheepway Gate Farm (Portishead Branch Line).

### Tall Ruderals

- 4.4.19 Tall ruderal vegetation is of limited extent within the site. Common nettle *Urtica dioica* is the dominant species, along with broad-leaved dock, rosebay willowherb *Chamerion angustifolium* and cleavers in areas surrounded by bramble. Larger areas of ruderal vegetation were noted to the west and east of Station Road.
- 4.4.20 Three stands of the invasive species Japanese knotweed *Fallopia japonica* were recorded (target notes 16 on the Portishead Branch Line, and 112 and 123 on the Portbury Freight Line).

### Watercourses

- 4.4.21 A number of watercourses are present passing beneath the Portishead Branch Line and also as drains parallel to the site. In most cases the watercourses parallel to and within the site were wet at the time of the survey and are considered to be ephemeral features. Where these ditches were wet, they were generally shallow and leaf filled with no emergent or aquatic vegetation, due to heavy shading.
- 4.4.22 In the west a major drain crosses beneath the railway in a deep cutting. The lower banks of this drain are piled in places and lined with concrete or brick, however soft bank is present (target note 3). East of Quays Avenue a small drain is present within the railway boundary. This drain has a two-stage concrete channel (target note 15). East of Sheepway Farm a stream marked on the map as passing beneath the railway was obscured by dense bramble. Towards Station Road a flowing stream passes beneath the railway (target note 41), which is shallow and heavily shaded and does not support aquatic or emergent vegetation.
- 4.4.23 The Portbury Freight Line runs parallel to the River Avon for much of its length. A small tributary stream runs under the railway into Oak Wood.
- 4.4.24 A small drain runs parallel to the Portbury Freight Line from Ashton Vale Road to Ashton Road over-bridge where the drain is partially vegetated including a section of Japanese knotweed (target note 123). A narrow watercourse runs in from the Avon under the site at Miles Dock underbridge into the adjacent woodland. Colliter's Brook is culverted under the Portbury Freight Line at Barons Close (target note 128).

### Woodland and Trees

- 4.4.25 Along one stretch of the Portishead Branch Line either side of Portbury Dock Road the trees have matured to form a silver birch woodland. Lords-and-Ladies *Arum maculatum*, hart's-tongue *Phyllitis scolopendrium*, male-fern *Dryopteris felix-mas* and cleavers *Galium aparine* are frequent within the ground flora. Around target note 14 at Quays Avenue/Harbour Road roundabout, there is also a small willow and alder *Alnus glutinosa*

woodland with a rose, bramble and hawthorn understorey; and west of Station Road, a copse of mature poplar.

- 4.4.26 Mature ash trees are present between Quays Avenue and Sheepway Lane in Portishead and many of these have dense cladding of ivy providing potential bat roost opportunities (target notes 24, 25, 26, 27 and 28). Other clumps or lines of mature trees or trees with significant ivy-cladding are found at target notes 14, 22, 23, 28, 37, 46, 52, 53, 59, 60, 61, 63, 64, 69 and 72). In scrub dominated areas between Sheepway Lane and Station Road, and east of the M5, mature but small, gnarled oaks *Quercus robur* are present.
- 4.4.27 Throughout the Avon Gorge section of the Portbury Freight Line woodland dominates the adjacent habitat and banks of the railway cutting. The woodland within the banks of the railway is dominated by sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior*, oak *Quercus robur* and silver birch *Betula pendula* and hazel *Corylus avellana* and willow dominate the understorey in many areas. Ground flora is largely Lords-and-Ladies *Arum maculatum*, hart's-tongue fern *Phyllitis scolopendrium*, herb Robert, with areas of dense ivy *Hedera helix*.
- 4.4.28 The adjacent woodland is part of Avon Gorge Woodlands SAC and dominant species include hazel *Corylus avellana*, yew *Taxus baccata*, beech *Fagus sylvatica*, and sweet chestnut *Castanea sativa*.

## 4.5 Species

### Amphibians

- 4.5.1 Four species of amphibian have been recorded within the site or a 0.5 km buffer around the Portishead Branch Line (BRERC, 2014). These are great crested newt *Triturus cristatus*, smooth newt *Lissotriton vulgaris*, common toad *Bufo bufo* and common frog *Rana temporaria*. These are summarised below.

- Great crested newts: There are records for this species from within the site from the pond at target note 49, where seven individuals were recorded in 1988. Great crested newt have also been recorded at Portbury Wharf Nature Reserve 0.2 km north of the western end of the site in 2013 and 2011, Portbury 'vole city' (a water vole reintroduction site) 0.25 km north of the western half of the site in 2005, and in a garden 0.25 km south of the eastern end of the site. There are older records for the search area from the 1980s.

A great crested newt survey was undertaken of the disused section of track along the Portishead Branch Line by Mott MacDonald in 2011 as part of a Phase 2 habitat and protected species survey, following the results of the initial Phase 1 survey (Halcrow, 2011). No great crested newts were found in ponds identified with target notes 18 and 50. In the ponds identified with a target note 50, three adult great crested newts were recorded. Pond 55 could not be surveyed as no access was given, so it is treated in the report as if great crested newts were found to be present for mitigation purposes.

- Smooth newt: This species has been recorded within the pond at target note 49, with many individuals recorded in 1988. Other records are from the Portbury Wharf Nature Reserve 0.2 km north of the western end of the site in 2013; from fields and Caswell Lane in 1km grid squares covering the site in the 1980s.
- Common frog: The most recent record is from 2013 at Portbury Wharf Nature Reserve 0.2 km north of the western end of the site. Other records up to 2010 are from Pill at the eastern end of the railway line and M5 junction 19. Older records from the 1980s are located in fields and Caswell Lane in 1km grid squares covering the site.
- Common toad: These amphibians were last recorded at Portbury Wharf Nature Reserve, 0.2 km north of the western end of the site in 2013. The only other record for this species in the search area is a 2010 sighting in Pill at the far eastern end of the search area.

- 4.5.2 No evidence for the presence of amphibians was recorded during the extended Phase 1 Habitat Survey, although a number of refuges within the site would provide shelter and suitable habitat for amphibians, especially where ponds, ditches and gardens are nearby.

### Badgers

- 4.5.3 There are many recent records for badger *Meles meles* within the search area (BRERC, 2014). Most of these are from the Portbury Wharf area, although there are records from the Portbury Hundred, Caswell Lane and Gordano services on the east side of the M5 – all along the Portishead Branch Line. There are no records from within the Project boundary.
- 4.5.4 A badger survey undertaken by Mott MacDonald in 2011 as part of a Phase 2 habitat and protected species survey, recorded one active and one inactive badger hole a few metres apart from each other in Portbury. An active badger sett was also recorded at the western end of the survey area at target note 8. The sett is concealed beneath hawthorn scrub and could not be fully examined without unreasonable vegetation clearance in a publically accessible location, however six entrances were visible. Fresh bedding was outside some of the entrances.
- 4.5.5 In the previous 2011 survey a potential single-holed badger sett was recorded at target note 39. Neither of these potential badger setts could be located as part of this study, although this could be due to the dense bramble obscuring the setts or they are no longer present. A disused badger sett, was also recorded in 2011 near target note 52. This could also not be located. However, a sett was recorded within scrub on the bridge embankment to the south of the track at target note 58. This supported four active entrances, with fresh bedding and a latrine, approximately 20m from the track.
- 4.5.6 In general other signs of badgers were very limited, although some major mammal paths may be used by badger. One latrine was recorded with no footprints and hairs found.

### Bats

- 4.5.7 There are extensive bat and bat roosts records for a variety of bat species within a 2.5 km radius of the railway (BRERC, 2014) including the following.
- Lesser horseshoe *Rhinolophus hipposideros* - Includes hibernation roosts. All records over 1 km south of the site.
  - Common *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* - Includes a roost. Records within 1 km of the site.
  - Greater horseshoe bat - Includes a roost. Records over 1 km southwest of the site.
  - Serotine *Eptesicus serotinus* - Summer roost within a 1 km grid square located over the centre of the site. Records over 2 km south of the site.
  - Leisler's bat *Nyctalus leisleri* - Over 1 km northeast of the site and over 2 km south of the site.
  - Brown long-eared bat *Plecotus auritus* - Includes hibernation roost. Records with 1 km of the site.
  - Daubenton's bat *Myotis daubentonii* - Records over 2 km southeast of the site.
  - Noctule *Nyctalus noctula* - Records within 1 km of the site.
- 4.5.8 A bat survey undertaken by Mott MacDonald (2011) found a high level of bat activity with mostly foraging behaviour along the disused section of the Portishead Branch Line; below bridges at Sheepway and from the Portbury area to Pill. At the west of the site (the beginning of the railway line) commuting behaviour was recorded with low levels of foraging and with overall lower numbers of bats than the rest of the disused railway line. All calls recorded were pipistrelles. Most activity was found underneath or adjacent to bridges such as the M5, Sheepway and the bridge on Royal Portbury Dock road where one or more bats were observed to fly in circles underneath the bridges and in linear lines adjacent to the bridges.
- 4.5.9 No signs of bats, such as staining or droppings were observed during the survey, however trees with bat roost potential (broken boughs, crevices or dense ivy-cladding were noted at target notes 14,



22, 23, 24, 25, 26, 27, 28, , 37, 46, 52, 53, 59, 60, 61, 63, 64, 69, 72, 80, 85, 86, 88, 105, 109, 111, 113, 120 and 126) and structures with bat roost potential (target notes 2, 4, 32, 33, 45, 51, 56, 62, 78, 84, 85, 90, 96, 97, 102, 104, 107, 108, 114, 118, 120, 121 and 122) were recorded. Farm and residential buildings within 50m of the railway such as Sheepway Gate Farm may have bat roost potential.

- 4.5.10 The railway corridor itself provides a linear feature that may be of importance for bat commuting and foraging, as well as perpendicular habitats such as the major drain at target note 3. It is likely to be of particular importance due to the adjacent woodland and river.
- 4.5.11 Along the Portbury Freight Line Greater and lesser horseshoe bat are also noted as an Annex II species for the Avon Gorge Woodlands SAC. The caves and veteran trees of Leigh Woods also provide valuable winter roosts for bats, including the greater and lesser horseshoe bats and Daubenton's bat.

## Birds

- 4.5.12 Numerous bird records have been provided for the search area (BRERC, 2014). These include Red List species<sup>1</sup> (Eaton *et al.*, 2010), birds listed on Section 41<sup>2</sup> of the NERC Act 2006, and species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Many species of wetland bird have been recorded, due to the proximity to the Severn Estuary (see Section 4.3), and there are records for ground nesting species, raptors and passerine species.
- 4.5.13 During the survey passerine birds were abundant throughout the study area. Species recorded were blackbird *Turdus merula*, goldfinch *Carduelis carduelis*, wren *Troglodytes troglodytes*, dunnock *Prunella modularis*, common gull *Larus canus*, jay *Garrulus glandarius*, carrion crow *Corvus corone*, pheasant *Phasianus colchicus*, great tit *Parus major*, long-tailed tit *Aegithalos caudatus*, robin *Erithacus rubecula* and starling *Sturnus vulgaris*, with coot *Fulica atra* and mallard *Anas platyrhynchos* on waterbodies beyond the site. Records of Peregrine Falcon *Falco peregrinus* are also known from the western side of the Avon Gorge (BRERC, 2014).

## Dormouse

- 4.5.14 There are records of dormouse *Muscardinus avellanarius* within the search area (BRERC, 2014) at Portbury Common in 2009 and Ham Green Lake along the Portishead Branch Line and Leigh Woods NNR<sup>3</sup> along the Portbury Freight Line.
- 4.5.15 No evidence of dormice or notable dormouse habitat were observed during the Phase 1 survey within the disused section of the site and the railway corridor does not link with any major wooded corridors, so should not be considered further in this section. However, within the Portbury Freight Line section there is potential for dormice to be present throughout the Avon Gorge Woodlands SAC and in adjoining woodland and scrub.

## Invertebrates

- 4.5.16 Numerous invertebrate records have been provided for the search area (BRERC, 2014). These include records for notable beetles, dragonfly and damselfly, grasshoppers and crickets, butterflies and moths, many of which are listed on Section 41 of the NERC Act 2006.
- 4.5.17 An invertebrate survey of the Portishead Branch Line was conducted in 2011 (Mott MacDonald, 2011) following the results of the initial Phase 1 survey (Halcrow, 2011). Five Nationally Scarce invertebrate species were recorded:
- Long-winged cone-head (a small bush cricket) *Conocephalus discolor*;
  - Lesne's Earwig *Forficula lesnei*;

<sup>1</sup> Birds that meet one of the following criteria (i) globally threatened, (ii) historical population decline in UK during 1800–1995, (iii) severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969) or (iv) severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period.

<sup>2</sup> Species of principal importance for biological conservation in England.

<sup>3</sup> National Trust <http://www.nationaltrust.org.uk/leigh-woods/wildlife/> accessed 8 April 2014

- A fly species *Homoneura thalhammeri*;
  - A snail-killing fly *Tetanocera punctifrons*; and
  - A parasitoid fly *Athrycia curvinervis*.
- 4.5.18 The following UK BAP species were also recorded:
- Shaded Broad-bar moth *Scotopteryx chenopodiata*; and
  - Cinnabar moth *Tyria jacobaeae*.
- 4.5.19 A number of invertebrate species were recorded during the 2011 survey. These were generally clustered in the semi-improved grassland and tall ruderal vegetation within the site (target notes 1, 5, 10, and 12). Species recorded included:
- A red-tailed bumblebee *Bombus* sp. was recorded at target note 1;
  - Small tortoiseshell butterfly *Aglais urticae* was recorded at several locations;
  - Brimstone *Gonepteryx rhamni* recorded on common nettle dominated tall ruderal vegetation at target note 7; and
  - A painted lady *Vanessa cardui* was recorded near to target note 10.
- 4.5.20 In addition, mature trees and dead stumps, for example at target note 64 may have potential to support saproxylic invertebrate species (invertebrates that depend on decaying and dead wood).
- 4.5.21 There were no watercourses considered suitable for white-clawed crayfish *Austropotamobius pallipes* and this species is not considered further in this report.

### Reptiles

- 4.5.22 Records of grass snake *Natrix natrix*, Slow-worm *Anguis fragilis* and Viviparous lizard *Zootoca vivipara* have been provided within the search area (BRERC, 2014).
- 4.5.23 Grass snakes have been recorded near Marsh Lane in close proximity to the Portishead Branch Line (possibly within the Project corridor) and also 0.5km north of the western end of the site in the Portbury Wharf area. Slow worm records are more numerous and are also from the Portbury Wharf area as well as gardens in Lodway and Pill. Grass snakes, slow-worms and lizards have also been recorded within the Avon Gorge and in habitats adjacent to the Portbury Freight Line.
- 4.5.24 A reptile survey was undertaken by Mott MacDonald in 2011 as part of a Phase 2 habitat and protected species survey following the results of the initial Phase 1 survey along the disused section of the Portishead Branch Line (Halcrow, 2011). A single juvenile grass snake was found at the western end of the site and a low population of slow worms was recorded along the length of the disused railway (valued as a medium population of reptiles).
- 4.5.25 No reptiles or evidence of reptile presence was recorded during the current survey (March April 2014). However the site does offer good opportunities for reptile basking, foraging and shelter as well as good overwintering habitat. Adjacent habitat such as grassy slopes and allotments also provide excellent habitat for widespread reptile species.

### Otter

- 4.5.26 Records provided by BRERC (2014) show that in 2000 an otter *Lutra lutra* spraint was recorded by a ditch approximately 0.5 km south of the central part of the disused section of the Portishead Branch Line. An immature otter was also recorded dead on the A369 near this location. Records of otter are present close to the Ham Lakes section near the River Avon.
- 4.5.27 No signs of otter or potential otter habitat were recorded during the survey and it is therefore not considered further in this report.

### Water Vole

- 4.5.28 A significant population of water vole *Arvicola amphibius* has been recorded recently (2007) in Drove Rhine approximately 0.75 km to the north of the disused section of the Portishead Branch Line (BRERC, 2014). This species has also been reintroduced to Portbury Wharf Nature Reserve

which extends immediately adjacent to the site (see Figure C3). Records of otter are also present around the Ham lakes section of the River Avon.

- 4.5.29 No signs of water vole were observed during the 2014 survey. Although a number of ditches are present within the railway corridor none of them is considered to provide suitable habitat for water voles. Only the major drain at the western end of the site in Portishead at target note 3 and the pond at target note 50 north of Junction 19 on the Portishead Branch Line support habitat with sufficient depth and bankside vegetation to be suitable to support water voles. However, Mott MacDonald carried out a water vole survey at these two locations as they were thought to have potential to support this species in 2011. No evidence of water vole was found at either of the watercourses within the site boundary.

### Other Notable Species

- 4.5.30 Records for other notable species of relevance to the site provided by BRERC (2014) are:
- Brown hare *Lepus europaeus*, listed on Section 41 of NERC Act 2006, located mainly around Portbury Wharf area at the western end of the Portishead Branch Line; and
  - Hedgehog *Erinaceus europaeus*, listed on Section 41 of NERC Act 2006, various locations.
- 4.5.31 No evidence of these species was observed during the Phase 1 Habitat Survey.

# Evaluation and Recommendations

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## 5.1 Designated Sites

- 5.1.1 The Severn Estuary, designated as SAC, SPA, Ramsar site and SSSI, and the Avon Gorge Woodlands SAC and Avon Gorge SSSI are of **International** value for nature conservation. At its nearest point to the Portishead Branch Line the Severn Estuary site is within 80m, and approximately a 3.8 km length of the Portbury Freight Line crosses the Avon Gorge Woodlands SAC. A Habitats Regulations Assessment ("HRA") screening assessment has been undertaken to ascertain whether an Appropriate Assessment is required for the Project and is appended to the Scoping Report which is available separately. Additional surveys relating to features of these sites may be required following detailed assessment and consultation with Natural England.
- 5.1.2 As the predominant habitat type of the protected sites on the Portbury Freight Line is ancient woodland on steep slopes and diverse flora (Avon Gorge Woodlands SAC and Avon Gorge SSSI), issues relating to overhanging and trees hazardous to the railway should be handled in a sensitive manner. Any improvement works should be undertaken alongside statutory nature conservation bodies to ensure that any ground and arboricultural works are carried out with the integrity of the sites in mind.
- 5.1.3 The Portbury Freight Line also crosses the Ham Green SSSI (a geological SSSI). No works are proposed in this section. However, if works are need, mitigation will be required to ensure the site remains stable during and post-works. Consent from Natural England will be required to undertake any works within the protected area and operations likely to cause damage should be avoided.
- 5.1.4 The non-statutory Wildlife Sites are located adjacent to the site are of **County** value for nature conservation. It is considered that without mitigation, construction may adversely impact these sites. During the operation phase it is considered that habitat connectivity for species of fauna may be affected, although severance has already occurred along the Portbury Freight Line.
- 5.1.5 It is recommended that potential indirect impacts on adjacent designated sites are avoided by employing good construction practices to avoid disturbance and prevent impacts from dust, silt, oils and other potential pollutants. Such mitigation is likely to include, dust suppression measures, site run-off disposed of in accordance with appropriate legal requirements and appropriately sited, bunded and protected fuel or chemical storage areas. The construction footprint, including access routes, storage areas and site compounds should not impinge upon designated sites. Suitable connectivity for wildlife under and over the railway should be provided, such as providing mammal ledges in culverts beneath the railway and connectivity of hedgerows and linear woodlands linked to bridges.
- 5.1.6 Other designated sites are located more distant from the site and, therefore, it is considered highly unlikely that the proposals will impact these during construction or operation.

## 5.2 Habitats

### Scrub, Woodland and Trees

- 5.2.1 The scrub and woodland habitats on the site are an integral part of the green corridor habitat of the site, providing connectivity functions as well as providing shelter and foraging opportunities for animals including bats, and nesting opportunities for birds. These habitats are considered to be of **Local** value for nature conservation (where they are present outside of designated sites).

- 5.2.2 Mature trees are important habitats in themselves and are only replaceable in the long-term. The adjacent landscape is relatively flat and open and the mature trees on this site are considered to be of up to **District** value for nature conservation.
- 5.2.3 It is recommended that continuous belts of scrub or linear woodland to either side of the tracks are maintained, where possible, to retain the habitat on site and to preserve connectivity of the green corridor. It is also recommended that mature trees are retained where possible.

### Grassland and Tall Ruderals

- 5.2.4 Grasslands and tall ruderal stands within the site boundary are not extensive or species-rich, but provide some structural diversity and foraging opportunities for animals. However these habitats are relatively small in extent and are considered to be of value within the **immediate zone of influence only**.
- 5.2.5 It is recommended that where grasslands are retained or created within the Project that these are enhanced to develop species-rich swards using locally sourced seeds or plants. For optimal structural diversity for the benefit of invertebrates, it is recommended that grassland/tall ruderal/scrub interfaces are maintained around the site perimeter.

### Reedbed and Wetlands

- 5.2.6 Reed, sedge and rush habitats within the site are small in extent and species-poor, so considered to be of low quality. These habitats are frequent in the surrounding landscape especially to the south of the track where the A369 comes off the M5 near the Portishead Branch Line, where the habitat quality is greater. Therefore, the reedbed and wetland habitats within the site are considered to be of value within the **immediate zone of influence only**.

### Ephemeral/short perennial

- 5.2.7 Although none of the rare and scarce plant species for which the Avon Gorge Woodlands SAC is designated were identified within the Portbury Freight Line corridor during the Phase 1 survey, there is potential for some of these species to be present. To ensure the protection of these species further plant surveys should be undertaken within the designated sections in order to establish any areas where rare and scarce species occur.

### Watercourses and Ponds

- 5.2.8 The Portishead Branch Line passes through a landscape of floodplain and coastal grazing marsh, and as such the watercourses and ponds within and adjacent to the site form part of a network of aquatic habitats. Although the watercourses and ponds within the site boundary are considered to be of low quality, they provide a link between other wetland habitats to the north and south and are considered to be of **Local** value for nature conservation. Although a significant proportion of the Portbury Freight Line runs parallel to the River Avon there are very few sections where the watercourse connects with the railway. The River Avon is considered to be of **Regional** value in this section and designated as a SNCI.
- 5.2.9 It is recommended that these habitats are retained and restored as the drainage system for the railway during construction. It is recommended that any risk of impacts on ponds and watercourses are minimised by employing good construction management practices and implementation of the relevant codes of practice for construction sites. Water pollution prevention measures should be adhered to as set out in the Environment Agency's Pollution Prevention Guidelines (PPG 5: Works and maintenance in or near water).

### Structures

- 5.2.10 Numerous tunnels and structures run along, over and under the site many of which have the potential to support breeding, roosting and hibernating fauna, such as bats as well as lichens and mosses. These structures are therefore considered to be of up to **Local** value for nature conservation.



- 5.2.11 Some of the natural stone tunnels along the Portbury Freight Line may also support geological interest and features linked to the Avon Gorge Woodlands SAC and Avon Gorge SSSI.
- 5.2.12 It is recommended that any works to these structures are undertaken using sensitive methods (informed by bat and breeding bird surveys) and that enhancement of the structures for wildlife are made, where practicable, such as providing nesting or roosting opportunities.

## 5.3 Species

### Amphibians

- 5.3.1 Amphibians are partially protected by the Wildlife and Countryside Act, 1981 (as amended). Great crested newts are fully protected by the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010.
- 5.3.2 Two waterbodies with potential for great crested newt are located within the Portishead Branch Line corridor.
- Small pond at target note 50. The habitat suitability index ("HSI") shows that the pond is below average for great crested newt. A survey in 2011 (Mott MacDonald, 2011) found no great crested newts, indicating that they are highly unlikely to be present.
  - Small pond/ditch at target note 49. The HSI shows that the waterbody is average suitability for great crested newt. A survey undertaken in 2011 (Mott MacDonald, 2011) recorded three adult great crested newts.
- 5.3.3 Six waterbodies with potential to support great crested newt were observed outside the Portishead Branch Line corridor during this survey:
- Large pond at target note 18. The HSI results indicate excellent habitat for great crested newt. A survey in 2011 (Mott MacDonald, 2011) recorded no great crested newts, so they are unlikely to be present.
  - Wet ditch south of the railway near target note 17. The HSI results indicate below average habitat for great crested newt. A survey of this water body has not been undertaken.
  - Pond in field at target note 55. The HSI results indicate good habitat for great crested newt. As surveyors could not gain access to this pond (Mott MacDonald, 2011), it is assumed that great crested newts are likely to be present as the pond is less than 250m from pond 49 where great crested newts have been recorded.
  - Pond within field east of M5 motorway, Lodway WS at target note 70. The HSI results suggest below average habitat for great crested newt due to the large size of the pond (approximately 0.3ha). A survey of this water body has not been undertaken.
  - Two ponds identified in adjacent habitat (target note 81) may have the potential to support amphibians and great crested newts. No HSI assessment has been carried out as the ponds were not accessed. It is recommended that the ponds are visited and if found to be present an HSI should be carried out in accordance with methodology developed by Oldham et al. (2000) order to assess potential for great crested newts.
  - The lakes located south of Pill tunnel (target note 85) are large fishing lakes and highly unlikely to support great crested newts. There is associated wetland habitat (ditches) in this area but based on the current scope of works in this section no impacts are considered likely therefore no further off-site checks for amphibian habitat are required.
- 5.3.4 The desk study has also indicated that a further seven ponds or waterbodies are located within 250m of the site boundary with no major barriers to movement at the following locations.

- A ditch east of Elm Tree Farm;
- Two ponds within a reed bed either side of The Drove;
- A second pond within the Field east of M5 motorway, Lodway WS, northwest from Target Note 70;
- Two small ponds in fields south of the railway and west of Lodway Farm; and
- Pond within the allotments immediately adjacent to the site at ST5653071569.

- 5.3.5 It is recommended that a habitat suitability index (HSI) assessment for great crested newts is undertaken for each of the ponds within 250m that have connectivity to the site. Following best practice, survey data that are more than three years old will not be valid for assessment. Based on the findings of the HSI and the proximity of ponds to each other and the railway, a great crested newt survey may be required. Surveys would involve a minimum of four survey visits to be undertaken between mid-March and mid-June. In order to meet an Environmental Statement (“ES”) submittal in spring 2016, HSIs should be carried out between summer 2014 and winter 2015 with great crested newt surveys following on between March and June 2015.
- 5.3.6 If great crested newts are discovered in close proximity to, or within the Portishead Branch Line a detailed mitigation plan will be required. In order to permit construction within great crested newt habitat a development licence from Natural England will be required. The process of obtaining such a licence can take two months or longer and will involve a detailed method statement and mitigation plan to be submitted by an experienced ecologist.
- 5.3.7 Toads are listed as a Species of Principal Importance in England in Section 41 of the NERC Act 2006. The toad crossing at Pill cycle path indicates that toads are active in this area close to the Portishead Branch Line. It is recommended that further information is gathered regarding the migration route and ponds linked to the Pill toad crossing<sup>4</sup>.

### Badgers

- 5.3.8 Badgers and their setts are protected under the Protection of Badgers Act 1992. Badgers have been found to be resident on the site and locations of other setts are possible within dense vegetation. It is considered that the badger population on the site is up to **Local** value for nature conservation.
- 5.3.9 It is recommended that the setts identified at target note 8 and 58 on the Portishead Branch Line are retained. It is not possible to confirm presence of other setts without clearance of vegetation. It is recommended that clearance of the site is undertaken in association with a watching brief by an experienced ecologist. A mitigation strategy will be required for any setts that fall within approximately 30m of construction or areas to be accessed by heavy machinery. Should any setts need to be closed this must be carried out under licence from Natural England. Licences for sett interference are generally not issued between the beginning of December and the end of June, which is when badgers are breeding. A two month period should be allowed for the licence application process.

### Bats

- 5.3.10 All bat species and their places of refuge are fully protected in the Conservation and Habitats Regulations 2010 (as amended) and the Wildlife and Countryside Act (“WCA”) 1981 (as amended).
- 5.3.11 A bat survey undertaken in 2011 (Mott MacDonald, 2011) concluded that pipistrelle bats are using the disused railway line on the Portishead Branch Line for foraging and commuting. The surveys did not record significant activity to suggest roosts in close proximity to the route corridor, and where activity was higher, such as beneath bridges, access was limited to undertake further investigations.

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<sup>4</sup> <http://www.froglife.org/what-we-do/toads-on-roads/tormap/>

- 5.3.12 As the works will involve the removal of vegetation, any roosts that are potentially within the bridge structures or tunnels may be disturbed by the works. It is recommended that if any trees with bat roost potential are required for removal or structures impacted, they should be inspected by a suitably qualified ecologist for bat roost signs. Bat potential trees are usually mature trees, which have cracks or broken branches and may be ivy covered, which could be used for shelter. If bat activity surveys are required, three visits covering dusk and dawn periods should be undertaken between May and September. Winter surveys may also be deemed necessary if hibernation features are identified within structures. All surveys should be undertaken in accordance with *Bat Surveys, Good Practice Guidelines* (Bat Conservation Trust, 2012).
- 5.3.13 A number of tunnels within the site footprint have recently been surveyed for bats prior to scheduled maintenance work (personal communication with BAM Nuttall staff). It is recommended that this survey data are obtained as a reference for future works.
- 5.3.14 As ecological mitigation bat boxes could be erected on structures such as railway bridges or retained trees.

### Birds

- 5.3.15 All breeding birds, whilst actively nesting, are protected in the UK under the Wildlife and Countryside Act 1981 (as amended). The site supports features (scrub, woodland, mature trees and grassland), which are likely to be used by breeding birds and could support significant species, populations or assemblages. A previous breeding bird survey identified numerous species within the habitat. Further, it is recommended, that site clearance is undertaken between September and February, outside the bird nesting season. It is also recommended that sufficient replanting is undertaken and vegetation retained where possible in order to maintain habitat for breeding and foraging bird species. Additional bird surveys may be required in relation to the features of the Severn Estuary SPA. This will depend upon the recommendations of Natural England which will be determined at a later date.

### Dormouse

- 5.3.16 Adjacent habitat along the Portbury Freight Line is known to support dormice (BRERC, 2014) therefore connective habitat, such as woodland, hedgerow and scrub that connects to the railway corridor has likely potential to support dormice. Any damage to, or need to remove habitat along this section of the railway has the potential to disturb or harm dormice and their habitat. Staff should be fully briefed on the ecology of dormice and their protection. Should any vegetation within the Avon Gorge Woodlands SAC or connected to the SAC require removal then these sections are likely to require a detailed method statement to be written and supervised by an experienced ecologist and, or a development licence may need to be applied for. A licence from Natural England can take up to two months to obtain. Both licences and method statements are likely to impose time constraints on the works.

### Invertebrates

- 5.3.17 The site supports features (mature trees and grassland, tall ruderal and scrub interfaces) that may be of importance for invertebrate species or assemblages.
- 5.3.18 It is recommended from an invertebrate survey undertaken by Mott MacDonald (2011) that some areas of the Portishead Freight Line, notably the open areas indicated by target note 2, 3 and 12, (especially the latter) have sufficient potential to require further survey. The same is also likely to be true of the area between Church Road and the eastern end of the disused section of the railway, although the survey did not find much evidence of valuable communities of invertebrates there.
- 5.3.19 If these areas are to receive any significant development resulting in the loss of open habitats, then it is recommended that a more thorough survey is undertaken to discover how damaging

this might be to local biodiversity and what mitigation is required. Further surveys could include a spring (early May) sample and a June sample to cover those species that would have been missed in 2011.

## Reptiles

- 5.3.20 Widespread reptiles receive a limited degree of protection in the UK under the Wildlife and Countryside Act 1981 (as amended). Reptiles likely to use the site (e.g. grass snake and slow worm) are protected against killing, injury and sale.
- 5.3.21 Potentially suitable habitats for reptiles are present along the disused section of the Portishead Branch Line within grassland, tall herb and scrub mosaics and transitions. Potential basking areas and also wetland foraging areas (for grass snakes) are present at target notes 1, 2, 5, 10, 11, 13, 28, 35 and 73. Potential reptile hibernacula in dead wood habitats in the railway line are also present, e.g. at target note 17. A reptile survey undertaken in 2011 (Mott MacDonald, 2011) concluded that there is a medium population of reptiles within the site.
- 5.3.22 Suitable habitats for reptiles are also present in similar habitats along the Portbury Freight Line and are identified in target notes 77, 101, 102, 115, 117, 119, 127, 130 and 136. Potential reptile hibernacula in dead wood habitats along the railway line are also present.
- 5.3.23 It is recommended that the reptile survey is updated in April-May or September, to inform a reptile mitigation strategy to prevent killing or injury to reptiles during construction. Mitigation is likely to include: minimal clearance within particularly reptile sensitive areas (the west of the site); if sensitive areas are to be impacted then care is to be taken so that structures such as log piles, rock piles and bunds are not disturbed; these structures should also be avoided during vegetation clearance, and if found on site an ecologist called immediately. As ecological mitigation, hibernacula could be put in place adjacent to the railway line, such as log or rock piles. These would need to be located where they would not be disturbed in the future by the public, the railway or further construction work.
- 5.3.24 If significant disturbance to habitat with reptile potential is anticipated then a reptile survey should be undertaken in April-May or September, to inform a reptile mitigation strategy to prevent killing or injury to reptiles during construction.

## Water Vole and Otter

- 5.3.25 Water voles and their places of shelter or protection receive full protection under the provisions of Section 9 of the Wildlife and Countryside Act 1981 (as amended).
- 5.3.26 The large drain at the western end of the Portishead Branch Line (target note 3) and the pond at target note 50 near Portbury thought to have potential to support this species were surveyed in 2011 (Mott MacDonald, 2011), with no water vole signs or water voles themselves recorded. It is recommended however that an updated water vole survey is undertaken of these sites and of any water bodies adjacent to Portbury Wharf Nature Reserve where water voles have been reintroduced. This survey should be used to inform water vole mitigation during construction (if necessary) and enhancements for this species during operation. No suitable water vole habitat was identified within the Portbury Freight Line section.
- 5.3.27 Otters receive protection under both the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010. Otters and their resting places are fully protected, it is an offence to deliberately, capture, injure or kill them or to damage, destroy or obstruct their breeding or resting places. It is also an offence to disturb otters in their breeding or resting places. Ham Lake was identified as potentially suitable otter habitat but this will not be impacted by the works provided pollution prevention measures are in place.

## Other Notable Species

- 5.3.28 The existing wildlife corridor function of the disused railway line is likely to provide habitat opportunities for hedgehog. It is therefore recommended that the green corridor function

of the site is maintained following construction, where possible, to maintain connectivity of habitats. Site staff should be briefed via toolbox talks on the potential for protected and notable species likely to be seen during construction.

## 5.4 Conclusion

- 5.4.1 Adequate measures should be implemented to ensure protection for species and habitats of value within and adjacent to the site. Subject to the recommendations set out above in relation to avoiding or mitigating for potential impacts to ecological features and subject to recommendations of detailed species surveys, that the proposed development of the site could be implemented without significant adverse ecological impacts and be in accordance with relevant legislation and planning policy.



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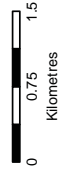
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<http://www.bto.org/sites/default/files/u37/downloads/recording/bocc3.pdf>
- Joint Nature Conservation Committee UK Biodiversity Action Plan: <http://jncc.defra.gov.uk/page-5155>
- Natural England Natural Areas:  
<http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/englands/naturalareas.aspx>

**KEY**

- 2km Radius Study Area
- Existing Railway Station
- Existing Railway Line
- Portishead Branch Line
- DCO Indicative Red Line Boundary
- Network Rail Permitted Development Rights
- Pill Railway Station

**Designated Conservation Sites**

- Special Area of Conservation (SAC)
- Ramsar Site
- Special Protection Areas (SPA)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserves (NNR)



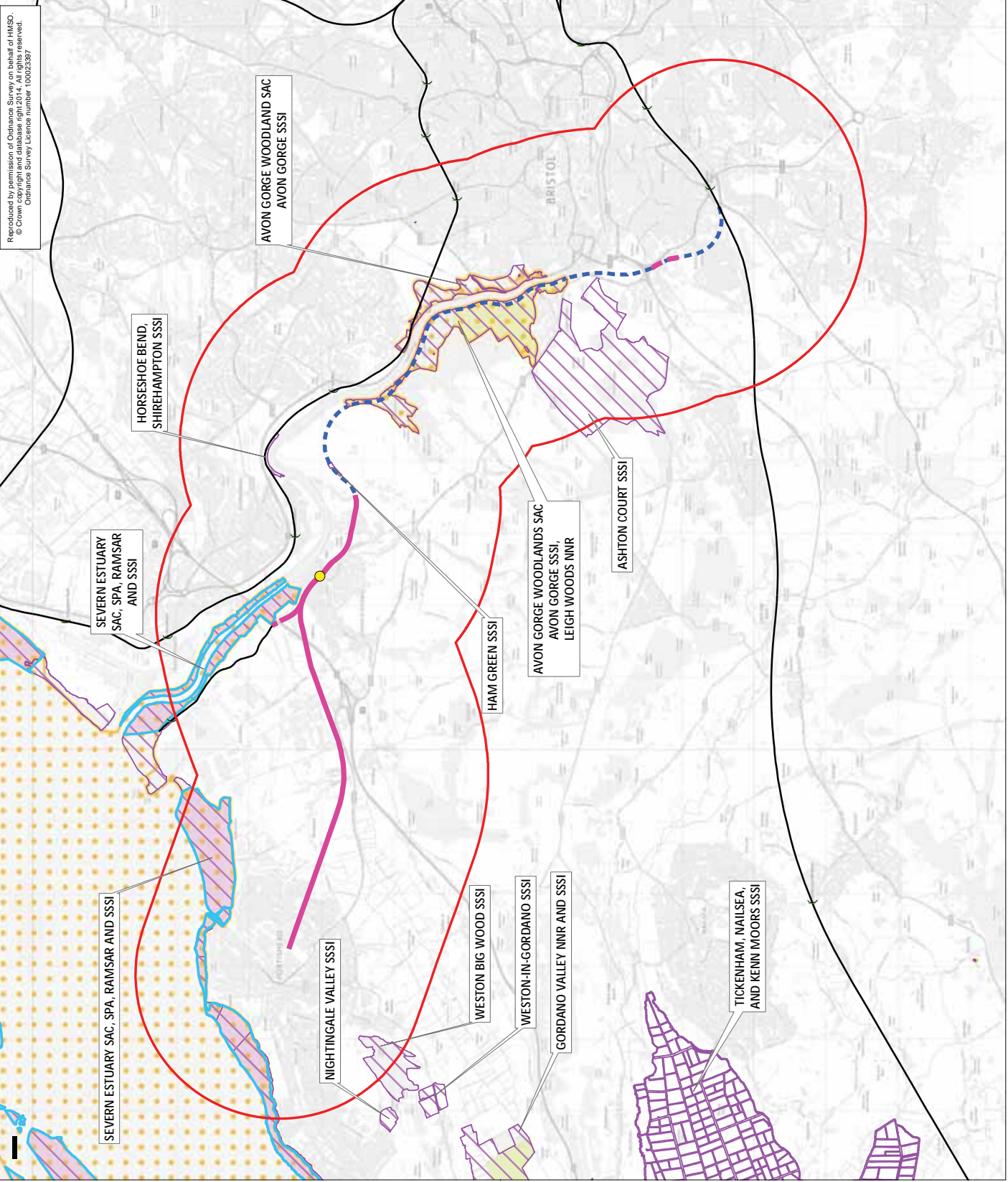
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**Project:** Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing:** Figure C.1: Statutory Designated Sites

Drawn By:	Tim Curtis	Date:	19/06/2015
Checked By:	Emily Earing	Date:	19/06/2015
Approved By:	Carolyn Francis	Date:	19/06/2015
Drawing No.:	490327-006-008	Revision	2
Drawing Scale:		1:50,000 @ A3	



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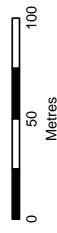






**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Phase 1 Habitats (Point)
- A3.1, Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- G2, Running water
- J2.4, Fence
- Phase 1 Habitat (Polygon)
- A1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- A2.2, Scrub - scattered
- B2.2, Neutral grassland - semi-improved
- C3.1, Other tall herb and fern - ruderal
- G2, Running water
- J1.2, Cultivated/disturbed land - amenity grassland
- J1.4, Introduced shrub



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**Project**  
 Portishead Branch Line  
 (MetroWest Phase 1)

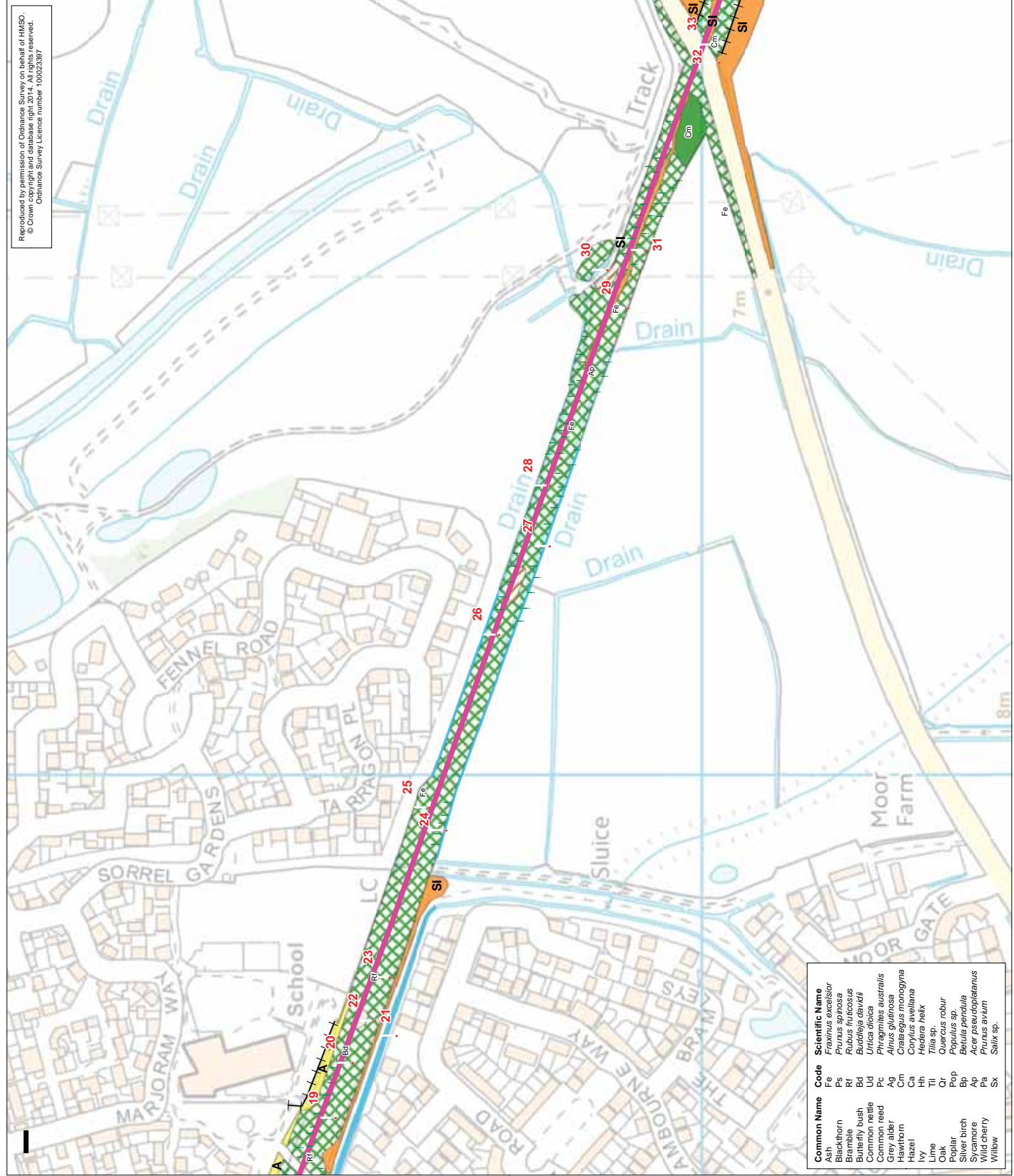
**Drawing**  
 Figure C2: Phase 1 Habitat Mapping -  
 Sheet 2 of 19

**Drawn By:** Chris Duke  
**Checked By:** Gemma Harding  
**Approved By:** Carolyn Francis  
**Drawn No.:** 490327-006-001 - 2  
**Revision:** 1

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**Date:** 19/06/2015

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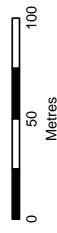
Common Name	Code	Scientific Name
Ash	Fa	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Buddleia	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Line	Tl	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Rose	Rp	<i>Rosa sp.</i>
Sycamore	By	<i>Populus sp.</i>
Sycamore	Ap	<i>Acer pseudoplatanus</i>
Wild cherry	Pa	<i>Prunus avium</i>
Willow	Sx	<i>Salix sp.</i>





**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Phase 1 Habitats (Point)
- A3.1. Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- J2.5, Wall
- J2.6, Dry ditch
- Phase 1 Habitat (Polygon)
- A1.1.1. Broadleaved woodland - semi-natural dense/continuous
- A2.1. Scrub - dense/continuous
- A2.2. Scrub - scattered
- B2.2. Neutral grassland - semi-improved
- C3.1. Other tall herb and fern - ruderal
- F1, Swamp
- G1, Standing water
- G2, Running water
- J1.4, Introduced shrub



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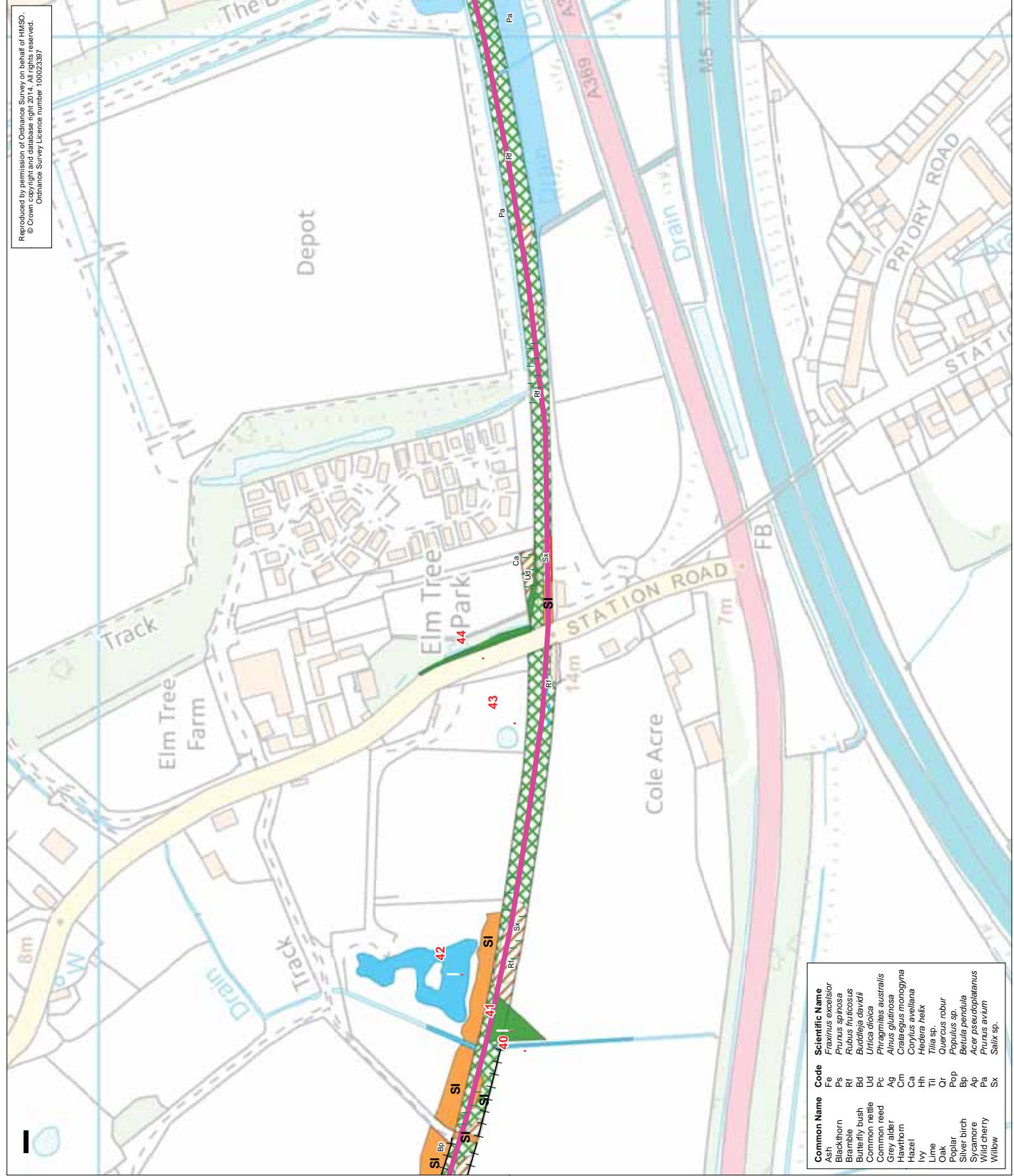
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 4 of 19

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Checked By:	Carlynn Harding	Date:	19/06/2015
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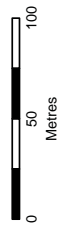
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Common Name	Code	Scientific Name
Ash	SI	<i>Fraxinus excelsior</i>
Birch	Bs	<i>Betula sp.</i>
Broadleaved	Pa	<i>Panicum sp.</i>
Butterfly bush	Rt	<i>Rudbeckia hirta</i>
Common reed	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Grey alder	Pc	<i>Phragmites australis</i>
Hawthorn	Ag	<i>Alnus glutinosa</i>
Hazel	Cm	<i>Crataegus monogyna</i>
Ivy	Ca	<i>Corylus avellana</i>
Lime	Hh	<i>Hedera helix</i>
Oak	Tll	<i>Tilia sp.</i>
Poplar	Cr	<i>Quercus robur</i>
Sycamore	Pop	<i>Populus sp.</i>
Willow	Sp	<i>Salix sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
	Pa	<i>Panicum sp.</i>
	Sx	<i>Salix sp.</i>

**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Phase 1 Habitats (Point)
- A3.1, Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- J2.6, Dry ditch
- Phase 1 Habitat (Polygon)
- A1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- B2.2, Neutral grassland - semi-improved
- F1, Swamp
- G1, Standing water
- J3.6, Buildings



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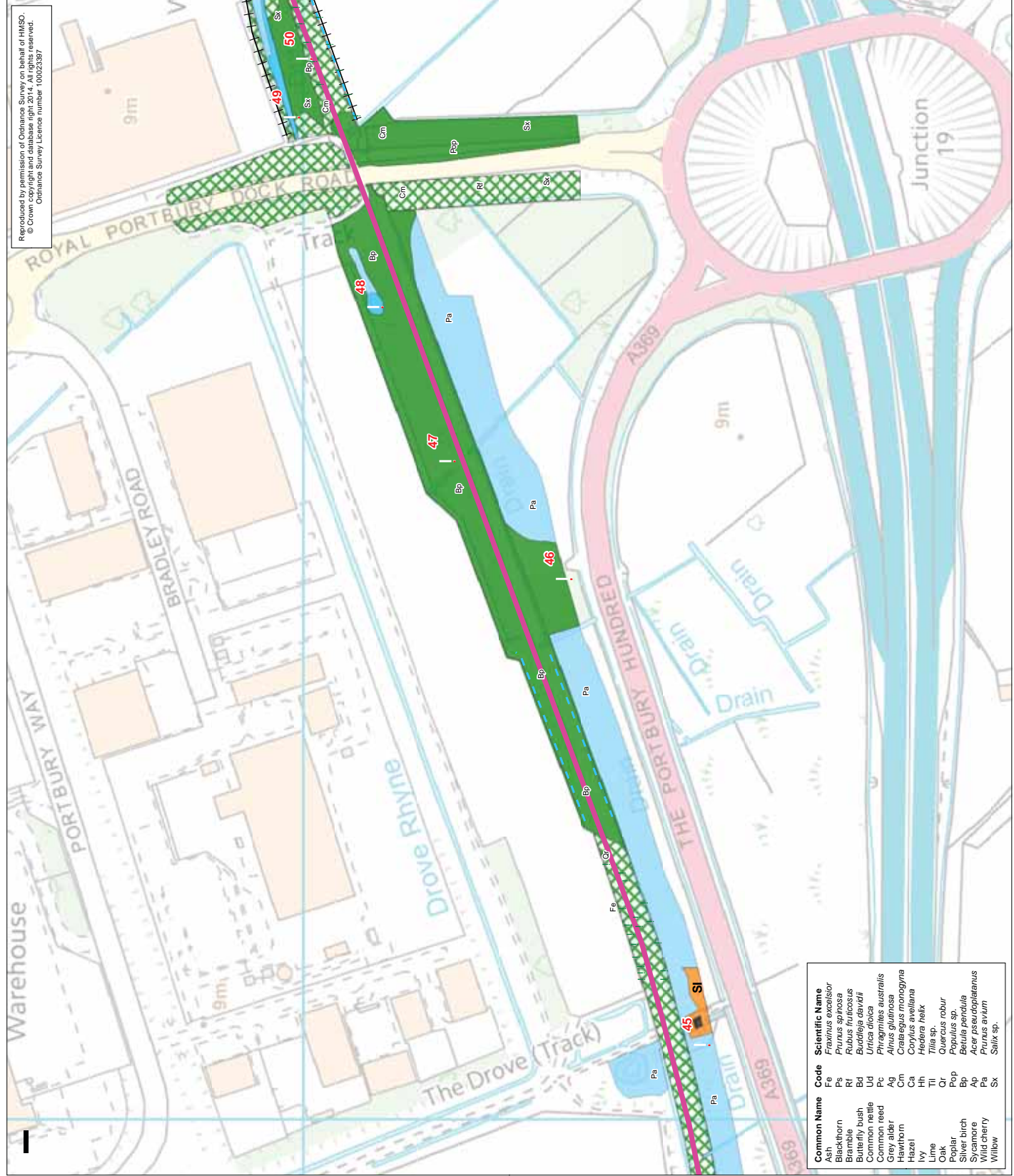
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 5 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
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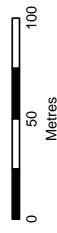


Common Name	Code	Scientific Name
Ash	Fa	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Broadleaved	Pa	<i>Prunus spinosa</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Ca	<i>Crataegus monogyna</i>
Hazel	Hh	<i>Corylus avellana</i>
Ivy	Ti	<i>Hedera helix</i>
Line	J2	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Spindle	Sp	<i>Euonymus sp.</i>
Sycamore	By	<i>Copulus sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>



**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Phase 1 Habitats (Point)
- A3.1. Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.1.2, Intact hedge - species-poor
- J2.4, Fence
- J2.6, Dry ditch
- Phase 1 Habitat (Polygon)
- A1.1.1, Broadleaved woodland - semi-natural
- A1.1.2, Broadleaved woodland - plantation
- A2.1, Scrub - dense/continuous
- A2.2, Scrub - scattered
- B2.2, Neutral grassland - semi-improved
- C3.1, Other tall herb and fern - ruderal
- F1, Swamp
- G1, Standing water



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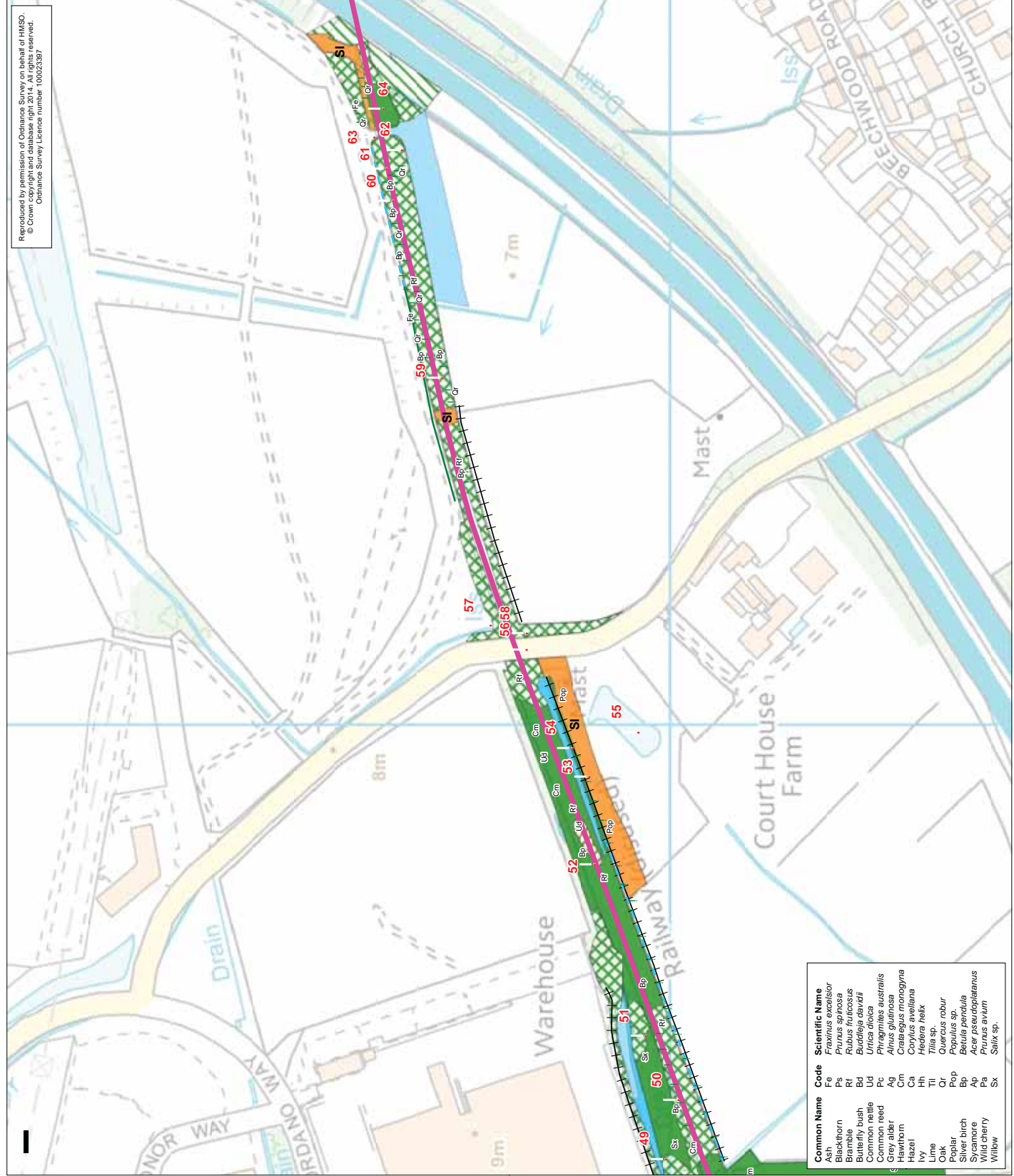
**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:**

**Figure C2: Phase 1 Habitat Mapping - Sheet 6 of 19**

Drawn By:	Chris Duke	Date:	19/06/2015
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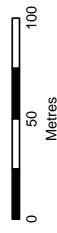
Common Name	Code	Scientific Name
Ash	Fs	<i>Fraxinus excelsior</i>
Baldern	Rt	<i>Rhus typhina</i>
Birch	Bd	<i>Betula pendula</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Lime	Tll	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Roadside	Ppp	<i>Coprinus sp.</i>
Sycamore	Bp	<i>Betula sp.</i>
Sycamore	Ap	<i>Acer pseudoplatanus</i>
Wild cherry	Pa	<i>Prunus avium</i>
Willow	Sx	<i>Salix sp.</i>





**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Phase 1 Habitats (Point)
- D A2.2, Scrub - scattered
- I A3.1, Broadleaved Parkland/scattered trees
- I A3.2, Coniferous Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- J2.5, Wall
- Phase 1 Habitat (Polygon)
- A1.1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- A2.2, Scrub - scattered
- B2.2, Neutral grassland - semi-improved
- G1, Standing water
- J4, Bare ground



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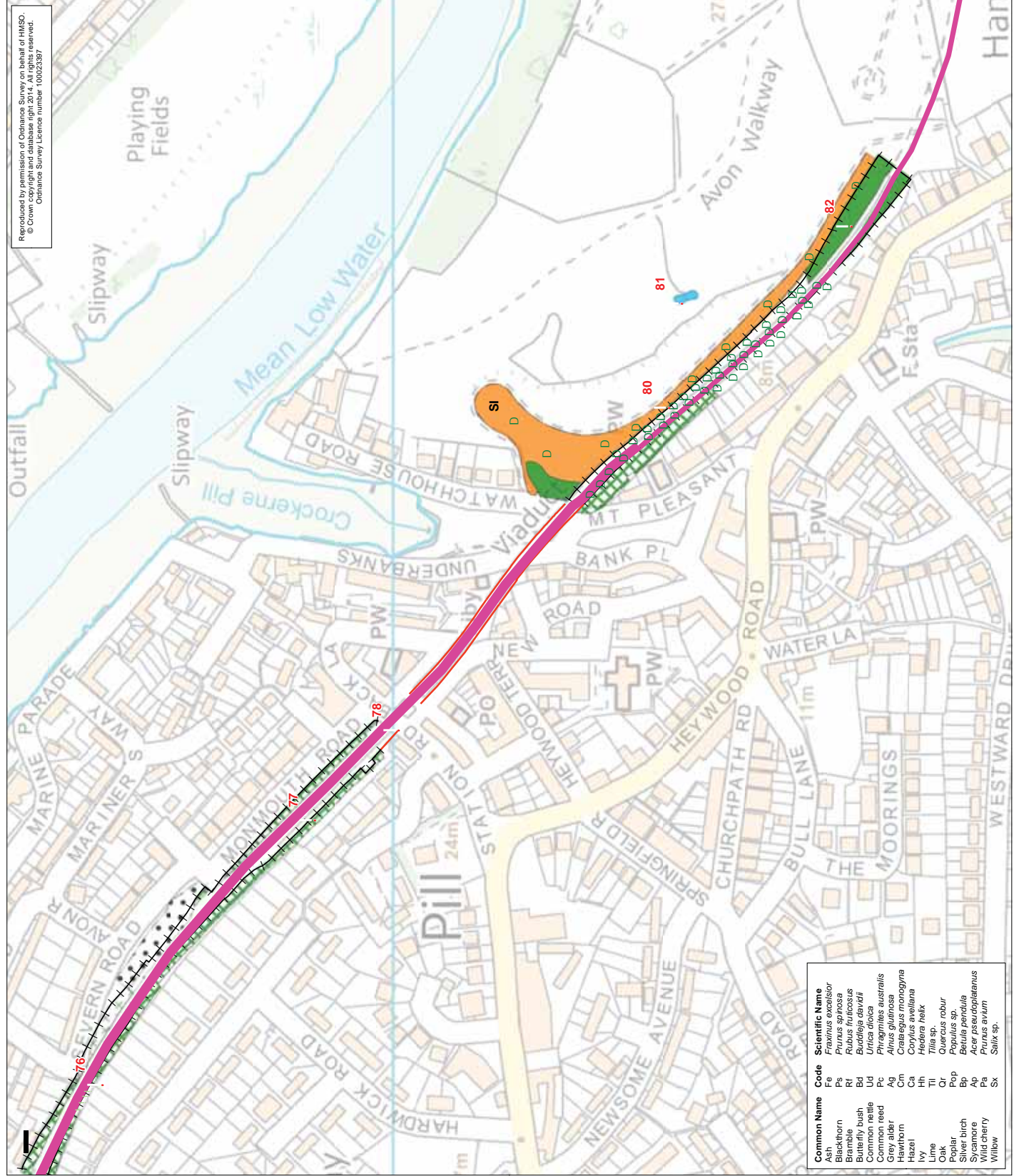
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 8 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Gamma Harding	Date:	19/06/2015
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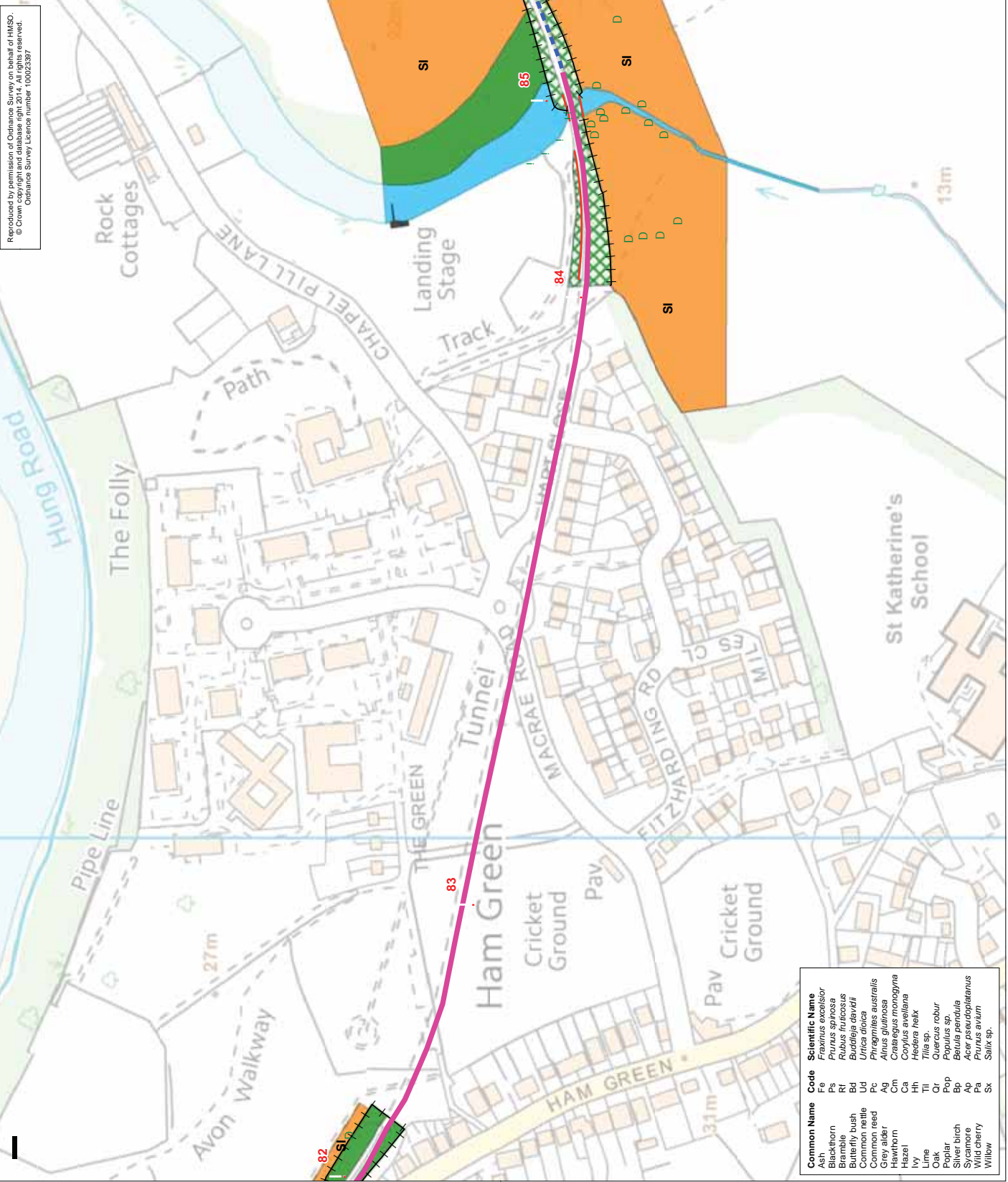
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Common Name	Code	Scientific Name
Ash	Fs	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Bramble	Rt	<i>Rubus sp.</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Lime	Tl	<i>Tilia sp.</i>
Oak	Qr	<i>Quercus robur</i>
Rose	Rp	<i>Rosa sp.</i>
Sycamore	Sp	<i>Copula sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>

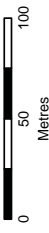


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**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- D A2.2, Scrub - scattered
- I A3.1, Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- J2.5, Wall
- Phase 1 Habitat (Polygon)
- A1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- B2.2, Neutral grassland - semi-improved
- G1, Standing water
- J3.6, Buildings



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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 9 of 19

**Drawn By:** Chris Duke Date: 19/06/2015

**Checked By:** Gemma Harding Date: 19/06/2015

**Approved By:** Carolyn Francis Date: 19/06/2015

**Drawing No.:** 490327-006-001 - 9 Revision: 1

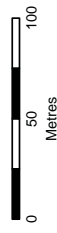
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Common Name	Code	Scientific Name
Ash	Fr	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Line	Tl	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Rose	Rp	<i>Rosa sp.</i>
Sycamore	Sp	<i>Copulus sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>



**KEY**

- Existing Railway Line
- Pottishead Branch Line
- Network Rail Permitted
- - - Development Rights
- Phase 1 Habitats (Point)
- A3.1. Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4., Fence
- Phase 1 Habitat (Polygon)
- A1.1.1. Broadleaved woodland - semi-natural
- A2.1. Scrub - dense/continuous
- B2.2. Neutral grassland - semi-improved
- B6. Poor semi-improved grassland



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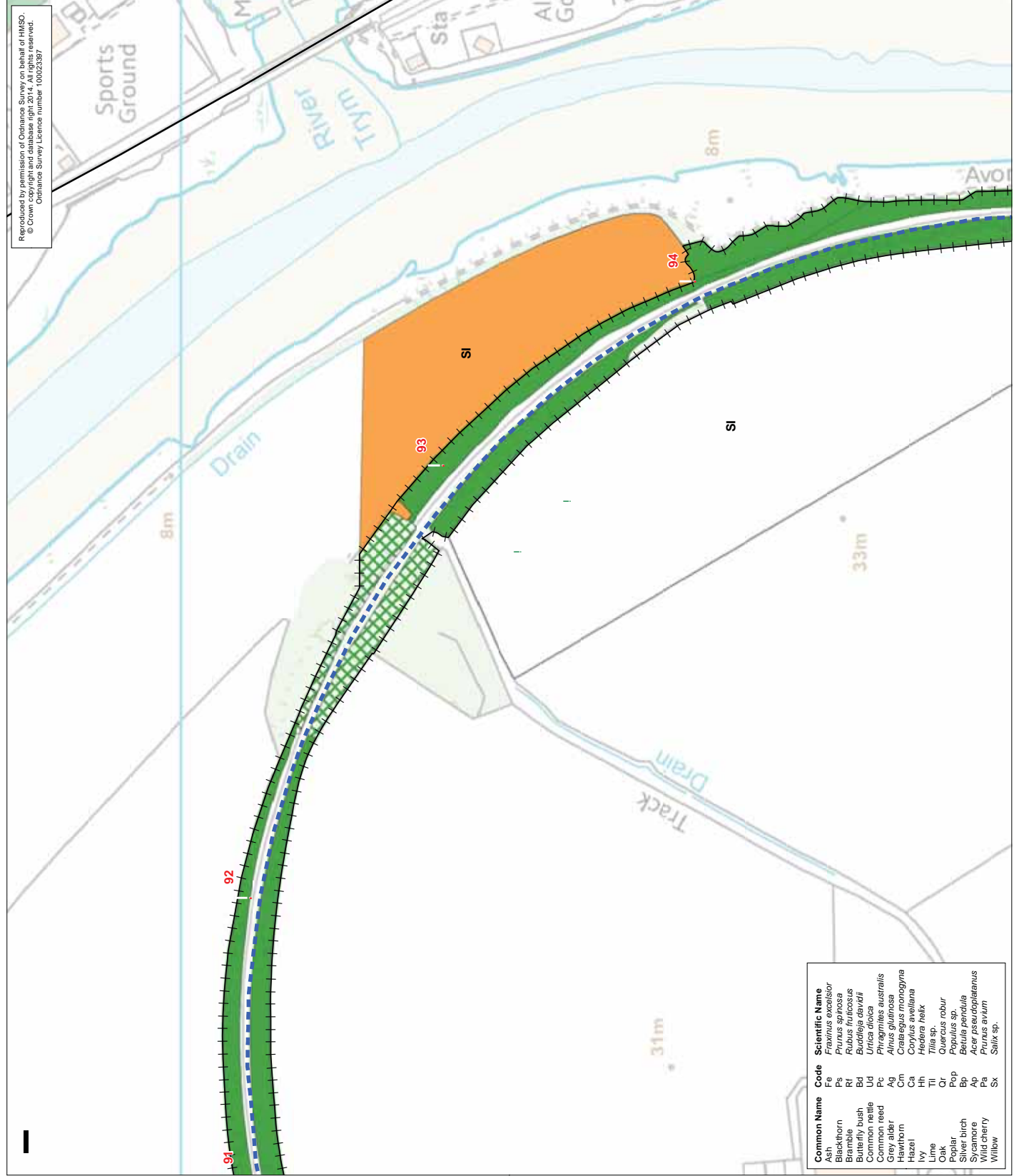
**Project:** Pottishead Branch Line (MetroWest Phase 1)

**Drawing:**

**Figure C2: Phase 1 Habitat Mapping - Sheet 11 of 19**

**Drawn By:** Chris Duke    **Date:** 19/06/2015  
**Checked By:** Gemma Harding    **Date:** 19/06/2015  
**Approved By:** Carolyn Francis    **Date:** 19/06/2015  
**Drawn No.:** 490327-006-001 - 11    **Revision:** 1  
**Drawing Scale:** 1:2,500

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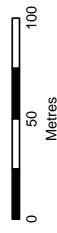


Common Name	Code	Scientific Name
Ash	Fr	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Bramble	Bb	<i>Rubus fruticosus</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Line	Tl	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Spindle tree	Sp	<i>Euphrasia sp.</i>
Sycamore	By	<i>Betula sp.</i>
Sycamore	Ap	<i>Acer pseudoplatanus</i>
Wild cherry	Pa	<i>Prunus avium</i>
Willow	Sx	<i>Salix sp.</i>



**KEY**

- Existing Railway Line
- Portishead Branch Line
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- Target Note
- Phase 1 Habitat (Line)
- DDDD 1.1.2, Inland cliff - basic
- J2.4, Fence
- Phase 1 Habitat (Polygon)
- A1.1.1, Broadleaved woodland - semi-natural
- B6, Poor semi-improved grassland



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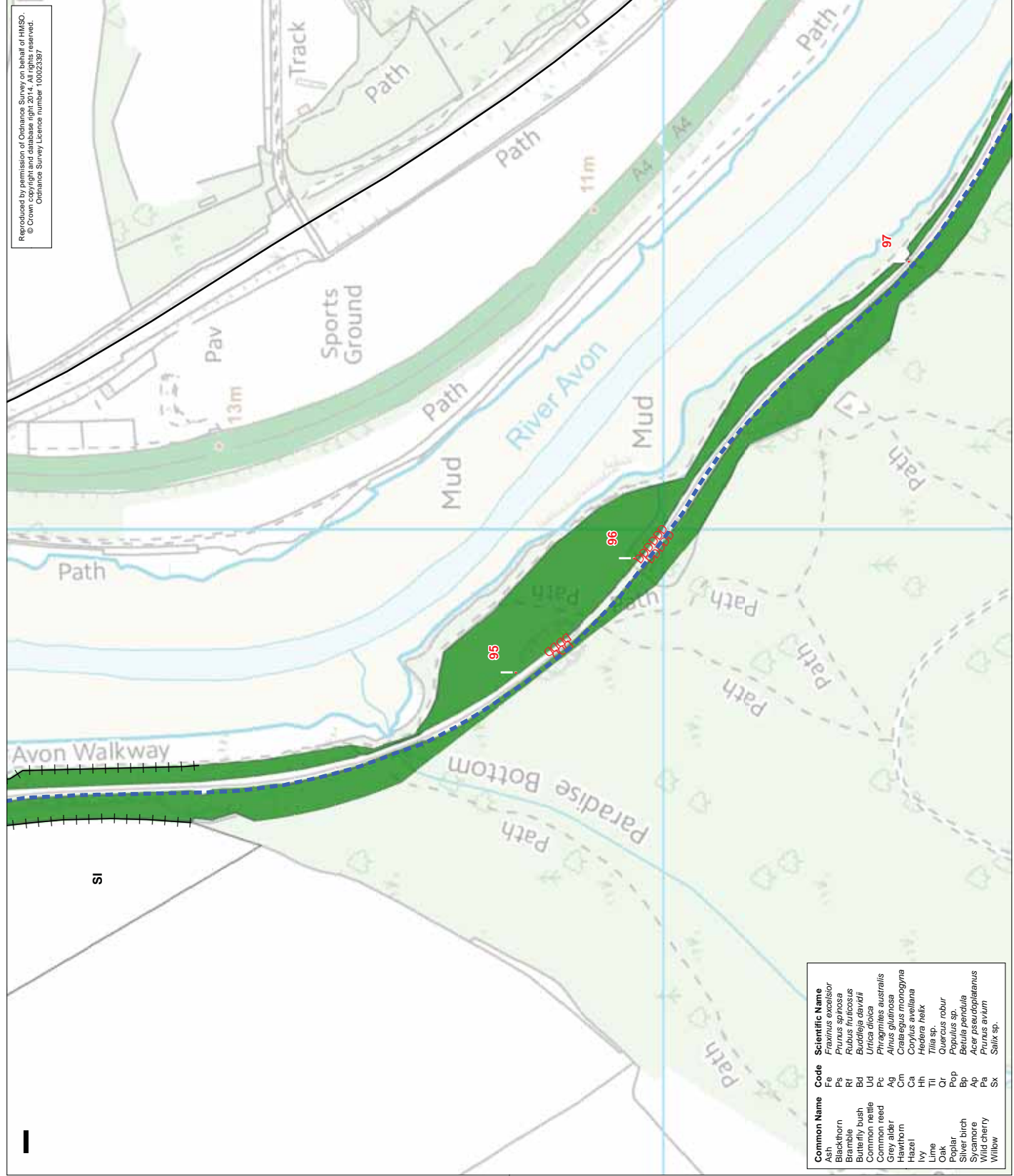
**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:**

**Figure C2: Phase 1 Habitat Mapping - Sheet 12 of 19**

**Drawn By:** Chris Duke    **Date:** 19/06/2015  
**Checked By:** Gemma Harding    **Date:** 19/06/2015  
**Approved By:** Carolyn Francis    **Date:** 19/06/2015  
**Drawing No.:** 490327-006-001 - 12    **Revision:** 1  
**Drawing Scale:** 1:2,500

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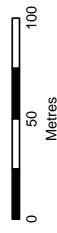


Common Name	Code	Scientific Name
Ash	Ps	<i>Fraxinus excelsior</i>
Baldern	Bd	<i>Rhus typhina</i>
Bramble	Bt	<i>Rubus fruticosus</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Lime	Tll	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Spindle tree	Pp	<i>Copallus sp.</i>
Sycamore	Sp	<i>Betula sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>



**KEY**

- Existing Railway Line
- Portishead Branch Line
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- Target Note
- Phase 1 Habitat (Polygon)
  - A1.1, Broadleaved woodland - semi-natural



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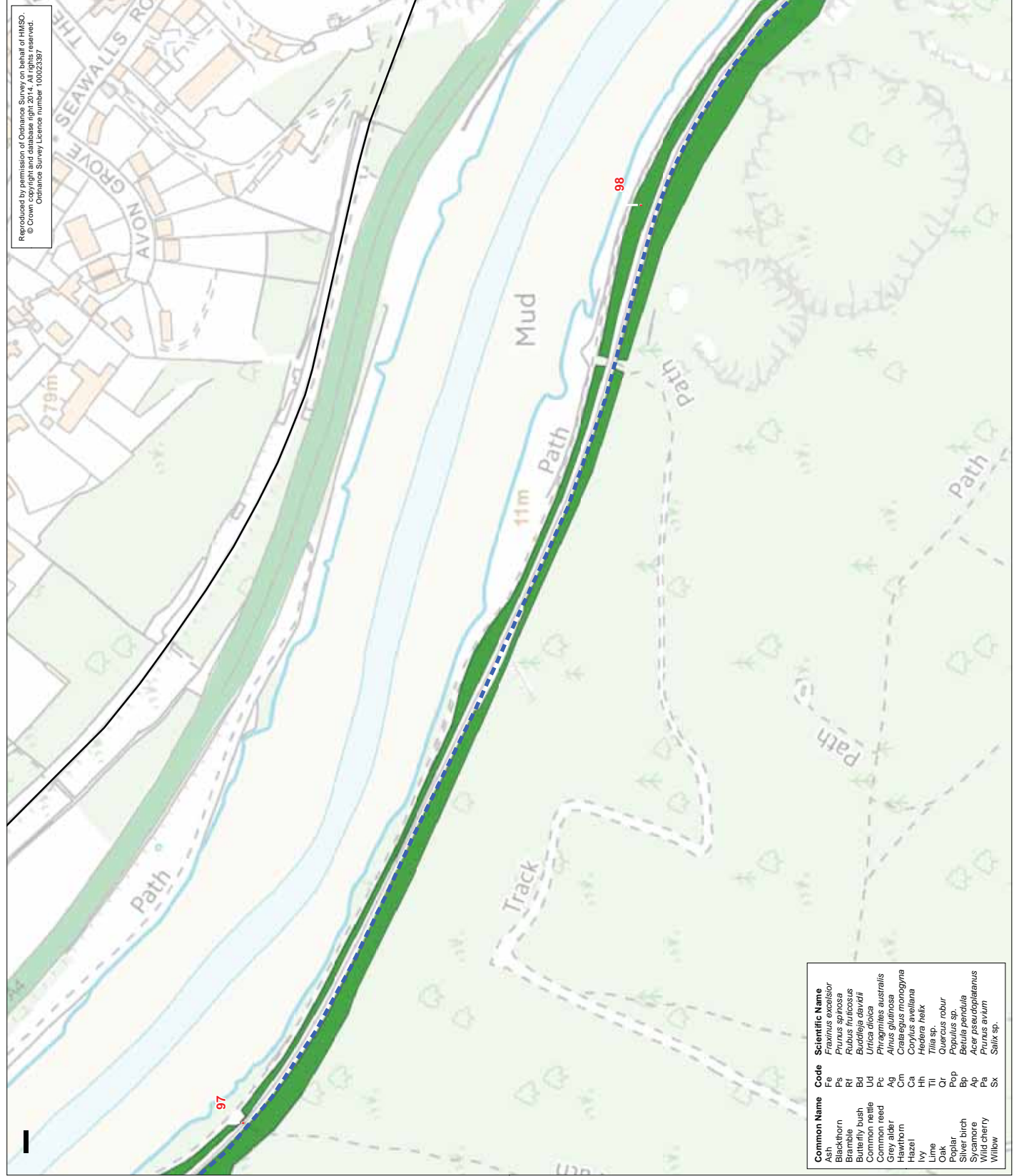
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 13 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Carlynn Francis	Date:	19/06/2015
Approved By:	Carlynn Francis	Date:	19/06/2015
Drawn No.:	490327-006-001 - 13	Revision:	1
Drawing Scale:		1:2,500	

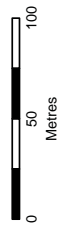
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Common Name	Code	Scientific Name
Ash	Fr	<i>Fraxinus excelsior</i>
Baldern	Ba	<i>Rhus typhina</i>
Birch	Bt	<i>Betula sp.</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Ca	<i>Crataegus monogyna</i>
Hazel	Hh	<i>Corylus avellana</i>
Ivy	Ti	<i>Hedera helix</i>
Lime	Ti	<i>Tilia sp.</i>
Oak	Co	<i>Quercus robur</i>
Raspberries	Ra	<i>Rubus sp.</i>
Sycamore	Al	<i>Acer sp.</i>
Wild cherry	Al	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>

**KEY**

- Portishead Branch Line
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- Phase 1 Habitat (Polygon)
- A1.1.1, Broadleaved woodland - semi-natural
- B3.1, Calcareous grassland - unimproved
- I1.1.2, Inland cliff - basic
- I1.4.2, Other exposure - basic
- J3.6, Buildings



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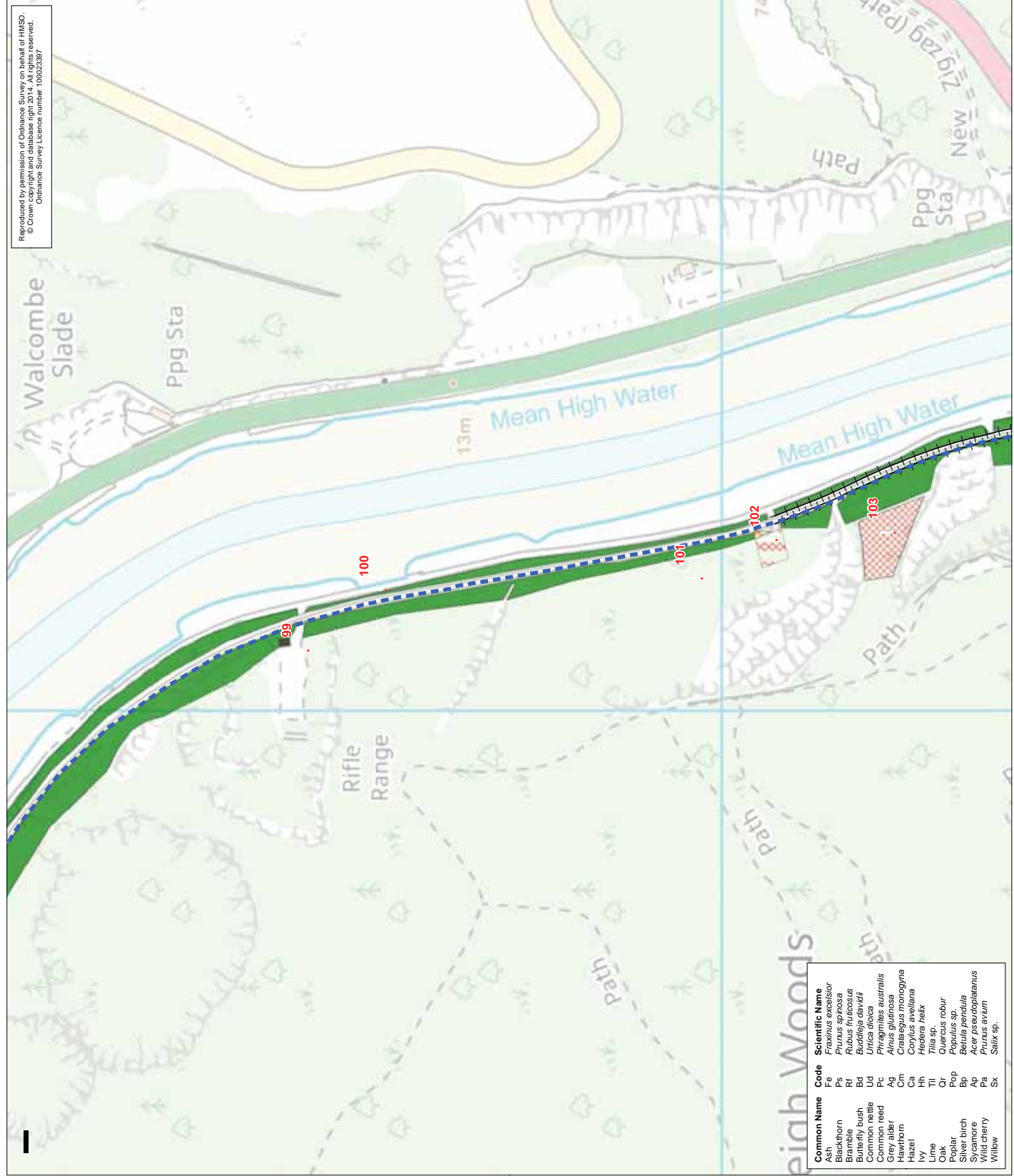
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 14 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Carolina Harding	Date:	19/06/2015
Approved By:	Carolyn Francis	Date:	19/06/2015
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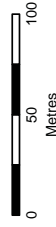


Common Name	Code	Scientific Name
Ash	Fs	<i>Fraxinus excelsior</i>
Baldern	Rt	<i>Rhus typhina</i>
Birch	Bu	<i>Betula pubescens</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Lime	Tlls	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Raspberries	Rsp	<i>Rubus sp.</i>
Sycamore	Sp	<i>Acer sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>



**KEY**

- Portishead Branch Line
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- Phase 1 Habitat (Polygon)
- A1.1.1, Broadleaved woodland - semi-natural
- B1.1.2, Inland cliff - basic



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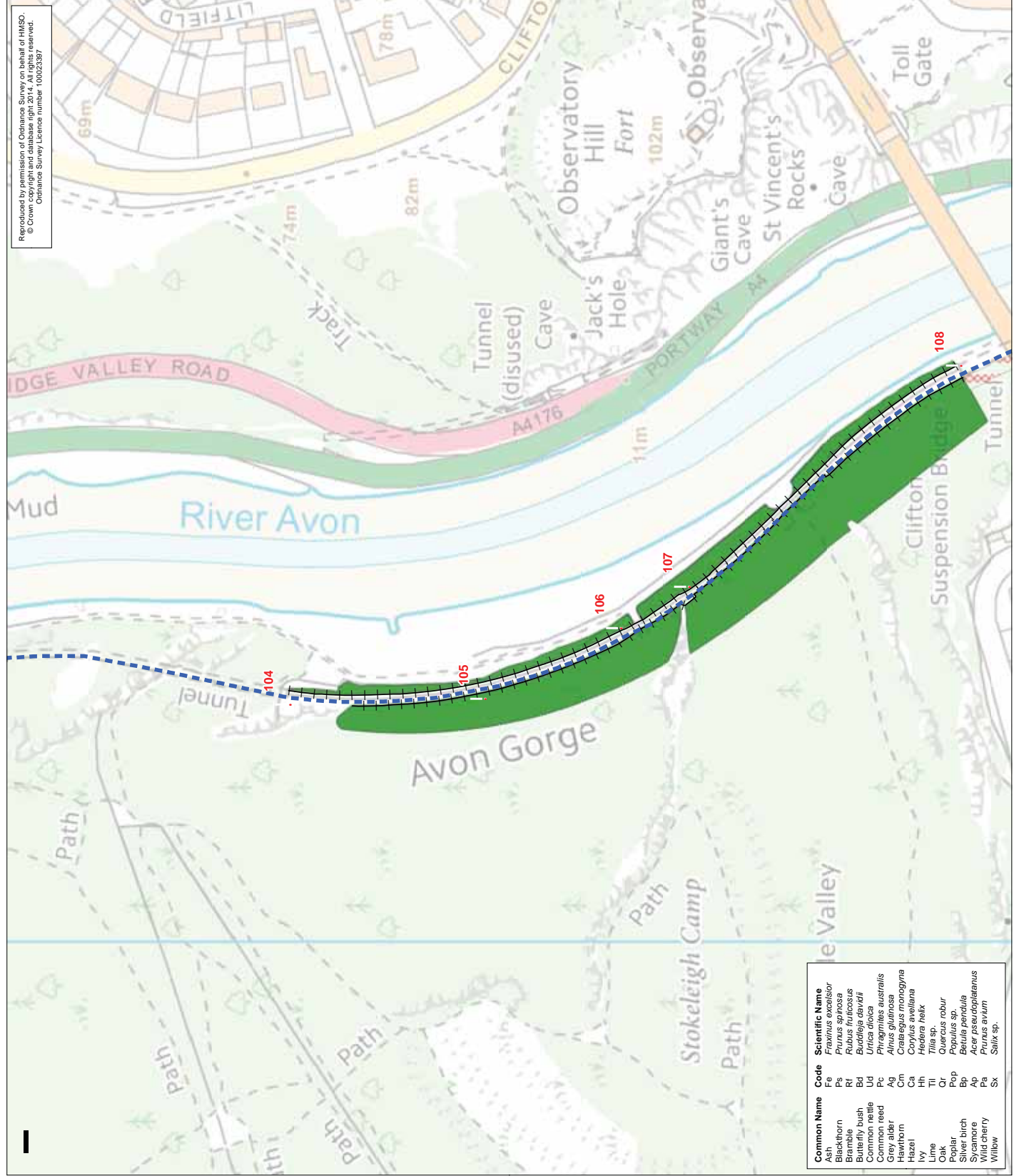
**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:**

**Figure C2: Phase 1 Habitat Mapping - Sheet 15 of 19**

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Germa Harding	Date:	19/06/2015
Approved By:	Carolyn Francis	Date:	19/06/2015
Drawing No.:	490327-006-001 - 15	Revision:	1
Drawing Scale:		1:2,500	

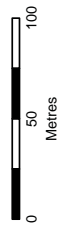
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Common Name	Code	Scientific Name
Ash	Fr	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Broadleaved woodland - semi-natural	Bd	<i>Betula davidi</i>
Butterfly bush	Ud	<i>Urtica dioica</i>
Common nettle	Pc	<i>Phragmites australis</i>
Common reed	Ag	<i>Alnus glutinosa</i>
Grey alder	Cm	<i>Crataegus monogyna</i>
Hawthorn	Ca	<i>Corylus avellana</i>
Hazel	Hh	<i>Hedera helix</i>
Ivy	Ti	<i>Tilia sp.</i>
Line	Cr	<i>Carex robor</i>
Oak	Op	<i>Quercus sp.</i>
Spindle tree	Et	<i>Euonymus alatus</i>
Sycamore	Ap	<i>Acer pseudoplatanus</i>
Wild cherry	Pa	<i>Prunus avium</i>
Willow	Sx	<i>Salix sp.</i>

**KEY**

- Portishead Branch Line
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- Phase 1 Habitat (Polygon)
- A1.1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- C3.1, Other tall herb and fern - ruderal
- I1.1.2, Inland cliff - basic



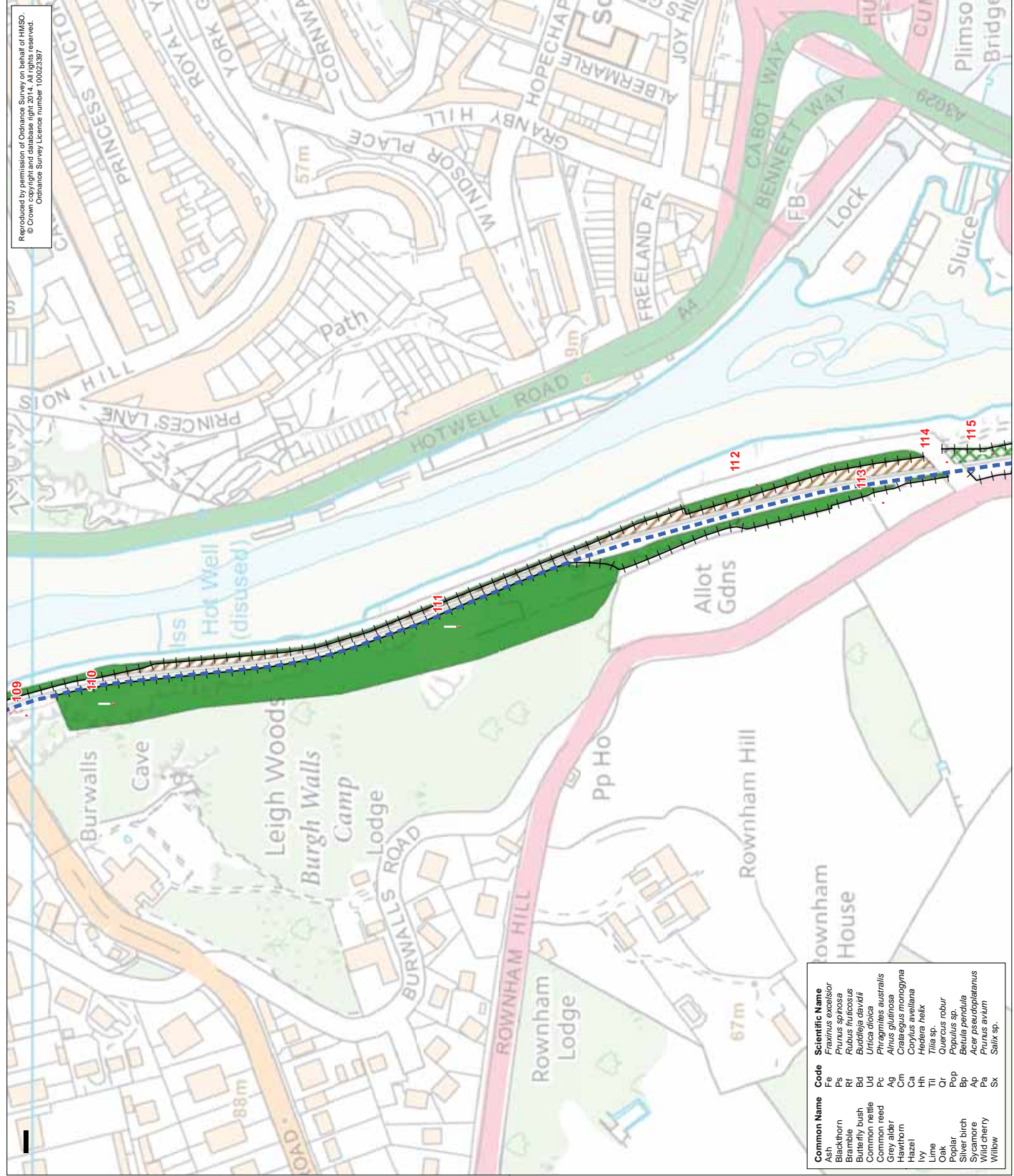
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**Project**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing**  
 Figure C2: Phase 1 Habitat Mapping -  
 Sheet 16 of 19

**Drawn By:** Chris Duke    **Date:** 19/06/2015  
**Checked By:** Gemma Harding    **Date:** 19/06/2015  
**Approved By:** Carolyn Francis    **Date:** 19/06/2015  
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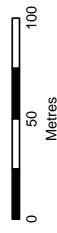


Common Name	Code	Scientific Name
Ash	Fs	<i>Fraxinus excelsior</i>
Badkern	Rl	<i>Prunus spinosa</i>
Bramble	Rd	<i>Rubus fruticosus</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Corylus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Line	Tl	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
River Birch	Pop	<i>Populus sp.</i>
Sycamore	Sp	<i>Copula sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>



**KEY**

- Portishead Branch Line
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- D A2.2, Scrub - scattered
- A3.1, Broadleaved Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- Phase 1 Habitat (Polygon)
- A1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- B2.2, Neutral grassland - semi-improved
- J1.2, Cultivated/disturbed land - amenity grassland



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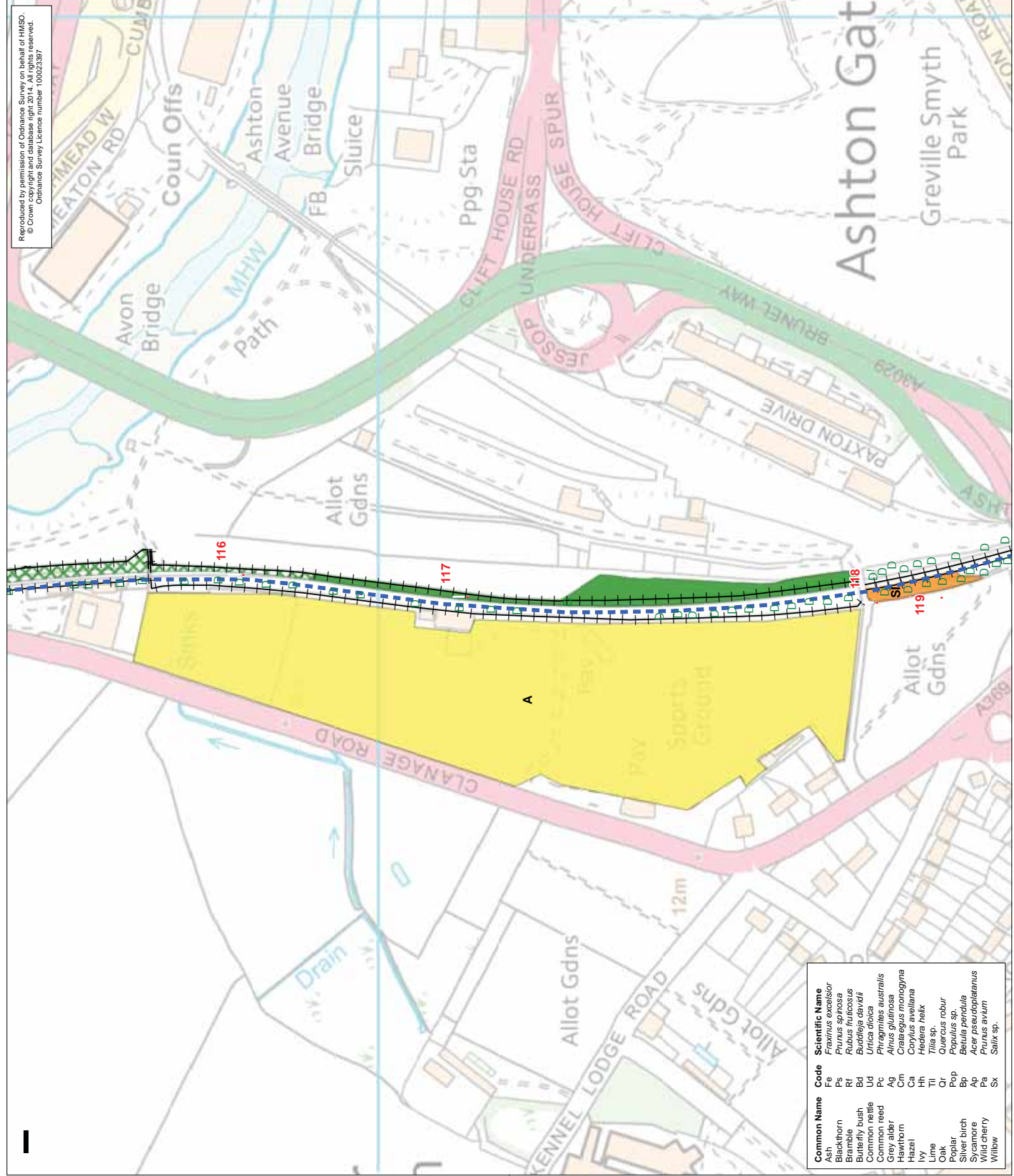
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 17 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Carlynn Harding	Date:	19/06/2015
Approved By:	Carlynn Francis	Date:	19/06/2015
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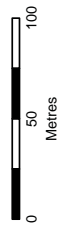
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Common Name	Code	Scientific Name
Ash	Pg	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Line	Tl	<i>Tilia sp.</i>
Oak	Or	<i>Quercus robur</i>
Poplar	Pop	<i>Populus sp.</i>
Sycamore	Sp	<i>Acer pseudoplatanus</i>
Wild cherry	Ap	<i>Prunus avium</i>
Willow	Sx	<i>Salix sp.</i>

**KEY**

- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Network Rail Permitted Development Rights
- Phase 1 Habitats (Point)
- A2.2. Scrub - scattered
- A3.1. Broadleaved Parkland/scattered trees
- A3.2. Coniferous Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4. Fence
- Phase 1 Habitat (Polygon)
- A2.1. Scrub - dense/continuous
- A2.2. Scrub - scattered
- B2.2. Neutral grassland - semi-improved
- C3.1. Other tall herb and fern - ruderal
- J4. Bare ground



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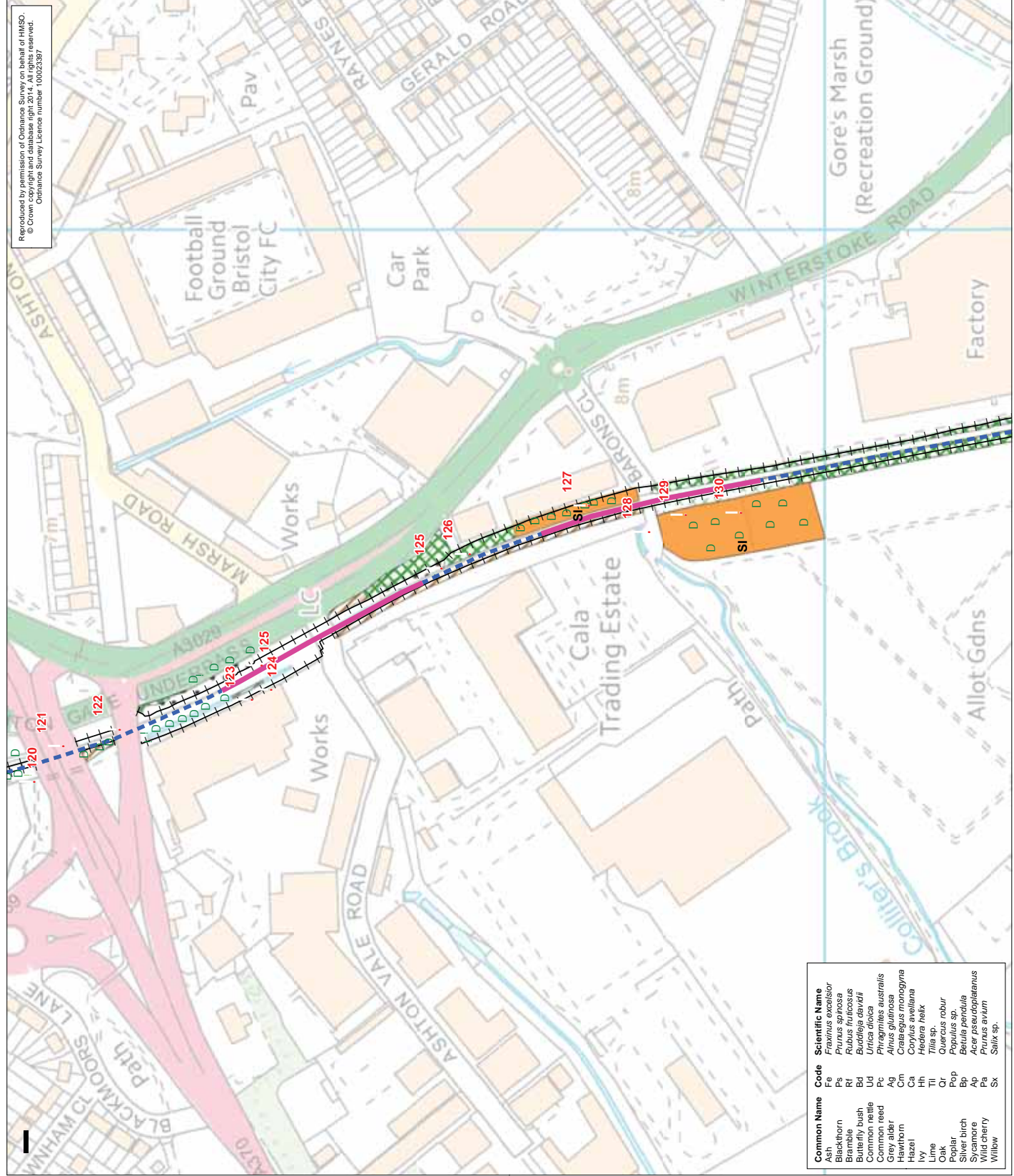
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure C2: Phase 1 Habitat Mapping - Sheet 18 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Gemma Harding	Date:	19/06/2015
Approved By:	Carylyn Francis	Date:	19/06/2015
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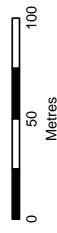


Common Name	Code	Scientific Name
Ash	Fs	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Butterfly bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Line	Tll	<i>Tilia sp.</i>
Oak	Cr	<i>Quercus robur</i>
Rose	Rp	<i>Rosa sp.</i>
Sycamore	By	<i>Copulus sp.</i>
Sycamore	Ap	<i>Acer pseudoplatanus</i>
Wild cherry	Pa	<i>Prunus avium</i>
Willow	Sx	<i>Salix sp.</i>



**KEY**

- Existing Railway Line
- Portishead Branch Line
- Network Rail Permitted
- - - Development Rights
- Phase 1 Habitats (Point)
- D A2.2, Scrub - scattered
- I A3.1, Broadleaved Parkland/scattered trees
- A3.2, Coniferous Parkland/scattered trees
- Target Note
- Phase 1 Habitat (Line)
- J2.4, Fence
- J2.5, Wall
- Phase 1 Habitat (Polygon)
- A1.1, Broadleaved woodland - semi-natural
- A2.1, Scrub - dense/continuous
- B6, Poor semi-improved grassland



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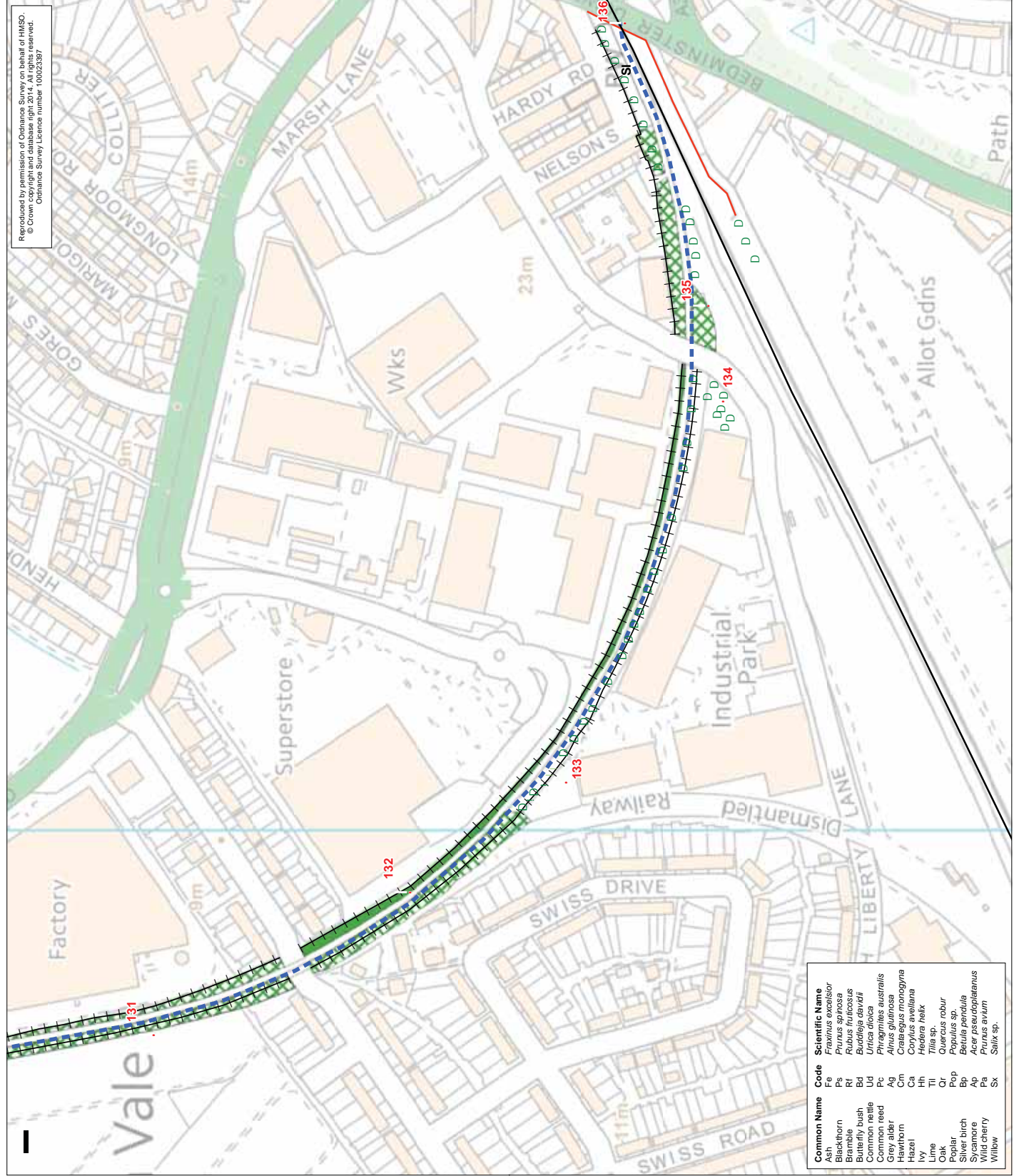
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**Project**  
 Portishead Branch Line  
 (MetroWest Phase 1)

**Drawing**  
 Figure C2: Phase 1 Habitat Mapping -  
 Sheet 19 of 19

Drawn By:	Chris Duke	Date:	19/06/2015
Checked By:	Carma Harding	Date:	19/06/2015
Approved By:	Carolyn Francis	Date:	19/06/2015
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Common Name	Code	Scientific Name
Ash	Fr	<i>Fraxinus excelsior</i>
Birch	Bt	<i>Betula sp.</i>
Buddleia bush	Bd	<i>Buddleia davidii</i>
Common nettle	Ud	<i>Urtica dioica</i>
Common reed	Pc	<i>Phragmites australis</i>
Grey alder	Ag	<i>Alnus glutinosa</i>
Hawthorn	Cm	<i>Crataegus monogyna</i>
Hazel	Ca	<i>Corylus avellana</i>
Ivy	Hh	<i>Hedera helix</i>
Lime	Tll	<i>Tilia sp.</i>
Oak	Qr	<i>Quercus robur</i>
Spindle tree	Sp	<i>Euphrasia sp.</i>
Sycamore	By	<i>Betula sp.</i>
Wild cherry	Ap	<i>Acer pseudoplatanus</i>
Willow	Pa	<i>Prunus avium</i>
	Sx	<i>Salix sp.</i>





## Annex 1






# Annex 1: Target Notes and Photographs




Target Note	Description	Photograph
1	<p>Semi-improved grassland, which has not been managed in previous growing season. Species include cock's-foot, common bent, ribwort plantain, teasel, broadleaved dock, vetch, white clover and creeping cinquefoil. Patches of bare ground are present and bramble is starting to develop within sward. Reptile potential.</p> <p>Photo taken 13/3/14</p>	
2	<p>Concrete road bridge over drain (Den Dungen Bridge). Newly pointed abutments. Low bat potential.</p> <p>Photo taken 13/3/14</p>	
3	<p>Large drain. Lower banks are piled in places and lined with concrete or brick, however soft bank is present. Some water vole potential although no emergent vegetation. Linear feature with potential for bat commuting and foraging.</p>	<p>None.</p> 



Target Note	Description	Photograph
4	<p>Brick railway bridge over drain. Brickwork may offer bat roost potential.</p> <p>Photo taken 13/3/14</p>	
5	<p>Mosaic of scrub and grass paths with broad tall ruderal transitions. Some rubble. Good reptile and invertebrate potential.</p> <p>Photo taken 13/3/14</p>	
6	<p>Area which has been recently cleared of vegetation. Clearance works appear to be part of an adjacent site clearance works where great crested newts have been recorded.</p>	<p>None</p>
7	<p>Immediately next to the site is an area fenced off as part of a development for Sainsbury's. Great crested newts have been recorded in adjacent ponds. Tree and scrub clearance within the areas bordering the fencing has been undertaken.</p> <p>Photo taken 13/3/14</p>	



Target Note	Description	Photograph
8	<p>Badger sett with six active entrances with signs of fresh bedding and latrines. Visible from pathway.</p> <p>Photo taken 13/3/14</p>	
9	<p>Area along track with sapling trees and buddleia</p> <p>Photo taken 13/3/14</p>	
10	<p>A strip of rough grassland and ruderal vegetation bordered by hawthorn scrub. Good reptile potential.</p> <p>Photo taken 13/3/14</p>	
11	<p>Site recently cleared, now semi-improved grassland.</p> <p>Photo taken 13/3/14</p>	




Target Note	Description	Photograph
12	Sheltered area of tall ruderal dominated by common nettle between scrub. Potential for invertebrates and reptiles. Brimstone, small tortoiseshell and rabbit present.	None.
13	Burrows under the track and in dense vegetation. All appear to be rabbit  Photo taken 13/3/14	
14	Broad leaved plantation with ash, willow, hawthorn and bramble. An ivy-clad willow. Some bat potential.  Photo taken 13/3/14	
15	Drain with two-stage concrete channel. Not suitable for water vole.  Photo taken 13/3/14	






Target Note	Description	Photograph
16	<p>A dense patch of Japanese knotweed in the middle of the track, approximately 300m from the road</p> <p>Photo taken 13/3/14</p>	
17	<p>Dense bramble scrub with a high level of starling activity e.g. singing and calling. Area of scrub, with frequent to abundant bramble, occasional (locally abundant) buddleia, willow sp., birch and blackthorn. Ground flora includes occasional lords and ladies, cleavers, herb-Robert, rosebay willow herb, nettle and bristle ox tongue.</p> <p>Photo taken 13/3/14</p>	
18	<p>Pond with great crested newt potential.</p> <p>Photo taken 13/3/14</p>	
19	<p>A mature willow tree with an old bird nest present. Has low bat potential.</p>	None.
20	<p>A pile of wooden sleepers with signs of burrowing underneath.</p>	None.
21	<p>A rabbit entrances at side of track.</p>	None.




Target Note	Description	Photograph
22	A willow tree with the potential to support sites for roosting bats.	None.
23	Five mature black Italian popular trees, one with very high potential for bat as a hole observed within trunk. Another tree split and ivy covered so also has some potential to support roosting bats. Very tall. A dead tall tree stump with four trees with bat potential.	None.
24	An ash tree with bat roost potential.  Photo taken 13/3/14	
25	Tree with bat roost potential.	None.
26	Tree with bat roost potential. High pot remains.	None.
27	Tree with bat roost potential and dead wood stumps. Bat pot within split trees with ivy.	None.
28	Ivy-clad mature trees with bat potential.  Photo taken 13/3/14	




Target Note	Description	Photograph
29	A change in habitat with more diverse ground flora. Locally abundant hearts tongue fern, ivy, lords and ladies, scarlet pimpernel, herb-Robert, cleavers and red-dead nettle.	None.
30A	A) A ponded area of a drain which goes under the track, which shallow and very shaded so has limited potential for great crested newts.	None.
30B	30.1 B) Great crested newts have been recorded within Portbury Wharf Nature Reserve	None.
31	Good off site habitat for reptiles.	None.
32	<p>Voids in brickwork of road bridge arch and west elevation. Bat potential.</p> <p>Photo taken 13/3/14</p>	
33	<p>Engineering gaps in eastern elevation of Sheepway Lane bridge. Bat potential.</p> <p>Photo taken 13/3/14</p>	
34	Open grassy area on south side of tracks. Reptile basking potential.	None.



Target Note	Description	Photograph
35	An area with numerous log piles and a mosaic of scrubby and open vegetation which make it potentially suitable for reptiles.	None.
36	An area of dense bramble, except an oak surrounded by grass.  Photo taken 13/3/14	
37	Mature ash trees developed from a layered hedge. Rot holes and ivy-cladding. Bat potential.  Photo taken 13/3/14	
38	Bird boxes and bat boxes mounted on trees at the end of a garden.  Photo taken 13/3/14	






Target Note	Description	Photograph
39	<p>Mammal hole with bedding and a clear mammal trail. No evidence of badger. Rabbit signs around.</p> <p>Photo taken 13/3/14</p>	
40	<p>Open grassy area on south side of tracks with reptile potential. Lots of signs of mammal foraging and rabbits.</p> <p>Photo taken 13/3/14</p>	
41	<p>A narrow stream. Sub-optimal habitat for water vole. Shallow and little bankside vegetation. Passes beneath railway in a low brick culvert.</p> <p>Photo taken 13/3/14</p>	
42	Pond stocked with fish	
43	Fishing pond. Not suitable for great crested newts.	None.
44	Dry pond (bare earth depression).	None.
45	Modern brick shed. Low potential for bats.	None.




Target Note	Description	Photograph
46	<p>Trees with bat roost potential.</p> <p>Photo taken 13/3/14</p>	
47	Vagrant camp	None.
48	<p>A large area of broad-leaved woodland supporting silver birch, blackthorn, ash, hawthorn. With occasional bramble, lords and ladies, nettle, ground ivy and cleavers. Area is also suitable for reptiles in areas.</p> <p>Photo taken 13/3/14</p>	
49	<p>Small standing water feature covered with duckweed and fool's watercress emerging on north bank.</p> <p>Photo taken 13/3/14</p>	




Target Note	Description	Photograph
50	<p>Drain with standing water covered with duckweed. Fringed by common reed and overhung by goat willow.</p> <p>Photo taken 13/3/14</p>	
51	<p>Derelict building with no roof. Ivy-clad structure in centre. Bat roost potential.</p>	None.
52	<p>Mature silver birch clad in dense ivy. High potential for roosting bats.</p>	None.
53	<p>Line of mature poplars. Some with ivy cladding and broken boughs. Moderate bat roost potential.</p> <p>Photo taken 13/3/14</p>	
54	<p>Wet ditch, shallow and stagnant. Filled with leaves and in heavy shade. On north side of track at this location is a disused mammal hole, possibly a badger sett due to very large spoil heaps in front, with at least three disused entrances now full of leaves, semi-collapsed and covered by bramble.</p> <p>Photo taken 13/3/14</p>	




Target Note	Description	Photograph
55	<p>Pond with mallard ducks present. Limited marginal vegetation.</p> <p>Photo taken 13/3/14</p>	
56	<p>Marsh Lane road bridge. Stone and brick with a few gaps in the mortar. Moderate potential for roosting bats.</p>	None.
57	<p>A stream with signs of flooding, earth banks with no submerged or emergent vegetation</p>	None.
58	<p>A badger sett supporting four active entrances, with bedding, an active latrine, approximately 20m from the track.</p>	None.
59	<p>Silver birch tree with ivy. Bat potential.</p> <p>Photo taken 13/3/14</p>	






Target Note	Description	Photograph
60	<p>Oak with ivy covered trunk. Bat potential.</p> <p>Photo taken 13/3/14</p>	
61	<p>Oak with ivy covered trunk. Bat potential.</p> <p>Photo taken 13/3/14</p>	
62	<p>Brick and masonry arch culvert. Voids in north elevation. Bat roost potential. Standing water in culvert. Water parsnip and creeping buttercup present.</p>	<p>None.</p> 



Target Note	Description	Photograph
63	<p>Group of ivy-clad trees with bat potential.</p> <p>Photo taken 13/3/14</p>	
64	<p>Group of ivy-clad trees with bat potential. Large stag-headed oak with potential for bats and invertebrates.</p> <p>Photo taken 13/3/14</p>	
65	<p>Concrete motorway bridge. Few opportunities for bats.</p>	None.
66	<p>An area of broadleaved woodland, ground flora dominated by ivy with occasional lords and ladies. Mature hawthorn, field maple and blackthorn</p>	None.
67	<p>Mature line of hawthorn covered in ivy.</p> <p>Photo taken 13/3/14</p>	
68	<p>Dry pond surrounded by willow herb.</p>	None.



Target Note	Description	Photograph
69	Oak with ivy. Low bat potential.  Photo taken 13/3/14	
70	Extensive common reed and bulrush with open water in the centre. Coots present.  Photo taken 13/3/14	
71	Mature line of hawthorn covered in ivy. Honeysuckle also present.  Photo taken 13/3/14	



Target Note	Description	Photograph
72	<p>Gnarled oak with ivy. Low bat potential.</p> <p>Photo taken 13/3/14</p>	
73	<p>Grassy area on railway line. Abundant moss with ox-eye daisy and vetches. Reptile potential.</p>	<p>None.</p> 
74	<p>Line of young hawthorn and privet.</p> <p>Photo taken 13/3/14</p>	
75	<p>Area of planted hawthorn and a number of fox scats recorded near the track.</p>	<p>None.</p>






Target Note	Description	Photograph
76	<p>A row of Leyland cypress in adjacent habitat and butterfly-bush dominant within the scrub.</p> <p>Herb layer consisting of herb Robert and lords and ladies along with areas of dense nettle.</p> <p>Photo taken 2/4/14</p>	
77	<p>Disused Pill train platform with reptile potential. Areas of scrub either side included sycamore, hazel, blackthorn and holly. Ground flora along ballast; occasional bramble, cleavers, lords and ladies, groundsel, sow thistle, willow herb and ivy.</p> <p>Photo taken 2/4/14</p>	
78	<p>Pill Station Bridge and Pill over-bridge, with holes in brickwork between the platform and bridge walls provides potential for bat roosting.</p> <p>Photo taken 2/4/14</p>	
79	<p>Closet point of the Severn Estuary SAC SPA Ramsar to the site.</p>	<p>None.</p>



Target Note	Description	Photograph
80	<p>Ash tree with low bat potential.</p> <p>Photo taken 2/4/14</p>	
81	<p>Ponds identified via map; these were not visited but noteworthy for Great crested newt potential.</p>	<p>None.</p>
82	<p>Wooded banks vegetated with bramble, wild madder, ash, hawthorn, birch, wild privet and blackthorn.</p> <p>Photo taken 2/4/14</p>	
83	<p>Pill tunnel carries the railway line underground for this entire section.</p>	<p>None.</p>




Target Note	Description	Photograph
84	<p>Pill tunnel entrance, potential for bats. Ivy covered wall running up towards the tunnel.</p> <p>Photos taken 2/4/14</p>	
85	<p>Large fishing lake with water lily and potential for otter.</p> <p>Adjacent to the lake is a section of woodland with mature oak trees and potential for bat roosting sites.</p> <p>A number of mature trees surrounding the lake also have splits with potential for bat roosts.</p> <p>Miles viaduct runs underneath from lake toward fields and a stream.</p> <p>Photo taken 2/4/14</p>	





Target Note	Description	Photograph
86	<p>An ivy covered field maple with bat potential.</p> <p>Photo taken 2/4/14</p>	
87	<p>Potential fox den with three holes. Two on northern bank, one of the southern bank. No signs of rabbit, and holes too small for badger.</p>	None.
88	<p>Start of Ham Green Geological SSSI, where a number of ivy covered oaks have the potential to be roosting sites for bats. The understory consists of lords ladies, hart's-tongue fern and white dead nettle.</p>	None.
89	<p>Recent landslide currently under repair.</p> <p>Wooded slopes are very steep risk of falling trees and landslides.</p> <p>Photo taken 2/4/14</p>	






Target Note	Description	Photograph
90	<p>Bridge with bat potential ivy covered.</p> <p>End of Ham Green Geological SSSI.</p> <p>Photo taken 2/4/14</p>	
91	A bank of mature ash trees.	None.
92	Rabbit warren with numerous holes, adjacent to the track.	None.
93	<p>Length of steep woodland comprises ash, blackthorn, privet with an open canopy. Ground flora dominated by bramble, ivy and hart's-tongue fern.</p> <p>Photo taken 2/4/14</p>	
94	<p>Start of SSSI and SAC listed for <i>Tilio-Acerion</i> forests of slopes, screes and ravines Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) and ancient woodland of Leigh Woods NNR.</p> <p>Photo taken 2/4/14</p>	




Target Note	Description	Photograph
95	North of Sandstone Tunnel vegetation along the ballast becomes more frequent with ivy in places dominating, with occasional wood avens, wood sorrel, herb Robert, common dog-violet, dogs mercury, polypody, valerian, pale St. John's-wort, red valerian, ground ivy, mint, ramsons and wild madder.	None.
96	Sandstone tunnel with bat potential.  Photo taken 2/4/14	
97	A number of quarry bridges which have the potential to support sites suitable for bats.  Photo taken 1/4/14	
98	Denser woodland lower plateau east side of track. West side beginning to see rock exposures.	None.





Target Note	Description	Photograph
<p>99</p>	<p>Disused shooting range next to Quarry Bridge No.3</p> <p>Photo taken 1/4/14</p>	
<p>100</p>	<p>Vegetation on ballast at this section is species rich with wild sage, barren strawberry, hedge bindweed, ivy, valerian, herb Robert, tufted vetch, wood sedge and butterfly-bush. Adjacent habitat broad-leaved woodland supporting hazel, hawthorn, ash, willow, yew, beech, and sweet chestnut.</p> <p>Photo taken 1/4/14</p>	
<p>101</p>	<p>Steep-slopes covered with broadleaved woodland. Many ivy covered trees with nesting bird and bat potential.</p> <p>Log piles provide suitable for reptiles, amphibians and small mammals.</p>	<p>None.</p>
<p>102</p>	<p>Small concrete building adjacent to inland rock, potentially suitable for bats.</p> <p>Reptile basking opportunities.</p> <p>Photo taken 1/4/14</p>	

Target Note	Description	Photograph
		
103	<p>Quarry Bridge No.1 adjacent to exposed rock with a variety of graffiti.</p> <p>Photo taken 1/4/14</p>	
104	<p>Clifton Bridge No. 2 Tunnel; cut out of rock exhibiting holes above the southern entrance which may provide opportunities for roosting bats.</p> <p>Photo taken 1/4/14</p>	
105	<p>Mature trees fallen towards the line, some with bat potential.</p> <p>Photo taken 1/4/14</p>	





Target Note	Description	Photograph
106	<p>Strip of woodland which includes silver birch, beech, hazel, bramble and hawthorn with a ground flora comprising mainly ivy with hart's-tongue fern, lords and ladies</p> <p>Woodland is denser on the east of the track than before and there is dormouse potential in habitat along the side of the track.</p> <p>Photo taken 1/4/14</p>	
107	<p>Quarry Bridge with access into Leigh Woods, likely to have bat potential.</p> <p>Photo taken 1/4/14</p>	
108	<p>Clifton Bridge No.1 Tunnel: gaps are present within the brickwork at both entrances and breaks between the rock and tunnel structure.</p> <p>Photo taken 1/4/14</p>	





Target Note	Description	Photograph
		
109	<p>A mature tree, approximately 12m from the boundary fence with a hole in the trunk. Potentially suitable for bats.</p> <p>Steep sloped broadleaved woodland within railway boundary.</p> <p>Photo taken 1/4/14</p>	
110	Inland cliffs/rock exposure between trees	None.
111	<p>Area of broad-leaved woodland with rock exposure on steep vegetated banks. Ground flora includes; ramsons and lords and ladies. Ivy covered trees with the potential for roosting bats.</p> <p>Photo taken 1/4/14</p>	




Target Note	Description	Photograph
<p>112</p>	<p>Japanese knotweed to the east of the track within an area of bramble.</p> <p>Photo taken 1/4/14</p>	
<p>113</p>	<p>Approximately 7-8 trees ivy covered, some with broken branches, immediately adjacent to the boundary fence with bat potential.</p> <p>Photo taken 1/4/14</p>	
<p>114</p>	<p>Medium potential for roosting bats due to the gaps and crevices between in brick work</p> <p>Photo taken 1/4/14</p>	<p>Y</p> 
<p>115</p>	<p>A disused bramble and ivy covered platform with deep cracks. Has the potential to reptiles and small mammals</p> <p>Photo taken 1/4/14</p>	








Target Note	Description	Photograph
116	A vagrants camp	None.
117	<p>A strip of broadleaved woodland which includes silver birch with barer areas suitable for reptiles.</p> <p>The majority of the ground cover is ivy and bare earth with occasional lord and ladies, harts tongue and nettle. On the eastern bank an ivy covered mature tree with broken braches, has the potential to support sites suitable for roosting bats.</p>	None.
118	<p>A brick bridge with very few cracks, therefore low potential for bats.</p> <p>Photo taken 1/4/14</p>	
119	<p>The majority of the track length in this section has potential for reptiles. The banks on either side of the track provide a mosaic of grassland, scrub habitats combined with allotment rubbish.</p> <p>Photo taken 1/4/14</p>	<p>Y</p> 



Target Note	Description	Photograph
120	<p>An ivy and bramble covered derelict building which has the potential to support sites for roosting bats.</p> <p>Photo taken 1/4/14</p>	
121	<p>Road bridge with gaps between parapets and decking, therefore the potential to support bats.</p> <p>Photo taken 1/4/14</p>	
122	<p>Bridge with concrete parapets and wooden decking. Bat potential in walls and in gaps between iron work and decking.</p> <p>Photo taken 1/4/14</p>	
123	<p>Strip of Japanese knotweed either side of a wet drain with earth banks on one side and concrete lined the other. Very shallow and heavily shaded with nettle and bramble. The drain is culverted at both ends and has no potential for water vole.</p> <p>Photo taken 1/4/14</p>	

Target Note	Description	Photograph
<p>124</p>	<p>Pile of concrete and wooden sleepers providing opportunities for small mammals, reptiles and amphibians.</p> <p>Photo taken 1/4/14</p>	
<p>125</p>	<p>An ephemeral area with occasional bristly ox-tongue, clover, purslane, speedwell, dandelion, groundsel and bramble.</p> <p>Narrow strip of bramble with occasional ruderal vegetation, which includes nettle, rosebay willow herb and herb Robert.</p> <p>Photo taken 1/4/14</p>	
<p>126</p>	<p>A mature ivy covered tree, approximately 3m from the Network Rail boundary. The tree has low bat potential.</p>	<p>None.</p>
<p>127</p>	<p>Area of rubble which has a high potential to support reptiles, with loose rubble, bramble, and ruderal vegetation.</p> <p>Photo taken 1/4/14</p>	

Target Note	Description	Photograph
128	<p>Colliter's Brook with steep earth banks and very silty murky water with very occasional fool's water cress. Mostly filled with rubbish and general debris. The stream is culverted under the railway. No potential for water vole.</p> <p>Photo taken 1/4/14</p>	
129	<p>Wet area, very overgrown with nettle and dead wood. No emergent or submerged vegetation. No potential for great crested newts.</p> <p>Photo taken 1/4/14</p>	
130	<p>Field immediately adjacent to the rail track with reptile/newt fencing around its edge. Field has dense areas of bramble and golden rod with patches of grassland. Plastic fencing is no longer in use.</p> <p>Photo taken 1/4/14</p>	
131	<p>Allotments are marked at this section. Allotments habitats are associated with amphibians and reptiles, therefore there may be potential for this species along the railway edge.</p>	None.
132	<p>Eastern side of the site there is woodland dominated by beech and polar with dense ivy on the ground and dogs mercury east side only.</p>	None.

Target Note	Description	Photograph
133	Scrub with scattered trees and a stand of Leyland cypress, connecting offsite habitat is predominantly urban and industrial units.	None.
134	Section of hazel coppice situated between South Liberty Lane and Liberty Industrial Park.	None.
135	<p>Dense areas of scrub with bramble and butterfly bush present on both embankments but thins out as the second rail joins on the southern side.</p> <p>Photo taken 1/4/14</p>	
136	<p>The grass and scrub slope on the north easterly embankment provides opportunities for reptiles.</p> <p>The south west side is reinforced by a high stone wall.</p> <p>Photo taken 1/4/14</p>	



## Appendix C.2: Preliminary Bat Survey Report



PRELIMINARY BAT SURVEY REPORT

# MetroWest Phase 1: Portishead to Pill

*Prepared for*

North Somerset Council

January 2015



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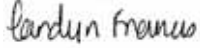
# Document History

PRELIMINARY BAT SURVEY REPORT

**MetroWest Phase 1: Portishead to Pill**

*This document has been issued and amended as follows:*

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**Table 2. Categories for Bat Roost Potential in Structures**

**Table 3 Walked Transect Survey Conditions**

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**Figure(s)**

**Figure 1: Bat Surveys and Study Area**

**Figure 2a. Distribution of Lesser & Greater Horseshoe bats Recorded on Walked Transects**

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**Figure 3: Locations of Structures**



# Executive Summary

- 1.1 CH2M HILL prepared a draft Environmental Baseline Report on behalf of North Somerset Council for the proposed Portishead to Pill railway line which is being promoted as part of MetroWest Phase 1. The report recommended the need for further surveys for protected species including bats to provide a baseline against which to assess the potential impacts of re-opening the railway line.
- 1.2 This report presents the findings of preliminary bat surveys undertaken between August and October 2014. The study consisted of a desk study of existing bat roost and activity information within 2.5km of the proposed scheme, a daytime inspection of trees and structures for bat roost potential, and bat activity surveys.
- 1.3 The surveys showed that the disused railway line was being used by at least six bat species during late summer and autumn 2014, including lesser and greater horseshoe bats, and that bat roost potential is confined to a low number of trees and structures.
- 1.4 The following recommendations have been made for a programme of bat surveys for 2015 to provide a robust level of survey data to support an environmental impact assessment of the proposed scheme.
  - Phase 1 – an application to Natural England for a project licence to trap and track bats.
  - Phase 2 – Detailed survey work to establish baseline data (roost assessments, acoustic surveys and trapping surveys). If target species (i.e. rare or uncommon species such as horseshoe bats) are captured, Phase 3 of the study would commence.
  - Phase 3 – Tagging, tracking and roost counts to assess impacts on their conservation status in the local area.

# Introduction

---

## 1.1 Background

- 1.1.1 As part of the environmental baseline studies for the MetroWest Phase 1 scheme, CH2M HILL has undertaken preliminary bat surveys on behalf of North Somerset Council (NSC). MetroWest Phase 1 (hereafter referred to as the 'proposed scheme') includes a new passenger service between Portishead and Bristol Temple Meads, which will involve restoring the disused railway line between Portishead and Pill, constructing a new railway station at Portishead and modifying the existing station at Pill, and works along the existing Portbury Freight Line between Pill and Ashton Gate. To implement the proposed scheme it will be necessary to build new infrastructure and modify or upgrade the existing operational rail, with works including that the existing abandoned railway between Portishead and Pill will be removed and replaced by modern standard earthworks, railway tracks, and other features to build an operational railway.
- 1.1.2 As part of the environmental baseline studies for the MetroWest Phase 1 scheme, CH2M HILL has undertaken preliminary bat surveys on behalf of North Somerset Council (NSC). MetroWest Phase 1 (hereafter referred to as the 'proposed scheme') includes a new passenger service between Portishead and Bristol Temple Meads, which will involve restoring the disused railway line between Portishead and Pill, constructing a new railway station at Portishead and modifying the existing station at Pill, and works along the existing Portbury Freight Line between Pill and Ashton Gate. To implement the proposed scheme it will be necessary to build new infrastructure and modify or upgrade the existing operational rail, with works including that the existing abandoned railway between Portishead and Pill will be removed and replaced by modern standard earthworks, railway tracks, and other features to build an operational railway.
- 1.1.3 The disused railway line is overgrown with scrub and trees encroaching across the tracks. The track was cleared in 2013 to facilitate access, although dense bramble scrub has since grown back.
- 1.1.4 All bat species and their roosts are protected in the UK under the Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations), which implements the EC Directive 92/43/EEC (the Habitats Directive). Bats and their roosts are also protected under the Wildlife and Countryside Act (WCA) 1981 (as amended). The protection afforded to bats in the UK and the licence process under the Habitats Regulations is summarised in Appendix 1.

## 1.2 Site Description

- 1.2.1 At the western approach to Portishead the disused line passes through a new housing development, where a neighbourhood road serving residential areas crosses the route. The disused line crosses Portbury Common, passing under an arched bridge that carries Sheepway, an unclassified road between Portishead and Portbury. The route crosses farmland dominated by pasture before once again passing under Sheepway. Continuing east, the line passes a former railway station (now a residential property) and runs between the A369 and industrial areas to the north, passing under Royal Portbury Dock Road and then the M5 before arriving at Pill. Cyclepaths cross and follow the disused railway alignment and there are pedestrian routes through the housing estate in Pill.

## 1.3 Aims for the Preliminary Surveys

- 1.3.1 There is currently very little survey data available. Bat activity surveys in 2013 (Mott Macdonald, 2013) were undertaken to inform scrub clearance work, but do not provide sufficient baseline information to evaluate the disused railway line as a resource for bats. A

survey programme to provide a baseline against which potential impacts of re-opening the line is therefore required to inform the environmental impact assessment (EIA).

- 1.3.2 Guidelines<sup>1</sup> recommend that at least one year of baseline data should be available to design robust mitigation for bats. It is important to understand seasonal patterns of use, particularly in landscapes that are important for bats such as that around the proposed scheme.
- 1.3.3 This report presents the findings of surveys undertaken between August and October 2014 and provides an initial baseline that can be used to develop the survey programme for spring and summer 2015.

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<sup>1</sup> Hundt, L., 2012. *Bat Surveys: Good Practice Guidelines*, 2nd Edition. Bat Conservation Trust.

## 1.4 Project Objectives

1.4.1 The study has the following objectives:

- Establish the assemblage of rare, scarce and uncommon bat species to evaluate the importance of the disused railway line that will be reopened for the proposed scheme.
- Determine the level and nature of use of the disused railway line by rare and uncommon species, with particular consideration to lesser and greater horseshoe bats.
- Investigate roosting, commuting and foraging behaviour of bats within habitats along the proposed scheme.
- Evaluate the importance of the disused railway line as a corridor for movement by bats.
- Establish a baseline of information against which the impact from the loss of trees and scrub can be assessed.
- Develop mitigation measures required to maintain the conservation status of rare, scarce and uncommon bat species.

1.4.2 The preliminary survey work in 2014 provides an initial baseline and the aims of this stage of the study are to:

- Establish seasonal use of the disused railway line by bats in late summer and autumn.
- Identify potential roosts and hibernation sites for bats in trees and structures along the proposed scheme.
- Develop a survey programme for 2015, to provide sufficient level of survey information to inform the EIA.



# Methodology

## 2.1 Desk Study

- 2.1.1 Records of bats and bat roosts obtained in April 2014 from Bristol Regional Environmental Records Centre (BRERC) for a 2.5km buffer zone either side of the proposed scheme have been reviewed for this study.

## 2.2 Daytime Inspection for Bat Roosts

- 2.2.1 Bat roost potential in trees, bridges and culverts within the proposed scheme was assessed on the 27<sup>th</sup> August, 20<sup>th</sup> October and 21<sup>st</sup> October 2014. The survey used standard methods recommended by the Bat Conservation Trust<sup>1</sup> to identify and describe features that can provide shelter for bats to roost.

### Trees

- 2.2.2 The survey identified trees with obvious signs of damage. An assessment of these trees was carried out from the ground using close focusing binoculars to examine the upper parts of the trees. A Cluson Clulite with 500m spot beam was used to illuminate dark areas under the canopy and holes/crevices in the timber. The purpose of the ground-based assessment was to locate features in the tree that may provide shelter for bats. Examples of the type of features looked for include:

- Rot holes and cavities;
- Woodpecker holes;
- Splits and cracks in branches, such as storm damaged limbs;
- Loose bark;
- Thick-stem ivy; and
- Twisted and entwined limbs.

- 2.2.3 Trees were graded high, moderate or low according to their potential to provide shelter for bats. The potential shelter for bats was assessed according to the condition of the tree, as described in Table 1.

Table 1. Categories for Trees with Potential Bat Roost Features

Category	Tree Condition
High	Veteran features and significant decay that may provide shelter for a colony of bats. Potential roost features that could provide protection in winter and may be used for hibernation, e.g. Woodpecker holes; dead wood with rot hole or split; and split with sheltered cavity.
Medium	Damage and decay with a cavity space that could provide shelter for several bats. Potential for breeding bats to be present, but features are possibly too small or exposed to qualify as 'high'.
Low	Small features with potential for solitary bats to shelter in summer, but unlikely to provide protection against extreme weather conditions. Almost certainly unsuitable for breeding animals.

### Bridges and Culverts

- 2.2.4 A preliminary survey of the bridges from the ground was carried out to look for crevices and cavities in the fabric of the structures that could provide shelter for bats. Close focusing binoculars were used to examine features at the top of bridges and a powerful Cluson Clulite

torch with a 500m spot beam provided lighting for dark and shaded areas under the structures. Culverts were surveyed from the entrance of the structures.

- 2.2.5 The presence of bats can be determined from field signs (such as droppings), but in the absence of evidence confirming bats have used the structure it is necessary to assess the potential of a roost site. The criteria in Table 2 have been used to describe the bat roost potential of features in the bridges and culverts.

**Table 2. Categories for Bat Roost Potential in Structures**

<b>Category</b>	<b>Criteria</b>
High	Large sheltered void or feature with space for several bats (c.10+ bats). Shelter provides stable temperatures and therefore potential for animals to thermo-regulate (e.g. for breeding and/or hibernation). Located in a typical/optimal location on the structure.
Medium	Small features that would provide shelter for low numbers of bats, but collectively may be used by a colony. Small features located in a typical/optimal location on the structure.
Low	Small features with potential for solitary bats to shelter in summer, but the crevice or feature is unlikely to provide a stable roost climate.

## 2.3 Bat Activity Surveys

### **Walked Transects**

- 2.3.1 To record bat activity, the surveys listed in Table 3 below were undertaken between August and October. An Elekon BatloggerM was used to record bat calls for later computer analysis (using Batexplorer computer software).
- 2.3.2 A transect followed the route of the disused railway. Where access permitted, surveyors walked along the track, following the alignment of the route in the centre of the railway corridor. Some sections of the track were obstructed by impenetrable bramble scrub and deviations were taken along one side of the disused railway. Transect routes also occasionally followed designated paths around the proposed scheme. The transect included 14 predetermined stopping points where surveyors monitored bat activity for three minutes (referred to as 'station stops').
- 2.3.3 The transect route and station stops are shown on a Figure 1, with deviations from the (central) track and disused railway line shown. The start position of the walked transect was varied, so that sections of the proposed scheme were surveyed at different times during the survey periods. The sequence of station stops for each survey is shown in Table 3. Sections of the proposed scheme that were inaccessible are also shown. Due to access restrictions preventing a continuous walked route along the entire length of the railway it was necessary to drive and park at two locations along the route (shown on Figure 1); the drive took less than five minutes.

Table 3 Walked Transect Survey Conditions

Date (2014)	Sunset (hrs)	Survey Period (hrs)	Weather Conditions	Transect*
28 Aug	20:09	20:05-23:30	Temperature 19-16°C. 60% Cloud. Light wind. No precipitation.	1-14
25 Sept	19:04	19:00-22:05	Temperature 17°C. 100% Cloud. Light wind. No precipitation.	4-1 7-5 9-8 8-14
20 Oct	18:20	18:15-20:00	Temperature 14°C. 100%Cloud. Light Breeze. Rain until 18:45 and then heavy rain at 19:50.	14-8 7-5
21 Oct <sup>+</sup>	18:18	18:15-21:15	Temperature 14-13°C. 100%Cloud. Light Breeze. Light rain between 18:00-18:50, but clearing.	14-8 7-5 4-1

\* Sequence of station stops shown on Figure 1

<sup>+</sup> Transect repeated due to rain on the 20<sup>th</sup> October

#### Static Automated Bat Detectors

2.3.4 A Wildlife Acoustics SM2 and Anabat SD1 automated bat detectors were deployed along the disused railway line and recorded sound frequency to capture echo location sound emitted by bats over the periods shown in Table 4. These static bat detectors were positioned in trees along the track and record nearby bat calls automatically, with each digital file being appropriately date and time-stamped. After recording, the data collected were downloaded for analysis on computer using Analook software. The location of the static automated bat detectors is shown on Figure 1.

Table 4. Deployment of Static Automated Bat Detectors

Location	OS Grid Reference	Start Date	End Date	No. Nights of Monitoring
S1 (Anabat)	ST 49588 75689	28/08/14	30/08/14	3
S2 (Anabat)	ST 48294 76071	28/08/14	31/08/14	4
S3 (SM2)	ST 49307 75728	25/09/14	26/09/14	1
S4 (SM2)	ST 50362 75844	25/09/14	30/09/14	6
S5 (Anabat)	ST 48285 76083	20/10/14	05/11/14	17

## 2.4 Limitations

2.4.1 A primary objective of the study is to establish a baseline to show seasonal use by bats in late summer and autumn, a time of year when maternity roosts are disbanding, breeding animals are mating and there is movement between seasonal roosts. Access along the entire length of the proposed scheme was restricted. Where data from acoustic (bat detector) surveys are limited, a precautionary baseline and interpretation of results has been adopted. This constitutes a 'reasonable worst case' basis for the subsequent assessment. Inaccessible sections were in areas where the disused railway line is in urban areas and agriculturally improved farmland that has relatively limited interest for bats. This simplifies the landscape appraisal required when interpreting results and predicting worst case impacts.

- 2.4.2 The 2014 surveys provide seasonal data on local bat populations and do not provide a comprehensive baseline of information on the assemblage of bat species within the proposed scheme (bat activity over the period when bats are most active and breeding (May to August inclusive) is required to give a robust indication of species activity in accordance with best practice). Data from spring and summer 2015 are required before evaluation of the species assemblage can be made.

## 2.5 Personnel

- 2.5.1 The study was undertaken by Anton Kattan MCIEEM in accordance with standard survey guidance<sup>1</sup>. Anton Kattan is a consultant ecologist with 14 years of experience and has specialist knowledge and training in bat ecology and survey. He was assisted by Robert Pelc, a bat surveyor with over 3 years of experience. Mr. Kattan and Mr. Pelc are registered with Natural England to use Class 2 survey licences.



# Results

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## 3.1 Context

- 3.1.1 Portishead (OS grid reference ST470765 to ST479762): The disused railway line provides a green corridor from the town through a new housing estate on the outskirts. The western end of the route passes a trading estate, with a bridge taking the line over a large drainage ditch and a neighbourhood road crossing the route at OS grid reference ST475763. This section of the disused railway line supports mainly scrub habitats, and there are no trees with bat roost potential. It is relatively isolated by its urban surroundings, and fragmented from the rest of the proposed scheme by the neighbourhood road.
- 3.1.2 Portbury Common (OS grid reference ST479762 to ST485759): As the disused railway line comes out of the housing estate it goes through farmland with Portbury Common to the north. The semi-natural grassland of the common and wetland habitats (associated with ditches and ponds) provides good quality foraging habitat for bats. There are several large Italian black poplar trees with bat roost potential along this section of the route. The railway line is enclosed by mature trees and is more wooded than the open scrub habitats within Portishead.
- 3.1.3 Farmland (OS grid reference ST485759 to ST495756): The disused railway passes under two arch bridges that take Sheepway over the disused railway line. Farmland between the two bridges is predominantly pasture, which appears to be agriculturally improved. There is a network farmland hedges, which connect to the railway line and provide potential flight lines for bats.
- 3.1.4 The disused railway line through the farmland supports relatively low scrub habitat and there are few mature trees. It was not possible to walk the entire section of the proposed route through the farmland, but it was evident from views from the bridges on Sheepway that this section of the proposed scheme supports scrub (rather than woodland habitat).
- 3.1.5 Royal Portbury Dock (OS grid reference ST495756 to ST510761): The disused railway line is wooded along this section of the proposed scheme. The railway line passes between an industrial estate to the north and the A369 road to the south. There are small fields with pasture along the route and the farmland appears to be fairly wet and supports damp grassland.
- 3.1.6 The combination of woodland, scrub and damp grassland provides favourable habitat for bats. Mature trees border the track of the disused railway line creating an enclosed linear feature and bats can forage and commute along the track. The trees typically have a straight growth, characteristic of fast growing specimens, and there are relatively few veteran features or holes that bats can exploit for roosting.
- 3.1.7 Pill (OS grid reference ST510761 to ST525758): The eastern end of the proposed scheme passes through a housing estate. The disused railway line rises on embankment here and passes between residential gardens. Although it was not possible to gain access to parts of the route, it appears that the disused railway line supports scrub and grassland and is relatively open.
- 3.1.8 At the outskirts of Pill a network of cyclepaths and footpaths cross the disused railway line. The railway line passes under the M5 and the main roads to Royal Portbury Dock. There are wooded embankments along the road, but this section of the proposed scheme has a largely urban character.

## 3.2 Distribution and Diversity of Bat Species

3.2.1 The species recorded on the disused railway line in late summer and autumn 2014 by acoustic (bat detector) surveys are listed below, with an overview of the activity in late summer and autumn also shown in Table 5. Distribution of bat species is shown in Figures 2a and 2b.

- Common pipistrelle bat (*Pipistrellus pipistrellus*) - Recorded at most transect stops. Common pipistrelle bats are considered present along the entire length of the proposed scheme. Levels of bat activity indicate that animals are foraging within habitats along the disused railway as well as commuting through the site.
- Soprano pipistrelle bat (*Pipistrellus pygmaeus*) - A low to moderate level of activity along the proposed scheme. The distribution of activity is concentrated in areas with semi-natural habitat. The highest levels of activity were recorded at Royal Portbury Dock and Portbury Common.
- Noctule bat (*Nyctalus noctula*) - Recorded infrequently.
- Myotis species - Primarily recorded by dataloggers, the parameters of some calls resemble Natterer's bat (*Myotis nattererii*). Most bat detector registrations recorded where there is woodland canopy.
- Lesser horseshoe bat (*Rhinolophus hipposideros*) - Lesser horseshoe bats were most frequently recorded at Portbury Common, and were repeatedly recorded at Royal Portbury Dock. Portbury Common appears to be a feeding area for the species and the disused railway line may provide a corridor for movement.
- Greater horseshoe bat (*Rhinolophus ferrumequinum*) - A low level of activity by greater horseshoe bats was recorded, with most bat detector registrations being where there is woodland canopy cover on the disused railway line at Royal Portbury Dock.

Table 5. The Number of Nights that Species were Recorded on Static Automated Bat Detectors

Location (refer to Figure 1)	Month	Duration of Monitoring (no. of nights)	Species (no. of nights detected)					
			Pp	Ppy	Nn	Ms p	Rh	Rf
S1 Royal Portbury Dock (ST 49588 75689)	August	3	3	3	0	3	1	1
S2 Portbury Common (ST 48294 76071)	August	4	4	0	0	2	1	0
S3 Farmland (ST 49307 75728)	September	1	1	1	1	0	1	0
S4 Royal Portbury Dock (ST 50362 75844)	September	6	6	0	1	3	0	2
S5 Portbury Common (ST 48285 76083)	October/ November	17	17	12	2	8	5	1
<b>Total Number of Nights</b>		<b>31</b>	<b>31</b>	<b>16</b>	<b>4</b>	<b>16</b>	<b>8</b>	<b>4</b>

Notes: Species key – 'Pp' Common pipistrelle (*Pipistrellus pipistrellus*); 'Ppy' Soprano pipistrelle (*P. pygmaeus*); 'Nn' Noctule (*Nyctalus noctula*); 'Msp' (*Myotis* sp); 'Rh' Lesser horseshoe (*Rhinolophus hipposideros*); and 'Rf' Greater horseshoe (*Rhinolophus ferrumequinum*)

3.2.2 Table 6 shows the length of time after sunset and before sunrise when the automated bat detectors recorded the earliest detections of bats after dusk, or latest detections of bats before dawn. It provides an indication of the duration of time from emerging or returning to roosts that bats occur on the disused railway line. Short durations of time for noctule bats (26/09/14 and 04/11/14) and Myotis bat species (08/08/14 and 27/10/14) suggest that there may be roosts close to, or within the proposed scheme. The majority of the lesser and greater horseshoe bat activity is a considerable time after their expected emergence from roosts.

Table 6. Number of Registrations of Bat Species Recorded on a Nightly Basis and the Period of Time of the Registration Nearest to Sunrise or Sunset

Species	Location	Date	No of Registrations	Length of Time from Sunset of Earliest Registration (hrs:mins)	Length of Time from Sunrise of Latest Registration (hrs:mins)	Total No. of Registrations for each Species
Lesser Horseshoe	S1 Royal Portbury Dock (ST 49588 75689)	28/08/14	2	3:44	-	20
	S2 Portbury Common (ST 48294 76071)	28/08/14	1	1:08	-	
	S3 Farmland (ST 49307 75728)	25/09/14	1	4:21	-	
	S5 Portbury Common (ST 48285 76083)	22/10/14	8	7:00	3:52	
		23/10/14	5	-	2:32	
		24/10/14	1	-	5:47	
		26/10/14	1	-	5:24	
27/10/14	1	-	2:58			
Greater Horseshoe	S1 Royal Portbury Dock (ST 49588 75689)	28/08/14	1	2:47	-	4
	S4 Royal Portbury Dock (ST 50362 75844)	26/09/14	1	2:11	-	
		27/09/14	1	4:34	-	
	S5 Portbury Common (ST 48285 76083)	28/10/14	1	-	2:57	
Noctule	S3 Farmland (ST 49307 75728)	25/10/14	2	2:03	-	11
	S4 Royal Portbury Dock (ST 50362 75844)	26/09/14	1	0:15	-	
	S5 Portbury Common (ST 48285 76083)	24/10/14	2	5:39	-	
		25/10/14	5	-	5:58	
		04/11/14	1	-	0:00	
Myotis spp.	S1 Royal Portbury Dock (ST 49588 75689)	28/08/14	1	03:48	-	40
		29/08/14	6	-	1:02	
		30/08/14	11	1:08	3:03	
	S2 Portbury Common (ST 48294 76071)	28/08/14	4	0:30	-	
		31/08/14	1	3:59	-	
	S4 Royal Portbury Dock	26/09/14	1	1:15	-	
		27/09/14	1	1:08	-	

Species	Location	Date	No of Registrations	Length of Time from Sunset of Earliest Registration (hrs:mins)	Length of Time from Sunrise of Latest Registration (hrs:mins)	Total No. of Registrations for each Species
	(ST 50362 75844)	29/09/14	1	5:52	-	
	S5 Portbury Common (ST 48285 76083)	20/10/14	3	2:36	-	
		22/10/14	1	7:02	-	
		24/10/14	2	-	2:59	
		26/10/14	1	-	5:57	
		27/10/14	3	-	0:44	
		30/10/14	2	6:53	2:06	
		01/11/14	1	2:52	-	
		02/11/14	1	2:13	-	

### 3.3 Bat Roost Survey

#### Desk Study Results

- 3.3.1 The data search of BRERC records and the initial assessment of trees and structures did not find any bat roosts within the proposed scheme. The trees and structures surveyed were considered to provide relatively limited potential shelter for bats, although further survey is required.
- 3.3.2 The majority of the bat roosts within 2.5km of the proposed scheme are small roosts, with low numbers of bats recorded during summer. The only large, potentially breeding, roosts are pipistrelle roosts that were recorded in Portishead in the 1990s, listed in Table 7. North Somerset is an important area for bats and the proposed scheme is approximately 5km west of the Avon Gorge, a known stronghold for lesser and greater horseshoe bats.

Table 7. Summary of Bat Roosts within 2.5km

Species	Roost Count	Date	Grid Reference	Approx. Distance
Pipistrelle sp.	97	1993	ST4677	1km
	80	1994	ST4675	1km

Source: BRERC, 2014

#### Tree Roost Potential

- 3.3.3 The assessment of trees recorded four trees with high potential and seven trees with moderate bat roost potential. The results of the tree inspection are given in Table 8 and the location of trees is shown on Figure 3. Stands of trees in woodland with ivy cover that could provide shelter for low numbers of non-breeding bats in summer, but were not damaged and did not exhibit distinctive veteran features were assessed as a group.



Table 8. Evaluation of Potential Roosts in Trees

Tree Ref**	Grid Reference	Tree Species	Habitat Description	Roost Description	Height Above Ground Level	Evaluation
T1	ST 48243 76090	Italian Black Poplar	Portbury Common - Woodland, pasture and semi-natural habitats	Rot hole in main limb on north side	6m	High
				Woodpecker hole on east side	7m	
				Damaged and loose bark on north side of main limb	8m	
G1	ST 48243 76090	Ash	ditto	Mature trees with ivy cover	Various	Low
T2	ST 48187 76092	Italian Black Poplar	ditto	Broken limb on south side with possible cavities	6m	Low
				Large scar on north side of trunk	6m	
T3	ST 48171 76105	Italian Black Poplar	ditto	Horizontal split on underside of small limb on east side of tree	8m	Low
T4	ST 48163 76109	Italian Black Poplar	ditto	Rot hole in the end of a small branch on the south side of the tree	4m	Low
				Scar with flaking bark on south side of the tree trunk	5m	
T5	ST 48159 76110	Italian Black Poplar	ditto	Scar with rot hole c.20cm wide on north side of tree trunk	10m	Moderate
				Dead limb with splits on north side of tree	15m	
T6	ST 48132 76112	Italian Black Poplar	ditto	Large broken limb with flaking bark on south-east side	5m	Moderate
				Flaking bark around small broken limb on north side	6m	
				Ivy cover over decayed timber	9m	
T7	ST 48113 76113	Italian Black Poplar	ditto	Woodpecker hole on east side of trunk	5m	Moderate
				Flaking bark on dead limb on east side	6m	

Tree Ref*	Grid Reference	Tree Species	Habitat Description	Roost Description	Height Above Ground Level	Evaluation
				Rot hole in small branch on south-east side	9m	
T8	ST 48112 76113	Italian Black Poplar	ditto	Dying, tree has a beheaded trunk with a woodpecker hole on north side	5m	High
T9	ST 48102 76124	Italian Black Poplar	ditto	Beheaded main branch with woodpecker hole on north-east side	10m	High
				Flaking bark and decay on broken limb	6m	
T10	ST 47998 76157	Italian Black Poplar	Close to housing estate and adjacent to pasture.	Small areas of damage on west side	12m	Low
				Flaking bark on south side	Various	
T11	ST 47998 76158	Italian Black Poplar	Close to housing estate and adjacent to common land	Beheaded main branch with cracks	Top of tree	Moderate
T12	ST 47955 76176	Italian Black Poplar	Close to housing estate and adjacent to pasture.	Hole in trunk on west side	2m	Low
G2	ST 47096 76505	Sycamore and Ash	Scrub thicket in urban area	Mature trees with ivy cover	Various	Low
T13	ST 49311 75709	White Poplar	Arable and pasture farmland	Large limb on south side with split in barn	5m	Moderate
				Split in limb (through the branch) on south side	10m	
G3	ST 50631 75940	Sycamore	Woodland embankment at the edge of urban area	Mature trees with ivy cover	Various	Low
G4	ST 50591 75944	Mainly Birch	Secondary woodland along railway line at edge of industrial estate	Mature trees with ivy cover	Various	Low
T14	ST 50543 75926	Italian Black Poplar	Secondary woodland along railway line at edge of industrial estate with countryside	Rot hole in trunk on south side	4.5m	Moderate

Tree Ref*	Grid Reference	Tree Species	Habitat Description	Roost Description	Height Above Ground Level	Evaluation
T15	ST 50418 75887	Poplar	ditto	Dying tree with ivy cover over decayed timber Rot hole on north side of trunk	Various 1m	High
T16	ST 50391 75864	Oak	ditto	Horizontal split in limb on north side of tree	3m	Moderate
T17	ST 50371 75863	Birch	ditto	Thick stem ivy	Various	Low
G5	ST50705 75981	Ash and Birch	Urban edge with arable and pasture farmland	Mature trees with ivy cover	Various	Low
T18	ST 50883 76045	Birch	ditto	Twin stem tree with thick stem ivy over deadwood	Various	Low
G6	ST 51289 76189	Oak and Birch	Green corridor and cyclepath at the edge of town	Mature trees with ivy cover	Various	Low
T19	ST 51461 76226	Oak	ditto	Mature tree with ivy and dead wood in canopy of tree	Various	Low

\*Tree reference is shown on Figure 3. T denotes a single tree; G denotes a group of trees

## Roost Potential of Structures

- 3.3.4 The survey identified nine bridges and four culverts that are within the proposed scheme. Access to some of the structures was constrained by dense vegetation along the railway line, and not all culverts have been found.
- 3.3.5 The survey did not find any structures with high potential bat roost features. The bridges did not have any obvious structure defects on the exterior and the majority of the potential shelter for bats was in expansion joints and small crevices in bricked arches or stone abutments. Culverts were typically small concrete pipes with brick buttresses. An evaluation of the structures is given in Table 9.

Table 9. Evaluation of Potential Roosts in Structures

Ref*	Grid Reference	Description of Structure	Extent of Survey	Bat Roost Potential	Evaluation <sup>+</sup>
B1	ST 47191 76468	Brick arch	Inspection from the banks of the stream – visibility poor due to vegetation.	No obvious crevices, but requires further survey	TBC
B2	ST48504 76004	Brick arch carrying Sheepway unclassified road	Inspection of bridge abutments, but access under arch restricted by fencing.	No obvious defects and the brick work generally appears to be in good condition. Low number of small crevices 10-20cm from missing mortar in brickwork under arch. Ivy cover on abutments is fairly sparse.	Moderate
B3	ST 49587 75688	Brick arch carrying Sheepway unclassified road	Comprehensive scoping assessment	2 drainage pipes 30cm deep in the roof of the arch. Low number of small gaps c.10cm deep in the stone abutment walls.	Low
B4	ST 50646 75961	Concrete bridge with 10m span	Comprehensive scoping assessment	Expansion joints at the top of the abutment walls and between concrete floor beams across the span. Gaps appear shallow (<15cm), but are numerous.	Moderate
B5	ST 51057 76112	Brick arch bridge with stone abutments	Comprehensive scoping assessment	Small crevices between bricks and stonewalls from missing mortar.	Low
B6	ST 51404 76207	Small brick arch bridge with a 4m wide span.	Not accessible, needs further survey	TBC	TBC



## SECTION 3 RESULTS

Ref*	Grid Reference	Description of Structure	Extent of Survey	Bat Roost Potential	Evaluation <sup>+</sup>
B7	ST 51544 76226	Concrete motorway bridge	Comprehensive scoping assessment	Expansion joints at the top of walls.	Low
B8	ST 51978 76283	Low concrete bridge over cyclepath	Comprehensive scoping assessment	No bat roost features	No Potential
B9	ST 52098 76246	Small bridge with brick abutments and a concrete deck.	Comprehensive scoping assessment	Expansion joints at top of the walls	Low
C1	ST 48771 75904	Small brick culvert for agricultural drainage ditch	Comprehensive scoping assessment	No bat roost potential because culvert pipe floods.	No Potential
C2	ST 49591 75691	Brick culvert with a vertical chamber with steel grating.	Comprehensive scoping assessment	Limited access for bats and no cavities or voids.	No Potential
C3	ST 50418 75887	Brick embankment and 1m wide concrete pipe.	Visual inspection from embankment	The design of the culvert is considered to limit potential roost features, but there may be defects in the 18m long concrete pipe.  Water level is high (with only 30cm air clearance through pipe) and culvert is likely to flood.	Low
C4	ST 50317 75845	Brick embankment and 1.5m wide concrete pipe.	Visual inspection from embankment	Brick work and concrete pipe appear to be solid with no obvious defects.	Low
<p>*Reference is shown on Figure 3. B denotes Bridge; C denotes Culvert. + TBC –Initial evaluation to be confirmed following survey in 2015.</p>					

# Discussion

---

## 4.1 Interpretation of the Results

### Seasonal Activity

- 4.1.1 The disused railway line is used by at least six bat species during late summer and autumn. Lesser and greater horseshoe bats were recorded at the eastern and western extent of the proposed scheme, where there is woodland habitat. The disused railway line is a prominent landscape feature that provides a corridor for movement through an agricultural and urban landscape. The level of activity recorded suggests that bats are commuting and there are only low levels of foraging activity (with the exception of common pipistrelle bats that regularly feed). Patterns of activity for each species are described below and survey records:
- Lesser horseshoe bats - The disused railway line is used as a commuting route and is a link to the potentially important feeding area at Portbury Common.
  - Greater horseshoe bats – This species is recorded in low numbers in locations with woodland. Further survey is required to determine the importance of the railway line as a foraging and commuting route.
  - Myotis species - Bats are using the disused railway line as a corridor for movement, but there is no evidence to suggest that woodland within the proposed scheme is used as a core area by these species in late summer and autumn.
  - Noctule - A low level of activity in the area, the disused railway line is not considered an important foraging or commuting habitat for this species. Mature trees with bat roost potential (particularly dead and dying trees with woodpecker holes) may provide shelter for this species. Further survey to identify roosts is required.
  - Soprano pipistrelle bats - The disused railway line is not considered to be important for local populations of this species at this time of year.
  - Common pipistrelle bats - The most frequent species recorded on the disused railway line, bats are foraging and moving through habitats within the proposed scheme. The seasonal use of the site by this species is not considered to be a constraint to re-opening the line.

### Roosting Habitats

- 4.1.2 The initial findings indicate that bat roost potential is confined to a low number of trees and structures. The culverts are small and many appear to flood, precluding them from being used for hibernation. Many of the bridges appear to be in fairly good condition with only small crevices in the fabric of the structure. The majority of the mature trees and woodland are located at Portbury Common and the Royal Portbury Dock section. There are negligible tree roosting opportunities elsewhere.
- 4.1.3 The preliminary assessment of potential bat roosts has identified trees and structures that require further survey, and although the availability of roosts appears to be relatively limited further survey in 2015 is required to evaluate their importance.

## 4.2 Recommendations for Further Survey

- 4.2.1 The bat assemblage recorded in 2014 has confirmed the presence of lesser and greater horseshoe bats within the Proposed Scheme. The disused railway line is a prominent landscape feature and vegetation clearance could potentially have a major impact on functionality, particularly with regard to horseshoe bats.
- 4.2.2 It is recommended that the importance of the disused railway line is assessed with consideration to:
- The level of bat activity throughout the year, building on the 2014 baseline;
  - The abundance and diversity of rare and uncommon species; and

- The prevalence of breeding bats, and their roosts.

4.2.3 The surveys in 2015 should be approached in three phases, as follows.

- Phase 1 – an application to Natural England for a project licence to trap and track bats.
- Phase 2 – detailed survey work to establish baseline data during late spring and summer. This phase of the scheme will involve roost assessments, acoustic surveys and trapping surveys. The level of survey in Phase 2 would also provide satisfactory baseline to evaluate the importance of the disused railway line as a wildlife corridor on the basis of negative proof and the absence of significant levels of bat activity (by rare species). If target species (rare or uncommon species associated with designated sites within the vicinity of the proposed scheme i.e. horseshoe bats) are captured, Phase 3 of the study would be undertaken concurrently during the remainder of Phase 2.
- Phase 3 – tagging, tracking and roost counts. This more detailed study would be required to assess the impact of the Proposed Scheme on the conservation status of target species in the local area.

4.2.4 A proposed programme for further surveys is provided in Appendix B.



Figures





Figure 1: Bat Surveys and Study Area

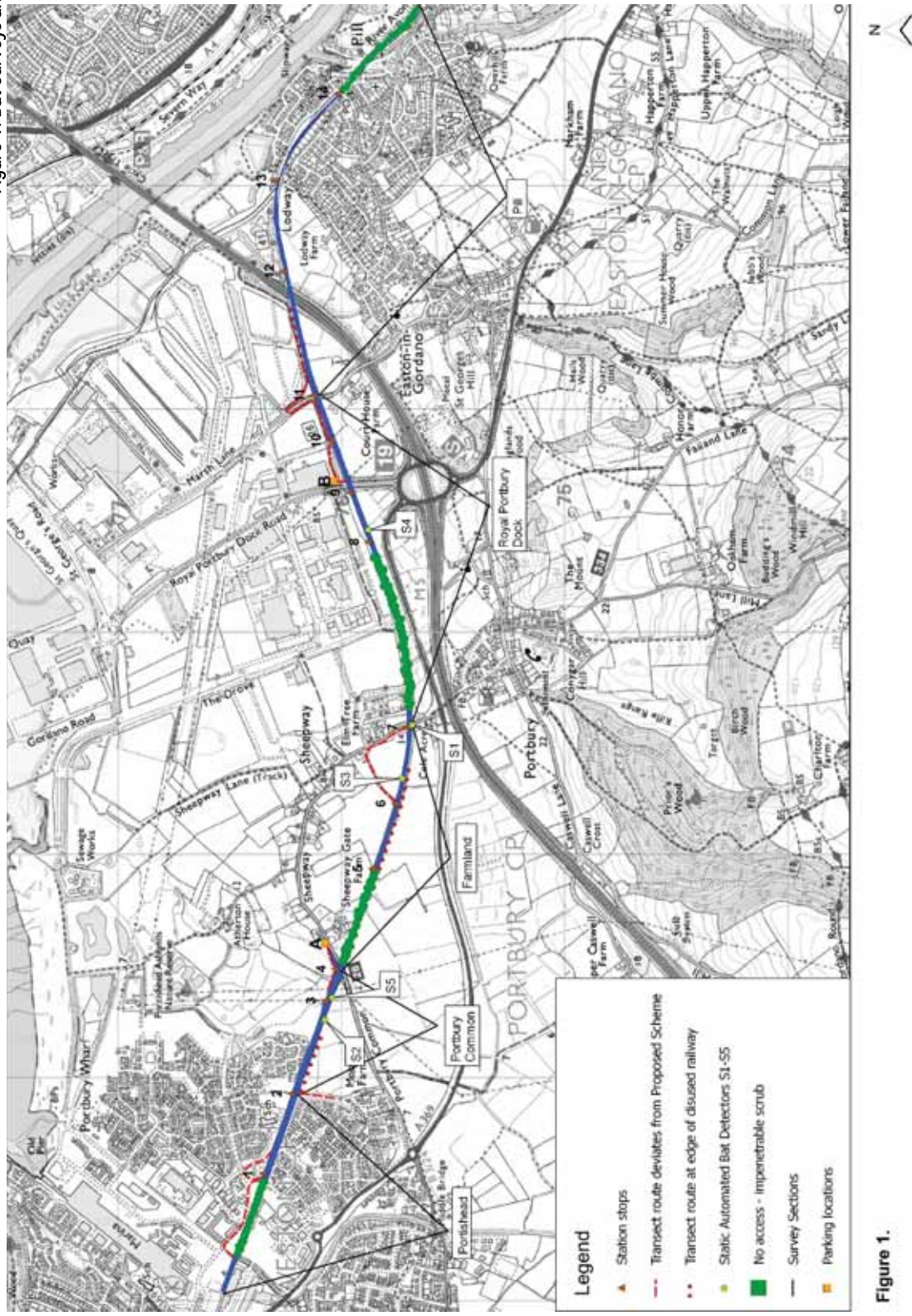


Figure 1.

Figure 2a. Distribution of Lesser & Greater Horseshoe bats Recorded on Walked Transects

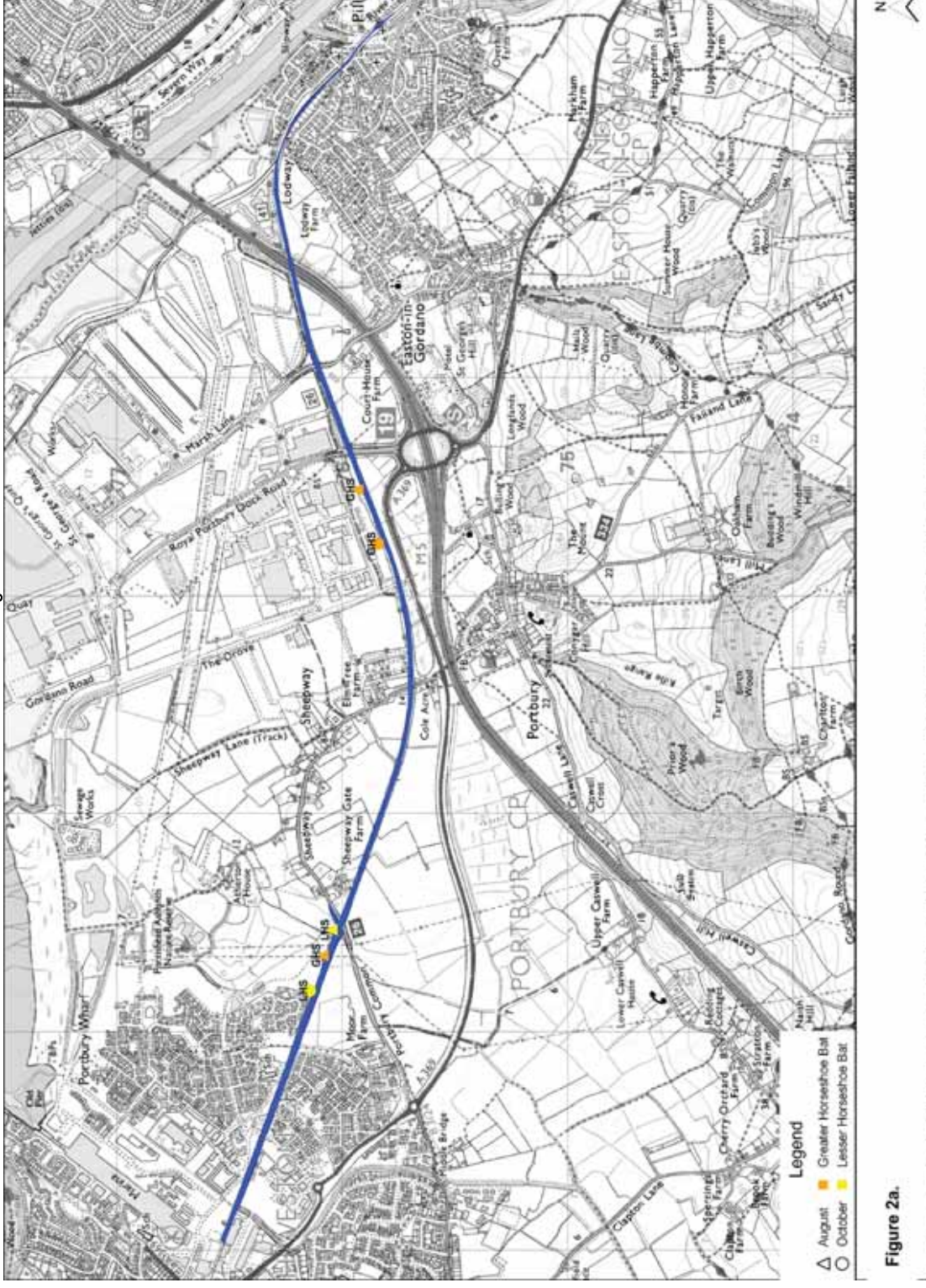


Figure 2a.





Figure 3: Locations of Structures

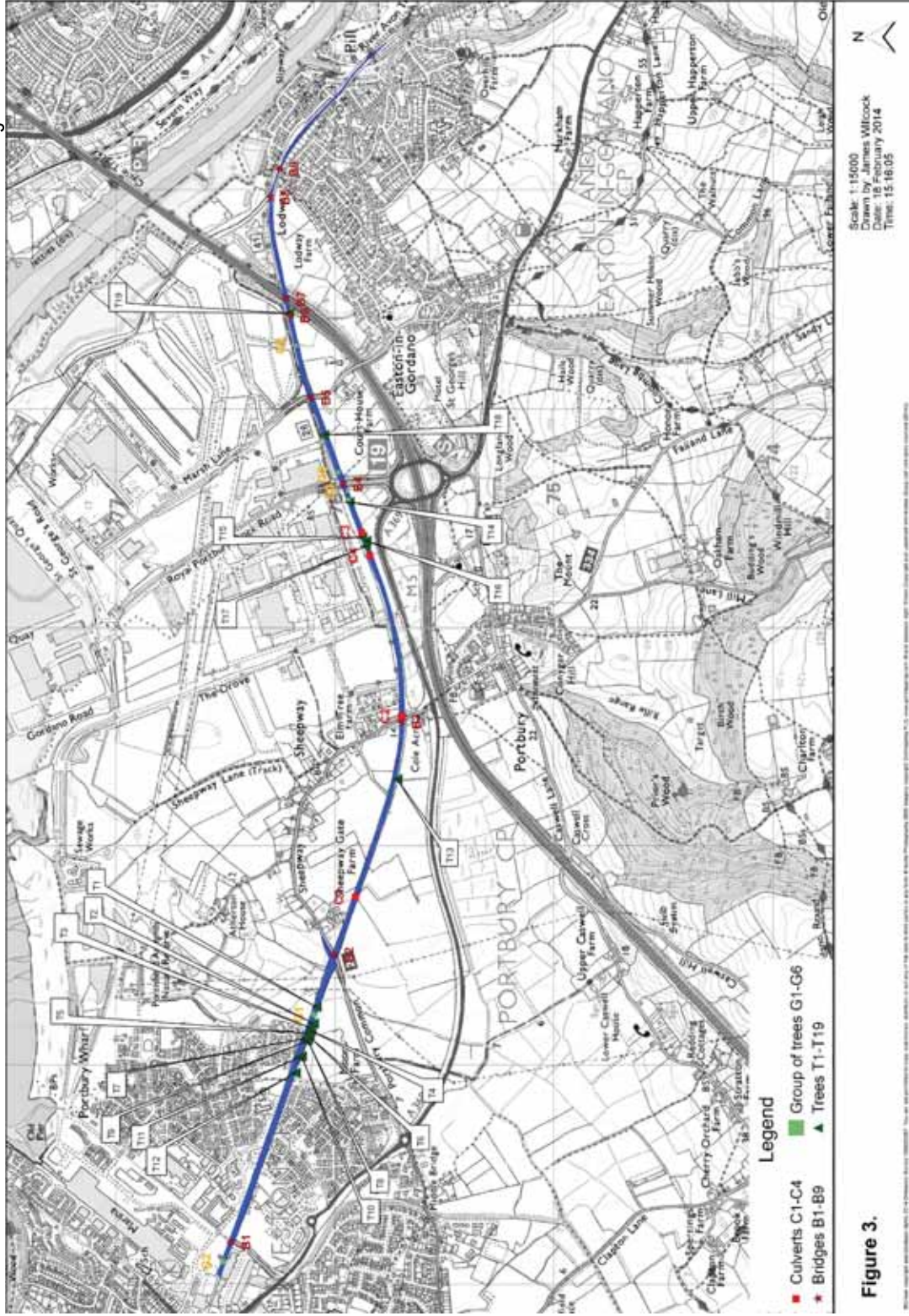


Figure 3.



## Appendix A: Legislation

1.1 All bat species and their roosts are protected in the UK under the Conservation of Habitats and Species Regulations 2010, which implements the EC Directive 92/43/EEC (the Habitats Directive). In addition, barbastelle *Barbastella barbastellus*, lesser and greater horseshoe bat *Rhinolophus hipposideros* and *R. ferrumequinum* and Bechstein's bat *Myotis bechsteinii* are listed in Annex II of the Habitats Directive, which requires sites to be designated in member states for their protection. Bats and their roosts are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, the Act and Regulations make it illegal to:

- a) deliberately capture or intentionally take a bat;
- b) deliberately or intentionally kill or injure a bat;
- c) to be in possession or control of any live or dead bat or any part of, or anything derived from a bat;
- d) damage or destroy a breeding site or resting place of a bat;
- e) intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection;
- f) intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection;
- g) deliberately disturb bats, in particular any disturbance which is likely to (i) impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) to affect significantly the local distribution or abundance of the species to which they belong.

2.1 A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected whether or not the bats are present at the time.

3.1 Although the law provides strict protection to bats, it also allows this protection to be set aside (derogated) under Regulation 53 of the Conservation of Habitats and Species Regulations 2010 through the issuing of licences for the purpose of preserving public health, or public safety, or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment. These licences in England are currently determined by Natural England.

4.1 Where a lawful operation is required to be carried out, but which is likely to result in one of the above offences, a licence may be obtained from Natural England to allow the operation to proceed. However, in accordance with the requirements of the Conservation of Habitats and Species Regulations 2010 a licence can only be issued where the following requirements are satisfied:

- a) that there is no satisfactory alternative; and
- b) that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

# Appendix B: Recommended Survey Programme for 2015





Survey	Programme 2015						
	January	February	March	April	May	June	July
<b>Application to Track and Trap Bats</b>							
<b>Roost Surveys</b>							
Inspection of structures and trees		Inspection of structures/trees					
1st Dusk survey – bridges					B1-B7		
2nd Dusk survey – bridges						B1, B2, B4, B6	
1 Dawn survey – culverts						C3, C4	
1st Tree climbing inspection					T1-19		
2nd Tree climbing inspection						T5, T6, T7, T11, T13, T14, T16	
3rd Tree climbing inspection							T1, T8, T9, T15
<b>Activity Surveys</b>							
Acoustic surveys – walked transects							
Acoustic surveys – static automated bat detector monitoring							
Trapping surveys					2 nights	2 nights	2 nights
Radio tracking					Up to 5 nights per month		

Phase 1
Phase 2
Phase 3

## Appendix C.3: Wintering Bird Survey



# Wintering bird surveys

Pill Marshes: MetroWest Phase 1

CH2M HILL

April 2015



<b>Report status</b>	<b>Date</b>	<b>Prepared by</b>	<b>Authorised</b>
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Figure 1: Site location and survey sectors plan

## Appendices

Appendix 1: Severn Estuary SPA Conservation Objectives

Appendix 2: Survey data

Appendix 3: Pedestrian visitor survey data

# 1 Introduction

## 1.1 Introduction

1.1.1 EAD was commissioned by CH2M HILL to complete the wintering bird surveys of Pill Marshes and the River Avon, centred on OS grid reference ST520766; refer to Figure 1. The surveys were undertaken to inform the assessment of potential impacts of the proposed Portishead Branch Line (MetroWest Phase 1) rail enhancement project ('the Proposed Scheme'), and were undertaken between October 2014 and January 2015.

## 1.2 Aim of survey

1.2.1 The survey was undertaken to establish the current use of Pill Marshes and the adjacent intertidal section of the River Avon by wintering waterfowl. Pill Marshes and the River Avon at this location lie within the Seven Estuary European Sites, comprising the Severn Estuary Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar Site ('the European Sites'), and are also designated as a Site of Special Scientific Interest (SSSI).

1.2.2 The Proposed Scheme concerns the reinstatement of the abandoned railway line between Portishead and Pill, the refurbishment of Pill station and some small scale works along the existing Portbury freight line. A new railway passenger service would be provided, running half hourly during peak periods and hourly outside peak hours. At present, the Portbury Docks has permission to run up to 20 freight trains per day in each direction.

1.2.3 The Proposed Scheme lies approximately 60m from the boundary of the European Sites at their nearest point. The wintering bird surveys were therefore undertaken to obtain an understanding of existing use of these areas by waterfowl to inform the assessment of the project under the Conservation of Habitats and Species Regulations 2010 (as amended) ('The Habitats Regulations'). In particular, surveys were undertaken to identify the current value of the area to wintering waterfowl species for which the European Sites have been designated, comprising:

- Tundra (Bewick's) Swan *Cygnus Columbianus bewickii*
- Curlew *Numenius arquata*
- Dunlin *Calidris alpina alpina*
- Pintail *Anas acuta*
- Redshank *Tringa totanus*
- Shelduck *Tadorna tadorna*
- Ringed Plover *Charadrius hiaticula* (on passage)
- Greater white-fronted goose *Anser albifrons albifrons*
- Gadwall *Anas strepera*

1.2.4 The Conservation Objectives for the SPA are included in Appendix 1.

1.2.5 The Severn Estuary SAC is designated for its estuarine habitats and the migratory fish species sea lamprey, river lamprey and twaite shad; the potential impacts of the Proposed Scheme on the interest features of the SAC are therefore not considered within this report.

## 2 Methodology

### 2.1 *Overview*

2.1.1 Surveys were undertaken between October 2014 and January 2015. A total of eight visits were undertaken, comprising one high-tide and one low-tide survey each month, using an adapted Wetland Bird Survey (WeBS) methodology (Gilbert et al., 1998). Following consultation with Natural England (NE), it was agreed that surveys during February and March were not required to inform the assessment of the Proposed Scheme.

### 2.2 *Methodology*

- 2.2.1 During each survey, a transect was walked by an experienced ornithologist, enabling all parts of the survey area to be observed. The survey area was divided into three sectors to enable some understanding of the spatial distribution of birds within the survey area to be obtained (refer to Figure 1); the species and number of birds within each sector were recorded. Birds in flight were also recorded, although these were not included in total counts for each sector. Sources of disturbance to birds, such as dog walkers, were also noted. Surveys were undertaken no more than two hours either side of high and low tide respectively, in accordance with WeBS methodology. Surveys between October and December were undertaken by CH2M HILL, January surveys were undertaken by EAD.
- 2.2.2 The numbers of birds recorded in each sector were tabulated onto spreadsheets to enable subsequent analysis.

### 3 Results

#### 3.1 *Survey dates, time and weather*

3.1.1 A summary of the survey dates, times and weather for the surveys is provided on Table 1. Tides are given as height in metres above Chart Datum at Avonmouth, based on data from the UK Hydrographic Office. Weather information includes cloud cover measured in oktas (i.e. the proportion of sky covered by cloud, ranging from 0/8 (no cloud) to 8/8 (complete cloud cover)), wind direction and strength (based on the Beaufort scale), air temperature and any precipitation noted during the survey. The October low tide survey was undertaken on 4 November as surveys did not commence until late October and this was the first opportunity to undertake a low tide survey during appropriate conditions.

**Table 1: Summary of survey visits**

<b>Date</b>	<b>Tide</b> (Time and height above Chart Datum at Avonmouth)	<b>Time</b>	<b>Weather</b> (Cloud cover, wind, temperature, precipitation)
<i>High tide</i>			
31/10/14	12:02; 10.8m	10:30-13:30	2/8, S3-4, 20°C
24/11/14	08:04; 13.2m	07:25-09:00	9/8 (mist)-0/8, 0-1, 0°C
8/12/14	08:03; 13.2m	07:25-08:50	1/8, 0-1, 4°C
22/1/15	08:22; 14.2m	07:50-09:45	8/8, NE1, 2°C
<i>Low tide</i>			
4/11/14	11:19; 1.9m	10:20-12:20	7/8, S2-3, 10°C, occasional rain
24/11/14	14:52; 1.5m	14:30-16:30	1/8, 1-2, 6°C
8/12/14	14:53; 1.5m	14:30-16:20	0/8, SW3-4, 6°C
22/1/15	15:18; 0.6m	14:00-15:45	7/8, NE1, 3°C

#### 3.2 *Bird survey data*

3.2.1 A summary of the bird survey results is presented on Table 2 (low-tide counts) and Table 3 (high-tide counts). The full survey results are presented in Appendix 2. The location of the count sectors is shown in Figure 1.



**Table 2: Summary of high-tide survey results**

Species	Count			
	October	November	December	January
Mallard	0	0	0	6
Cormorant	0	0	0	0
Little Egret	0	0	0	0
Grey Heron	1	1	1	0
Common Snipe	0	0	0	1
Eurasian Curlew	0	0	0	2
Common Redshank	0	0	0	28
Black-headed Gull	0	0	0	60
Lesser Black-backed Gull	0	0	0	0
Herring Gull	0	0	0	2
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>99</b>

**Table 3: Summary of low-tide survey results**

Species	Count			
	October	November	December	January
Mallard	4	0	0	8
Cormorant	0	2	0	0
Little Egret	1	0	0	0
Grey Heron	1	0	0	1
Common Snipe	0	0	0	0
Eurasian Curlew	1	1	1	2
Common Redshank	6	2	1	4
Black-headed Gull	45	36	50	167
Lesser Black-backed Gull	1	0	0	0
Herring Gull	10	3	3	2
<b>Total</b>	<b>69</b>	<b>44</b>	<b>55</b>	<b>184</b>

3.2.2 The survey area comprised the Pill Marshes, an area of predominantly unmanaged saltmarsh dominated by sea couch (see Photograph 1), together with the River Avon channel, a steep-banked estuarine channel supporting intertidal mud habitats. The survey area is crossed by the M5 Avonmouth Bridge.



**Photo 1: Pill Marshes looking north towards the M5 Avonmouth Bridge**

- 3.2.3 A total of 10 waterfowl species were recorded during the surveys, excluding those that were only recorded in flight. Of these, two were qualifying species for the Severn Estuary European Sites; redshank and curlew. Low numbers of these species were recorded. The peak count of redshank was 28 during the January high-tide survey, when 26 birds were recorded roosting together on the north-eastern bank of the river; the remaining two birds were recorded on the upper shore within Sector 2. Otherwise, records of this species were generally of one to six birds feeding on the intertidal muds at low tide. A maximum of two curlew were recorded during the surveys, also restricted to the intertidal area. Waterfowl were not recorded using the Pill Marshes to a significant extent; no European Site qualifying species (refer to Section 1.2) were recorded in this area.
- 3.2.4 No particular patterns of usage of the survey area by wintering birds were identified during the surveys. The lowest number of birds was recorded in Sector 1, downstream of the M5 Avonmouth Bridge. Very few birds were recorded at high tide; with the exception of the roosting redshank recorded during the January survey these comprised predominantly black-headed gulls and herring gulls on the water throughout the survey area. The highest number of birds was recorded in January; this may have reflected the very high spring tide on the day of the survey. There was also a notable passage of black-headed gulls at high tide during the

January survey, with an estimated 1000 birds flying upstream in approximately 30 minutes.

3.2.5 A range of human disturbance was identified during the surveys, comprising:

- Dog walkers using the Pill Marsh area throughout the tidal cycle (except on high spring tides when the saltmarsh becomes inundated). Only low numbers of walkers were recorded during the surveys; it is considered likely that this would increase at weekends. The results of a pedestrian visitor survey undertaken in March 2015 are presented in Appendix 3. This survey confirmed low numbers of pedestrian visitors using the site; a total of 13 visitors in nine groups were recorded during one day. Eight of the nine visitor groups were walking dogs.
- Noise and visual disturbance from the existing residential areas, which directly adjoin the designated site boundaries.
- Noise disturbance from the M5 Avonmouth Bridge.
- Existing rail traffic along the Portbury freight line.
- Noise and visual disturbance from the industrial activity on the north-eastern side of the River Avon.

## 4 Consideration of Likely Significant Effects

### 4.1 *Evaluation*

4.1.1 The results indicate that the survey area is not currently of significant value at high or low tide for qualifying bird species of the Severn Estuary European Sites. Two qualifying bird species were recorded during the surveys; redshank (peak count 38) and curlew (peak count 2). Based on the five-year peak mean counts from the SPA designation (redshank 2330 / curlew 3903), this represents 1.6% and 0.05% of the Severn Estuary population respectively. Overall, low numbers of waterfowl were recorded during the surveys comprising common and widespread species in the UK. The bird assemblage of the survey area was assessed as being of Parish value in accordance with guidance published by CIEEM (2006).

### 4.2 *Potential sources of impact*

4.2.1 There is the potential that noise and visual disturbance from the Proposed Scheme could affect waterfowl using Pill Marshes and the intertidal areas. This could arise as a result of construction activity and during operation as a result of increased rail services. The railway line passes approximately 60m from the edge of the designated sites at its closest point, and 250m from the edge of the River Avon channel, where the majority of birds were recorded during the survey. The proposed Scheme will pass along the same railway corridor as the existing Portbury freight line at its closest point to the designated site, and will diverge to the south west to Portishead, away from the designated site. At this location the Portbury freight line is set on ground elevated above Pill Marshes, and is mainly screened from the intertidal areas and the saltmarsh by scrub and the existing topography.

### 4.3 *Consideration of Likely Significant Effect*

4.3.1 It is considered that the proposed Scheme would not have a 'Likely Significant Effect' on the conservation objectives of the Severn Estuary SPA, in accordance with the requirements of the Conservation of Habitats and Species Regulations 2010 (as amended), or on other waterfowl species using the surveyed area for the following reasons.

- Surveys indicate that the designated species of the European Sites do not occur in significant numbers within the survey area (i.e. <2% of the estuary populations of redshank and curlew, with no other designated species recorded).
- Those designated species that occurred within the survey area (redshank and curlew) were restricted to the intertidal area, which due to the topography is screened from the Proposed Scheme.
- The survey area is currently subject to a range of noise and visual disturbance, including the freight rail traffic, M5 traffic and dog walkers.

- Other waterfowl species recorded during the surveys were predominantly common / widespread species (mainly gulls) that are generally considered to be tolerant of human disturbance.

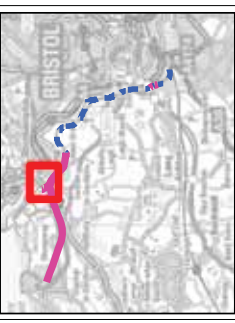
4.3.2 It is expected that the Proposed Scheme will incorporate a range of avoidance / mitigation measures to minimise disturbance to residents in the vicinity of the Proposed Scheme area. These measures would also reduce disturbance to the estuary. Although adverse effects on waterfowl are not predicted, it is recommended that the following precautionary measures are implemented where possible.

- *Timing of works* – Where possible, works in areas directly adjoining Pill Marshes should be undertaken between May and August, i.e. timed to avoid the key autumn and wintering periods. There could, however, be conflicts with the legal protection of other ecological features, such as nesting birds at this time. If works during the autumn and winter could not be avoided, regular monitoring should be undertaken to ensure that significant populations (i.e. >5% of the designated population) of qualifying bird species for the European Sites were not using the foreshore close to the working area. In the event that significant populations of qualifying species were present, then further mitigation measures may be required. Additional monitoring should also be undertaken during periods of extreme cold weather (i.e. when a winter wildfowling ban is enforced by the Secretary of State).
- *Duration and extent of works* – Methods should be chosen that minimise the duration of works and the extent of work area at any given time. Suitable mitigation should be put in place to minimise noise and visual disturbance by plant and personnel e.g. using visual and acoustic screening. All construction staff should be briefed to ensure that work is undertaken in a sensitive manner.
- *Scheme design* – The detail of scheme design and construction methods should take into account the need to minimise disturbance to birds and other ecological features. Management of existing scrub and provision of additional scrub planting adjoining Pill Marshes would help to screen the proposed railway in the medium and long-term.



## 5 References

- 5.1.1 CIEEM, 2006. Guidelines for ecological impact assessment, *Chartered Institute of Ecology and Environmental Management*.
- 5.1.2 Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD, 2009. Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man, *British Birds* 102, pp296–341.
- 5.1.3 Gilbert G, Gibbons D & Evans J (1998) – Bird Monitoring Methods. *RSPB*.



**KEY**

- Existing Railway Line
- Bridleway
- Footpath
- Portishead Branch Line
- DCO Indicative Red Line
- Boundary
- Pill Railway Station
- Environmental Features
- Ramsar Site
- Special Area of Conservation (SAC)
- Special Protection Areas (SPA)
- Site of Special Scientific Interest (SSSI)
- Wintering Bird Survey Area
- Sections



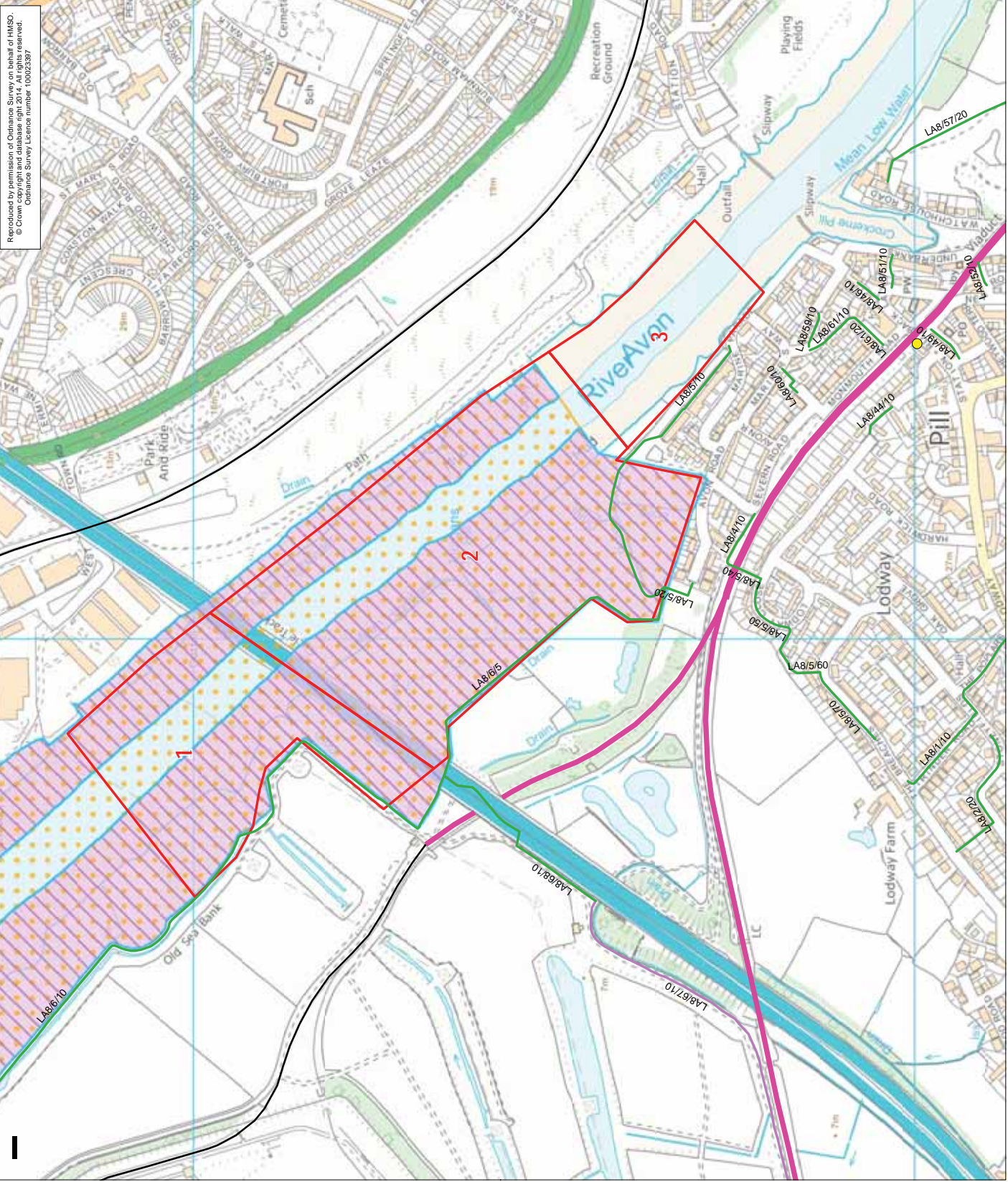
**Client:** North Somerset Council, North Somerset Council, Town Hall, South Street, Weston-super-Mare, BS23 1UJ

**Contract:** CH2M HILL  
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**Project:** Portishead Branch Line (MetroWest Phase 1)

**Drawing:** Figure 1: Wintering Bird Survey

Drawn By:	Luke Webb	Date:	19/06/2015
Checked By:	Gemma Harding	Date:	19/06/2015
Approved By:	Carolyn Francis	Date:	19/06/2015
Drawing No.:	490327-006-011	Revision:	2
Drawing Scale:		1:5,000 @ A3	



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# **Appendix 1: Severn Estuary SPA Conservation Objectives**





## European Site Conservation Objectives for Severn Estuary Special Protection Area Site Code: UK9015022

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

**Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;**

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

### **Qualifying Features:**

- A037 *Cygnus columbianus bewickii*; Bewick's swan (Non-breeding)
  - A048 *Tadorna tadorna*; Common shelduck (Non-breeding)
  - A051 *Anas strepera*; Gadwall (Non-breeding)
  - A149 *Calidris alpina alpina*; Dunlin (Non-breeding)
  - A162 *Tringa totanus*; Common redshank (Non-breeding)
  - A394 *Anser albifrons albifrons*; Greater white-fronted goose (Non-breeding)
- Waterbird assemblage

## **Appendix 2: Survey data**



WINTER BIRD SURVEY - OCTOBER 2014		Area 1 (ST517771 to M5 bridge)		Area 2 (M5 bridge to ST523764 - Pill Foreshore)		Area 3 (Marine Parade to ST525762)		TOTAL (excl. in flight)
		Count Number		Count Number		Count Number		
Common name	Scientific name	High tide	Low tide	High tide	Low tide	High tide	Low tide	
Mallard	<i>Anas platyrhynchos</i>		2				2	4
Cormorant	<i>Phalacrocorax carbo</i>			1*				0
Little Egret	<i>Egretta garzetta</i>				1			1
Grey Heron	<i>Ardea cinerea</i>			1	1			2
Peregrine	<i>Falco peregrinus</i>	1*						0
Eurasian Curlew	<i>Numenius arquata</i>				1			1
Common Redshank	<i>Tringa totanus</i>				5		1	6
Black-headed Gull	<i>Chroicocephalus ridibundus</i>		3	5*	29	2*	13	45
Lesser Black-backed Gull	<i>Larus fuscus</i>						1	1
Herring Gull	<i>Larus argentatus</i>		1	2*	7		2	10
Woodpigeon	<i>Columba palumbus</i>	2*		4*				0
Meadow Pipit	<i>Anthus pratensis</i>			3	1			4
Blue Tit	<i>Cyanistes caeruleus</i>			3*				0
Magpie	<i>Pica pica</i>			3	1			4
Jackdaw	<i>Corvus monedula</i>			2*	1*			0
Starling	<i>Sturnus vulgaris</i>			12*				0
Greenfinch	<i>Carduelis chloris</i>			2*				0
Goldfinch	<i>Carduelis carduelis</i>			8*				0
<b>TOTAL (excl. in flight)</b>		0	6	7	46	0	19	

SPA/Ramsar feature

\* recorded in flight

High tide 31/10/14

10:30 to 13:30. 30% cloud cover, dry with a brisk southerly wind and seasonally warm at approximately 20°C.

High tide 12:02 (10.8m)

Low tide 4/11/14

10:20 to 12:20. 90% cloud cover, occasional rain, light southerly breeze, 10°C.

Low tide 11:19 (1.9m) (spring tide).

WINTER BIRD SURVEY - NOVEMBER 2014		Area 1 (ST517771 to M5 bridge)		Area 2 (M5 bridge to ST523764 - Pill Foreshore)		Area 3 (Marine Parade to ST525762)		TOTAL (excl. in flight)
		Count Number		Count Number		Count Number		
Common name	Scientific name	High tide	Low tide	High tide	Low tide	High tide	Low tide	
Cormorant	<i>Phalacrocorax carbo</i>				2			2
Grey Heron	<i>Ardea cinerea</i>			1				1
Eurasian Curlew	<i>Numenius arquata</i>						1	1
Common Redshank	<i>Tringa totanus</i>						2	2
Black-headed Gull	<i>Chroicocephalus ridibundus</i>		9		19	15*	8	36
Herring Gull	<i>Larus argentatus</i>			1*	3			3
Woodpigeon	<i>Columba palumbus</i>			2*				0
Meadow Pipit	<i>Anthus pratensis</i>			4	5			9
Robin	<i>Erithacus rubecula</i>					1		1
Fieldfare	<i>Turdus pilaris</i>			3*				0
Long-tailed Tit	<i>Aegithalos caudatus</i>			4*				0
Blue Tit	<i>Cyanistes caeruleus</i>			2*				0
Magpie	<i>Pica pica</i>			2	1			3
Starling	<i>Sturnus vulgaris</i>			7*				0
Goldfinch	<i>Carduelis carduelis</i>			2*				0
<b>TOTAL (excl. in flight)</b>		0	9	7	30	1	11	

SPA/Ramsar feature

\* recorded in flight

High tide 24/11/14

07:25 to 09:00. thick mist first thing, then clear and cold approximately 0°C.  
High tide 08:04 (13.02m) (spring tide).  
Sunrise 07:48

Low tide 24/11/14

14:30 to 16:20. 10% cloud cover, clear, sunshine with light breeze, 6°C.  
Low tide 14:52 (1.5m) (spring tide).  
Sunset 16:06

WINTER BIRD SURVEY - DECEMBER 2014		Area 1 (ST517771 to M5 bridge)		Area 2 (M5 bridge to ST523764 - Pill Foreshore)		Area 3 (Marine Parade to ST525762)		TOTAL (excl. in flight)
		Count Number		Count Number		Count Number		
Common name	Scientific name	High tide	Low tide	High tide	Low tide	High tide	Low tide	
Cormorant	<i>Phalacrocorax carbo</i>				1*			0
Grey Heron	<i>Ardea cinerea</i>			1				1
Eurasian Curlew	<i>Numenius arquata</i>				1			1
Common Redshank	<i>Tringa totanus</i>						1	1
Black-headed Gull	<i>Chroicocephalus ridibundus</i>		1	92*	28	22*	21	50
Herring Gull	<i>Larus argentatus</i>				2		1	3
Woodpigeon	<i>Columba palumbus</i>			5*				0
Green Woodpecker	<i>Picus viridis</i>							0
Meadow Pipit	<i>Anthus pratensis</i>			1*	1			1
Fieldfare	<i>Turdus pilaris</i>	8*		5*				0
Great Tit	<i>Parus major</i>					1*		0
Carrion Crow	<i>Corvus corone</i>			1*				0
Starling	<i>Sturnus vulgaris</i>			60*				0
<b>TOTAL (excl. in flight)</b>		0	1	1	32	0	23	

SPA/Ramsar feature

\* recorded in flight

High tide 08/12/14 07:25 to 08:50. Clear and dry, approx.. 10% cloud, 3-4°C.  
High tide 08:03 (13.20m) (spring tide).  
Sunrise 08:08

Low tide 08/12/14 14:30 to 16:20. 5% cloud cover, clear, sunshine with brisk SW breeze, 6°C.  
Low tide 14:53 (1.5m)(spring tide).  
Sunset 15:57

WINTER BIRD SURVEY - JANUARY 2015		Area 1 (ST517771 to M5 bridge)		Area 2 (M5 bridge to ST523764 - Pill Foreshore)		Area 3 (Marine Parade to ST525762)		TOTAL (excl. in flight)
		Count Number		Count Number		Count Number		
Common name	Scientific name	High tide	Low tide	High tide	Low tide	High tide	Low tide	
Mallard	<i>Anas platyrhynchos</i>	2	8	4		2*		14
Cormorant	<i>Phalacrocorax carbo</i>		1*					0
Grey Heron	<i>Ardea cinerea</i>	1*	1					1
Buzzard	<i>Buteo buteo</i>			1*				0
Common Snipe	<i>Gallinago gallinago</i>			1				1
Eurasian Curlew	<i>Numenius arquata</i>			2	1		1	4
Common Redshank	<i>Tringa totanus</i>			2	1	26	3	32
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	42	33	10	35	8	99	227
		21*		1000*				0
Common Gull	<i>Larus canus</i>			2*				0
Herring Gull	<i>Larus argentatus</i>	1	1	1	1*		1	4
		1*						0
Great Black-backed Gull	<i>Larus marinus</i>		1*	1*				0
Woodpigeon	<i>Columba palumbus</i>	1*				1*		0
Collared Dove	<i>Streptopelia decaocto</i>					2*		0
Meadow Pipit	<i>Anthus pratensis</i>	1*			4	2*	2	6
Pied Wagtail	<i>Motacilla alba</i>						1	1
Grey Wagtail	<i>Motacilla cinerea</i>					1*		0
Jackdaw	<i>Corvus monedula</i>			7*				0
Linnet	<i>Carduelis cannabina</i>				4			4
Reed Bunting	<i>Emberiza schoeniclus</i>						1	1
<b>TOTAL (excl. in flight)</b>		45	43	20	45	34	107	

SPA/Ramsar feature

\* recorded in flight

High tide 22/01/15

07:50 to 09:45. Cloud 8/8, NE1, 2°C,  
High tide 08:22 (14.2m) (spring tide). Sunrise 08:03

Low tide 22/01/15

14:00 to 15:45. Cloud 7/8, NE1, 3°C  
Low tide 15:18 (0.6m) (spring tide)

## **Appendix 3: Pedestrian visitor survey data**



SUMMARY SHEET - Pedestrian Survey Form														
LOCATION:				"Area 1" near the River Avon, Portbury Dock (see Figure 1)										
COUNT NO:		1	DATE:		15-Mar-15									
WEATHER:				Grey, overcast, cold, light wind										
										Interview Questions				
		Age		Activity					Local	How often do you visit?				
Time	Adult	Child	Walking	Dog Walking	Bird Watching	Cyclist	Other	TOTAL	Within 5 mins	Daily	Weekly	Monthly	All year	Seasonal Visitor
10:10	1	3		I				4	Y	I			Y	
10:30	1		Running					1	Y		I			Spring / Summer
10:45	1			I				1	Y		I		Y	
10:46	1			I				1	Y	I			Y	
10:57	1			I				1	Y		I		Y	
11:03	1			I				1	Y	I			Y	
11:16	1			I				1	Y	I			Y	
AM	7	3	0	0	0	0	0	10	0	0	0	0	0	0
12:00	1	1		I				2	Y		I		Y	
02:39	1			I				1	Y		I		Y	
PM	2	1	0	0	0	0	0	3	0	0	0	0	0	0
TOTAL	9	4	0	0	0	0	0	13	0	0	0	0	0	0
COMMENTS		Many dog walkers let their dogs off the lead, which meant they covered a wide area of the site during the visit												
		Many dog walkers claimed they do not see many birds due to other dog walkers												
		The survey was conducted on Mothers Day which could have reduced the number of people using the site.												
		The roads and cycle route along the edge of the site were used a lot more than the site itself												
ENUMERATOR:		Andrew Wilkins												



3 Colleton Crescent Exeter EX2 4DG  
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e: [info@eadconsult.co.uk](mailto:info@eadconsult.co.uk)  
w: [www.eadconsult.co.uk](http://www.eadconsult.co.uk)

Appendix D  
Landmark Envirocheck Report



## Envirocheck<sup>®</sup> Report:

### Datasheet

#### Order Details:

**Order Number:**

54372246\_1\_1

**Customer Reference:**

489334.aa.01.04

**National Grid Reference:**

347550, 176350

**Slice:**

A

**Site Area (Ha):**

3.33

**Search Buffer (m):**

250

#### Site Details:

Portishead Cruising Club, Pump Square

Pill

BRISTOL

BS20 0BG

#### Client Details:

MR C Williams

Halcrow Group Ltd

1 Kingsway

Cardiff

CF10 3AN



Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	11
Hazardous Substances	12
Geological	13
Industrial Land Use	16
Sensitive Land Use	17
Data Currency	18
Data Suppliers	22
Useful Contacts	23

#### Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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#### Report Version v47.0

Data Type	Page Number	On Site	0 to 250m (*up to 500m)
<b>Agency &amp; Hydrological</b>			
Contaminated Land Register Entries and Notices			
Discharge Consents	pg 1	5	8
Enforcement and Prohibition Notices			
Integrated Pollution Controls			
Integrated Pollution Prevention And Control			
Local Authority Integrated Pollution Prevention And Control			
Local Authority Pollution Prevention and Controls	pg 4		1
Local Authority Pollution Prevention and Control Enforcements			
Nearest Surface Water Feature	pg 4	Yes	
Pollution Incidents to Controlled Waters			
Prosecutions Relating to Authorised Processes			
Prosecutions Relating to Controlled Waters			
Registered Radioactive Substances			
River Quality	pg 4	1	
River Quality Biology Sampling Points			
River Quality Chemistry Sampling Points			
Substantiated Pollution Incident Register			
Water Abstractions			
Water Industry Act Referrals			
Groundwater Vulnerability	pg 4	Yes	n/a
Bedrock Aquifer Designations	pg 4	Yes	n/a
Superficial Aquifer Designations	pg 4	Yes	n/a
Source Protection Zones			
Extreme Flooding from Rivers or Sea without Defences	pg 4	Yes	Yes
Flooding from Rivers or Sea without Defences	pg 5	Yes	Yes
Areas Benefiting from Flood Defences			
Flood Water Storage Areas			
Flood Defences			
Detailed River Network Lines	pg 7	Yes	Yes
Detailed River Network Offline Drainage	pg 9	Yes	Yes

Data Type	Page Number	On Site	0 to 250m (*up to 500m)
<b>Waste</b>			
BGS Recorded Landfill Sites	pg 11	1	
Historical Landfill Sites			
Integrated Pollution Control Registered Waste Sites			
Licensed Waste Management Facilities (Landfill Boundaries)			
Licensed Waste Management Facilities (Locations)			
Local Authority Recorded Landfill Sites			
Registered Landfill Sites			
Registered Waste Transfer Sites			
Registered Waste Treatment or Disposal Sites			
<b>Hazardous Substances</b>			
Control of Major Accident Hazards Sites (COMAH)	pg 12		1
Explosive Sites			
Notification of Installations Handling Hazardous Substances (NIHHS)			
Planning Hazardous Substance Consents			
Planning Hazardous Substance Enforcements			
<b>Geological</b>			
BGS 1:625,000 Solid Geology	pg 13	Yes	n/a
BGS Estimated Soil Chemistry	pg 13	Yes	Yes
BGS Recorded Mineral Sites			
BGS Urban Soil Chemistry			
BGS Urban Soil Chemistry Averages			
Brine Compensation Area			n/a
Coal Mining Affected Areas			n/a
Mining Instability			n/a
Man-Made Mining Cavities			
Natural Cavities			
Non Coal Mining Areas of Great Britain			
Potential for Collapsible Ground Stability Hazards	pg 14		Yes
Potential for Compressible Ground Stability Hazards	pg 14	Yes	
Potential for Ground Dissolution Stability Hazards	pg 14		Yes
Potential for Landslide Ground Stability Hazards	pg 14	Yes	
Potential for Running Sand Ground Stability Hazards	pg 14	Yes	
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 15	Yes	Yes
Radon Potential - Radon Affected Areas			n/a
Radon Potential - Radon Protection Measures			n/a

<b>Data Type</b>	<b>Page Number</b>	<b>On Site</b>	<b>0 to 250m (*up to 500m)</b>
<b>Industrial Land Use</b>			
Contemporary Trade Directory Entries (50m)	pg 16		10
Fuel Station Entries	pg 16		1
<b>Sensitive Land Use</b>			
Areas of Adopted Green Belt	pg 17		1
Areas of Unadopted Green Belt			
Areas of Outstanding Natural Beauty			
Environmentally Sensitive Areas			
Forest Parks			
Local Nature Reserves			
Marine Nature Reserves			
National Nature Reserves			
National Parks			
Nitrate Sensitive Areas			
Nitrate Vulnerable Zones			
Ramsar Sites			
Sites of Special Scientific Interest			
Special Areas of Conservation			
Special Protection Areas			

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Ltd  Property Type: Sewerage Network - Pumping Station - Water Company  Location: Portishead Town Pumping Station, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 070308  Permit Version: 3  Effective Date: 1st April 2008  Issued Date: 22nd January 2008  Revocation Date: Not Supplied  Discharge Type: Sewage Discharges - Pumping Station - Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch,Trib  <b>Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)</b>  Positional Accuracy: Located by supplier to within 10m</p>	A10NW (W)	0	1	347200 176480
1	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Ltd  Property Type: Sewerage Network - Pumping Station - Water Company  Location: Portishead Town Pumping Station, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 070308  Permit Version: 2  Effective Date: 1st April 2010  Issued Date: 25th February 2005  Revocation Date: 1st April 2008  Discharge Type: Sewage Discharges - Pumping Station - Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch,Trib  <b>Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)</b>  Positional Accuracy: Located by supplier to within 10m</p>	A10NW (W)	0	1	347200 176480
1	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Limited  Property Type: Sewerage Network - Sewers - Water Company  Location: Harbour Road Cso, Adjacent To Harbour Road, Portishead, 0, Bs20 7de  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 102658  Permit Version: 1  Effective Date: 31st December 2004  Issued Date: 23rd September 2004  Revocation Date: Not Supplied  Discharge Type: Public Sewage: Storm Sewage Overflow  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch(S)  <b>Status: New Consent (Water Resources Act 1991, Section 88 &amp; Schedule 10 as amended by Environment Act 1995)</b>  Positional Accuracy: Located by supplier to within 10m</p>	A10NW (W)	0	1	347200 176480
1	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Ltd  Property Type: Sewerage Network - Pumping Station - Water Company  Location: Portishead Town Pumping Station, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 070308  Permit Version: 1  Effective Date: 15th July 1987  Issued Date: Not Supplied  Revocation Date: 31st March 2008  Discharge Type: Sewage Discharges - Pumping Station - Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch,Trib  <b>Status: New Consent, by Application (Water Resources Act 1991, Section 88)</b>  Positional Accuracy: Located by supplier to within 100m</p>	A10NW (W)	0	1	347200 176480



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	<p><b>Discharge Consents</b></p> <p>Operator: Port Of Bristol Authority  Property Type: Undefined Or Other  Location: Heber Denty Canteen/Office(Portshd) Heber Denty Ltd, Portishead, Bristol, Avon  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 082012  Permit Version: 1  Effective Date: 19th April 1967  Issued Date: Not Supplied  Revocation Date: 28th January 1994  Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company  Discharge: Unknown  Environment:  Receiving Water: Not Supplied  <b>Status: Revoked: Appeal period (Water Act 1989, Schedule 12, 6 &amp; 8)</b>  Positional Accuracy: Located by supplier to within 100m</p>	A10NW (NW)	13	1	347200 176500
2	<p><b>Discharge Consents</b></p> <p>Operator: T W Ward Ltd  Property Type: Public Gas Supply  Location: Gasholder Station(Portishead) Old Harbour Road, Portishead, Bristol, Avon  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 082147  Permit Version: 1  Effective Date: 12th May 1970  Issued Date: Not Supplied  Revocation Date: 1st October 1996  Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Trib Of Portbury Ditch  <b>Status: Lapsed (under Environment Act 1995, Schedule 23)</b>  Positional Accuracy: Located by supplier to within 100m</p>	A10NW (W)	0	1	347100 176500
3	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Ltd  Property Type: Sewerage Network - Pumping Station - Water Company  Location: Portishead Town Pumping Station, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 070308  Permit Version: 3  Effective Date: 1st April 2008  Issued Date: 22nd January 2008  Revocation Date: Not Supplied  Discharge Type: Public Sewage: Storm Sewage Overflow  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch,Trib  <b>Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)</b>  Positional Accuracy: Located by supplier to within 10m</p>	A11NW (NE)	61	1	347620 176400
3	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Ltd  Property Type: Sewerage Network - Pumping Station - Water Company  Location: Portishead Town Pumping Station, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 070308  Permit Version: 2  Effective Date: 1st April 2010  Issued Date: 25th February 2005  Revocation Date: 1st April 2008  Discharge Type: Sewage Discharges - Pumping Station - Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch,Trib  <b>Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995)</b>  Positional Accuracy: Located by supplier to within 10m</p>	A11NW (NE)	61	1	347620 176400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
3	<p><b>Discharge Consents</b></p> <p>Operator: Wessex Water Services Ltd  Property Type: Sewerage Network - Pumping Station - Water Company  Location: Portishead Town Pumping Station, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 070308  Permit Version: 1  Effective Date: 15th July 1987  Issued Date: Not Supplied  Revocation Date: 31st March 2008  Discharge Type: Sewage Discharges - Pumping Station - Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Ditch,Trib  <b>Status:</b> <b>New Consent, by Application (Water Resources Act 1991, Section 88)</b>  Positional Accuracy: Located by supplier to within 100m</p>	A11NW (NE)	61	1	347620 176400
4	<p><b>Discharge Consents</b></p> <p>Operator: The Timber Mill  Property Type: Domestic Property (Multiple)  Location: Timber Mill, Portishead Dock, Potishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 082063  Permit Version: 1  Effective Date: 13th June 1966  Issued Date: Not Supplied  Revocation Date: 1st October 1996  Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Stream  <b>Status:</b> <b>Lapsed (under Environment Act 1995, Schedule 23)</b>  Positional Accuracy: Located by supplier to within 100m</p>	A10NW (W)	69	1	347150 176400
4	<p><b>Discharge Consents</b></p> <p>Operator: Tiltyard Developments Ltd  Property Type: Undefined Or Other  Location: Old Mill Road, Land Fronting, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 071129  Permit Version: 1  Effective Date: 26th February 1990  Issued Date: Not Supplied  Revocation Date: 18th May 1999  Discharge Type: Discharge Of Other Matter-Surface Water  Discharge: Onto Land/Into Watercourse  Environment:  Receiving Water: Portbury Ditch  <b>Status:</b> <b>Revoked (Water Resources Act 1991, Section 88 &amp; Schedule 10 as amended by Environment Act 1995)</b>  Positional Accuracy: Located by supplier to within 10m</p>	A10NW (W)	91	1	347140 176380
5	<p><b>Discharge Consents</b></p> <p>Operator: Mustad Manufacturing Co  Property Type: Business Services  Location: Nail Factory Offices, Old Mill Road, Portishead, Bristol  Authority: Environment Agency, South West Region  Catchment Area: Portbury Ditch  Reference: 082017  Permit Version: 1  Effective Date: 30th October 1963  Issued Date: Not Supplied  Revocation Date: Not Supplied  Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company  Discharge: Freshwater Stream/River  Environment:  Receiving Water: Portbury Brook  <b>Status:</b> <b>Transferred from Rivers (Prevention of Pollution) Act 1951-1961</b>  Positional Accuracy: Located by supplier to within 100m</p>	A10NW (W)	133	1	347100 176350

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	<b>Discharge Consents</b> Operator: Pearce Developments Ltd Property Type: Domestic Property (Single) Location: Harbour Road (Temp) Doctors Surgery, Portishead, Bristol, Bs20 Authority: Environment Agency, South West Region Catchment Area: Severn Estuary Coast Zone Reference: 101167 Permit Version: 1 Effective Date: 25th April 2000 Issued Date: 2nd May 2000 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Saline Estuary Environment: Receiving Water: Portishead Dock <b>Status: New Consent (Water Resources Act 1991, Section 88 &amp; Schedule 10 as amended by Environment Act 1995)</b> Positional Accuracy: Located by supplier to within 10m	A14SW (NW)	208	1	347060 176750
7	<b>Local Authority Pollution Prevention and Controls</b> Name: Protecta Print Ltd Location: Harbour Road, Portishead, Bristol, Avon, BS20 9BL Authority: North Somerset Council, Environmental Health Department Permit Reference: 41 Dated: 20th August 1993 Process Type: Local Authority Air Pollution Control Description: PG6/16 Printworks <b>Status: Authorisation revoked</b> Positional Accuracy: Manually positioned to the road within the address or location	A10NW (NW)	92	2	347061 176633
	<b>Nearest Surface Water Feature</b>	A10NW (W)	0	-	347201 176488
	<b>River Quality</b> Name: Portbury Ditch GQA Grade: River Quality D Reach: Middle Bridge-Sea Estimated Distance 3 (km): Flow Rate: Flow less than 0.62 cumecs Flow Type: River Year: 2000	A11NW (NE)	0	1	347603 176371
	<b>Groundwater Vulnerability</b> Soil Classification: Not classified Map Sheet: Sheet 36 Mid Glamorgan Scale: 1:100,000	A10SE (W)	0	1	347547 176346
	<b>Drift Deposits</b> None				
	<b>Bedrock Aquifer Designations</b> Aquifer Desination: Secondary Aquifer - B	A10SE (W)	0	3	347547 176346
	<b>Superficial Aquifer Designations</b> Aquifer Designation: Unproductive Strata	A10SE (W)	0	3	347547 176346
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10SE (W)	0	1	347547 176346
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NW (W)	0	1	347190 176480
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	0	1	347280 176590
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	0	1	347213 176502
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A10NW (W)	0	1	347170 176487

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A10NE (N)	0	1	347530 176520
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NW (W)	0	1	347180 176485
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	21	1	347210 176505
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	25	1	347218 176512
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	38	1	347220 176520
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	42	1	347228 176527
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A11SW (S)	95	1	347605 176205
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10SW (W)	129	1	347128 176340
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10SW (W)	131	1	347130 176340
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10SW (W)	152	1	347110 176326
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10SW (W)	154	1	347108 176325
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10SW (W)	165	1	347100 176316
	<b>Extreme Flooding from Rivers or Sea without Defences</b> Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A9NE (W)	236	1	346800 176440
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A10NW (W)	0	1	347170 176487
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial/Tidal Models Boundary Accuracy: As Supplied	A11NW (N)	0	1	347585 176595
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NW (W)	0	1	347190 176480

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	0	1	347275 176580
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A11SW (S)	0	1	347549 176329
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (W)	0	1	347270 176432
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A11NW (N)	0	1	347549 176351
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NW (W)	0	1	347180 176485
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	0	1	347213 176502
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	21	1	347210 176505
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	25	1	347218 176512
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	33	1	347220 176515
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	42	1	347228 176527
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	53	1	347250 176525
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	56	1	347255 176532
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	70	1	347260 176540
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	72	1	347275 176542
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	126	1	347300 176585
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	128	1	347325 176600



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10SW (W)	129	1	347128 176340
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10SW (W)	131	1	347130 176341
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10SW (W)	139	1	347120 176336
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	212	1	347360 176655
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A10NE (NW)	224	1	347364 176666
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A10NE (NW)	229	1	347370 176670
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A11NW (N)	240	1	347593 176600
	<b>Flooding from Rivers or Sea without Defences</b> Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Tidal Models Boundary Accuracy: As Supplied	A11NW (N)	242	1	347595 176601
	<b>Areas Benefiting from Flood Defences</b> None				
	<b>Flood Water Storage Areas</b> None				
	<b>Flood Defences</b> None				
8	<b>Detailed River Network Lines</b> River Type: Secondary River River Name: Not Supplied Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A10NW (W)	0	1	347195 176477
9	<b>Detailed River Network Lines</b> River Type: Primary River River Name: Not Supplied Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Water Course: Portbury Ditch Name: Water Course: 7011 Reference:	A10NE (NW)	0	1	347266 176563

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	<b>Detailed River Network Lines</b> River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A11SW (E)	0	1	347630 176344
11	<b>Detailed River Network Lines</b> River Type: Primary River River Name: Drain Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Currently Undefined Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Water Course: Portbury Ditch Name: Water Course: 7011 Reference:	A10NW (W)	0	1	347195 176477
12	<b>Detailed River Network Lines</b> River Type: Secondary River River Name: Drain Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A11SW (SE)	5	1	347657 176286
13	<b>Detailed River Network Lines</b> River Type: Secondary River River Name: Drain Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A11NW (E)	12	1	347626 176361
14	<b>Detailed River Network Lines</b> River Type: Secondary River River Name: Not Supplied Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A14SW (NW)	158	1	347085 176727
15	<b>Detailed River Network Lines</b> River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D002 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A10NE (N)	215	1	347434 176631

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
16	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A11SE (E)	0	1	347942 176212
17	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A11SE (E)	0	1	347933 176215
18	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A10NE (W)	0	1	347394 176407
19	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A10SE (W)	1	1	347502 176345
20	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A11SE (E)	5	1	348077 176159
21	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A11SE (E)	11	1	348073 176142
22	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A11SE (SE)	46	1	347931 176104
23	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A11SE (SE)	83	1	347931 176104
24	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A11SE (SE)	101	1	347929 176085
25	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A11SE (SE)	131	1	347923 176055
26	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A7NE (SE)	174	1	348155 176002
27	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A7NE (SE)	194	1	348133 175968
28	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A7NE (SE)	196	1	348108 175956
29	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A7NE (SE)	197	1	347976 175948
30	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A11SW (S)	201	1	347608 176095
31	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A7NE (SE)	206	1	347901 175984
32	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A7NE (SE)	206	1	347897 175982
33	<b>Detailed River Network Offline Drainage</b> River Type: Tertiary River Hydrographic Area: D002	A7NE (SE)	214	1	347976 175948
34	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A12SW (E)	236	1	348294 176080
35	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A12SW (E)	237	1	348297 176085
36	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A12SW (E)	243	1	348296 176063

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
37	<b>Detailed River Network Offline Drainage</b> River Type: Secondary River Hydrographic Area: D002	A12SW (E)	247	1	348316 176120

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	<b>BGS Recorded Landfill Sites</b> Site Name: CEGB Ashlands Perbury Wharf Location: Portishead, BRISTOL, Avon Authority: British Geological Survey, National Geoscience Information Service Ground Water: Information not available Surface Water: Information not available Geology: N/A Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Derived	A11NW (N)	0	3	347550 176353
	<b>Local Authority Landfill Coverage</b> Name: North Somerset Unitary Council - Has supplied landfill data		0	7	347547 176346



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
39	<p><b>Control of Major Accident Hazards Sites (COMAH)</b></p> <p>Name: Coleman Uk Plc            Location: Gordano Gate, Wyndham Way, Portishead, BRISTOL, Avon, BS20 7GG            Reference: Not Supplied            Type: Lower Tier  <b>Status: Active</b>            Positional Accuracy: Automatically positioned to the address</p>	A9NE (NW)	212	4	346862 176673

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>BGS 1:625,000 Solid Geology</b> Description: Triassic mudstones (including Keuper Marl, Dolomitic Conglomerate and Rhaetic)	A10SE (W)	0	3	347547 176346
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11SE (E)	0	6	348000 176346
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10SE (W)	0	6	347547 176346
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10SW (W)	23	6	347000 176346
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A7NE (SE)	148	6	348000 176000
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 90 - 120 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (S)	158	6	347547 176000
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SW (NW)	203	6	347000 176836

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A9NE (W)	229	6	346813 176381
	<b>BGS Estimated Soil Chemistry</b> Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SW (NW)	236	6	347000 176843
	<b>BGS Measured Urban Soil Chemistry</b> No data available				
	<b>BGS Urban Soil Chemistry Averages</b> No data available				
	<b>Coal Mining Affected Areas</b> In an area that might not be affected by coal mining				
	<b>Non Coal Mining Areas of Great Britain</b> No Hazard				
	<b>Potential for Collapsible Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346
	<b>Potential for Collapsible Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	204	3	347076 176892
	<b>Potential for Compressible Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346
	<b>Potential for Compressible Ground Stability Hazards</b> Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10SE (S)	0	3	347540 176323
	<b>Potential for Compressible Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A9NE (W)	210	3	346817 176487
	<b>Potential for Ground Dissolution Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A9NE (W)	237	3	346795 176462
	<b>Potential for Landslide Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346
	<b>Potential for Landslide Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	237	3	347011 176873
	<b>Potential for Running Sand Ground Stability Hazards</b> Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10SE (S)	0	3	347540 176323
	<b>Potential for Running Sand Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346
	<b>Potential for Running Sand Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A9NE (W)	210	3	346817 176487

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346
	<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	204	3	347028 176851
	<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	237	3	347076 176892
	<b>Radon Potential - Radon Protection Measures</b> Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346
	<b>Radon Potential - Radon Affected Areas</b> Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	3	347547 176346

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
40	<b>Contemporary Trade Directory Entries</b> Name: Delta Partners Location: Unit 2, Harbour Crescent, Portishead, Bristol, BS20 7FT Classification: Telecommunications Equipment & Systems Status: <b>Inactive</b> Positional Accuracy: Automatically positioned to the address	A10NE (W)	16	-	347417 176361
41	<b>Contemporary Trade Directory Entries</b> Name: Ryan'S Garage Ltd Location: Unit 8, Old Mill Road, Portishead, Bristol, BS20 7BX Classification: Garage Services Status: <b>Active</b> Positional Accuracy: Automatically positioned to the address	A10NW (W)	17	-	347015 176507
41	<b>Contemporary Trade Directory Entries</b> Name: Western Print Finishings Location: Old Mill Rd, Portishead, Bristol, Avon, BS20 7BX Classification: Bookbinding & Equipment Status: <b>Active</b> Positional Accuracy: Manually positioned within the geographical locality	A10NW (W)	32	-	346996 176508
41	<b>Contemporary Trade Directory Entries</b> Name: Crown Uk Ltd Location: Unit 6, Old Mill Road, Portishead, Bristol, Avon, BS20 7BX Classification: Mechanical Engineers Status: <b>Inactive</b> Positional Accuracy: Automatically positioned to the address	A10NW (W)	37	-	346987 176519
42	<b>Contemporary Trade Directory Entries</b> Name: Brian Newton Location: Harbour Road, Portishead, Bristol, BS20 7DE Classification: Engineers - General Status: <b>Inactive</b> Positional Accuracy: Automatically positioned to the address	A10NW (NW)	30	-	347100 176553
42	<b>Contemporary Trade Directory Entries</b> Name: T S E Rollo (Uk) Ltd Location: Harbour Road, Portishead, Bristol, BS20 7DE Classification: Diesel Engine Equipment & Services Status: <b>Inactive</b> Positional Accuracy: Automatically positioned to the address	A10NW (NW)	30	-	347100 176553
43	<b>Contemporary Trade Directory Entries</b> Name: Stickythings Ltd Location: Unit C/28, Kestrel Court, Harbour Road, Portishead, Bristol, BS20 7AN Classification: Digital Printing Status: <b>Active</b> Positional Accuracy: Automatically positioned to the address	A10NE (NW)	45	-	347313 176493
43	<b>Contemporary Trade Directory Entries</b> Name: Port Marine Home Services Location: Kestrel Court, Harbour Road, Portishead, Bristol, BS20 7AN Classification: Cleaning Services - Domestic Status: <b>Active</b> Positional Accuracy: Automatically positioned to the address	A10NE (NW)	45	-	347313 176493
43	<b>Contemporary Trade Directory Entries</b> Name: Quay Digital Location: Kestrel Court, Harbour Road, Portishead, Bristol, BS20 7AN Classification: Digital Printing Status: <b>Active</b> Positional Accuracy: Automatically positioned to the address	A10NE (NW)	45	-	347313 176493
43	<b>Contemporary Trade Directory Entries</b> Name: 3d Creation Lab Location: Kestrel Court, Harbour Rd, Portishead, Bristol, Avon, BS20 7AN Classification: Printers Status: <b>Inactive</b> Positional Accuracy: Manually positioned within the geographical locality	A10NE (NW)	47	-	347317 176494
44	<b>Fuel Station Entries</b> Name: Shell Waitrose Portishead Location: High Street, Portishead, Bristol, Somerset, BS20 6AG Brand: Shell Premises Type: Hypermarket Status: <b>Open</b> Positional Accuracy: Manually positioned to the address or location	A9NE (W)	222	-	346802 176553



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
45	<b>Areas of Adopted Green Belt</b> Authority: North Somerset Council Plan Name: North Somerset Replacement Local Plan Status: <b>Adopted</b> Plan Date: 30th March 2007	A11SE (E)	2	7	347940 176186

Agency & Hydrological	Version	Update Cycle
<b>Contaminated Land Register Entries and Notices</b> North Somerset Council - Environmental Health Department	January 2013	Annual Rolling Update
<b>Discharge Consents</b> Environment Agency - South West Region	February 2014	Quarterly
<b>Enforcement and Prohibition Notices</b> Environment Agency - South West Region	March 2013	As notified
<b>Integrated Pollution Controls</b> Environment Agency - South West Region	October 2008	Not Applicable
<b>Integrated Pollution Prevention And Control</b> Environment Agency - South West Region	February 2014	Quarterly
<b>Local Authority Integrated Pollution Prevention And Control</b> North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
<b>Local Authority Pollution Prevention and Controls</b> North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
<b>Local Authority Pollution Prevention and Control Enforcements</b> North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
<b>Nearest Surface Water Feature</b> Ordnance Survey	July 2012	Quarterly
<b>Pollution Incidents to Controlled Waters</b> Environment Agency - South West Region	September 1999	Not Applicable
<b>Prosecutions Relating to Authorised Processes</b> Environment Agency - South West Region	March 2013	As notified
<b>Prosecutions Relating to Controlled Waters</b> Environment Agency - South West Region	March 2013	As notified
<b>Registered Radioactive Substances</b> Environment Agency - South West Region	February 2014	Quarterly
<b>River Quality</b> Environment Agency - Head Office	November 2001	Not Applicable
<b>River Quality Biology Sampling Points</b> Environment Agency - Head Office	July 2012	Annually
<b>River Quality Chemistry Sampling Points</b> Environment Agency - Head Office	July 2012	Annually
<b>Substantiated Pollution Incident Register</b> Environment Agency - South West Region - North Wessex Area Environment Agency - South West Region - Wessex Area	February 2014 February 2014	Quarterly Quarterly
<b>Water Abstractions</b> Environment Agency - South West Region	December 2014	Quarterly
<b>Water Industry Act Referrals</b> Environment Agency - South West Region	February 2014	Quarterly
<b>Groundwater Vulnerability</b> Environment Agency - Head Office	January 2011	Not Applicable
<b>Drift Deposits</b> Environment Agency - Head Office	January 1999	Not Applicable
<b>Bedrock Aquifer Designations</b> British Geological Survey - National Geoscience Information Service	October 2012	Annually
<b>Superficial Aquifer Designations</b> British Geological Survey - National Geoscience Information Service	October 2012	Annually
<b>Source Protection Zones</b> Environment Agency - Head Office	December 2014	Quarterly
<b>Extreme Flooding from Rivers or Sea without Defences</b> Environment Agency - Head Office	February 2014	Quarterly

<b>Agency &amp; Hydrological</b>	<b>Version</b>	<b>Update Cycle</b>
<b>Flooding from Rivers or Sea without Defences</b> Environment Agency - Head Office	February 2014	Quarterly
<b>Areas Benefiting from Flood Defences</b> Environment Agency - Head Office	February 2014	Quarterly
<b>Flood Water Storage Areas</b> Environment Agency - Head Office	February 2014	Quarterly
<b>Flood Defences</b> Environment Agency - Head Office	February 2014	Quarterly
<b>Detailed River Network Lines</b> Environment Agency - Head Office	March 2012	Annually
<b>Detailed River Network Offline Drainage</b> Environment Agency - Head Office	March 2012	Annually
<b>Waste</b>	<b>Version</b>	<b>Update Cycle</b>
<b>BGS Recorded Landfill Sites</b> British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
<b>Historical Landfill Sites</b> Environment Agency - South East Region - Kent & South London Area Environment Agency - South East Region - North East Thames Area Environment Agency - South East Region - Solent & South Downs Area Environment Agency - South East Region - West Thames Area Environment Agency - South West Region - North Wessex Area Environment Agency - South West Region - Wessex Area	February 2014 February 2014 February 2014 February 2014 February 2014 February 2014	Quarterly Quarterly Quarterly Quarterly Quarterly Quarterly
<b>Integrated Pollution Control Registered Waste Sites</b> Environment Agency - South West Region	October 2008	Not Applicable
<b>Licensed Waste Management Facilities (Landfill Boundaries)</b> Environment Agency - South East Region - Kent & South London Area Environment Agency - South East Region - North East Thames Area Environment Agency - South East Region - Solent & South Downs Area Environment Agency - South East Region - West Thames Area Environment Agency - South West Region - North Wessex Area Environment Agency - South West Region - Wessex Area	February 2014 February 2014 February 2014 February 2014 February 2014 February 2014	Quarterly Quarterly Quarterly Quarterly Quarterly Quarterly
<b>Licensed Waste Management Facilities (Locations)</b> Environment Agency - South West Region - North Wessex Area Environment Agency - South West Region - Wessex Area	February 2014 February 2014	Quarterly Quarterly
<b>Local Authority Landfill Coverage</b> North Somerset Council	May 2000	Not Applicable
<b>Local Authority Recorded Landfill Sites</b> North Somerset Council	May 2000	Not Applicable
<b>Registered Landfill Sites</b> Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
<b>Registered Waste Transfer Sites</b> Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
<b>Registered Waste Treatment or Disposal Sites</b> Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable

<b>Hazardous Substances</b>	<b>Version</b>	<b>Update Cycle</b>
<b>Control of Major Accident Hazards Sites (COMAH)</b> Health and Safety Executive	March 2014	Bi-Annually
<b>Explosive Sites</b> Health and Safety Executive	November 2013	Bi-Annually
<b>Notification of Installations Handling Hazardous Substances (NIHHS)</b> Health and Safety Executive	November 2000	Not Applicable
<b>Planning Hazardous Substance Enforcements</b> North Somerset Council	September 2013	Annual Rolling Update
<b>Planning Hazardous Substance Consents</b> North Somerset Council	September 2013	Annual Rolling Update
<b>Geological</b>	<b>Version</b>	<b>Update Cycle</b>
<b>BGS 1:625,000 Solid Geology</b> British Geological Survey - National Geoscience Information Service	August 1996	Not Applicable
<b>BGS Estimated Soil Chemistry</b> British Geological Survey - National Geoscience Information Service	January 2010	Variable
<b>BGS Recorded Mineral Sites</b> British Geological Survey - National Geoscience Information Service	October 2013	Bi-Annually
<b>Brine Compensation Area</b> Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
<b>Coal Mining Affected Areas</b> The Coal Authority - Mining Report Service	December 2013	As notified
<b>Mining Instability</b> Ove Arup & Partners	October 2000	Not Applicable
<b>Non Coal Mining Areas of Great Britain</b> British Geological Survey - National Geoscience Information Service	February 2011	Not Applicable
<b>Potential for Collapsible Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Compressible Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Ground Dissolution Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Landslide Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Running Sand Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Radon Potential - Radon Affected Areas</b> British Geological Survey - National Geoscience Information Service	July 2011	As notified
<b>Radon Potential - Radon Protection Measures</b> British Geological Survey - National Geoscience Information Service	July 2011	As notified
<b>Industrial Land Use</b>	<b>Version</b>	<b>Update Cycle</b>
<b>Contemporary Trade Directory Entries</b> Thomson Directories	February 2014	Quarterly
<b>Fuel Station Entries</b> Catalist Ltd - Experian	March 2014	Quarterly

<b>Sensitive Land Use</b>	<b>Version</b>	<b>Update Cycle</b>
<b>Areas of Adopted Green Belt</b> North Somerset Council	February 2014	As notified
<b>Areas of Unadopted Green Belt</b> North Somerset Council	February 2014	As notified
<b>Areas of Outstanding Natural Beauty</b> Natural England	January 2014	Bi-Annually
<b>Environmentally Sensitive Areas</b> Natural England	July 2013	Annually
<b>Forest Parks</b> Forestry Commission	April 1997	Not Applicable
<b>Local Nature Reserves</b> Natural England	July 2013	Bi-Annually
<b>Marine Nature Reserves</b> Natural England	July 2013	Bi-Annually
<b>National Nature Reserves</b> Natural England	January 2014	Bi-Annually
<b>National Parks</b> Natural England	January 2014	Bi-Annually
<b>Nitrate Sensitive Areas</b> Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
<b>Nitrate Vulnerable Zones</b> Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2013	Annually
<b>Ramsar Sites</b> Natural England Natural Resources Wales (NRW) - formerly CCW	July 2013 May 2013	Bi-Annually Bi-Annually
<b>Sites of Special Scientific Interest</b> Natural England	July 2013	Bi-Annually
<b>Special Areas of Conservation</b> Natural England Natural Resources Wales (NRW) - formerly CCW	July 2013 May 2013	Bi-Annually Bi-Annually
<b>Special Protection Areas</b> Natural England Natural Resources Wales (NRW) - formerly CCW	July 2013 May 2013	Bi-Annually Bi-Annually



A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	 <b>British Geological Survey</b> <small>NATURAL ENVIRONMENT RESEARCH COUNCIL</small>
Centre for Ecology and Hydrology	 <b>Centre for Ecology &amp; Hydrology</b> <small>NATURAL ENVIRONMENT RESEARCH COUNCIL</small>
Countryside Council for Wales	 <b>CYNGOR CEFN GWLAD CYMRU</b> <b>COUNTRYSIDE COUNCIL FOR WALES</b>
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Contact	Name and Address	Contact Details
1	<b>Environment Agency - National Customer Contact Centre (NCCC)</b> PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
2	<b>North Somerset Council - Environmental Health Department</b> P O Box 143, Town Hall, Weston-super-mare, Avon, BS23 1EY	Telephone: 01934 888888 Fax: 01934 634634 Website: www.n-somerset.gov.uk
3	<b>British Geological Survey - Enquiry Service</b> British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
4	<b>Health and Safety Executive</b> 5S.2 Redgrave Court, Merton Road, Bootle, L20 7HS	Website: www.hse.gov.uk
5	<b>North Somerset Council</b> Town Hall, Weston-super-Mare, Avon, BS23 1UJ	Telephone: 01934 888888 Fax: 01934 888822 Website: www.n-somerset.gov.uk
6	<b>Landmark Information Group Limited</b> Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmarkinfo.co.uk
7	<b>North Somerset Council</b> PO Box 140, Town Hall, Weston-super-Mare, Avon, BS23 1UJ	Telephone: 01934 888888 Fax: 01934 888822 Website: www.n-somerset.gov.uk
8	<b>Natural England</b> Northminster House, Northminster Road, Peterborough, Cambridgeshire, PE1 1UA	Telephone: 0845 600 3078 Fax: 01733 455103 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
9	<b>Natural Resources Wales (NRW) - formerly CCW</b> Plas Penrhose, Fford Penrhos, Bangor, Gwynedd, LL57 2LQ	Telephone: 01248 385500 Fax: 01248 355782
-	<b>Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards</b> Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	<b>Landmark Information Group Limited</b> Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries.

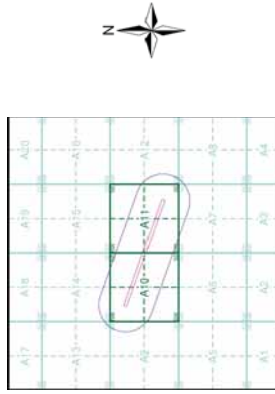
# Groundwater Vulnerability

**General**  
 Specified Site Specified Buffer(s) Bearing Reference Point   
 Slice Map ID

## Agency and Hydrological



## Site Sensitivity Context Map - Slice A

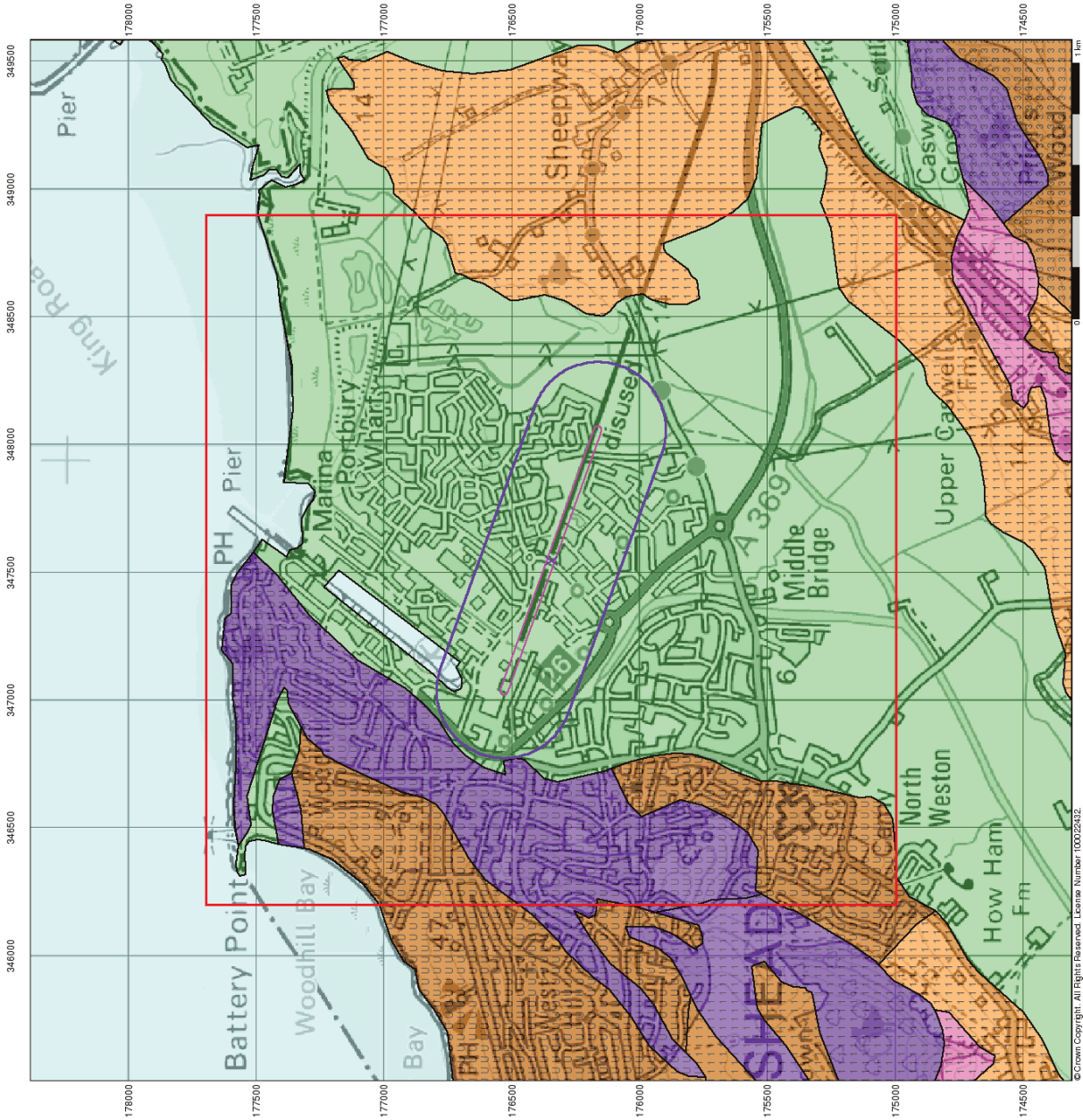


## Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

## Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG



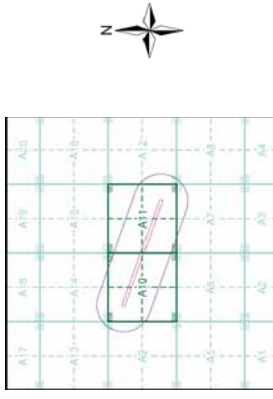
# Bedrock Aquifer Designation

- General**
- Specified Site
  - Specified Buffer(s)
  - Map ID
  - Bearing Reference Point

## Agency and Hydrological

- Geological Classes**
- Principal Aquifer
  - Secondary A Aquifer
  - Secondary B Aquifer
  - Secondary Undifferentiated
  - Unproductive Strata
  - Unknown

## Site Sensitivity Context Map - Slice A

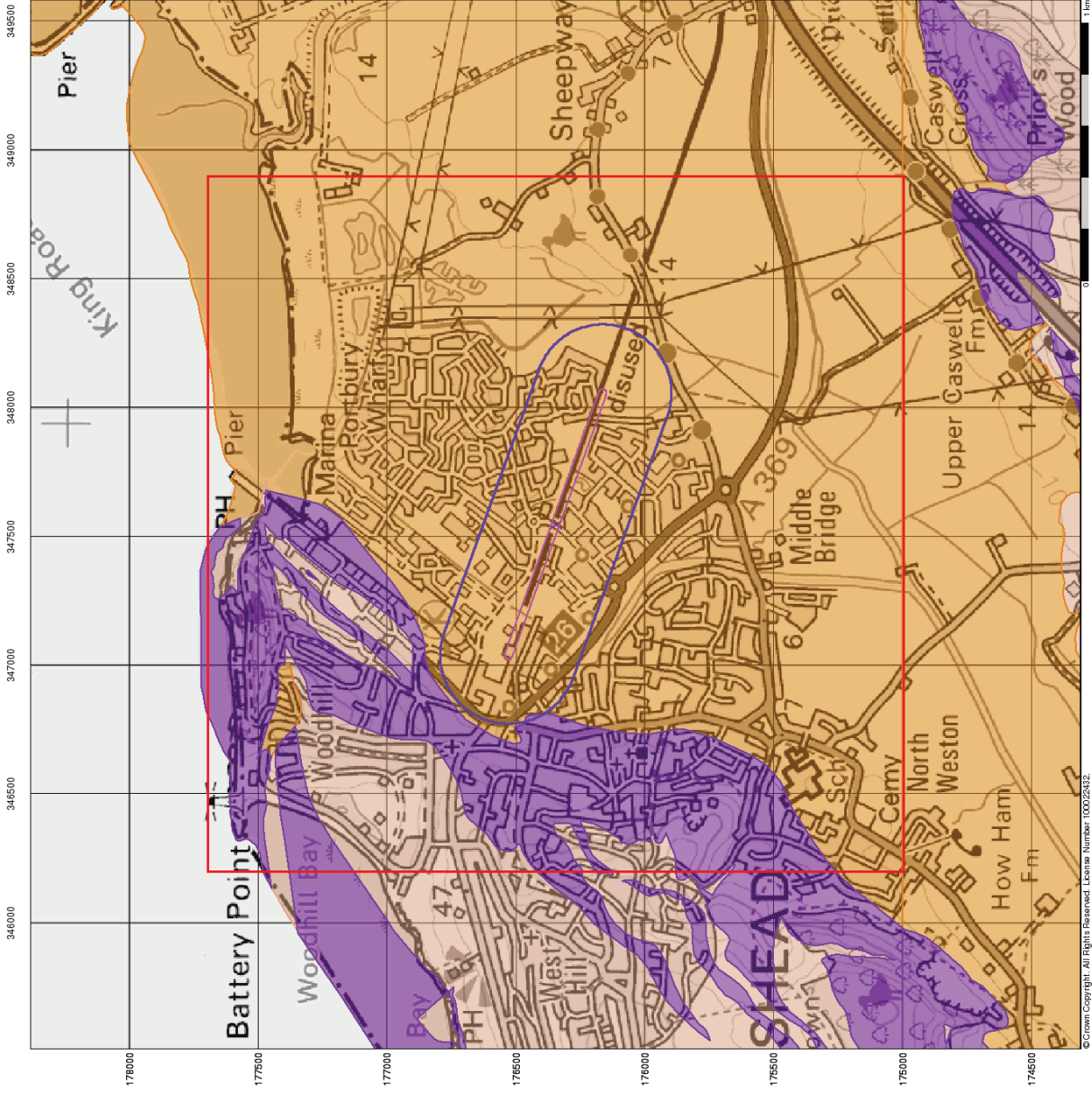


### Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG





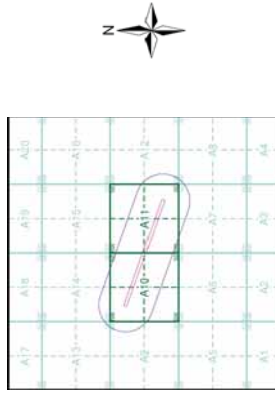
# Superficial Aquifer Designation

- General**
- Specified Site
  - Specified Buffer(s)
  - Map ID
  - Bearing Reference Point

## Agency and Hydrological

- Geological Classes**
- Principal Aquifer
  - Secondary A Aquifer
  - Secondary B Aquifer
  - Secondary Undifferentiated
  - Unproductive Strata
  - Unknown

## Site Sensitivity Context Map - Slice A

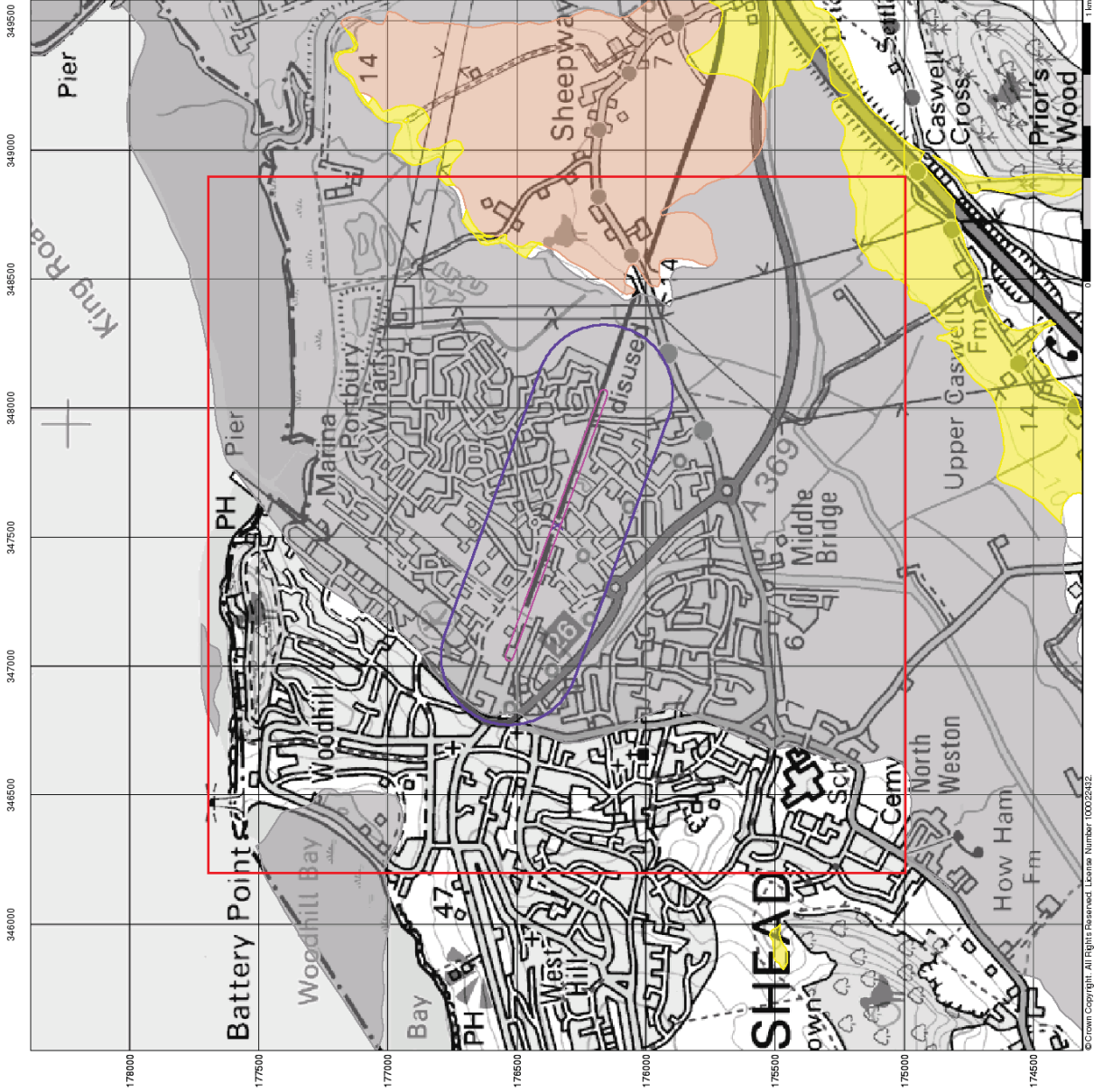


### Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa01\_04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Pontishead Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG

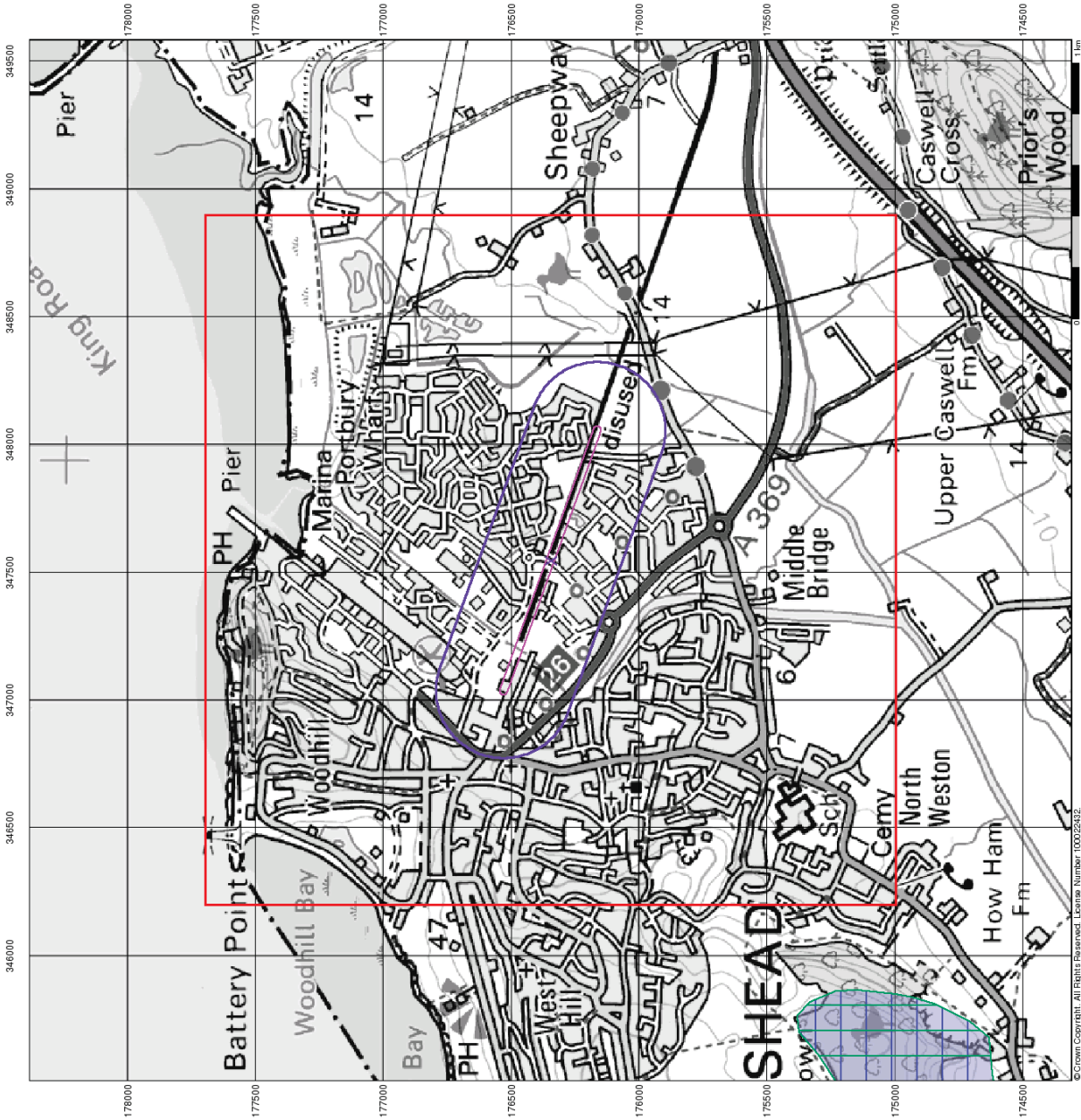




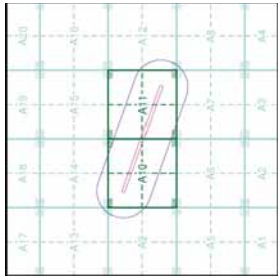


## Source Protection Zones

- General**
- Specified Site
  - Specified Buffer(s)
  - Map ID
  - Bearing Reference Point
- Agency and Hydrological**
- Source Protection Zone I
  - Source Protection Zone II
  - Source Protection Zone III
  - Zone of Special Interest
  - Source Protection Zone Borehole



## Site Sensitivity Context Map - Slice A



### Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG

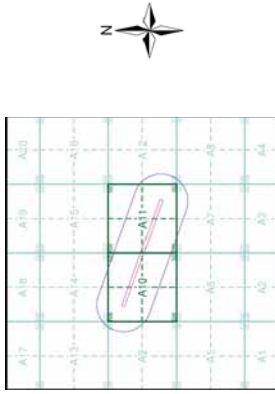


Tel: 0844 844 8900  
 Fax: 0844 844 8901  
 Web: www.envirocheck.co.uk

## Sensitive Land Uses

- General**
- Specified Site
  - Specified Buffer(s)
  - Bearing Reference Point
  - Slice
  - Map ID
- Sensitive Land Uses**
- Area of Adopted Green Belt
  - Area of Undeveloped Green Belt
  - Area of Outstanding Natural Beauty
  - Environmentally Sensitive Area
  - Forest Park
  - Local Nature Reserve
  - Marine Nature Reserve
  - National Nature Reserve
  - National Park
  - Nitrate Sensitive Area
  - Nitrate Vulnerable Zone
  - Ramsar Site
  - Site of Special Scientific Interest
  - Special Area of Conservation
  - Special Protection Area

## Site Sensitivity Context Map - Slice A

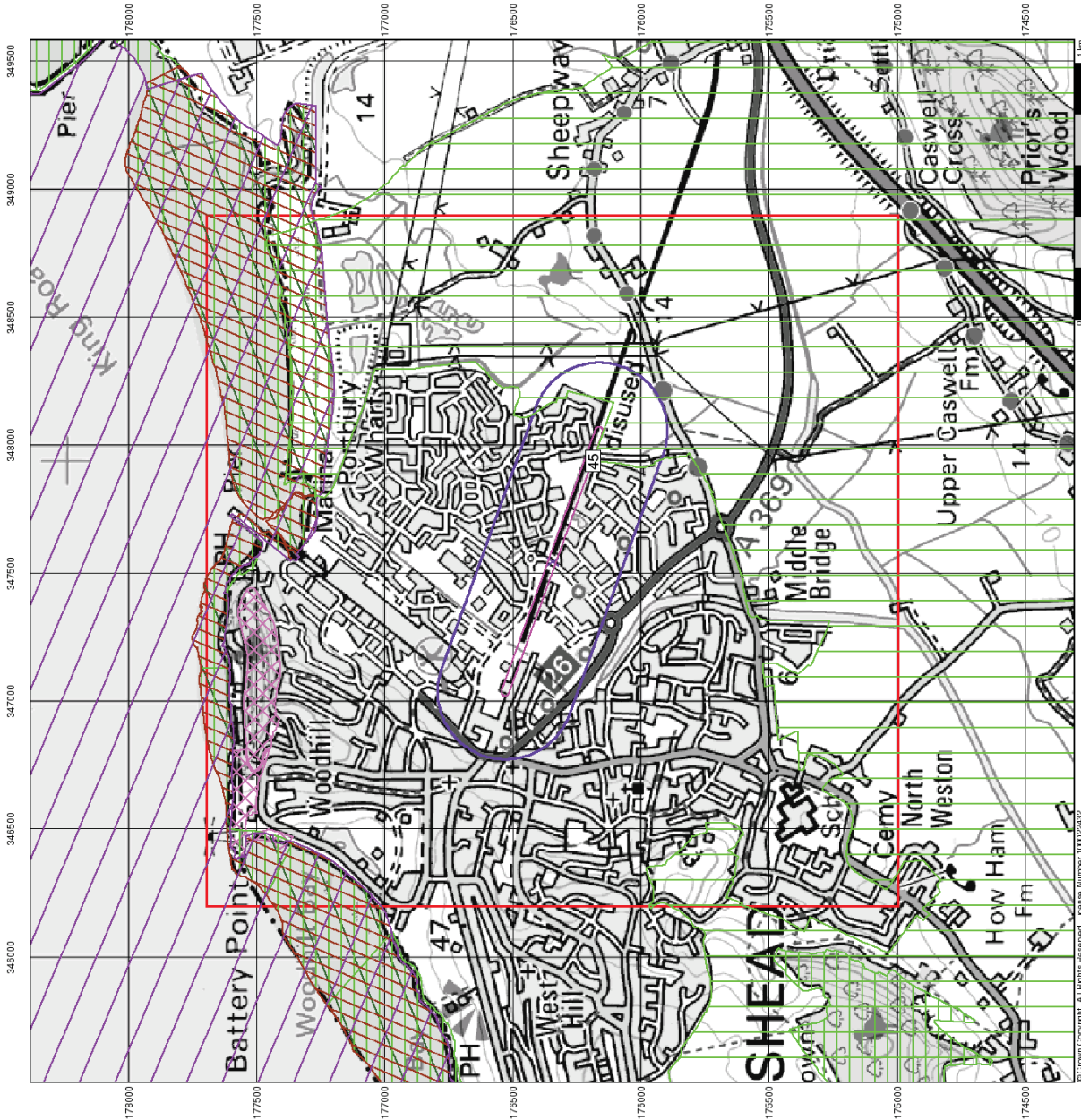


### Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG











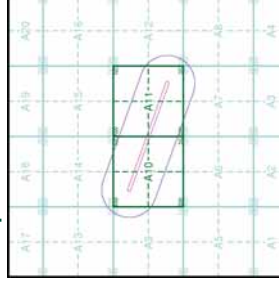
**General**

- Specified Site
- Bearing Reference Point

**Agency and Hydrological (Flood)**

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

**Flood Map - Slice A**



**Order Details**

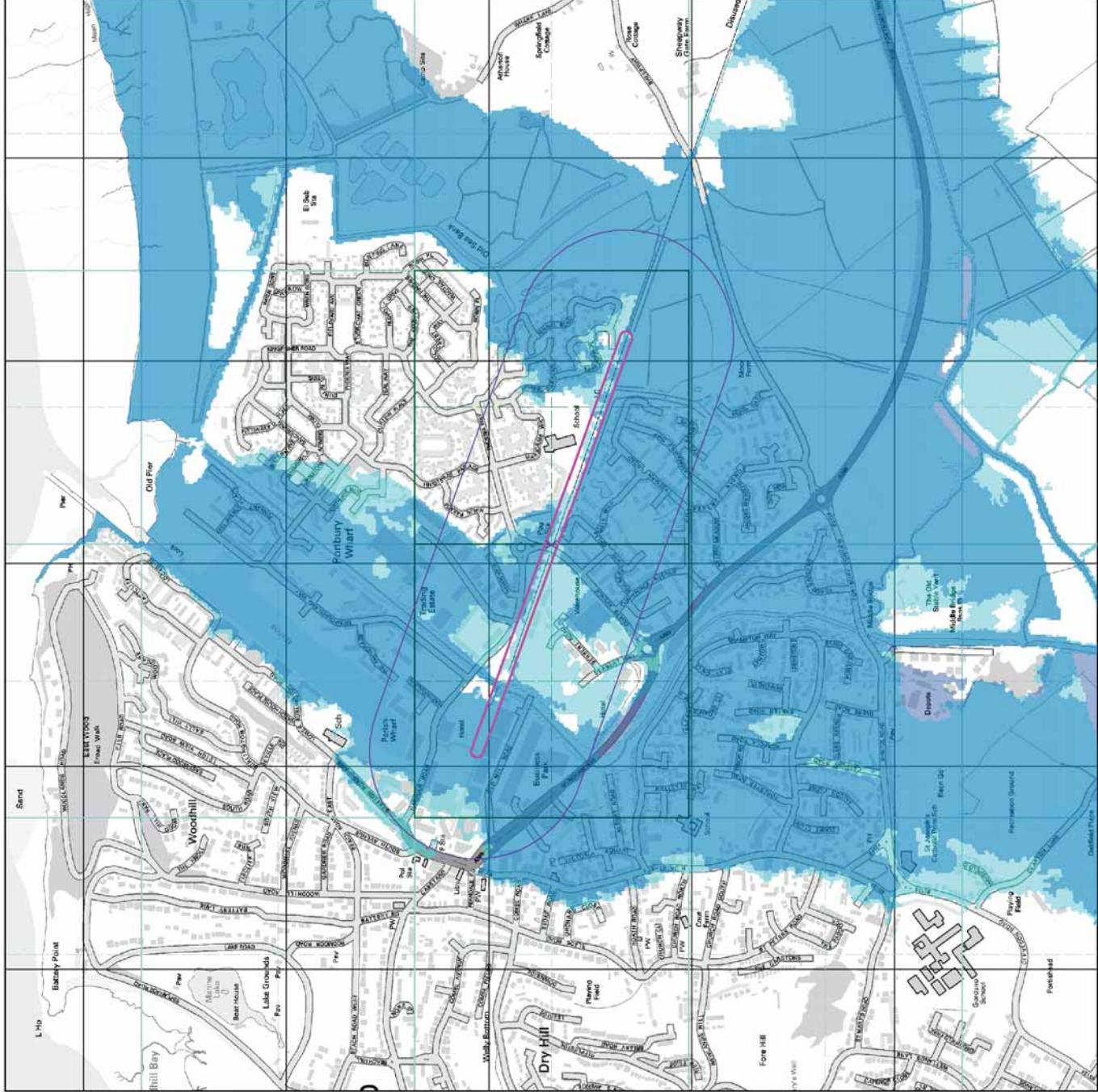
Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Site: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG



Tel: 0844 844 9852  
 Fax: 0844 844 9851  
 Web: www.envirocheck.co.uk





- General**
- Specified Site
  - Bearing Reference Point
  - Map ID
  - Several of Type at Location

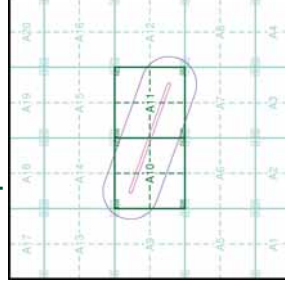
**Agency and Hydrological (Boreholes)**

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Contaminial
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of [www.envirocheck.co.uk](http://www.envirocheck.co.uk).

**Borehole Map - Slice A**



**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa0104  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

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**General**

- Specified Site
- Bearing Reference Point
- Map ID

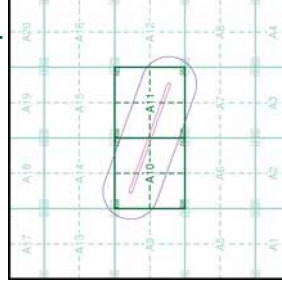
**EA Detailed River Network Data**

- Primary River
- Extended Culvert (greater than 50m)
- Secondary River
- Undergound River (local knowledge)
- Tertiary River
- Undergound River (local knowledge)
- Canal
- Downstream of High Water Mark
- Canal Tunnel
- Downstream of Seward Extension
- Undefined River
- Lake/Reservoir
- Offline Drainage Feature
- Not assigned River feature

**Contours (height in metres)**

- Standard Contour -1.05
- Index Contour -1.05
- Spot Height -1.673
- Air Height -1.468

**EA Detailed River Network Map - Slice A**



**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

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# Geology 1:10,000 Maps Legends









## Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Present Day - Present Day
	WGR	Worked Ground (Undivided)	Void	Present Day - Present Day

## Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TFD	Tidal Flat Deposits	Clay and Silt	Holocene - Holocene
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Quaternary - Quaternary
	HEAD	Head	Diamicton	Quaternary - Quaternary

## Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MMG	Mercia Mudstone Group	Mudstone	Rhaetian - Scythian
	MMMF	Mercia Mudstone Group (Marginal Facies)	Conglomerate	Triassic - Triassic
	PES	Permian Sandstone Formation	Sandstone	Westphalian D - Westphalian C
	AVO	Avon Group	Limestone	Courseyan - Courseyan
	AVO	Avon Group	Mudstone and Limestone, Interbedded	Courseyan - Courseyan
	BRL	Black Rock Limestone Subgroup	Dolomitised Limestone and Dolomite	Chadian - Courseyan
	POB	Portishead Formation	Sandstone and Mudstone	Famennian - Famennian
	Fault			

## Geology 1:10,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:10,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around a site. This mapping may be more up to date than previously published paper maps.

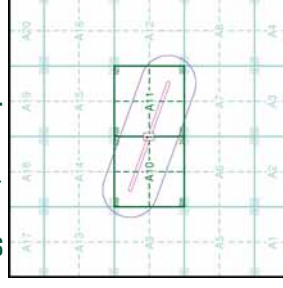
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page.

Please Note: Not all of the layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

### Geology 1:10,000 Maps Coverage

Map ID:	Map Name:	Map Date:	Bedrock Geology:	Superficial Geology:	Artificial Geology:	Faults:	Landslip:	Rock Segments:
1	ST47NE	1989	Available	Available	Available	Available	Not Available	Available
	ST47SE	1989	Available	Available	Available	Available	Not Available	Available

## Geology 1:10,000 Maps - Slice A



### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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### Artificial Ground and Landslip

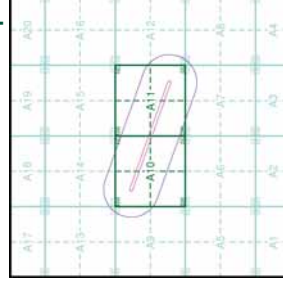
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

#### Artificial ground includes:

- Made ground - man-made deposits such as embankments and spot heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- In-filled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes founded strata, where the ground has collapsed due to subsidence.

### Artificial Ground and Landslip Map - Slice A



#### Order Details

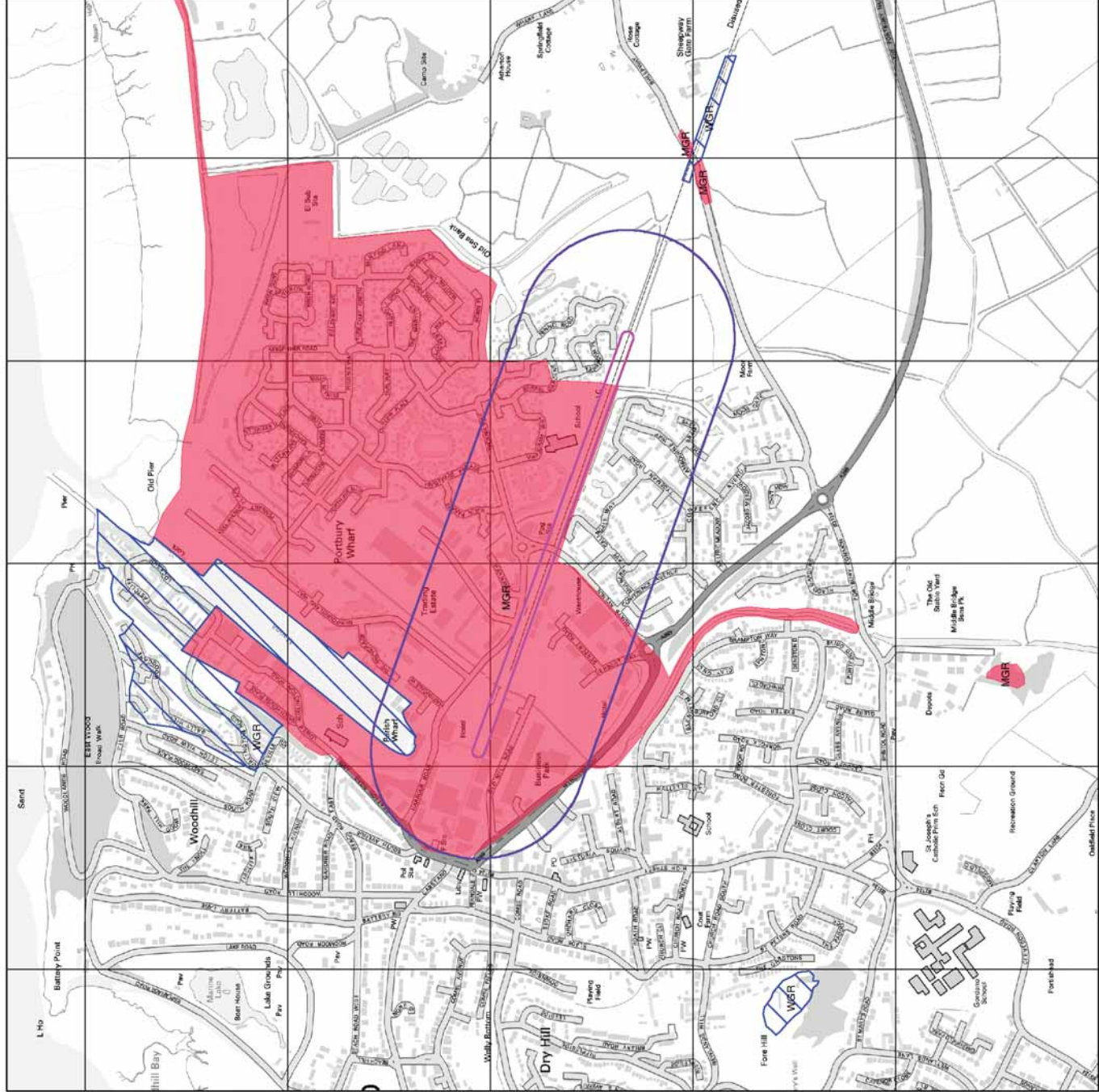
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

#### Site Details

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176300 176400 176500 176600 176700 176800 176900  
 347000 347100 347200 347300 347400 347500 347600 347700 347800 347900 348000

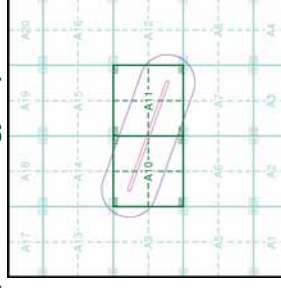
### Superficial Geology

BGS 1:10,000 Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial Deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

### Superficial Geology Map - Slice A

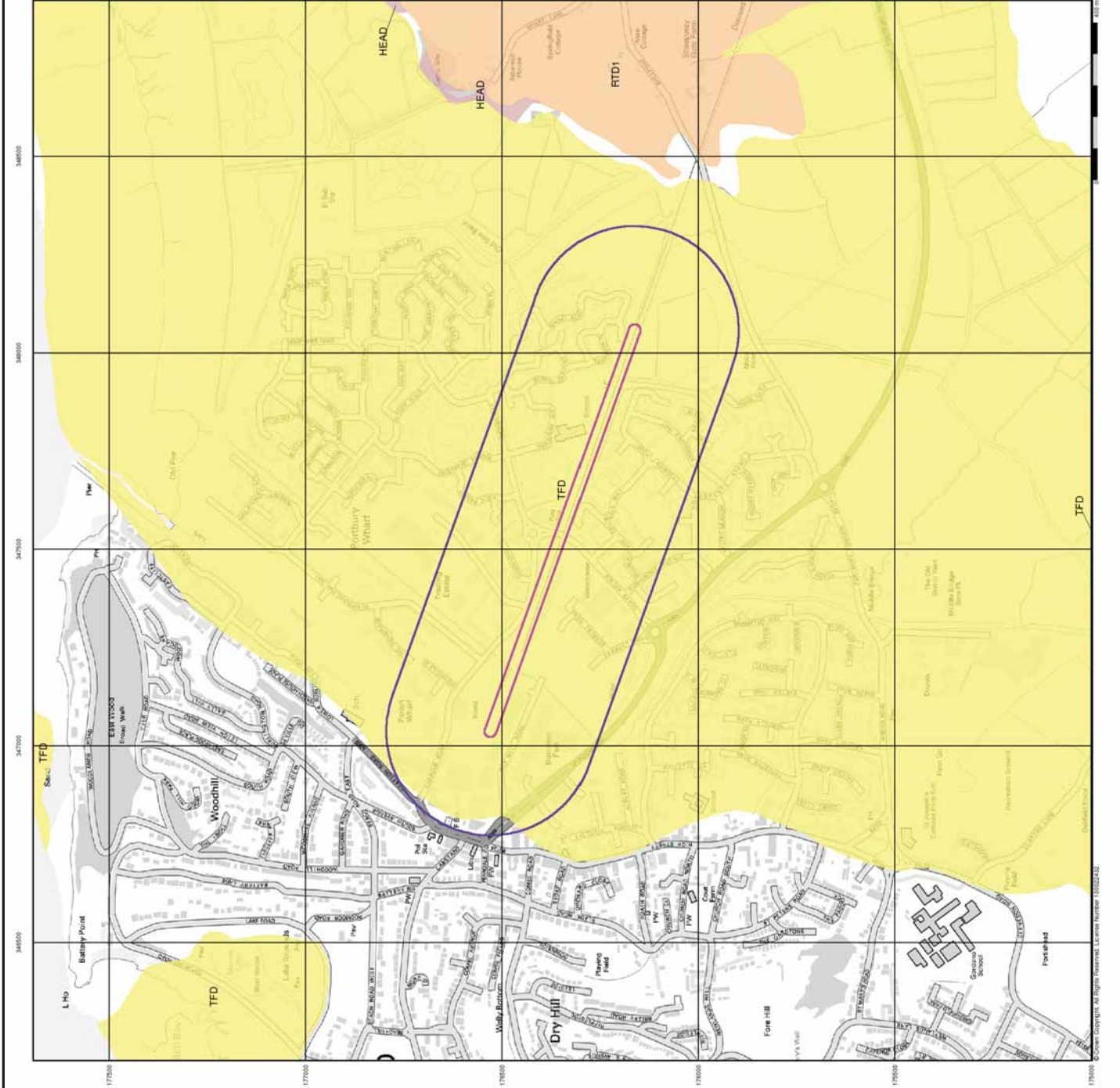


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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### Bedrock and Faults

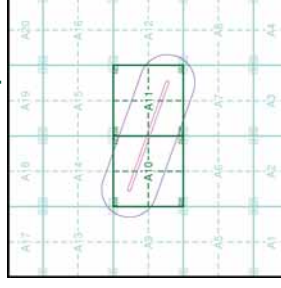
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults and thin beds mapped as lines such as coal seams and mineral veins. These are not restricted by age and could relate to features of any of the 1:10,000 geology datasets.

### Bedrock and Faults Map - Slice A

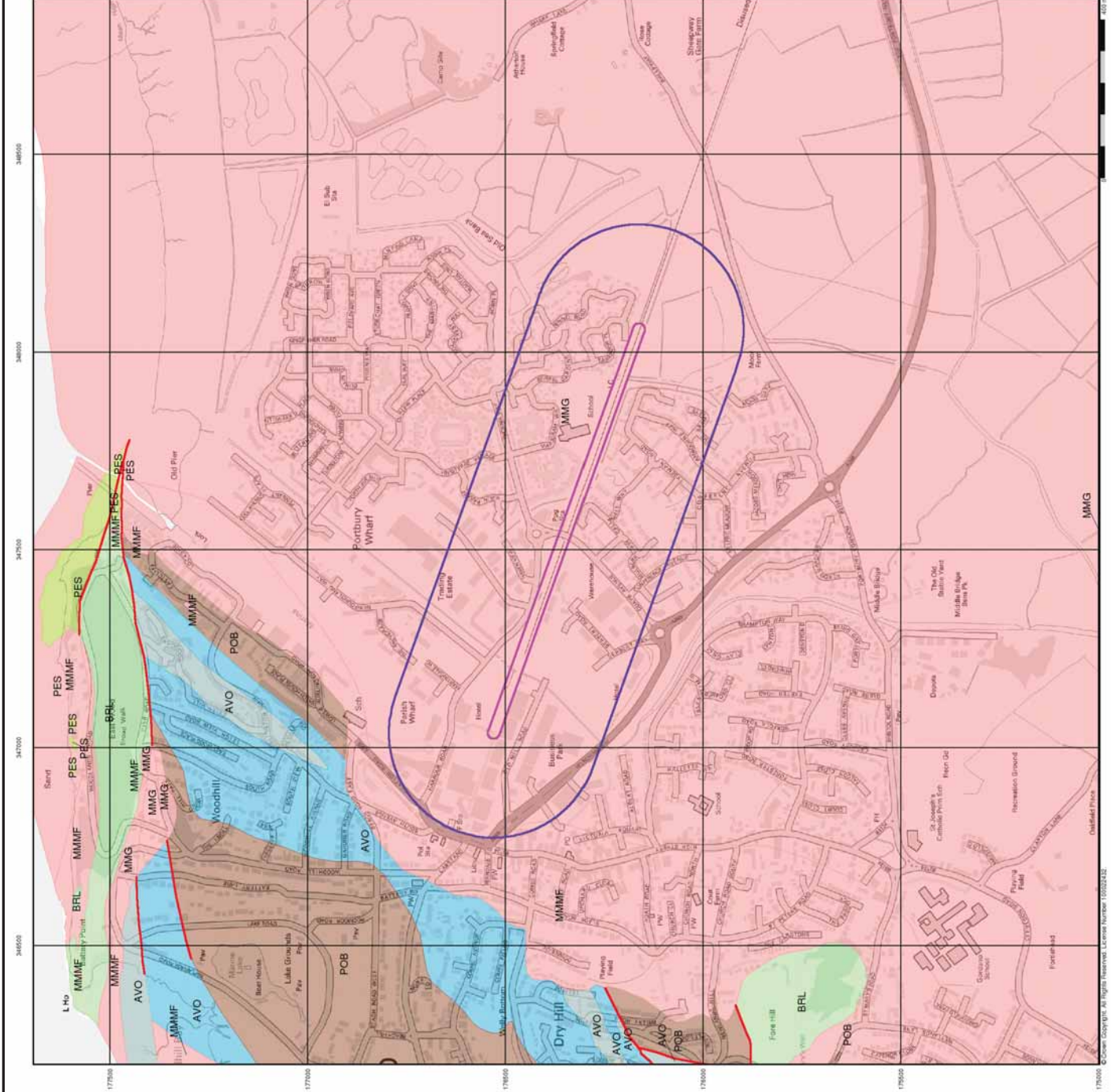


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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### Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined 'Surface Geology' map.

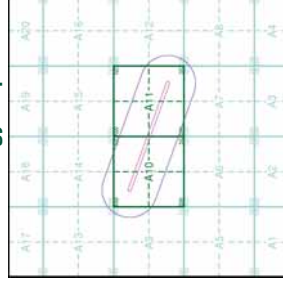
### Additional Information

More information on 1:10,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

### Contact

British Geological Survey  
 Kingsley Dunham Centre  
 Keyworth  
 Nottingham  
 NG12 5GG  
 Telephone: 0115 936 3143  
 Fax: 0115 936 3276  
 email: enquiries@bgs.ac.uk  
 website: www.bgs.ac.uk

### Combined Geology Map - Slice A

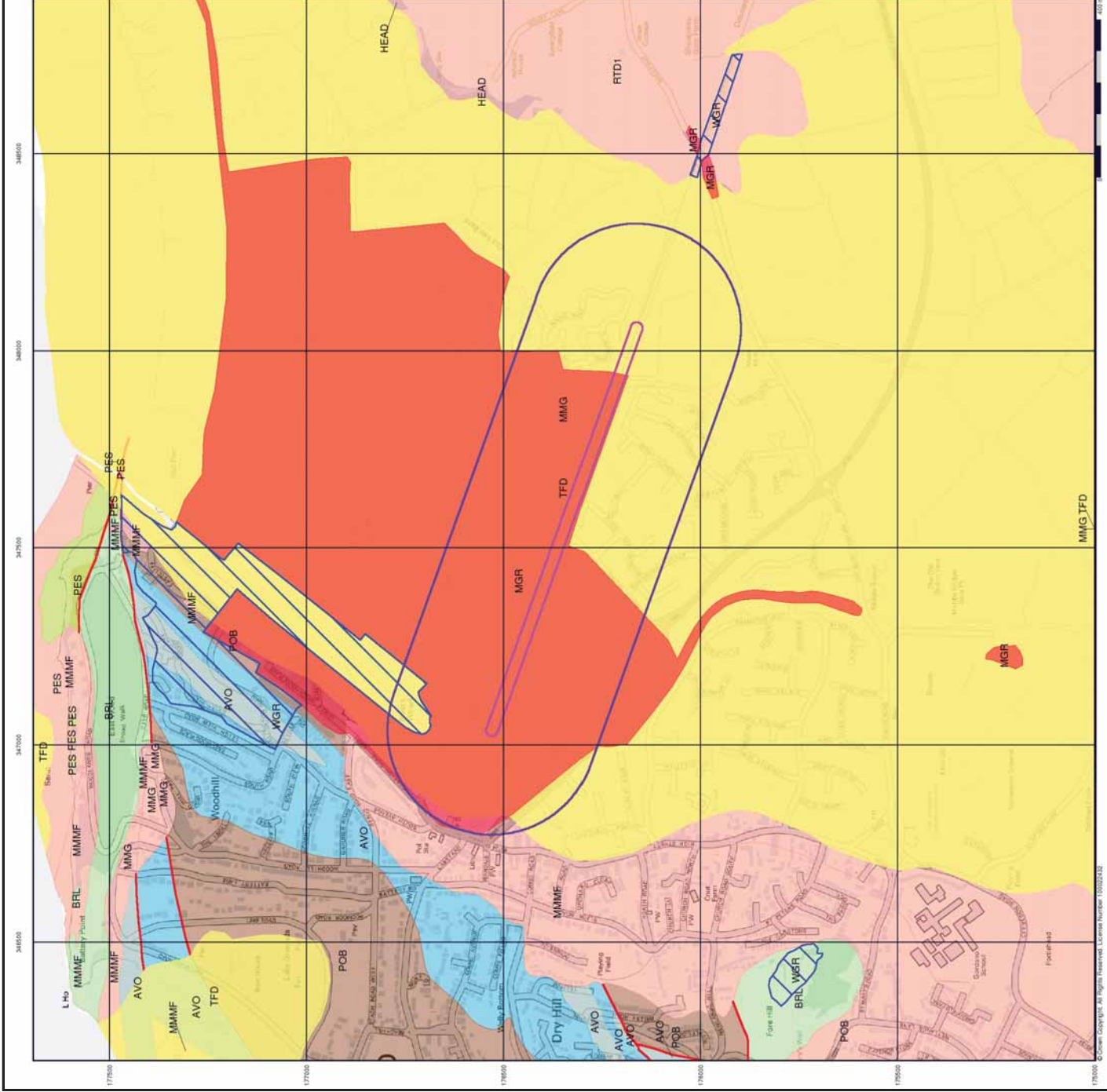


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
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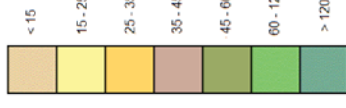




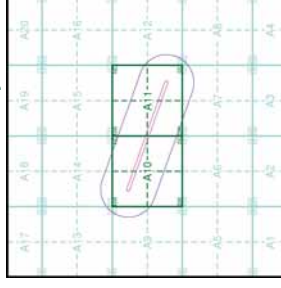


**Estimated Soil Chemistry Arsenic**

Arsenic Concentrations mg/kg



**Estimated Soil Chemistry Arsenic - Slice A**



**Order Details**

Order Details: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**  
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**General**

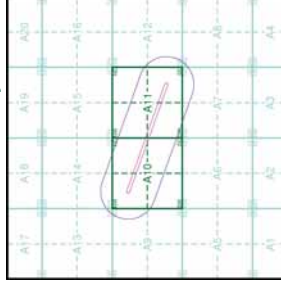
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

**Estimated Soil Chemistry Cadmium**

Cadmium Concentrations mg/kg



**Estimated Soil Chemistry Cadmium - Slice A**



**Order Details**

Order Details: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Site: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**  
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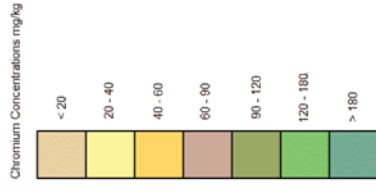


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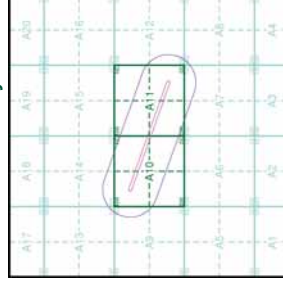


**General**  
 Specified Site Bearing Reference Point

**Estimated Soil Chemistry Chromium**



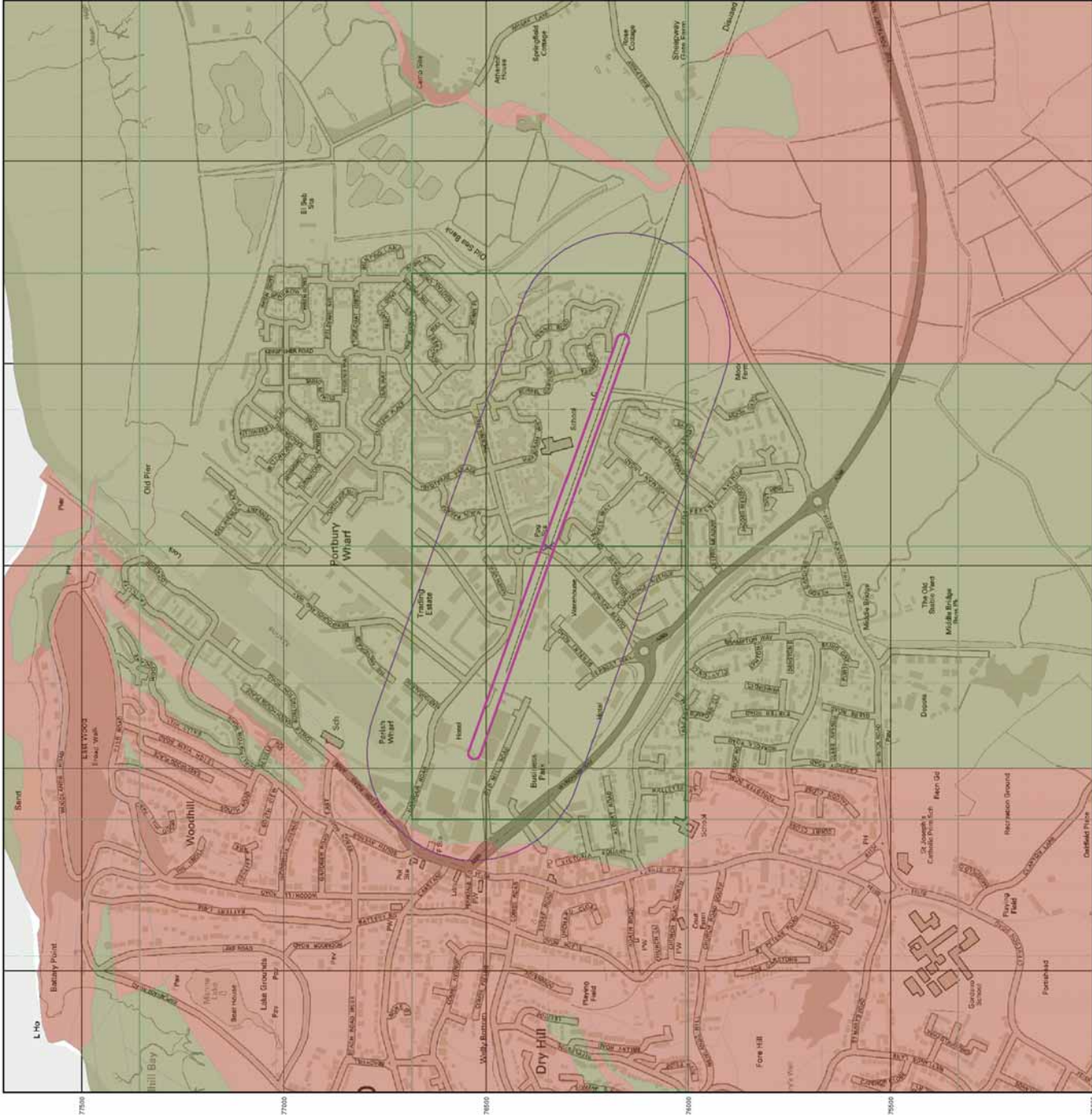
**Estimated Soil Chemistry Chromium - Slice A**



**Order Details**

Order Details: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**  
 Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



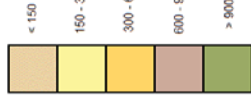
176000 346500 347000 347500 348000  
 177000 177500 178000 178500 179000

**General**

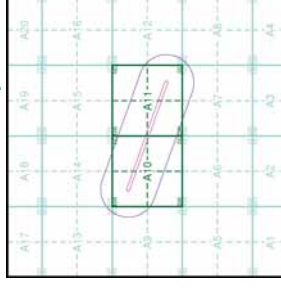
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

**Estimated Soil Chemistry Lead**

Lead Concentrations mg/kg



**Estimated Soil Chemistry Lead - Slice A**



**Order Details**

Order Details: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**  
 Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG

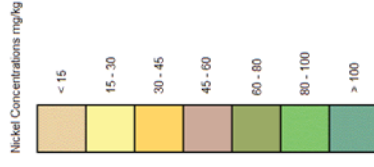


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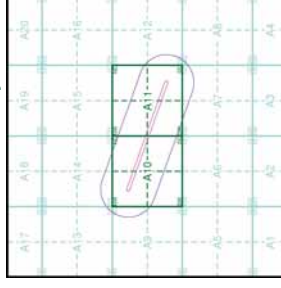




**Estimated Soil Chemistry Nickel**



**Estimated Soil Chemistry Nickel - Slice A**



**Order Details**

Order Details: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**  
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# Ground Stability Data (1:50,000)

**General**

- Specified Site
- Specified Buffer(s)
- Map ID
- Bearing Reference Point

**Potential for Compressible Ground Stability Hazards**

- High
- Moderate
- Low
- Very Low

**Potential for Collapsible Ground Stability Hazards**

- High
- Moderate
- Very Low

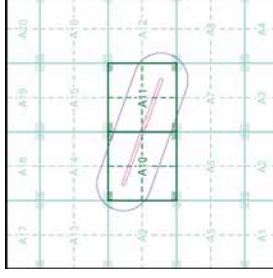
**Brine Pumping and Salt Mining**

- Brine Pumping Related Feature
- Salt Mining Related Feature

**Point Polygon**

- Point
- Polygon

## Mining and Ground Stability - Slice A

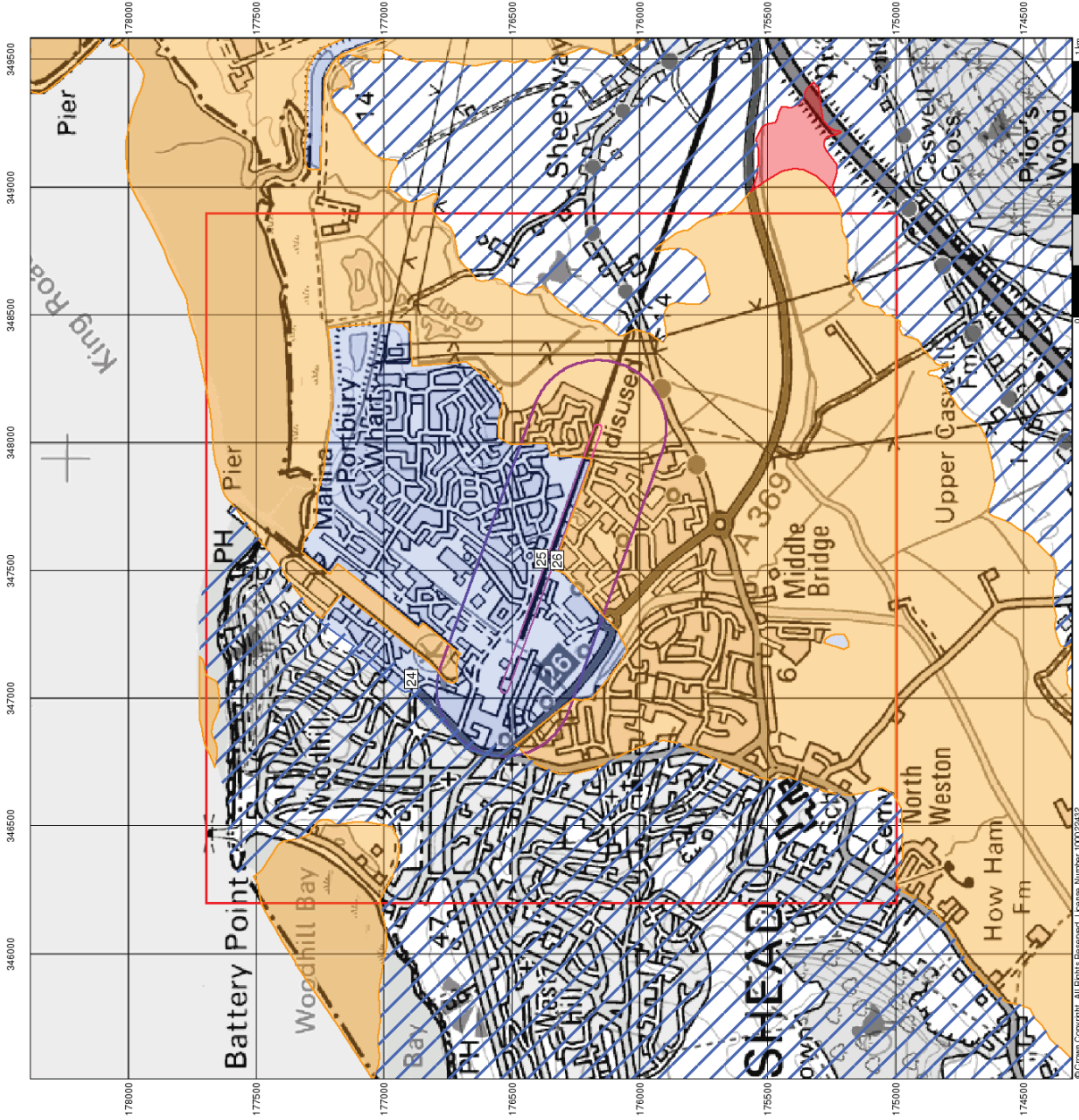


### Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG





## Ground Stability Data (1:50,000)

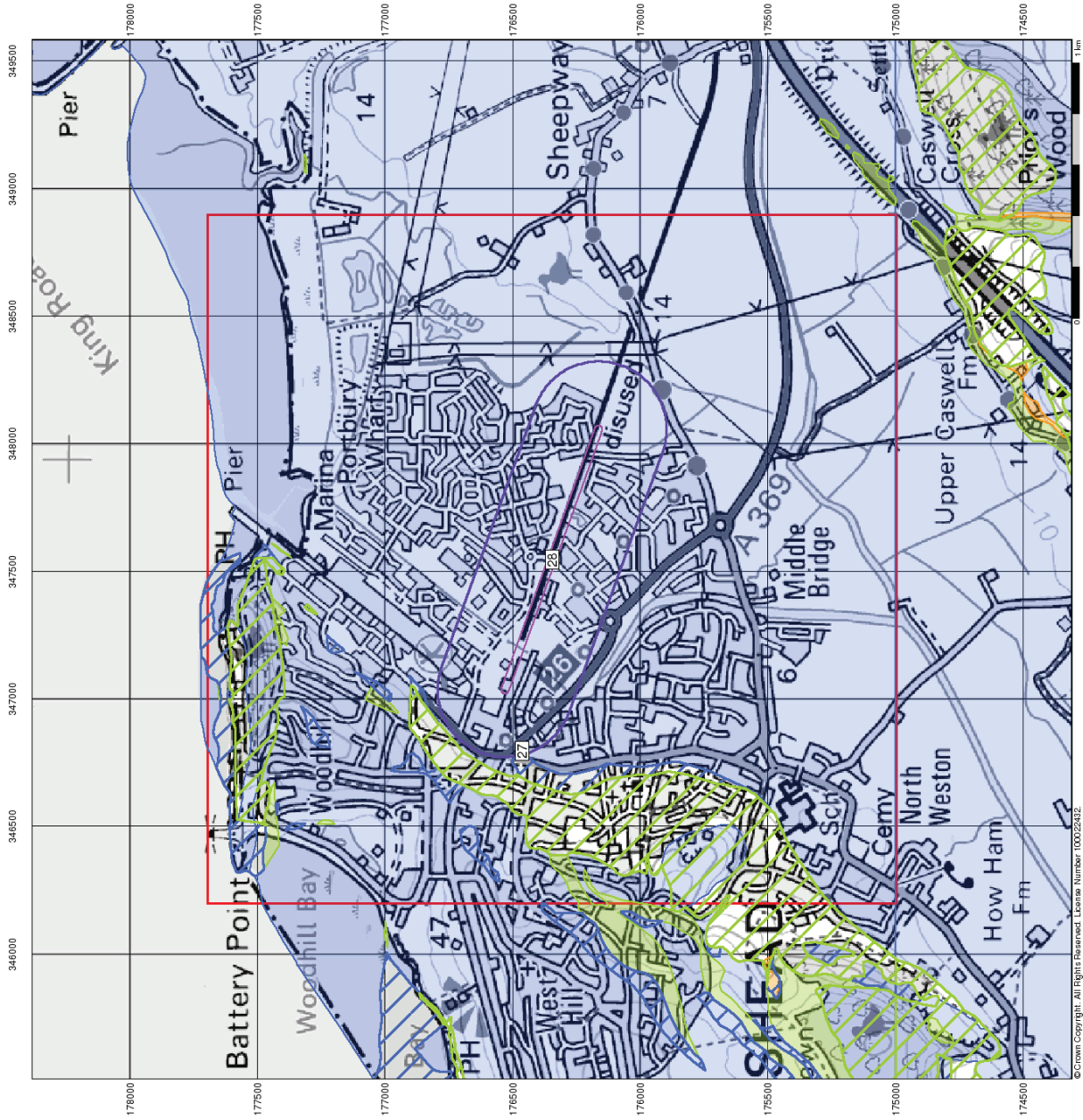
- General**
- Specified Site
  - Specified Buffer(s)
  - Bearing Reference Point
  - Slice
  - Map ID

### Potential for Landslide Ground Stability Hazards

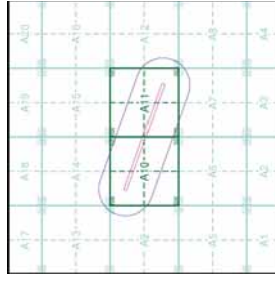
- High
- Moderate
- Low
- Very Low

### Potential for Ground Dissolution Stability Hazards

- High
- Moderate
- Low
- Very Low



### Mining and Ground Stability - Slice A



### Order Details

Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG



## Ground Stability Data (1:50,000)

- General**
- Specified Site
  - Specified Buffer(s)
  - Bearing Reference Point
  - Slice
  - Map ID

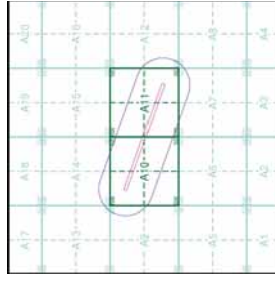
### Potential for Running Sand Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

### Potential for Shrinking or Swelling Clay Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

### Mining and Ground Stability - Slice A



### Order Details

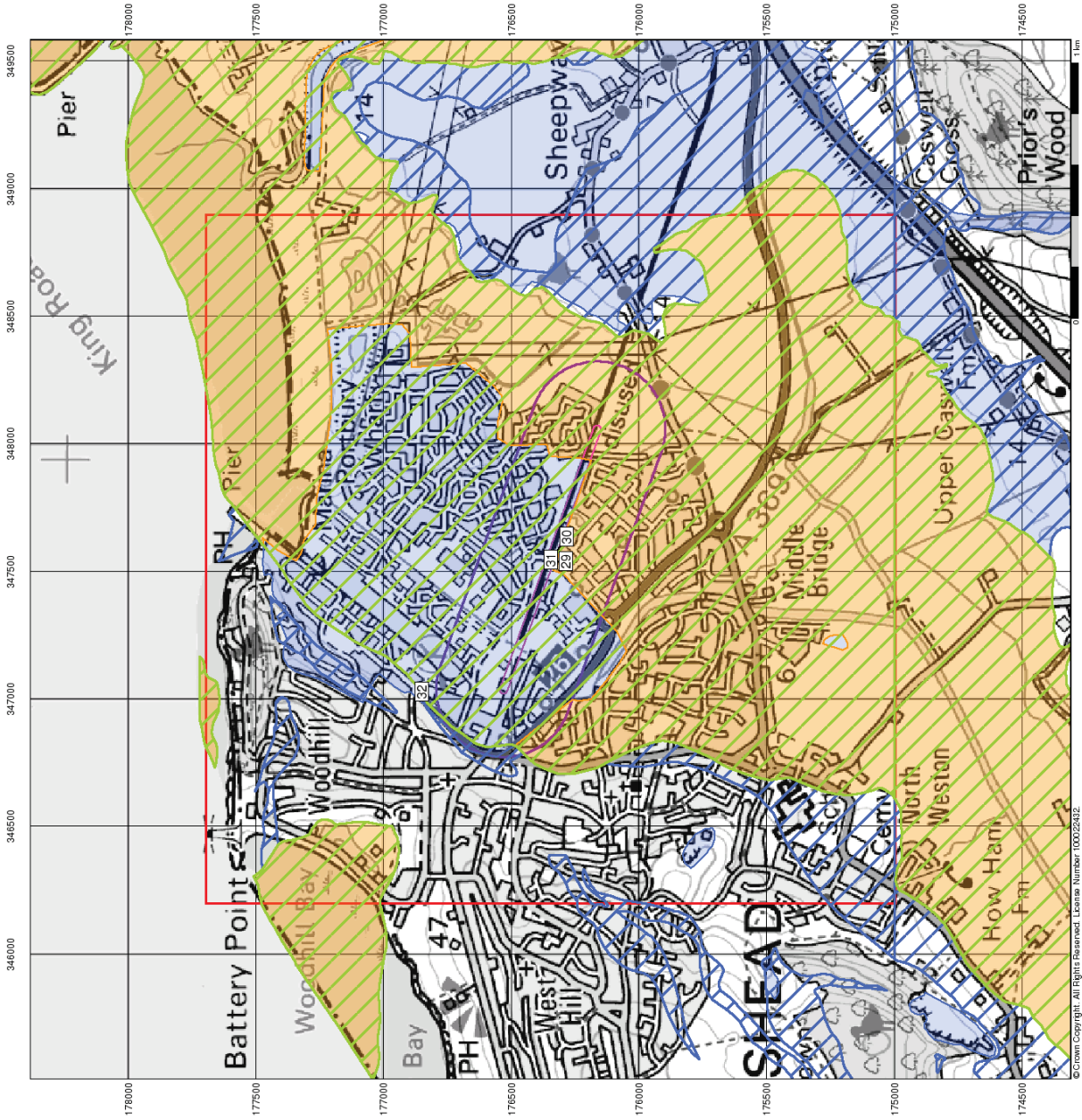
Order Number: 54372246\_1.1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

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## Envirocheck<sup>®</sup> Report:

### Mining and Ground Stability Datasheet

#### Order Details:

**Order Number:**

54372246\_1\_1

**Customer Reference:**

489334.aa.01.04

**National Grid Reference:**

347550, 176350

**Slice:**

A

**Site Area (Ha):**

3.33

**Search Buffer (m):**

250

**Site Details:**

Portishead Cruising Club, Pump Square

Pill

BRISTOL

BS20 0BG

**Client Details:**

MR C Williams

Halcrow Group Ltd

1 Kingsway

Cardiff

CF10 3AN

Report Section and Details	Page Number
<b>Summary</b>	-
<p>The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected.</p> <p>For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).</p>	
<b>Mining and Natural Cavities Data</b>	-
<p>The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities.</p> <p>Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical Land Use Information (1:10,000) map.</p>	
<b>Historical Land Use Information (1:2,500)</b>	<b>1</b>
<p>The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative.</p> <p>For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea Britannica society.</p>	
<b>Historical Land Use Information (1:10,000)</b>	<b>3</b>
<p>The Historical Land Use (1:10,000) section covers data captured from the systematic analysis carried out by Landmark of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th century, identifying potentially contaminative past industrial land uses.</p> <p>For the purpose of this Envirocheck module, only data relating to mining and ground stability has been included and plotted on the accompanying Historical Land Use Information (1:10,000) map.</p>	
<b>Ground Stability Data (1:50,000)</b>	<b>4</b>
<p>The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features to 250m and plotted onto 3 separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of which Brine Pumping and Salt Mining Related Features are plotted, and subsidence insurance claims and insurance investigations data, which is not plotted.</p>	
<b>Motion Map Data (1:2,500)</b>	<b>5</b>
<p>The Motion Map Data (1:2,500) section contains data which is plotted to indicate long-term stability trends from analysis of satellite radar data.</p>	
<b>Historical Map List</b>	<b>7</b>
<p>The Historical Map List section details the historical mapping that has been analysed for your site, in relation to the Historical Land Use Information sections.</p>	
<b>Data Currency</b>	<b>8</b>
<b>Data Suppliers</b>	<b>10</b>
<b>Useful Contacts</b>	<b>11</b>

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The brine subsidence data relating to the Driotwich area as provided in this report is derived from JPB studies and physical monitoring undertaken annually over more than 35 years. For more detailed interpretation contact enquiries@jpb.co.uk. JPB retain the copyright and intellectual rights to this data and accept no liability for any loss or damage, including in direct or consequential loss, arising from the use of this data.

Report Version v47.0

Data Type	Page Number	On Site	0 to 250m
<b>Mining and Natural Cavities Data</b>			
BGS Recorded Mineral Sites			
Coal Mining Affected Areas			n/a
Man Made Mining Cavities			
Mining Instability			n/a
Natural Cavities			
Non Coal Mining Areas of Great Britain			
Potential Mining Areas			
<b>Historical Land Use Information (1:2,500)</b>			
Extractive Industries or Potential Excavations from 1855-1909 (100m)	pg 1	1	2
Extractive Industries or Potential Excavations from 1893-1915 (100m)	pg 1	2	2
Extractive Industries or Potential Excavations from 1906-1937 (100m)	pg 1	2	1
Extractive Industries or Potential Excavations from 1924-1949 (100m)	pg 1	2	1
Extractive Industries or Potential Excavations from 1950-1980 (100m)	pg 2	1	4
Subterranean Features (100m)			
<b>Historical Land Use Information (1:10,000)</b>			
Air Shafts			
Disturbed Ground			
General Quarrying			
Heap, unknown constituents	pg 3	1	
Mineral Railway			
Mining & quarrying general			
Mining of coal & lignite			
Quarrying of sand & clay, operation of sand & gravel pits			
Former Marshes			
Potentially Infilled Land (Non-Water)			
Potentially Infilled Land (Water)	pg 3		4



Data Type	Page Number	On Site	0 to 250m
<b>Ground Stability Data (1:50,000)</b>			
Brine Compensation Area			n/a
Brine Pumping Related Features			
Brine Subsidence Solution Area			
Potential for Collapsible Ground Stability Hazards	pg 4	Yes	Yes
Potential for Compressible Ground Stability Hazards	pg 4	Yes	Yes
Potential for Ground Dissolution Stability Hazards	pg 4		Yes
Potential for Landslide Ground Stability Hazards	pg 4	Yes	Yes
Potential for Running Sand Ground Stability Hazards	pg 4	Yes	Yes
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 4	Yes	Yes
Salt Mining Related Features			
Subsidence Insurance Claims	pg 4		2
Subsidence Investigations			
<b>Motion Map Data (1:2,500)</b>			
Motion Map (100m)	pg 5	2	19

Report Version v47.0

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	<b>Extractive Industries or Potential Excavations from 1855-1909</b> Use: Portishead Dock First Map Published 1884 Date: Last Map Published 1884 Date:	A10NE (NW)	0	-	347234 176545
2	<b>Extractive Industries or Potential Excavations from 1855-1909</b> Use: Unspecified Industrial Water Feature First Map Published 1884 Date: Last Map Published 1884 Date:	A10NW (NW)	73	-	347182 176653
3	<b>Extractive Industries or Potential Excavations from 1855-1909</b> Use: Railway Embankment First Map Published 1884 Date: Last Map Published Not Applicable Date:	A10NW (NW)	98	-	347014 176642
4	<b>Extractive Industries or Potential Excavations from 1893-1915</b> Use: Portishead Dock First Map Published 1903 Date: Last Map Published 1903 Date:	A10NE (NW)	0	-	347270 176541
5	<b>Extractive Industries or Potential Excavations from 1893-1915</b> Use: Unspecified Deposited Material First Map Published 1903 Date: Last Map Published Not Applicable Date:	A10NE (NW)	0	-	347227 176539
6	<b>Extractive Industries or Potential Excavations from 1893-1915</b> Use: Railway Embankment First Map Published 1903 Date: Last Map Published Not Applicable Date:	A10NW (NW)	79	-	347008 176618
7	<b>Extractive Industries or Potential Excavations from 1893-1915</b> Use: Unspecified Industrial Water Feature First Map Published 1903 Date: Last Map Published Not Applicable Date:	A10NW (NW)	100	-	347001 176662
8	<b>Extractive Industries or Potential Excavations from 1906-1937</b> Use: Unspecified Deposited Material First Map Published 1915 Date: Last Map Published Not Applicable Date:	A10NE (NW)	0	-	347215 176513
9	<b>Extractive Industries or Potential Excavations from 1906-1937</b> Use: Portishead Dock First Map Published 1915 Date: Last Map Published 1915 Date:	A10NE (NW)	0	-	347262 176572
10	<b>Extractive Industries or Potential Excavations from 1906-1937</b> Use: Unspecified Deposited Material First Map Published 1915 Date: Last Map Published Not Applicable Date:	A10NE (NW)	48	-	347225 176536
11	<b>Extractive Industries or Potential Excavations from 1924-1949</b> Use: Portishead Dock First Map Published 1931 Date: Last Map Published 1932 Date:	A10NE (W)	0	-	347401 176395

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	<b>Extractive Industries or Potential Excavations from 1924-1949</b> Use: Unspecified Deposited Material First Map Published 1931 Date: Last Map Published Not Applicable Date:	A10NE (NW)	0	-	347212 176519
13	<b>Extractive Industries or Potential Excavations from 1924-1949</b> Use: Unspecified Deposited Material First Map Published 1931 Date: Last Map Published Not Applicable Date:	A10NE (NW)	48	-	347227 176539
14	<b>Extractive Industries or Potential Excavations from 1950-1980</b> Use: Portishead Dock First Map Published 1967 Date: Last Map Published 1968 Date:	A10NE (NW)	0	-	347278 176538
15	<b>Extractive Industries or Potential Excavations from 1950-1980</b> Use: Refuse Tip First Map Published 1968 Date: Last Map Published N/A Date:	A11NW (E)	6	-	347644 176371
16	<b>Extractive Industries or Potential Excavations from 1950-1980</b> Use: Gasholder First Map Published 1968 Date: Last Map Published N/A Date:	A10NW (NW)	28	-	347157 176539
17	<b>Extractive Industries or Potential Excavations from 1950-1980</b> Use: Unspecified Deposited Material First Map Published 1968 Date: Last Map Published N/A Date:	A10SE (SW)	39	-	347473 176301
18	<b>Extractive Industries or Potential Excavations from 1950-1980</b> Use: Pond First Map Published 1968 Date: Last Map Published N/A Date:	A10NW (W)	83	-	346985 176447

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
19	<b>Heap, unknown constituents</b> Use: Not Supplied Date of Mapping: 1981	A11NW (N)	0	-	347552 176359
20	<b>Potentially Infilled Land (Water)</b> Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1961	A10NE (W)	11	-	347381 176379
21	<b>Potentially Infilled Land (Water)</b> Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1920	A14SW (NW)	104	-	347071 176693
22	<b>Potentially Infilled Land (Water)</b> Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1920	A10NW (NW)	135	-	347174 176639
23	<b>Potentially Infilled Land (Water)</b> Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1920	A14SE (NW)	205	-	347223 176695

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	<b>Brine Compensation Area</b> The site does not fall within the brine compensation area.				
	<b>Brine Subsidence Solution Area</b> The site does not fall within the brine subsidence solution area.				
24	<b>Potential for Collapsible Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	204	1	347076 176892
	<b>Potential for Collapsible Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	1	347547 176346
25	<b>Potential for Compressible Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	1	347547 176346
26	<b>Potential for Compressible Ground Stability Hazards</b> Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10SE (S)	0	1	347540 176323
	<b>Potential for Compressible Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A9NE (W)	210	1	346817 176487
27	<b>Potential for Ground Dissolution Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A9NE (W)	237	1	346795 176462
28	<b>Potential for Landslide Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	1	347547 176346
	<b>Potential for Landslide Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	237	1	347011 176873
29	<b>Potential for Running Sand Ground Stability Hazards</b> Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A10SE (S)	0	1	347540 176323
30	<b>Potential for Running Sand Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	1	347547 176346
	<b>Potential for Running Sand Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A9NE (W)	210	1	346817 176487
31	<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A10SE (W)	0	1	347547 176346
32	<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	204	1	347028 176851
	<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A14SW (NW)	237	1	347076 176892
	<b>Subsidence Insurance Claims</b> Case Date: 30th January 2012 Movement Trend: Not Supplied Indication: Damage: Not Supplied Classification:			-	
	<b>Subsidence Insurance Claims</b> Case Date: 16th January 2012 Movement Trend: Not Supplied Indication: Damage: Not Supplied Classification:			-	



Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	<b>Motion Map</b> Average Velocity -0.7 Gradient (mmyear):	A11SW (E)	0	-	347596 176343
33	<b>Motion Map</b> Average Velocity -0.5 Gradient (mmyear):	A11SW (E)	0	-	347592 176344
33	<b>Motion Map</b> Average Velocity -0.8 Gradient (mmyear):	A11NW (E)	3	-	347594 176348
33	<b>Motion Map</b> Average Velocity -0.5 Gradient (mmyear):	A11NW (E)	3	-	347591 176348
34	<b>Motion Map</b> Average Velocity -1.9 Gradient (mmyear):	A10NW (NW)	14	-	347116 176531
35	<b>Motion Map</b> Average Velocity -0.4 Gradient (mmyear):	A11NW (E)	15	-	347593 176360
35	<b>Motion Map</b> Average Velocity -0.5 Gradient (mmyear):	A11NW (E)	19	-	347599 176363
35	<b>Motion Map</b> Average Velocity -0.4 Gradient (mmyear):	A11NW (E)	19	-	347595 176364
36	<b>Motion Map</b> Average Velocity -1.2 Gradient (mmyear):	A11SE (SE)	19	-	347918 176177
37	<b>Motion Map</b> Average Velocity -0.9 Gradient (mmyear):	A11NW (NE)	38	-	347596 176384
38	<b>Motion Map</b> Average Velocity -0.8 Gradient (mmyear):	A10NW (NW)	43	-	347105 176566
38	<b>Motion Map</b> Average Velocity -1.0 Gradient (mmyear):	A10NW (NW)	43	-	347099 176567
38	<b>Motion Map</b> Average Velocity -0.9 Gradient (mmyear):	A10NW (NW)	47	-	347104 176570
39	<b>Motion Map</b> Average Velocity -1.1 Gradient (mmyear):	A10NW (W)	44	-	347129 176434
40	<b>Motion Map</b> Average Velocity -1.5 Gradient (mmyear):	A10NW (W)	48	-	347128 176430
41	<b>Motion Map</b> Average Velocity -0.9 Gradient (mmyear):	A10NW (NW)	54	-	347099 176579
42	<b>Motion Map</b> Average Velocity -1.3 Gradient (mmyear):	A10NW (NW)	64	-	347126 176581
43	<b>Motion Map</b> Average Velocity -3.2 Gradient (mmyear):	A10NE (NW)	73	-	347431 176480
44	<b>Motion Map</b> Average Velocity -0.8 Gradient (mmyear):	A10NW (W)	77	-	346947 176543
45	<b>Motion Map</b> Average Velocity -4.0 Gradient (mmyear):	A10NE (NW)	79	-	347418 176492

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
45	<b>Motion Map</b> Average Velocity    -3.9 Gradient (mmyear):	A10NE (NW)	83	-	347419 176495

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Somerset	002_10	1884
Somerset	002_10	1884
Somerset	002_10	1903
Somerset	002_10	1903
Somerset	002_10	1915
Somerset	002_10	1915
Somerset	002_10	1931
Somerset	002_10	1931
Ordnance Survey Plan	ST4676	1968
Ordnance Survey Plan	ST4776	1968
Ordnance Survey Plan	ST4776	1968
Ordnance Survey Plan	ST4876	1968

The following mapping has been analysed for Historical Land Use Information (1:10,000):








1:10,560	Mapsheet	Published Date
Somerset	002_SW	1884
Somerset	002_NW	1886
Monmouthshire	040_00	1887
Monmouthshire	040_SW	1903
Somerset	002_NW	1904
Somerset	002_SW	1904
Somerset	002_NW	1920
Somerset	002_SW	1920
Monmouthshire	040_00	1922
Somerset	002_NW	1938
Somerset	002_SW	1938
Ordnance Survey Plan	ST47NE	1961
Ordnance Survey Plan	ST47SE	1961
1:10,000	Mapsheet	Published Date
Ordnance Survey Plan	ST47NE	1981
Ordnance Survey Plan	ST47SE	1981

<b>Mining and Cavities Data</b>	<b>Version</b>	<b>Update Cycle</b>
<b>BGS Recorded Mineral Sites</b> British Geological Survey - National Geoscience Information Service	October 2013	Bi-Annually
<b>Coal Mining Affected Areas</b> The Coal Authority - Mining Report Service	December 2013	As notified
<b>Man Made Mining Cavities</b> Peter Brett Associates	October 2013	Bi-Annually
<b>Mining Instability</b> Ove Arup & Partners	October 2000	Not Applicable
<b>Natural Cavities</b> Peter Brett Associates	October 2013	Bi-Annually
<b>Non Coal Mining Areas of Great Britain</b> British Geological Survey - National Geoscience Information Service	February 2011	Not Applicable
<b>Historical Land Use Information (1:2,500)</b>	<b>Version</b>	<b>Update Cycle</b>
<b>Subterranean Features</b> Landmark Information Group Limited	September 2013	Bi-Annually
<b>Ground Stability Data (1:50,000)</b>	<b>Version</b>	<b>Update Cycle</b>
<b>Brine Compensation Area</b> Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
<b>Potential for Collapsible Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Compressible Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Ground Dissolution Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Landslide Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Running Sand Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Potential for Shrinking or Swelling Clay Ground Stability Hazards</b> British Geological Survey - National Geoscience Information Service	October 2013	As notified
<b>Subsidence Insurance Claims</b> SP Property Services	February 2014	Quarterly
<b>Subsidence Investigations</b> CET Structures Ltd	February 2014	Quarterly

Motion Map Data (1:2,500)	Version	Update Cycle
<b>Motion Map</b>		
Nigel Press Associates - Hampshire	February 2011	As notified
Nigel Press Associates - Cambridge	January 2011	As notified
Nigel Press Associates - Ipswich	January 2011	As notified
Nigel Press Associates - Norwich	January 2011	As notified
Nigel Press Associates - Peterborough	January 2011	As notified
Nigel Press Associates - Barnstaple	July 2010	As notified
Nigel Press Associates - Derbyshire	July 2010	As notified
Nigel Press Associates - Humberside	July 2010	As notified
Nigel Press Associates - Kent	July 2010	As notified
Nigel Press Associates - Lincolnshire	July 2010	As notified
Nigel Press Associates - Nottinghamshire	July 2010	As notified
Nigel Press Associates - Birmingham	May 2009	As notified
Nigel Press Associates - Bournemouth	May 2009	As notified
Nigel Press Associates - Brighton	May 2009	As notified
Nigel Press Associates - Bristol	May 2009	As notified
Nigel Press Associates - Cardiff	May 2009	As notified
Nigel Press Associates - Central London	May 2009	As notified
Nigel Press Associates - Cheltenham	May 2009	As notified
Nigel Press Associates - Coventry	May 2009	As notified
Nigel Press Associates - Crawley	May 2009	As notified
Nigel Press Associates - Edinburgh	May 2009	As notified
Nigel Press Associates - Exeter	May 2009	As notified
Nigel Press Associates - Glasgow	May 2009	As notified
Nigel Press Associates - Isle of Wight	May 2009	As notified
Nigel Press Associates - Leeds	May 2009	As notified
Nigel Press Associates - Leicester	May 2009	As notified
Nigel Press Associates - Liverpool	May 2009	As notified
Nigel Press Associates - Manchester	May 2009	As notified
Nigel Press Associates - Milton Keynes	May 2009	As notified
Nigel Press Associates - Newcastle	May 2009	As notified
Nigel Press Associates - Northwich	May 2009	As notified
Nigel Press Associates - Nottingham	May 2009	As notified
Nigel Press Associates - Oxford	May 2009	As notified
Nigel Press Associates - Plymouth	May 2009	As notified
Nigel Press Associates - Portsmouth	May 2009	As notified
Nigel Press Associates - Preston	May 2009	As notified
Nigel Press Associates - Reading	May 2009	As notified
Nigel Press Associates - Sheffield	May 2009	As notified
Nigel Press Associates - Stoke	May 2009	As notified
Nigel Press Associates - Swindon	May 2009	As notified
Nigel Press Associates - Tonbridge	May 2009	As notified
Nigel Press Associates - North London	November 2008	As notified
Nigel Press Associates - Head Office	September 2008	As notified



A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
British Geological Survey	
The Coal Authority	
Ove Arup	
Peter Brett Associates	
Wardell Armstrong	
Johnson Poole & Bloomer	

Contact	Name and Address	Contact Details
1	<b>British Geological Survey - Enquiry Service</b> British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
-	<b>Landmark Information Group Limited</b> Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk



## Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

### Slice

Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

### Segment

A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

### Quadrant

A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

## Client Details

MR C Williams, Halcrow Group Ltd, 1 Kingsway, Cardiff,  
CF10 3AN

## Order Details

Order Number: 54372246\_1\_1  
Customer Ref: 489334\_aa01.04  
National Grid Reference: 347550, 176350  
Site Area (Ha): 3.33  
Search Buffer (m): 250

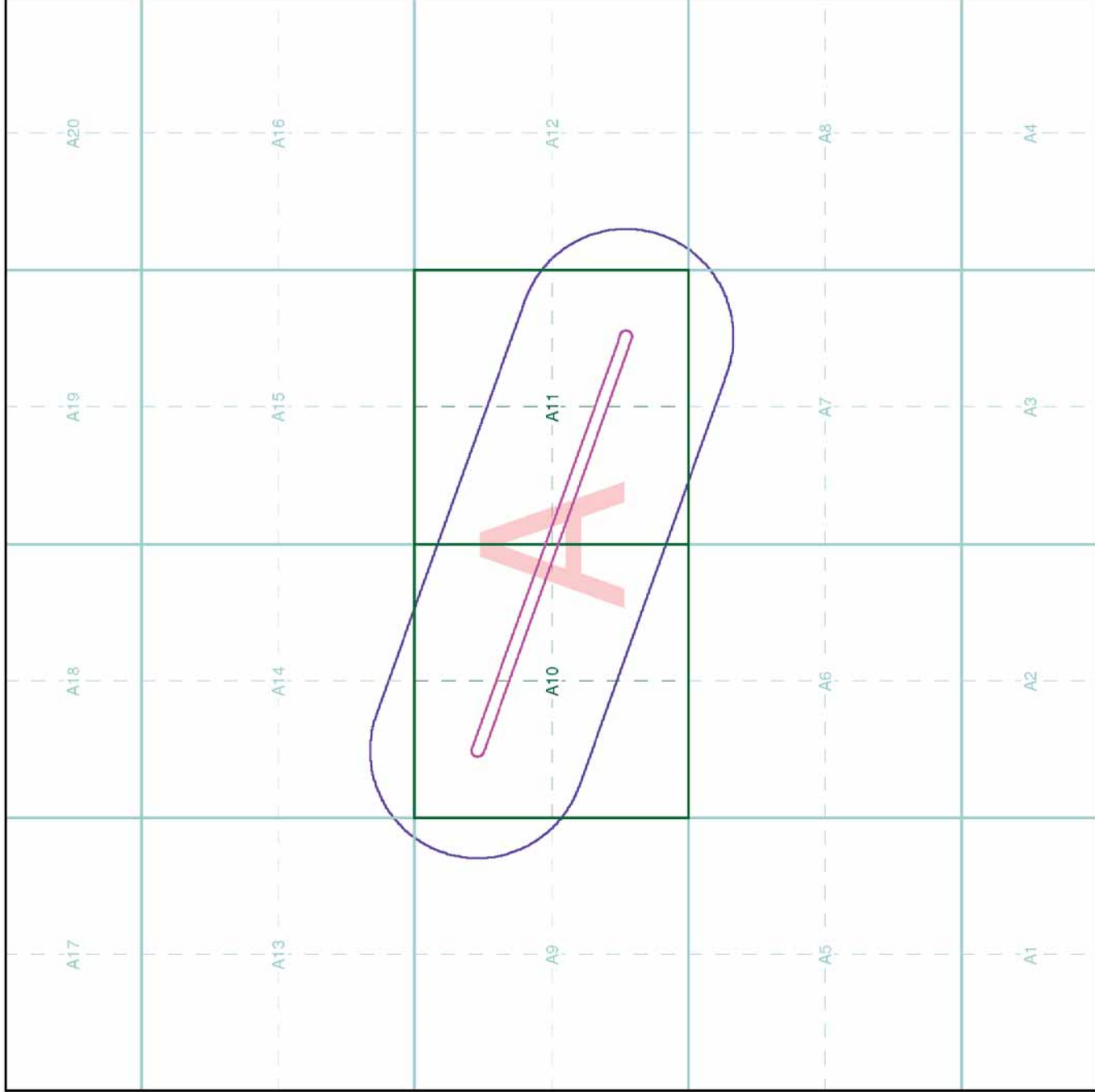
## Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
0BG

Full Terms and Conditions can be found on the following link:  
<http://www.landmarkinfo.co.uk/Terms/Show/515>



Tel: 0844 844 9852  
Fax: 0844 844 9851  
Web: www.envirocheck.co.uk





**General**

- Specified Site
- Bearing Reference Point
- Map ID
- Several of Type at Location

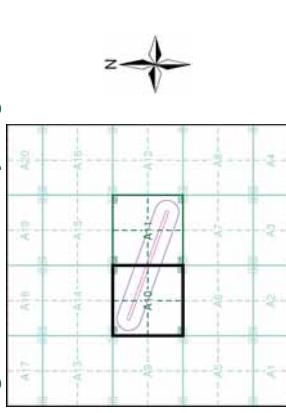
**Potentially Contaminative Industrial Uses (Extractive Industries Activity)**

Point	Line	Polygon
▲	—	▭
▲	—	▭
▲	—	▭
▲	—	▭
▲	—	▭
▲	—	▭

**Subterranean Features**

Point	Line	Polygon
▼	---	▭

Mining and Ground Stability - Segment A10

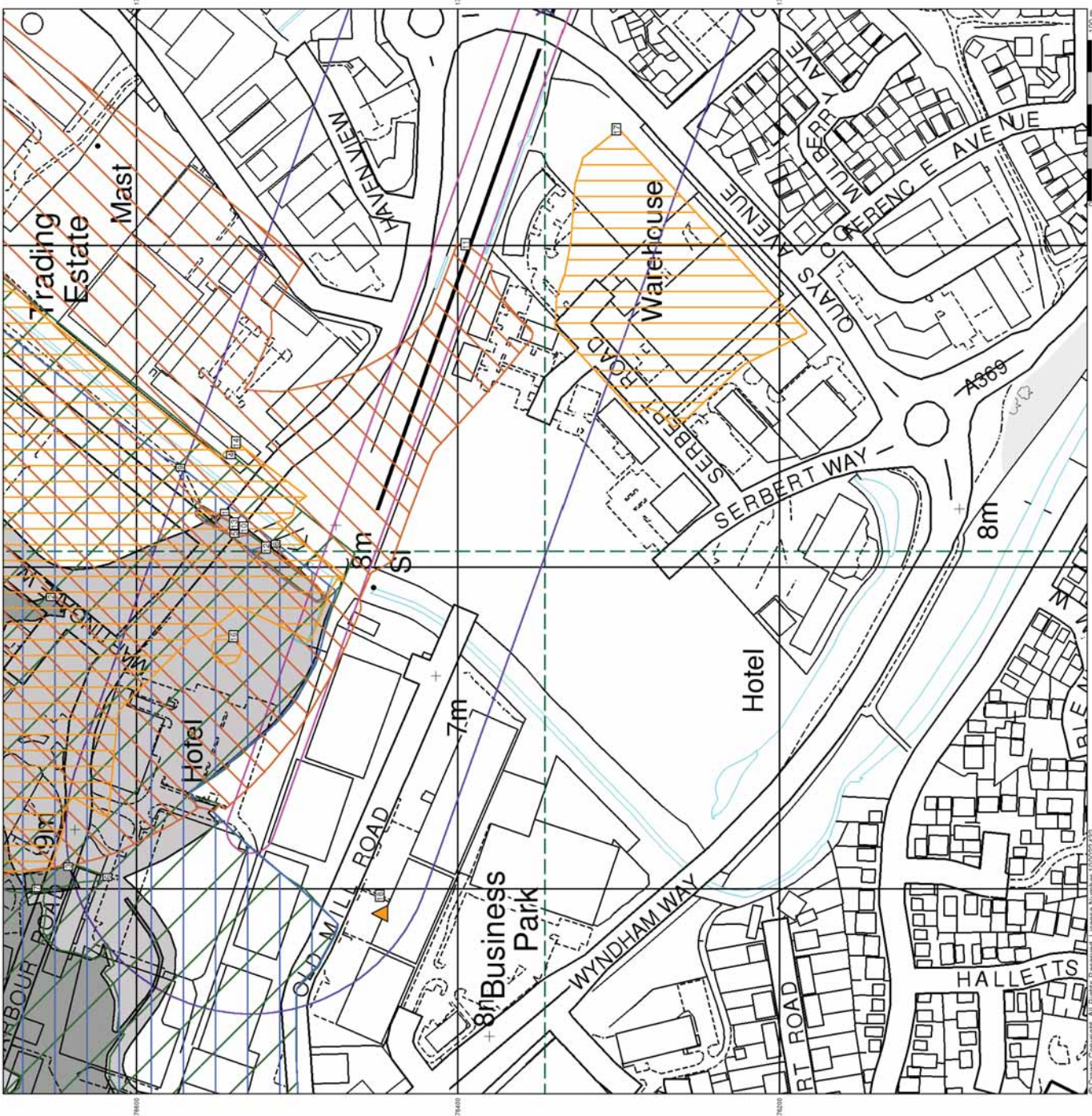


Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Plot Buffer (m): 100

Site Details

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



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**General**

- Specified Site
- Bearing Reference Point
- Map ID
- Several of Type at Location

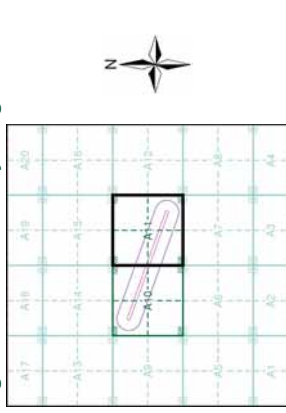
**Potentially Contaminative Industrial Uses (Extractive Industries Activity)**

Point	Line	Polygon
▲	—	■
▲	—	■
▲	—	■
▲	—	■
▲	—	■
▲	—	■

**Subterranean Features**

Point	Line	Polygon
▲	---	■

Mining and Ground Stability - Segment A11

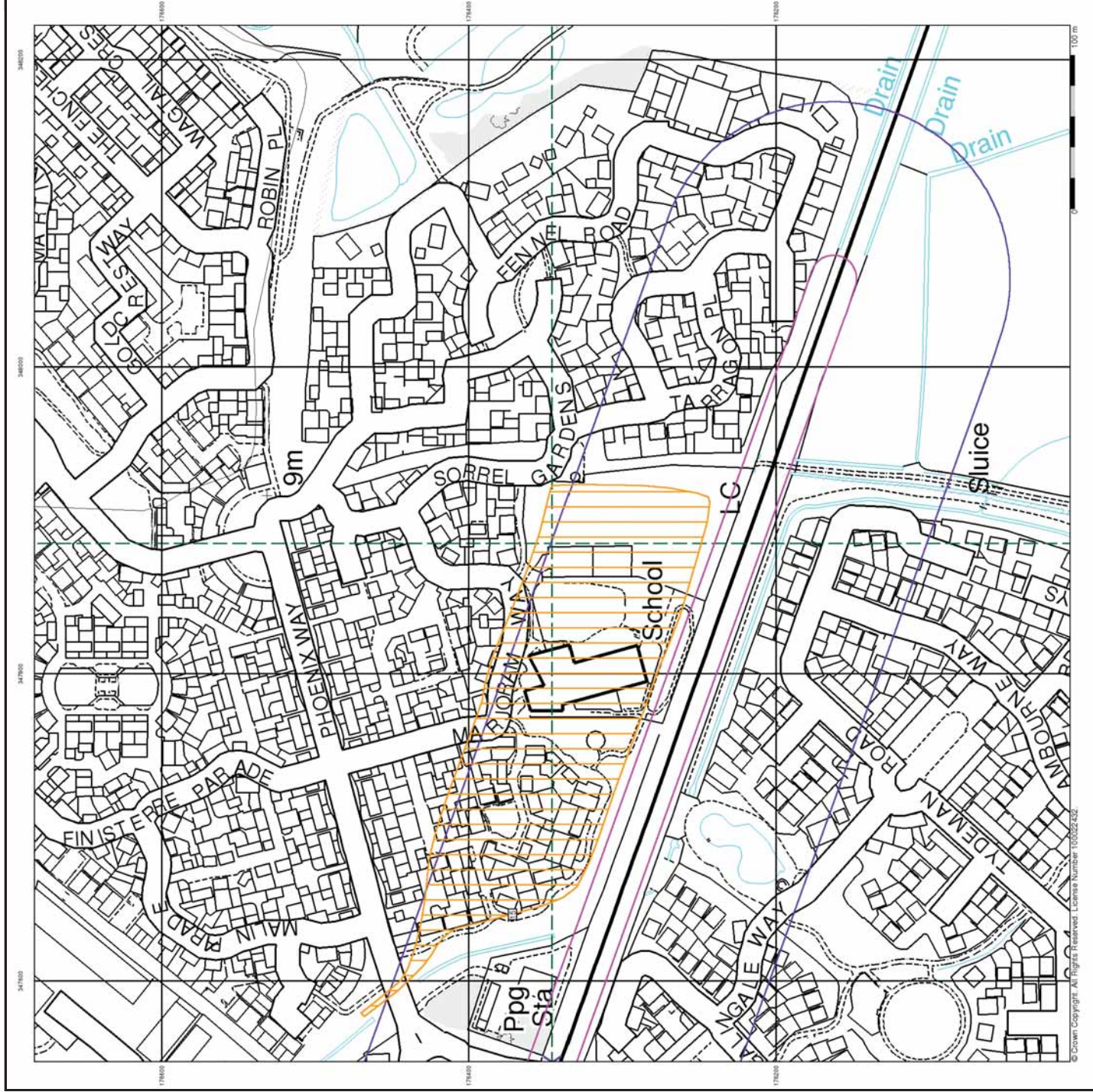


Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Site: A  
 Site Area (Ha): 3.33  
 Plot Buffer (m): 100

Site Details

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG





### Motion Map Data (1:2,500)

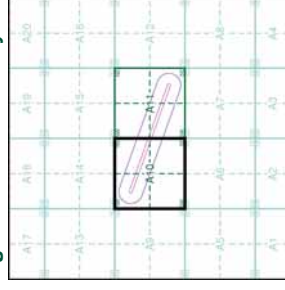
#### General

- Specified Site
- Bearing Reference Point
- Severely at Risk
- Map ID

#### Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement < -3.5mm per year

### Mining and Ground Stability - Segment A10

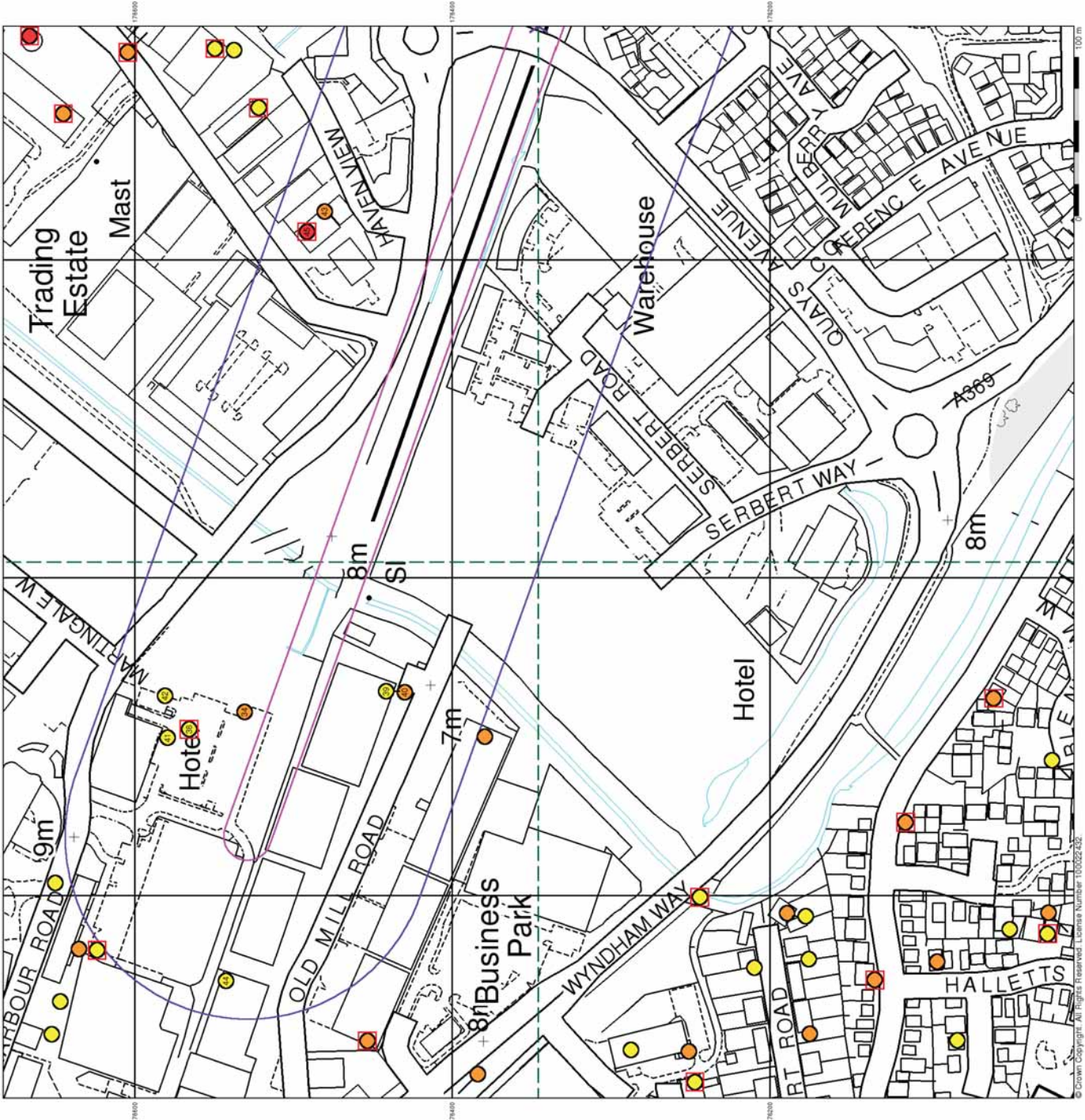


#### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa0104  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Plot Buffer (m): 100

#### Site Details

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
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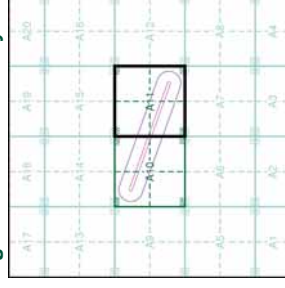
### Motion Map Data (1:2,500)

- General**
- Specified Site
  - Specified Buffer(s)
  - Bearing Reference Point
  - Map ID
  - Several of Type at Location
  - Several of Type at Location

### Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement < -3.5mm per year

### Mining and Ground Stability - Segment A11

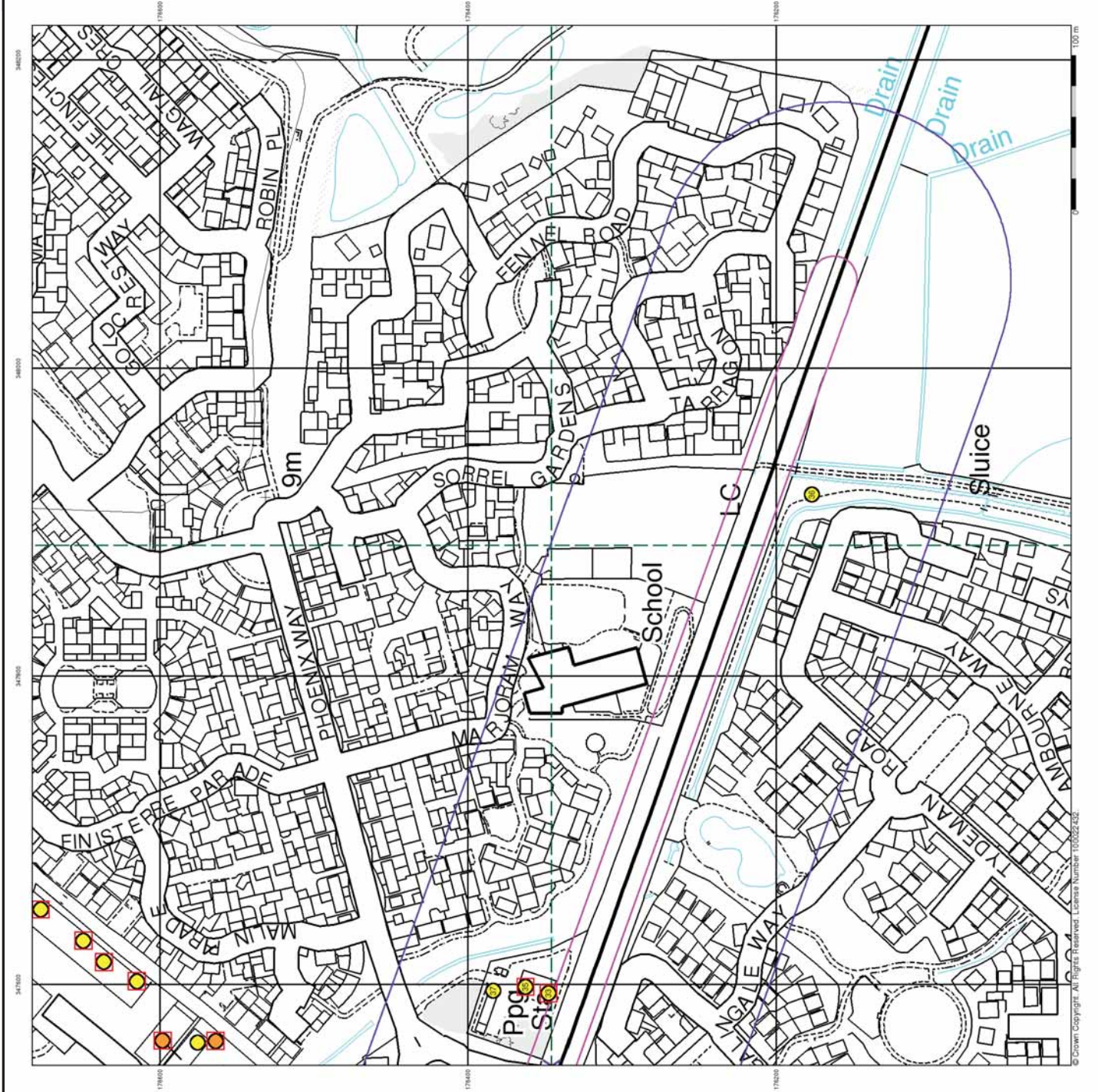


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334\_aa01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Plot Buffer (m): 100

### Site Details

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



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### Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Somerseset	1:2,500	1884	2
Somerseset	1:2,500	1903	3
Somerseset	1:2,500	1915	4
Somerseset	1:2,500	1931	5
Ordnance Survey Plan	1:2,500	1968	6
Additional SIMs	1:2,500	1972 - 1989	7
Supply of Unpublished Survey Information	1:2,500	1973 - 1976	8
Ordnance Survey Plan	1:2,500	1974	9
Additional SIMs	1:2,500	1977 - 1991	10
Ordnance Survey Plan	1:2,500	1987	11
Additional SIMs	1:2,500	1991	12
Large-Scale National Grid Data	1:2,500	1992	13
Large-Scale National Grid Data	1:2,500	1994 - 1995	14
Large-Scale National Grid Data	1:2,500	1995	15

### Large-Scale National Grid Data 1:2,500 and 1:1,250

### Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

### Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Porthead Cruising Club, Pump Square, Pili, BRISTOL, BS20  
 OBG

### Historical Map - Segment A10

### Landmark

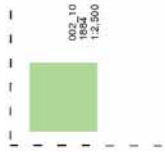
Tel: 0844 844 9882  
 Fax: 0844 844 9887  
 Web: www.envirocheck.co.uk

**Somerset  
Published 1884**

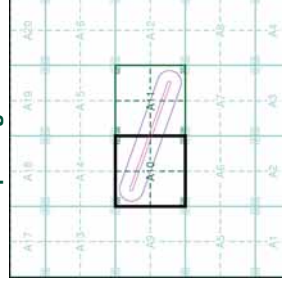
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1838, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**

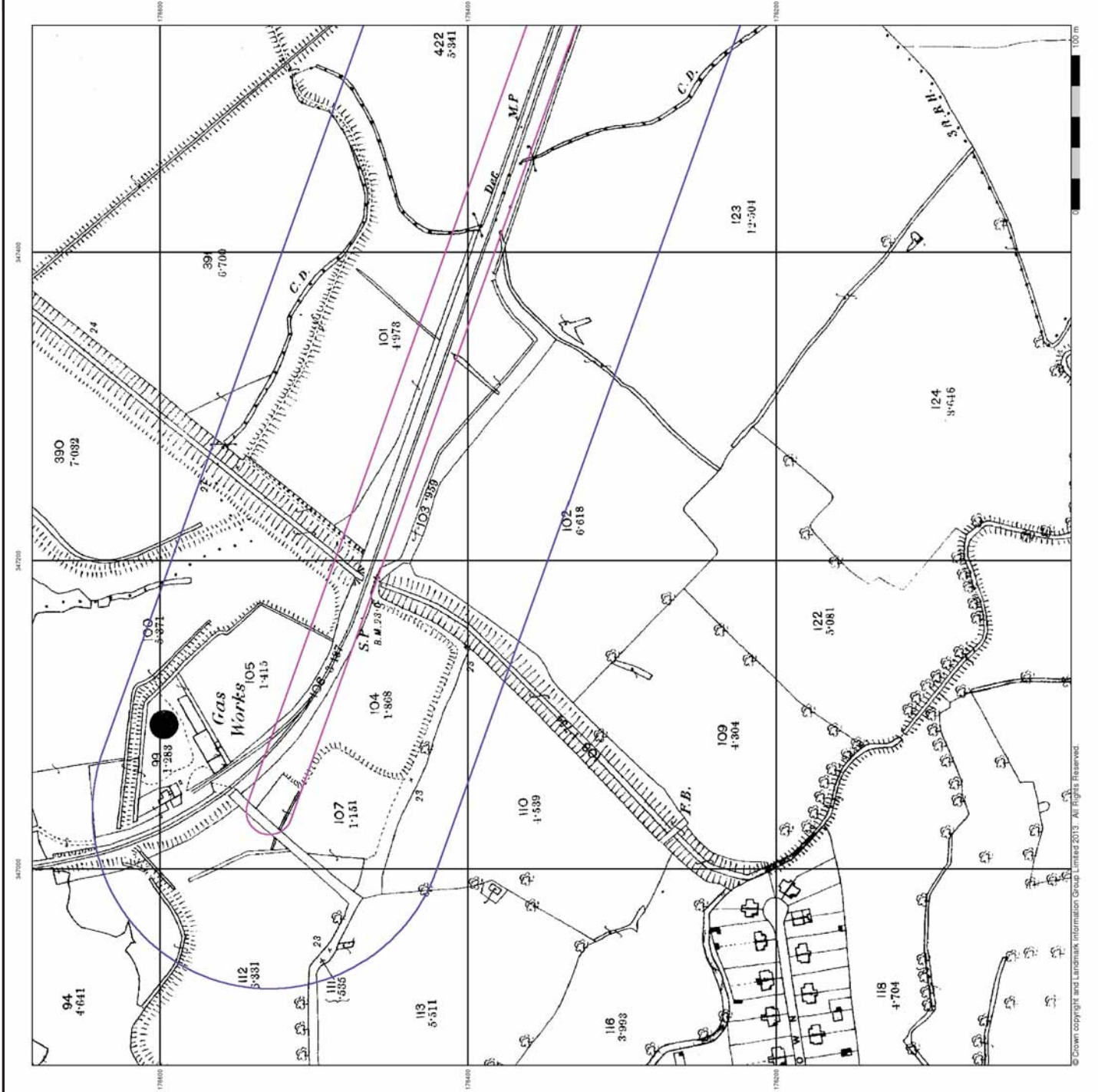


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 08G



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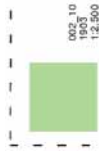
**Somerset**

**Published 1903**

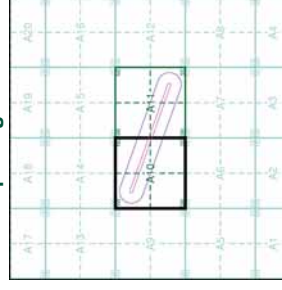
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in 1840. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**



**Order Details**

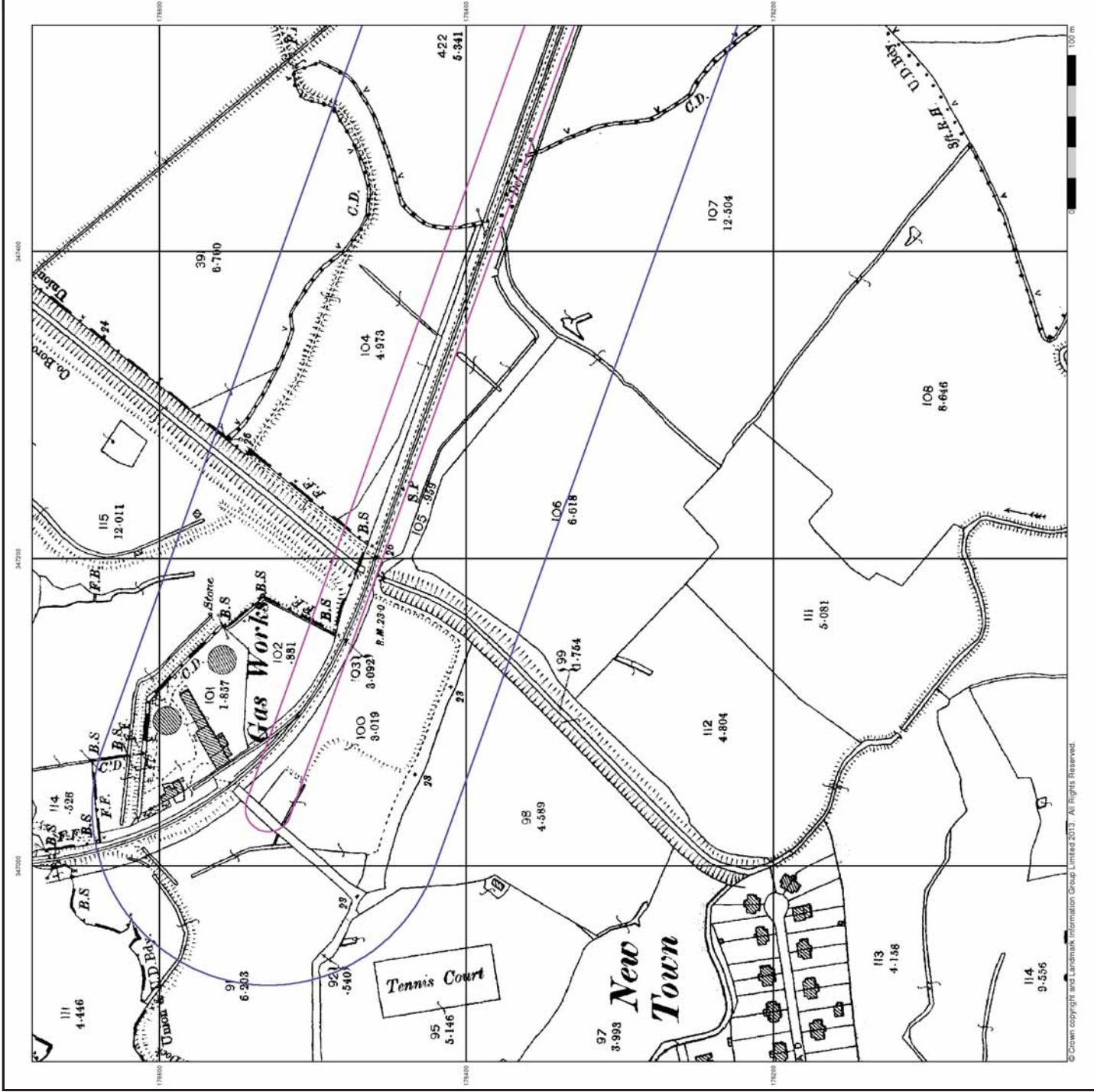
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG



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 Web: www.envirocheck.co.uk

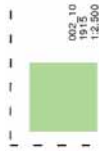


**Somerset  
Published 1915**

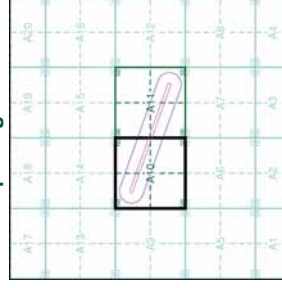
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the Ordnance Survey, Exeter, Devon and Scotland, the 1840s to 1854. The 1:2,500 scale was adopted for mapping urban areas and by 1856 it covered the whole of what was considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1838, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**

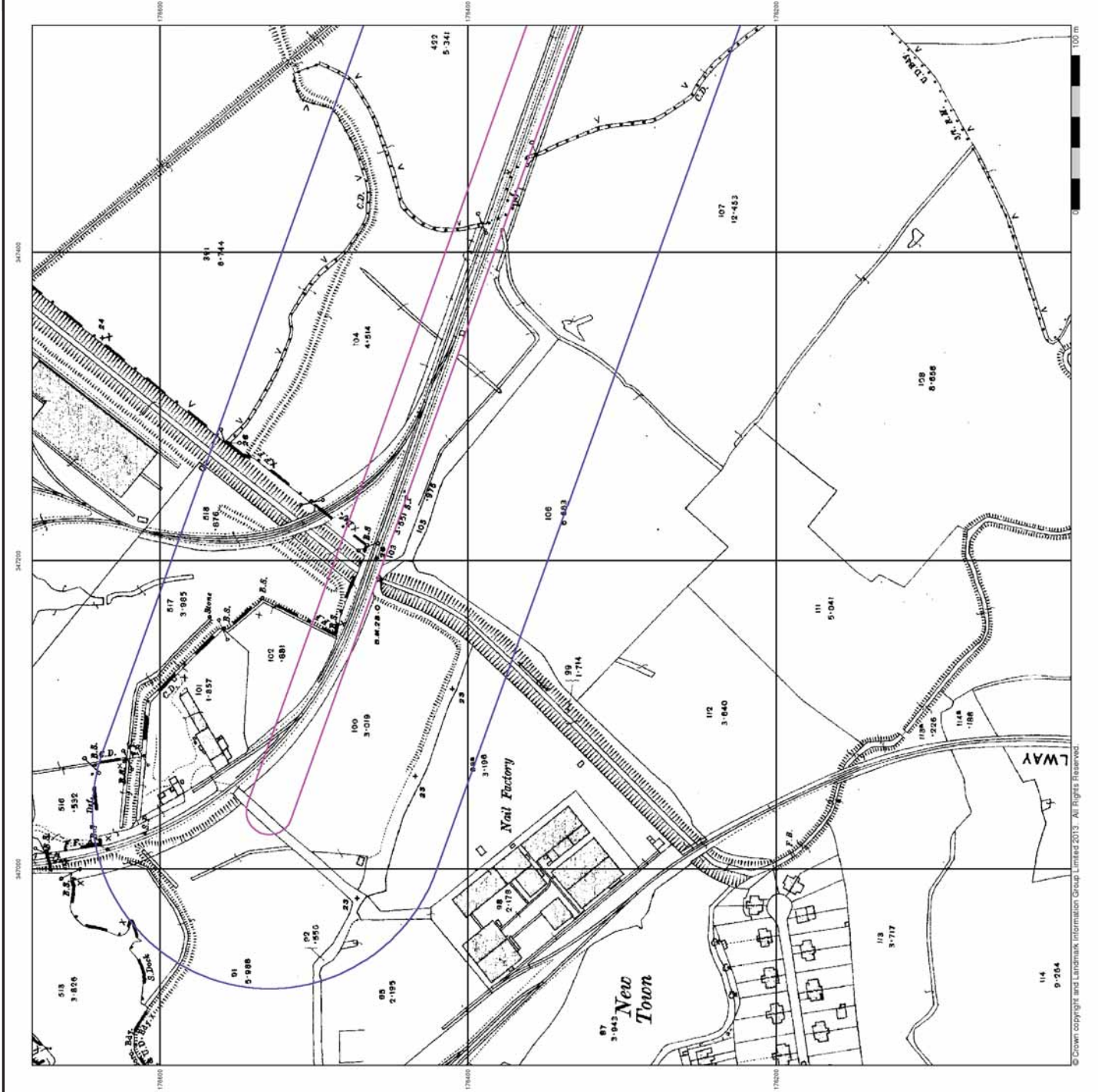


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Site: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG





**Somerset**

**Published 1931**

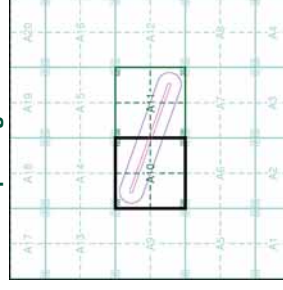
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what was considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**



**Order Details**

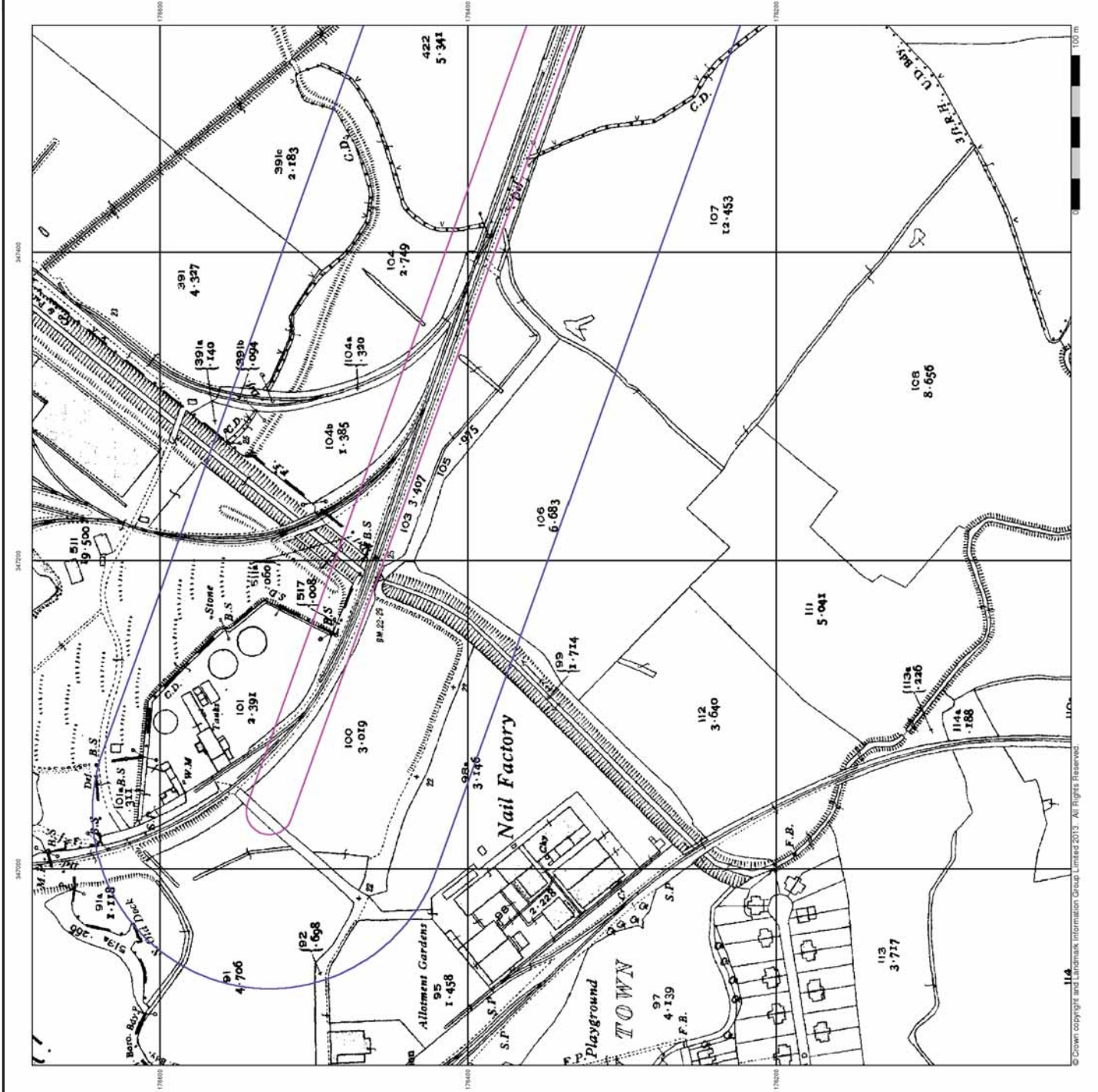
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG



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 Fax: 0844 844 9867  
 Web: www.envirocheck.co.uk



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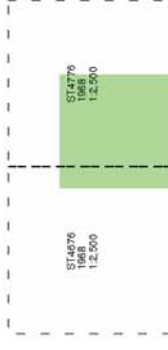


## Ordnance Survey Plan Published 1968

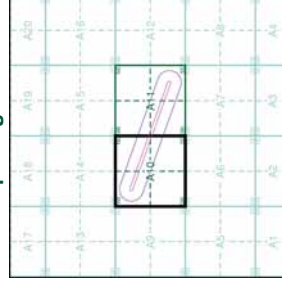
### Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1856 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A10



### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG









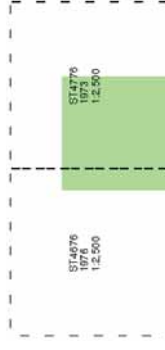
**Supply of Unpublished Survey Information**

**Published 1973 - 1976**

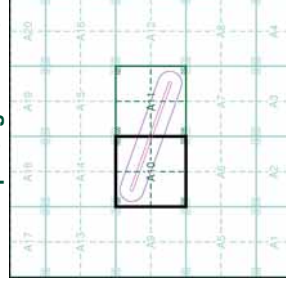
**Source map scale - 1:2,500**

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**

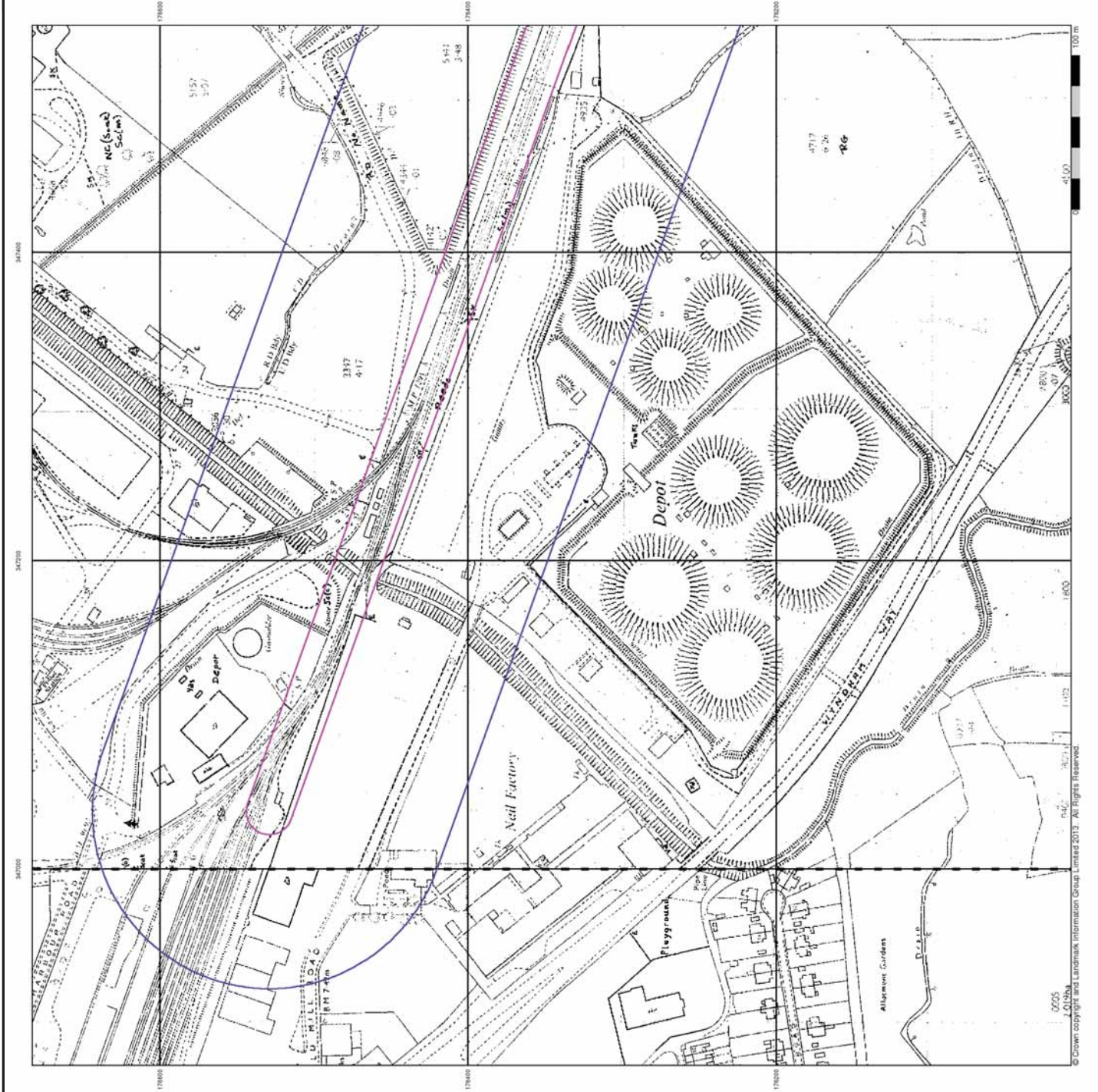


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG



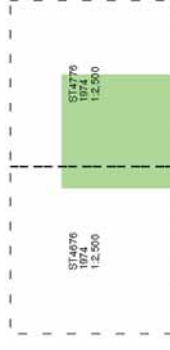


## Ordnance Survey Plan Published 1974

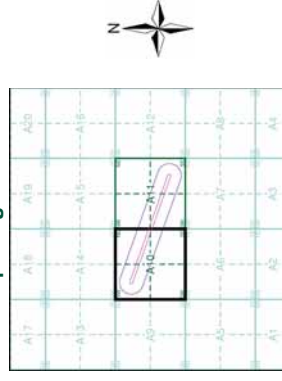
### Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in 1840. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1856 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A10

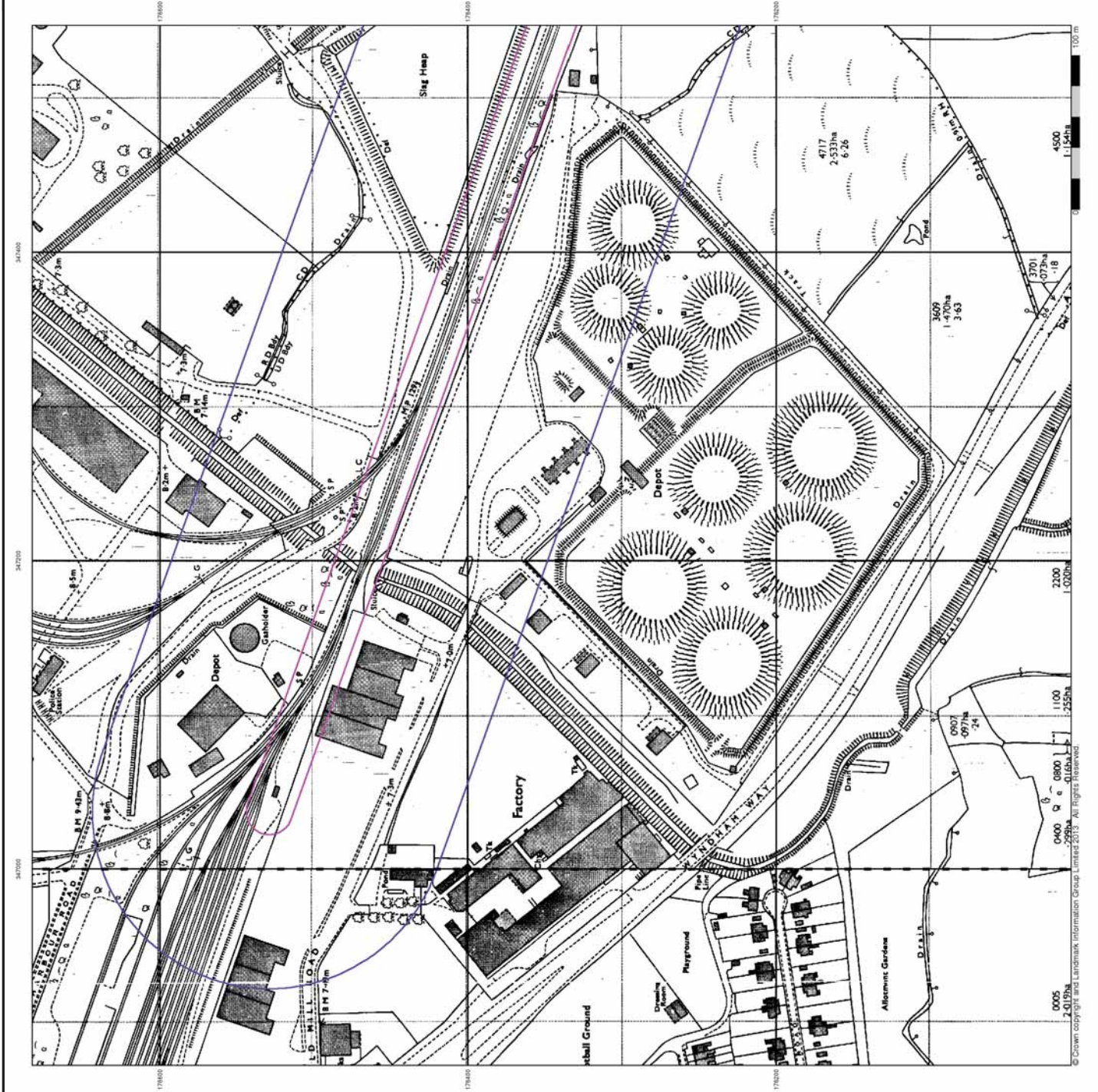


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Site: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG

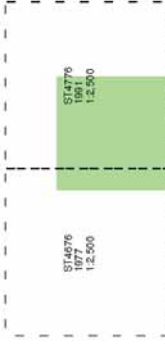




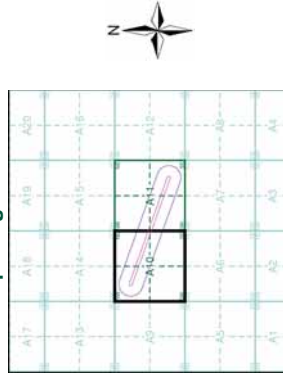
**Additional SIMS  
Published 1977 - 1991**

**Source map scale - 1:2,500**  
The SIM cards (Ordinance Survey's 'Survey of Information on Microfilm') are further editions of the original SIMs which were first published in 1984, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**

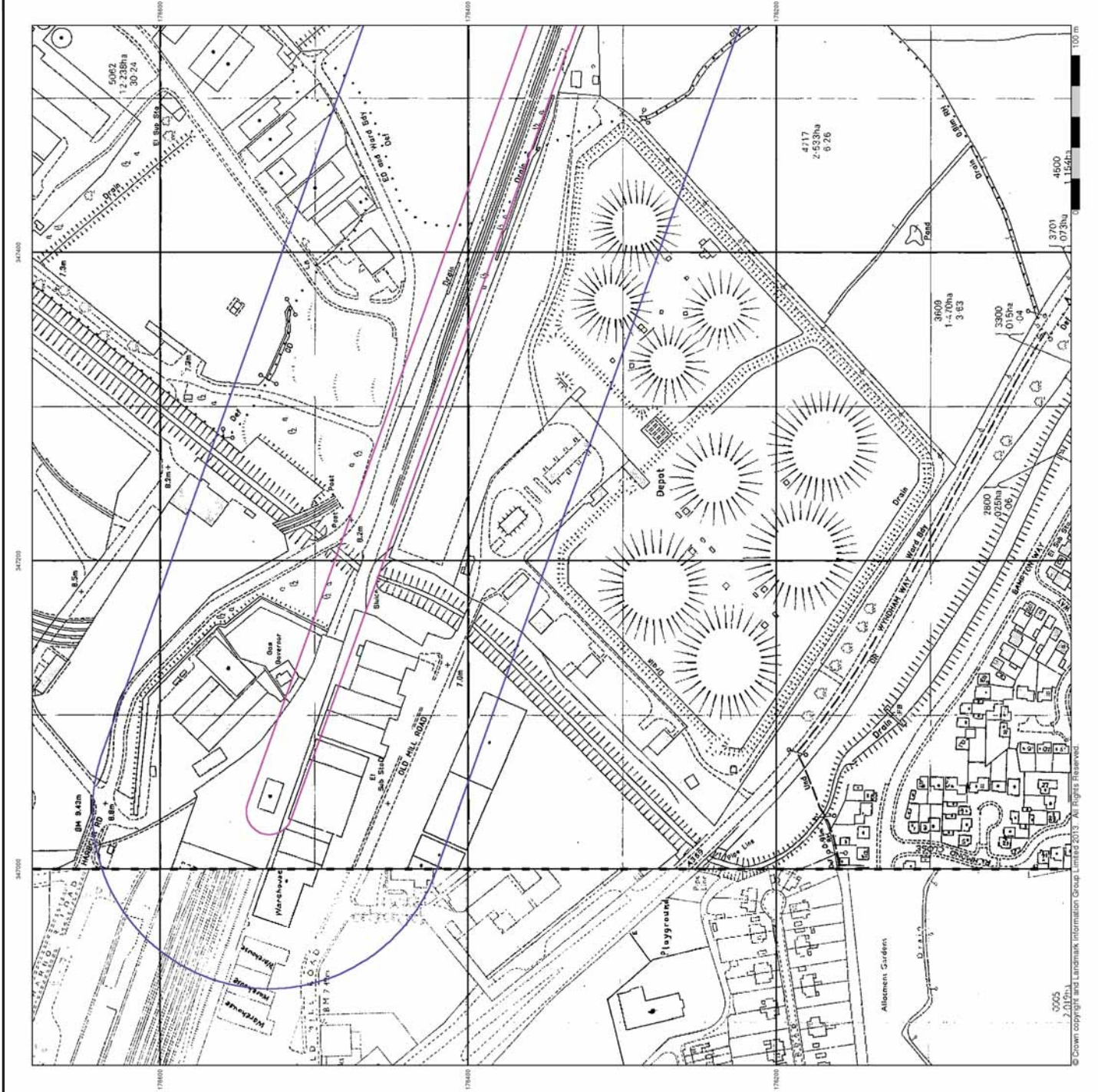


**Order Details**

Order Number: 54372246\_1\_1  
Customer Ref: 489334.aa.01.04  
National Grid Reference: 347550, 176350  
Slice: A  
Site Area (Ha): 3.33  
Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20  
OBG



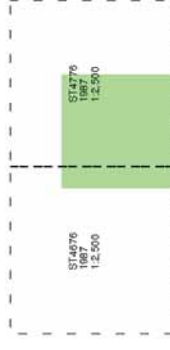


## Ordnance Survey Plan Published 1987

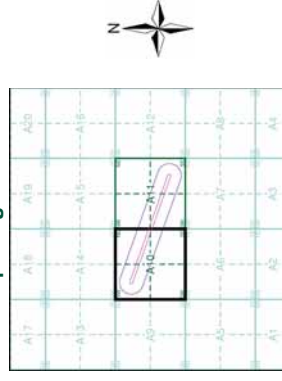
### Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1856 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A10

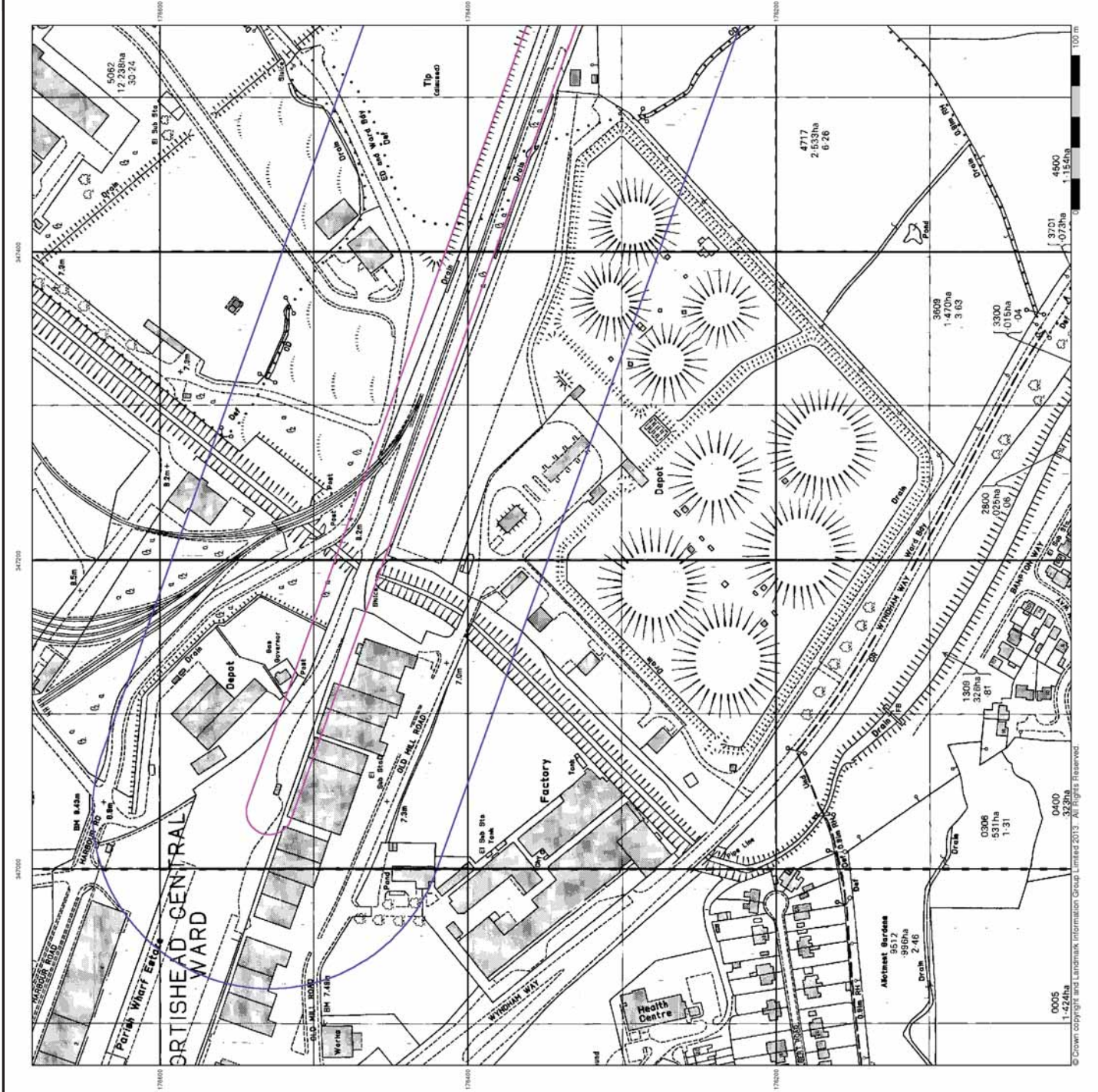


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG



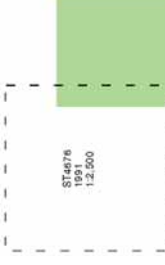


**Additional SIMs  
Published 1991**

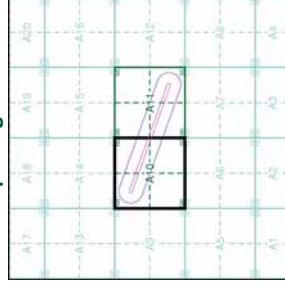
**Source map scale - 1:2,500**

The SIM cards (Ordinance Survey's 'Survey of Information on Microfilm') are further editions of the SIMs which were first published in 1947. Between the main editions an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

**Map Name(s) and Date(s)**



**Historical Map - Segment A10**

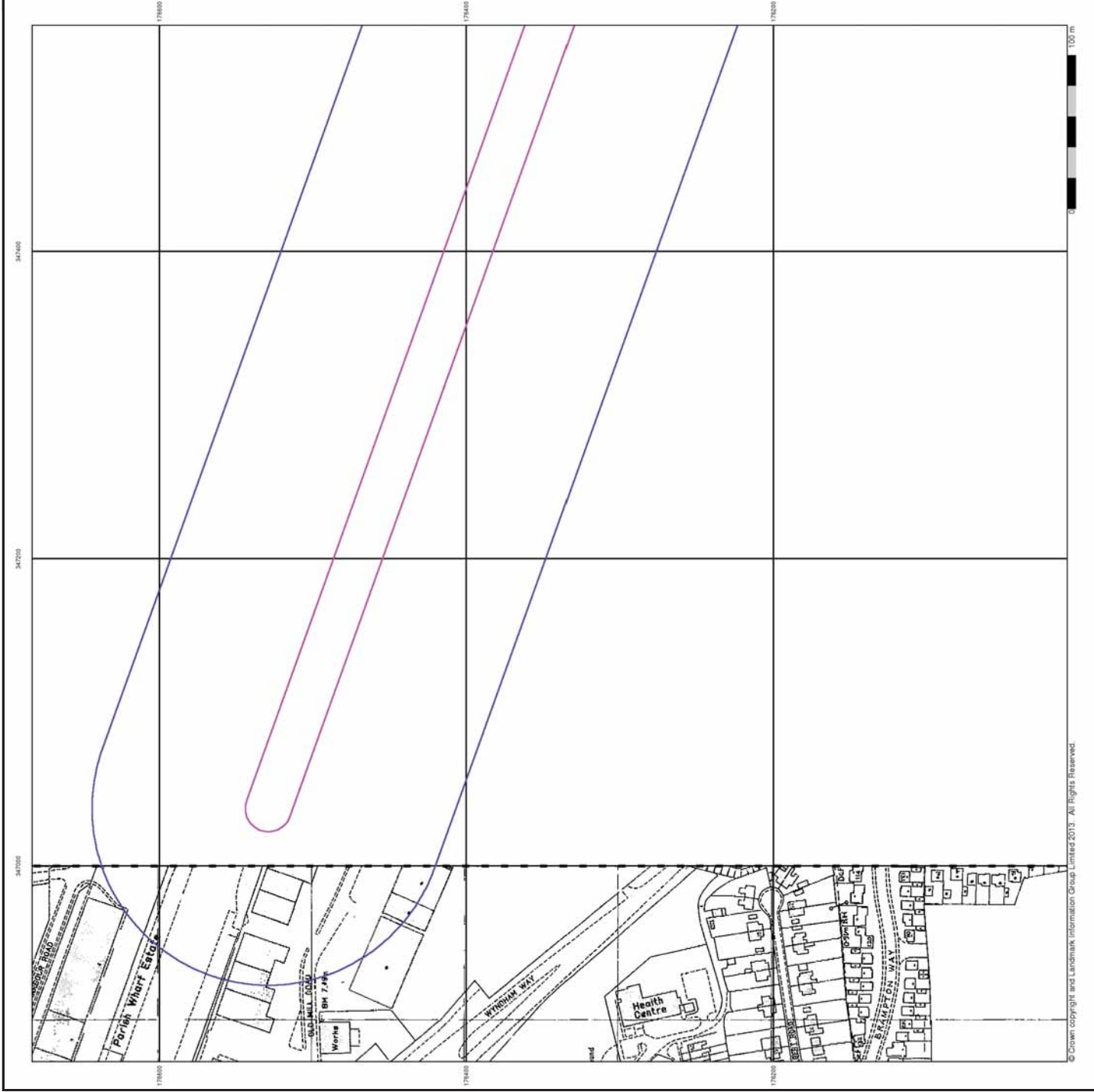


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG

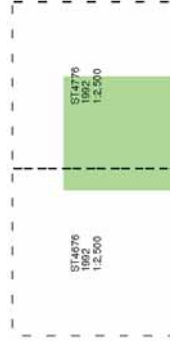


## Large-Scale National Grid Data Published 1992

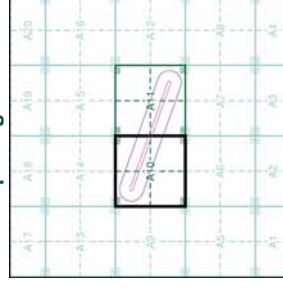
**Source map scale - 1:2,500**

Large Scale National Grid Data's superseded SIM cards (Ordnance Survey's Survey of Major Roads on Milsford) 1992, set up in 1992, and updated until 1993. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

### Map Name(s) and Date(s)



### Historical Map - Segment A10

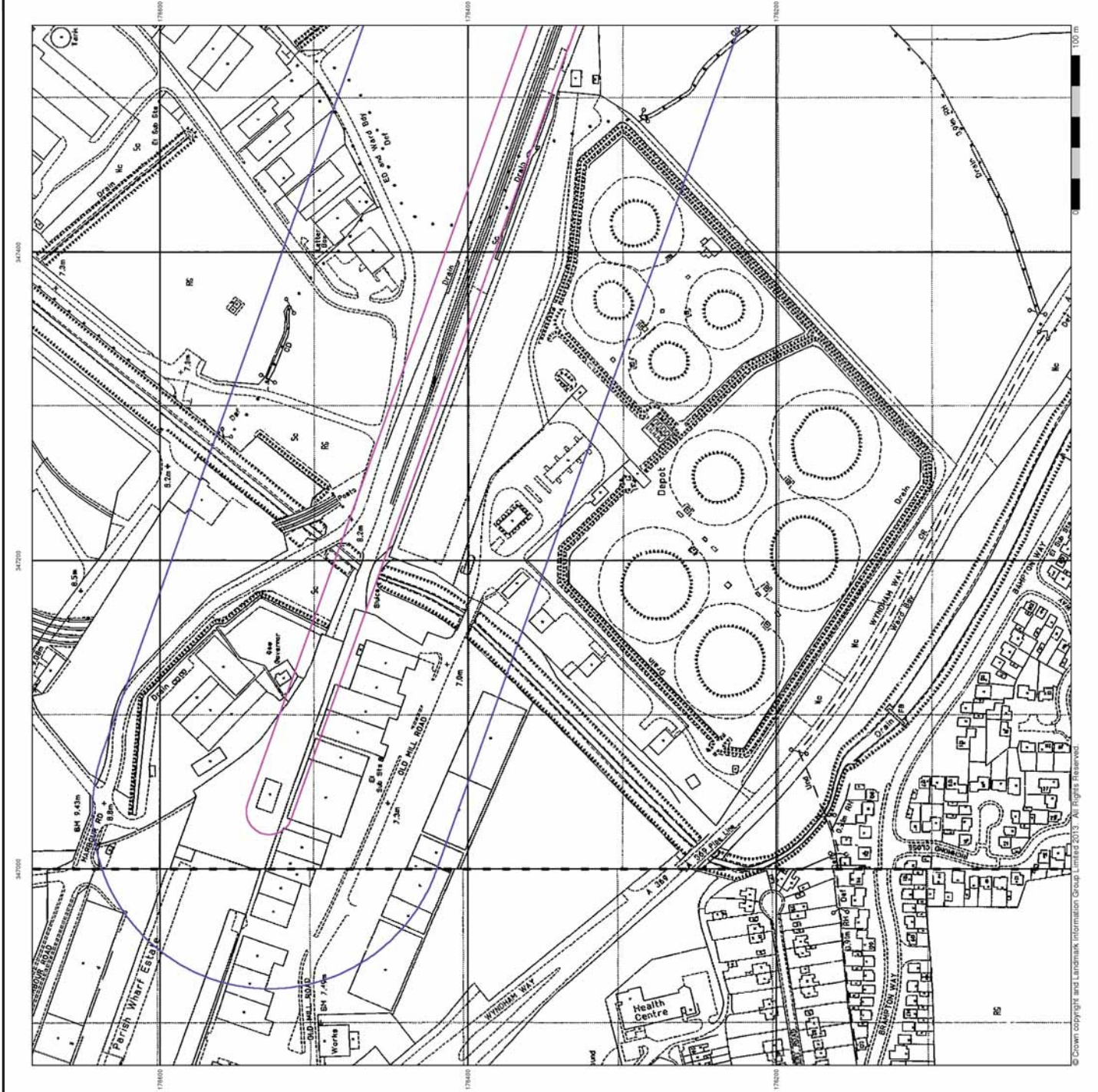


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



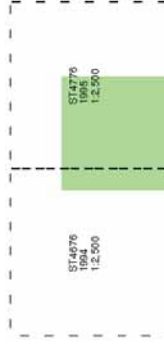


# Large-Scale National Grid Data Published 1994 - 1995

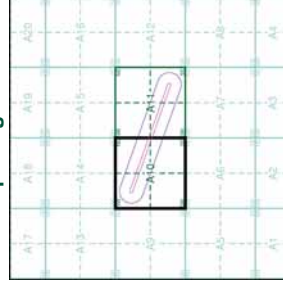
**Source map scale - 1:2,500**

Large Scale National Grid Data superseded SIM cards (Ordnance Survey's Survey of Information on Mapping) in 1992, and this data is only available until 1995. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

## Map Name(s) and Date(s)



## Historical Map - Segment A10

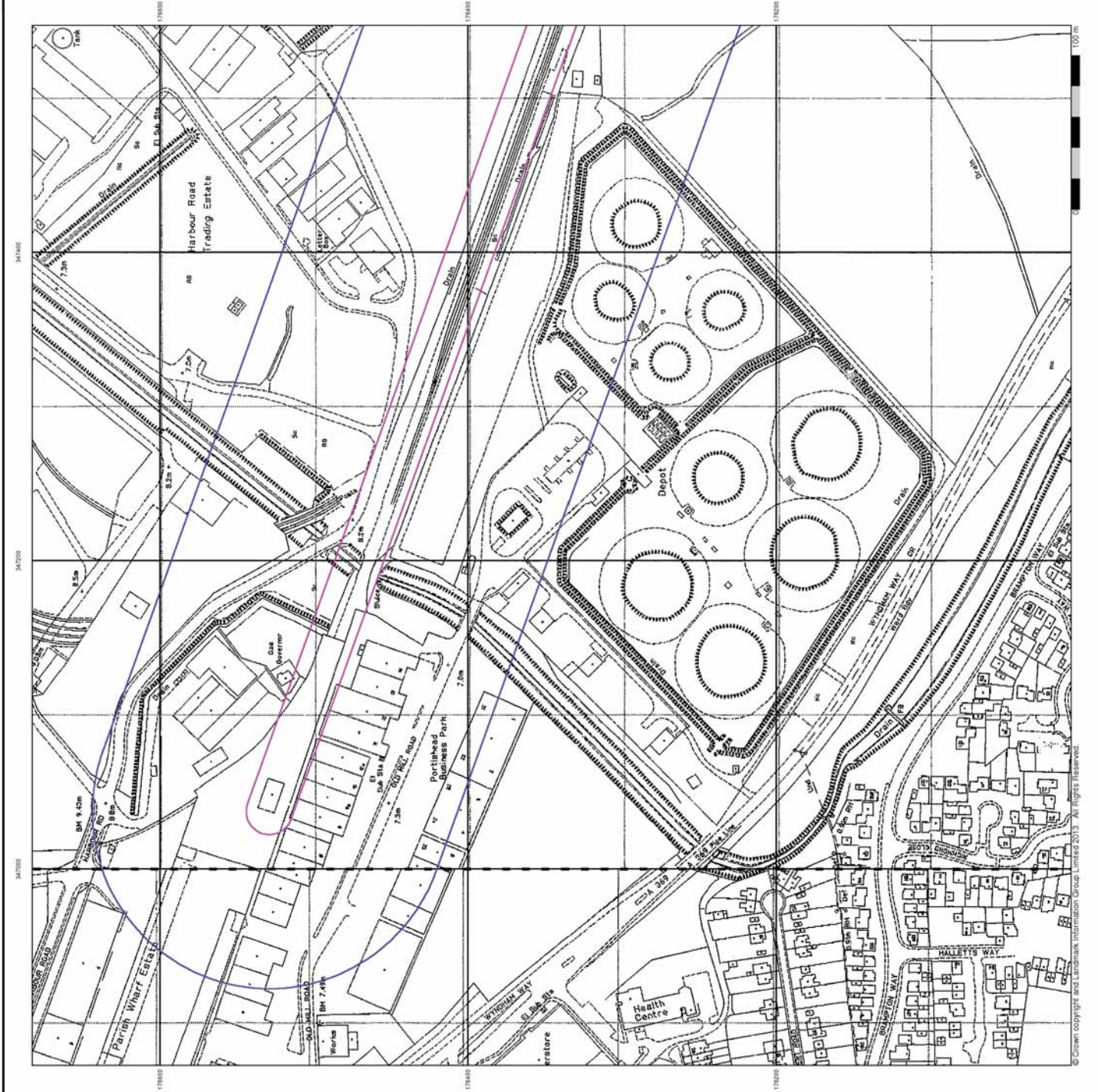


## Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

## Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



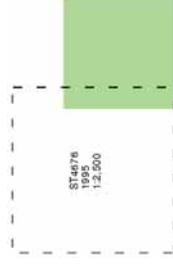
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## Large-Scale National Grid Data Published 1995

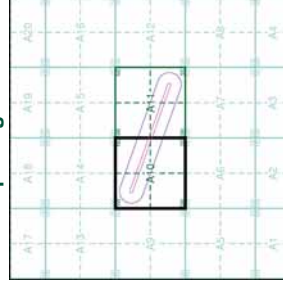
Source map scale - 1:2,500

Large Scale National Grid Data's superseded SIM cards (Ordnance Survey's Survey of Major Roads on Microfilm) 1992 set out the roads to be digitised until 1995. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

### Map Name(s) and Date(s)



### Historical Map - Segment A10



### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG







### Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Somerseset	1:2,500	1884	2
Somerseset	1:2,500	1903	3
Somerseset	1:2,500	1915	4
Somerseset	1:2,500	1931	5
Ordnance Survey Plan	1:2,500	1968	6
Supply of Unpublished Survey Information	1:2,500	1973	7
Ordnance Survey Plan	1:2,500	1974	8
Ordnance Survey Plan	1:2,500	1987	9
Additional SIMs	1:2,500	1989	10
Additional SIMs	1:2,500	1991	11
Large-Scale National Grid Data	1:2,500	1992	12
Large-Scale National Grid Data	1:2,500	1995	13

### Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

	Quarry		Sand Pit
	Clay Pit		Refuse Heap
	Sloping Masonry		Flat Rock
	Marsh		Reeds
	Rough Pasture		Wood
	Mixed Wood		Orchard
	Fir		Stepping Stones
	Ferry		Lock
	Trig. Station		Altitude at Trig. Station
	Bench Mark		Surface Level
	Arrow denotes flow of water		Antiquities (site of)

### Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

	Inactive Quarry, Chalk Pit or Clay Pit		Active Quarry, Chalk Pit or Clay Pit
	Rock		Boulders
	Cliff		Slopes
	Roofed Building		Glazed Roof Building
	Sloping Masonry		Archway
	Non-Confiferous Tree (surveyed)		Confiferous Tree (surveyed)
	Non-Confiferous Trees (not surveyed)		Confiferous Trees (not surveyed)
	Orchard Tree		Scrub
	Coppice, Osier		Reeds
	Rough Grassland		Heath
	Direction of water flow		Bench Mark
	Cave Entrance		Triangulation Station
	Electricity Transmission Line		Electricity Pylon

### Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Boundary Post or Stone		Police Call Box
	Bridle Road		Pump
	Electricity Pylon		Signal Post
	Foot Bridge		Sluice
	Foot Path		Spring
	Guide Post or Board		Telephone Call Box
	Mile Stone		Trough
	Mooring Post or Ring		Well

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Beer House		Pillar, Pole or Post
	Boundary Post or Stone		Post Office
	Capstan, Crane		Public Convenience
	Chimney		Public House
	Drinking Fountain		Pump
	Electricity Pylon or Post		Signal Box or Bridge
	Fire Alarm Pillar		Signal Post or Light
	Foot Bridge		Spring
	Guide Post		Tank or Track
	Hydraulic		Telephone Call Box
	Level Crossing		Trough
	Mantle		Water Point
	Mile Post or Mooring Post		Well
	Mile Stone		Wind Pump
	Normal Tidal Limit		

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Barracks		Bench Mark
	Battery		Roofed Building
	Cemetary		Glazed Roof Building
	Chimney		Civil parish/community boundary
	Cistern		District boundary
	Disamnted Railway		County boundary
	El Gen Sta		Boundary post/stone
	Electricity Generating Station		Boundary mering symbol (note: these always appear in opposed pairs or groups of three)
	Electricity Pole, Pillar		
	Electricity Sub Station		
	Filter Bed		
	Fountain/Drinking Ftn.		
	Gas Valve Compound		
	Gas Governor		
	Guide Post		
	Mantle		
	Mile Post or Mile Stone		

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Bridle Road		Police Call Box
	Electricity Pylon		Pump
	Foot Bridge		Signal Post
	Foot Path		Sluice
	Guide Post or Board		Spring
	Mile Stone		Telephone Call Box
	Mooring Post or Ring		Trough
			Well

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

## Historical Mapping Legends

### Large-Scale National Grid Data 1:2,500 and 1:1,250

	Slopes		Top
	Cliff		Rock
	Boulders		Positioned Boulder
	Non-Confiferous Tree (surveyed)		Confiferous Tree (surveyed)
	Non-Confiferous Trees (not surveyed)		Confiferous Trees (not surveyed)
	Orchard Tree		Scrub
	Coppice, Osier		Reeds
	Rough Grassland		Heath
	Direction of water flow		Triangulation Station
	Electricity Transmission Line		Electricity Pylon

### Large-Scale National Grid Data 1:2,500 and 1:1,250

	Barracks		Bench Mark
	Battery		Roofed Building
	Cemetary		Glazed Roof Building
	Chimney		Civil parish/community boundary
	Cistern		District boundary
	Disamnted Railway		County boundary
	El Gen Sta		Boundary post/stone
	Electricity Generating Station		Boundary mering symbol (note: these always appear in opposed pairs or groups of three)
	Electricity Pole, Pillar		
	Electricity Sub Station		
	Filter Bed		
	Fountain/Drinking Ftn.		
	Gas Valve Compound		
	Gas Governor		
	Guide Post		
	Mantle		
	Mile Post or Mile Stone		

### Large-Scale National Grid Data 1:2,500 and 1:1,250

	Barracks		Bench Mark
	Battery		Roofed Building
	Cemetary		Glazed Roof Building
	Chimney		Civil parish/community boundary
	Cistern		District boundary
	Disamnted Railway		County boundary
	El Gen Sta		Boundary post/stone
	Electricity Generating Station		Boundary mering symbol (note: these always appear in opposed pairs or groups of three)
	Electricity Pole, Pillar		
	Electricity Sub Station		
	Filter Bed		
	Fountain/Drinking Ftn.		
	Gas Valve Compound		
	Gas Governor		
	Guide Post		
	Mantle		
	Mile Post or Mile Stone		

### Large-Scale National Grid Data 1:2,500 and 1:1,250

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Bridle Road		Police Call Box
	Electricity Pylon		Pump
	Foot Bridge		Signal Post
	Foot Path		Sluice
	Guide Post or Board		Spring
	Mile Stone		Telephone Call Box
	Mooring Post or Ring		Trough
			Well

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Barracks		Bench Mark
	Battery		Roofed Building
	Cemetary		Glazed Roof Building
	Chimney		Civil parish/community boundary
	Cistern		District boundary
	Disamnted Railway		County boundary
	El Gen Sta		Boundary post/stone
	Electricity Generating Station		Boundary mering symbol (note: these always appear in opposed pairs or groups of three)
	Electricity Pole, Pillar		
	Electricity Sub Station		
	Filter Bed		
	Fountain/Drinking Ftn.		
	Gas Valve Compound		
	Gas Governor		
	Guide Post		
	Mantle		
	Mile Post or Mile Stone		

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Bridle Road		Police Call Box
	Electricity Pylon		Pump
	Foot Bridge		Signal Post
	Foot Path		Sluice
	Guide Post or Board		Spring
	Mile Stone		Telephone Call Box
	Mooring Post or Ring		Trough
			Well

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Barracks		Bench Mark
	Battery		Roofed Building
	Cemetary		Glazed Roof Building
	Chimney		Civil parish/community boundary
	Cistern		District boundary
	Disamnted Railway		County boundary
	El Gen Sta		Boundary post/stone
	Electricity Generating Station		Boundary mering symbol (note: these always appear in opposed pairs or groups of three)
	Electricity Pole, Pillar		
	Electricity Sub Station		
	Filter Bed		
	Fountain/Drinking Ftn.		
	Gas Valve Compound		
	Gas Governor		
	Guide Post		
	Mantle		
	Mile Post or Mile Stone		

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Bridle Road		Police Call Box
	Electricity Pylon		Pump
	Foot Bridge		Signal Post
	Foot Path		Sluice
	Guide Post or Board		Spring
	Mile Stone		Telephone Call Box
	Mooring Post or Ring		Trough
			Well

	County Boundary (Geographical)
	County & Civil Parish Boundary
	County Borough Boundary (England)
	County Burgh Boundary (Scotland)

	Barracks		Bench Mark
	Battery		Roofed Building
	Cemetary		Glazed Roof Building



### Historical Mapping & Photography included:

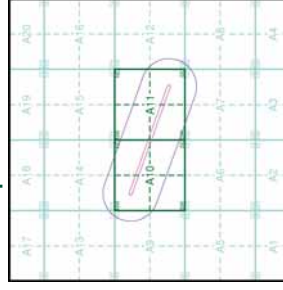
Mapping Type	Scale	Date	Pg
Somerset	1:10,560	1884	3
Monmouthshire	1:10,560	1887	4
Monmouthshire	1:10,560	1903	5
Somerset	1:10,560	1904	6
Somerset	1:10,560	1920	7
Monmouthshire	1:10,560	1922	8
Somerset	1:10,560	1938	9
Ordnance Survey Plan	1:10,000	1961	11
Ordnance Survey Plan	1:10,000	1970	12
Bristol	1:10,000	1972	13
Ordnance Survey Plan	1:10,000	1991	14
10K Raster Mapping	1:10,000	1999	15
10K Raster Mapping	1:10,000	2006	16
VectorMap Local	1:10,000	2013	17

### 1:10,000 Raster Mapping


### Ordnance Survey Plan 1:10,000


### Ordnance Survey County Series 1:10,560


### Historical Map - Slice A



### Order Details

54372246\_1\_1  
 Order Number: 489334.aa.01.04  
 Customer Ref: National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Fortshhead Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG



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# Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale    b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Subway Entrance
- Prominent Fireproof Building
- Non-fireproof Building (non-dwelling)
- Factory, mill, and flour mill, without chimneys
- Hydroelectric Power Station
- Telephone Station, drawn to scale
- Abandoned Open-pit Mine or Quarry
- Oil Deposit or Well
- Natural Gas Tank
- Fuel Storage Tanks
- Drill Hole
- Burial Mound
- Triangulation Point on Burial Mound
- Single-track Railroad
- Double-track Railroad and Station Building
- Mixed Forest
- Deciduous Forest
- Coniferous Forest
- Citrus Orchard
- Wet Ground
- Scattered Vegetation

**243,8** Values for prominent elevations  
 186.0 Numbers for spot elevations, depth soundings,  
 contour lines, etc.  
 0.2 Velocity of the current, width of river bed, depth of river  
 fords and condition of the river bottom; height of forest and  
 the diameter of trees

**Russian Alphabet** (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	Ъ ъ (-)
Д д (D)	Л л (L)	У у (U)	Ы ы (Y)
Е е (E)	М м (M)	Ф ф (F)	Ь ь (-)
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
		Ч ч (CH)	Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale    b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Subway Entrance
- Demolished Buildings
- Built-Up Area with Fireproof Buildings Predominant
- Prominent Industrial Building
- Remains of an individual Dwelling
- Factory or Mill with Chimney
- Factory or Mill without Chimney
- Open Pit Mine
- Operating Shaft or Mine
- Salt Mine
- Tailings Pile
- Oil or Natural Gas Derrick
- Gas Pump or Service Station
- Natural Gas Tank
- Power Station
- Transformer Station
- Burial Mound (height in metres)
- Triangulation Point on Burial Mound
- Bench Mark (monumented)
- Telephone Office
- Telephone Station
- Radio Station
- Radio Tower
- Airfield or Seaplane Base
- Landing Strip
- Highway under Construction
- Improved Dirt Road (former truck road)
- Discontinued Railroad
- Railroad Under Construction
- Water Gauge
- Direction and velocity of current
- Water-Level Mark
- Spring
- Isobath with value
- Spot Elevation Value
- Half Contour Line
- Scrub
- Deciduous
- Mixed
- Coniferous

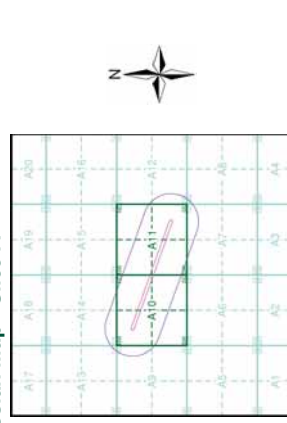
Key to Numbers on Mapping



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Somerset	1:10,560	1884	3
Monmouthshire	1:10,560	1887	4
Monmouthshire	1:10,560	1903	5
Somerset	1:10,560	1904	6
Monmouthshire	1:10,560	1920	7
Somerset	1:10,560	1932	8
Somerset	1:10,560	1938	9
Ordnance Survey Plan	1:10,000	1961	11
Ordnance Survey Plan	1:10,000	1970	12
Bristol	1:10,000	1972	13
Ordnance Survey Plan	1:10,000	1991	14
10K Raster Mapping	1:10,000	1999	15
10K Raster Mapping	1:10,000	2006	16
VectorMap Local	1:10,000	2013	17

Russian Map - Slice A



**Order Details**

54372246\_1\_1  
 Order Number:  
 489334.aa.01.04  
 Customer Ref:  
 National Grid Reference: 347550, 176350  
 Slice:  
 A  
 Site Area (Ha):  
 3.33  
 Search Buffer (m):  
 250

**Site Details**

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 OBG



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**Somerset**

**Published 1884**

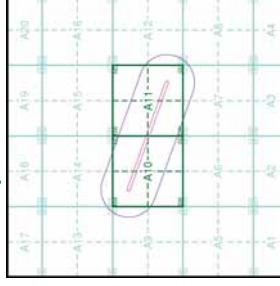
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first edition of the National Grid was published in 1948. The OS map revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**

002NW	1884	1:10,560
002SW	1884	1:10,560

**Historical Map - Slice A**

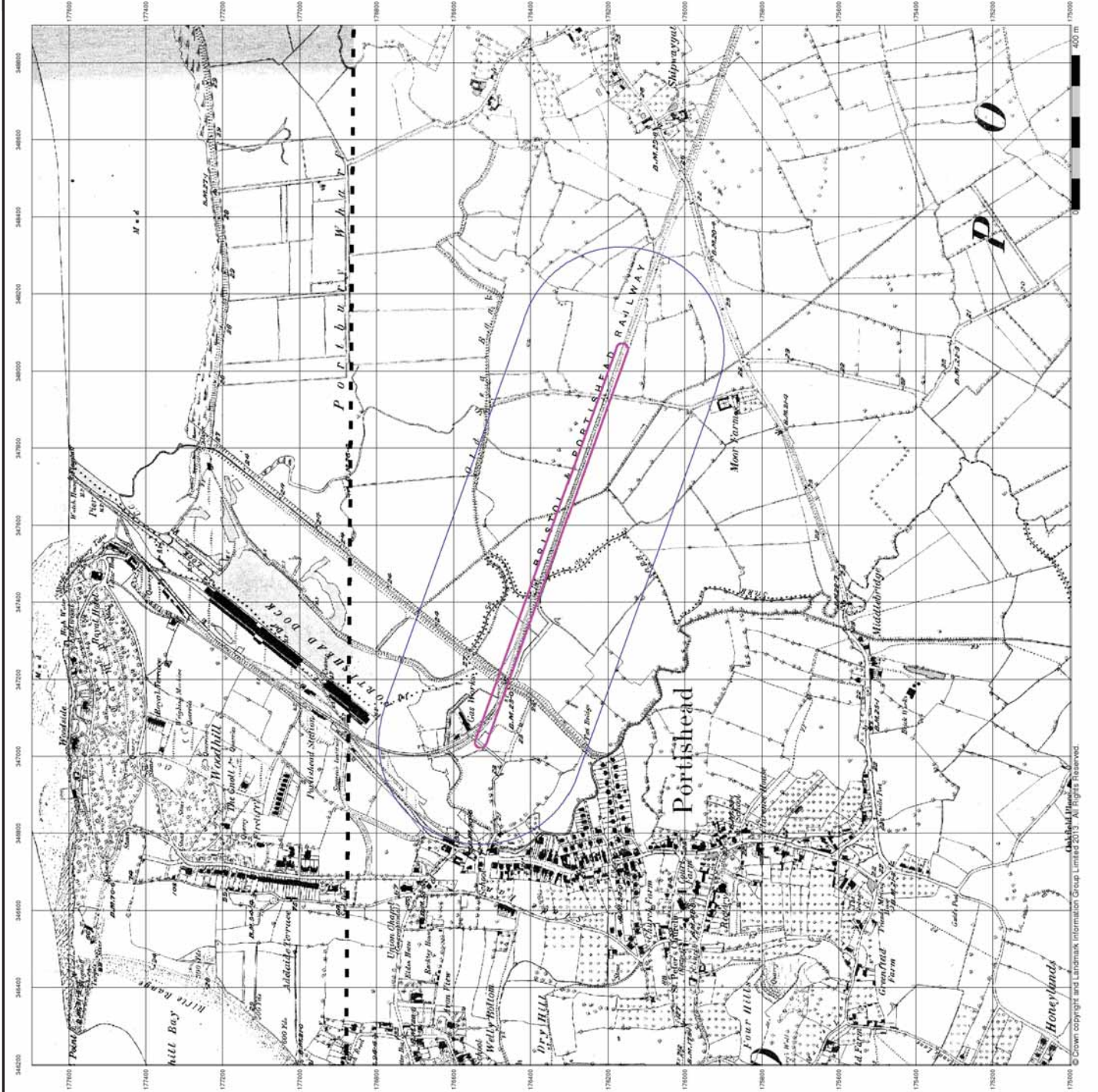


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG



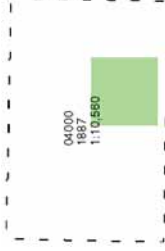


**Monmouthshire  
Published 1887**

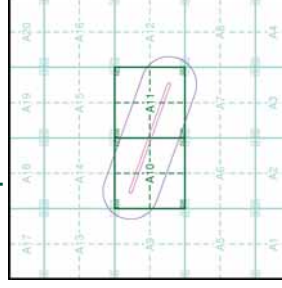
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first edition of the maps was published in 1970. The maps have since then undergone a revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**



**Historical Map - Slice A**



**Order Details**

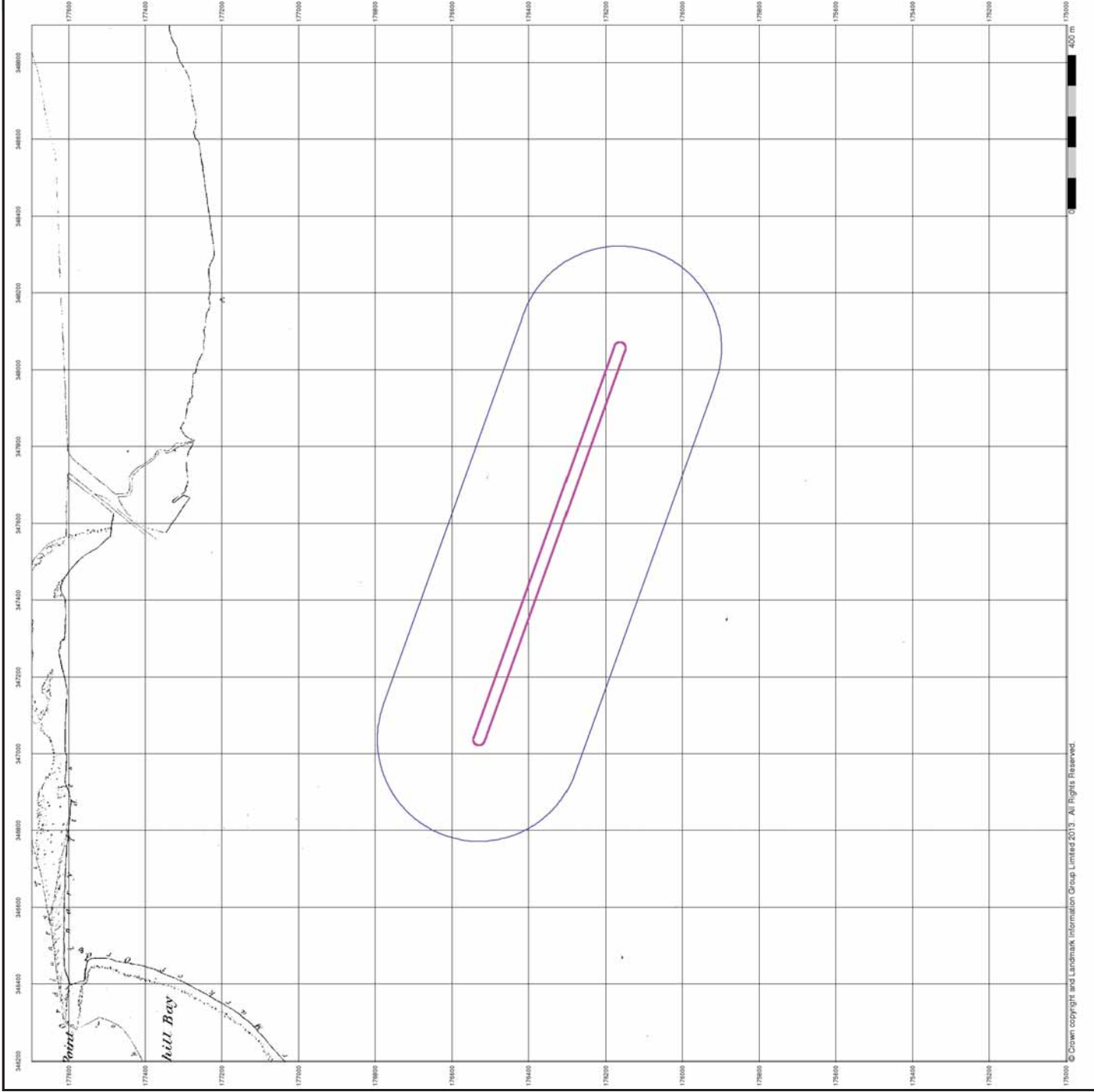
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 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

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 Web: www.envirocheck.co.uk

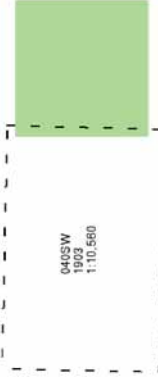


**Monmouthshire  
Published 1903**

**Source map scale - 1:10,560**

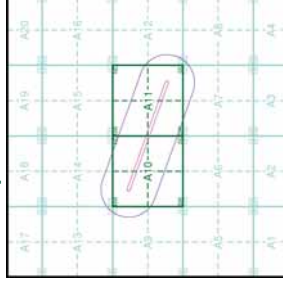
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1800s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first 1:10,560 maps were published in 1970. The maps have since then undergone a revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**



0405W  
1903  
1:10,560

**Historical Map - Slice A**



**Order Details**

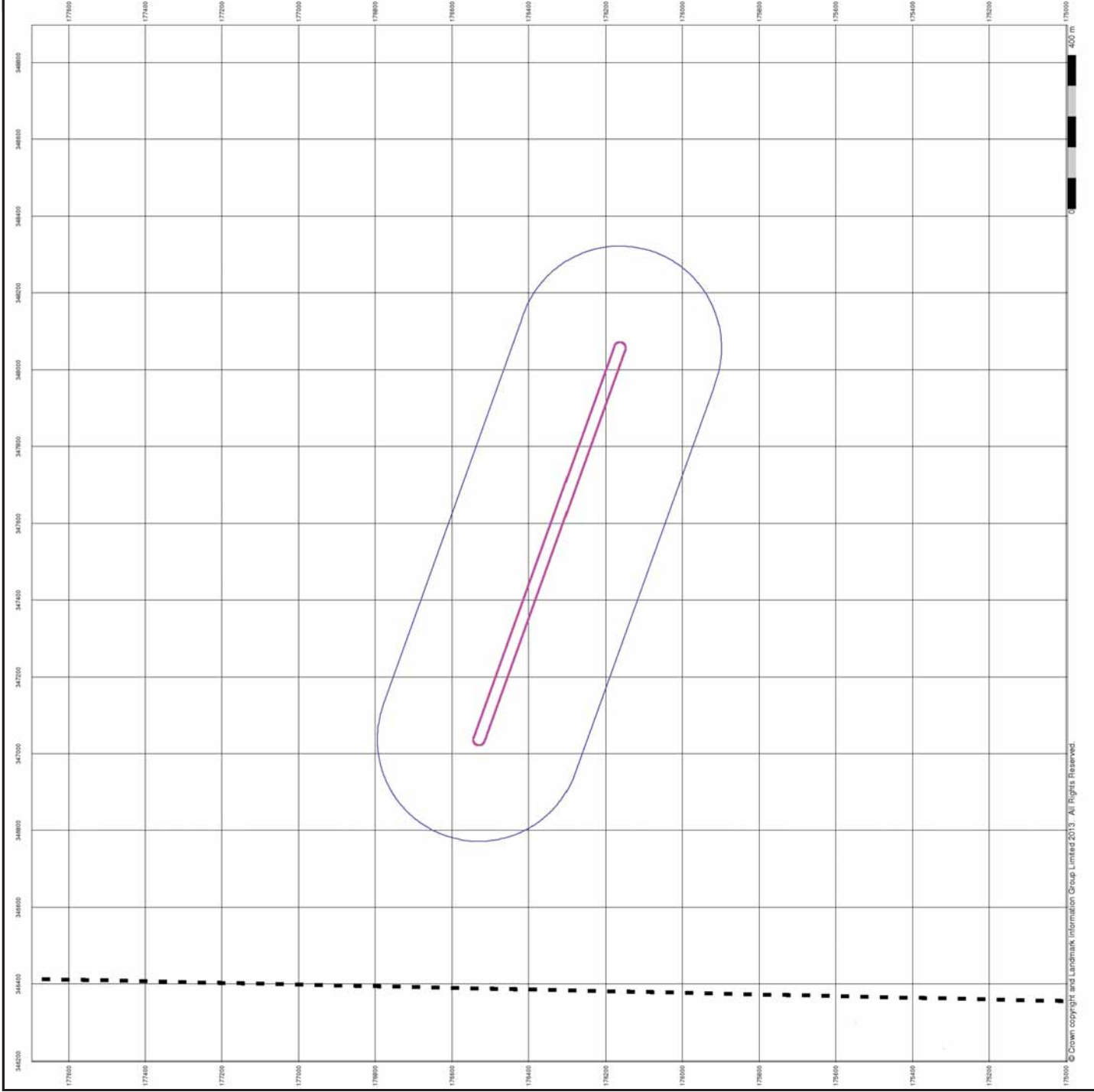
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Customer Ref: 489334.aa.01.04  
National Grid Reference: 347550, 176350  
Slice: A  
Site Area (Ha): 3.33  
Search Buffer (m): 250

**Site Details**

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OBG



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**Somerset  
Published 1904**

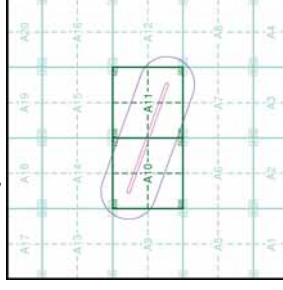
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1982. The 1982 edition of the maps, the revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**

002NW 1904	1:10,560
002SW 1904	1:10,560

**Historical Map - Slice A**



**Order Details**

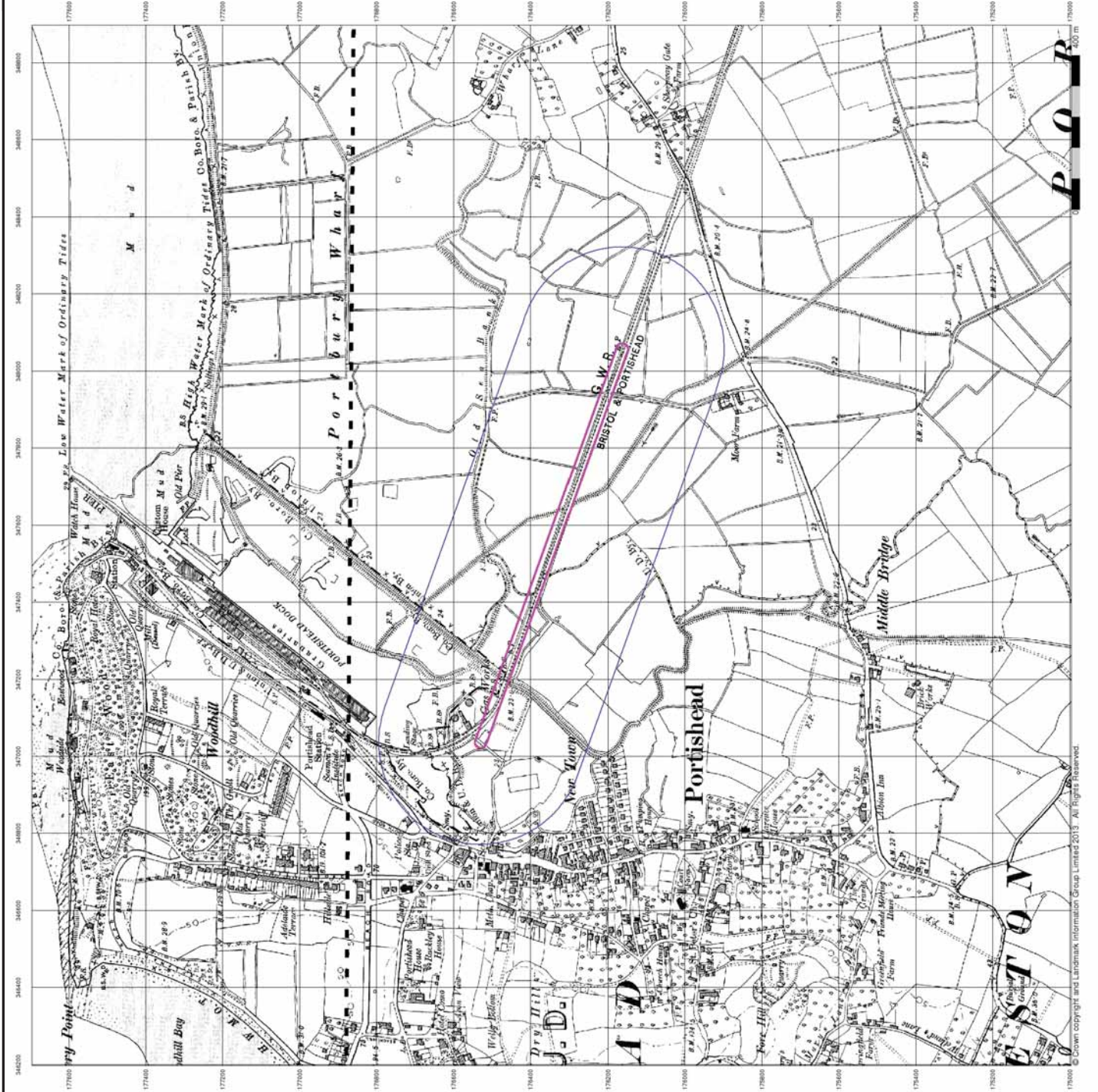
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 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

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 Fax: 0844 844 9867  
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**Somerset  
Published 1920**

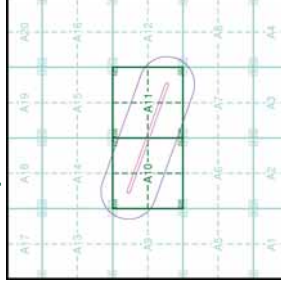
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1976. The Provisional Edition revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**

002NW	1920
1:10,560	
002SW	1920
1:10,560	

**Historical Map - Slice A**



**Order Details**

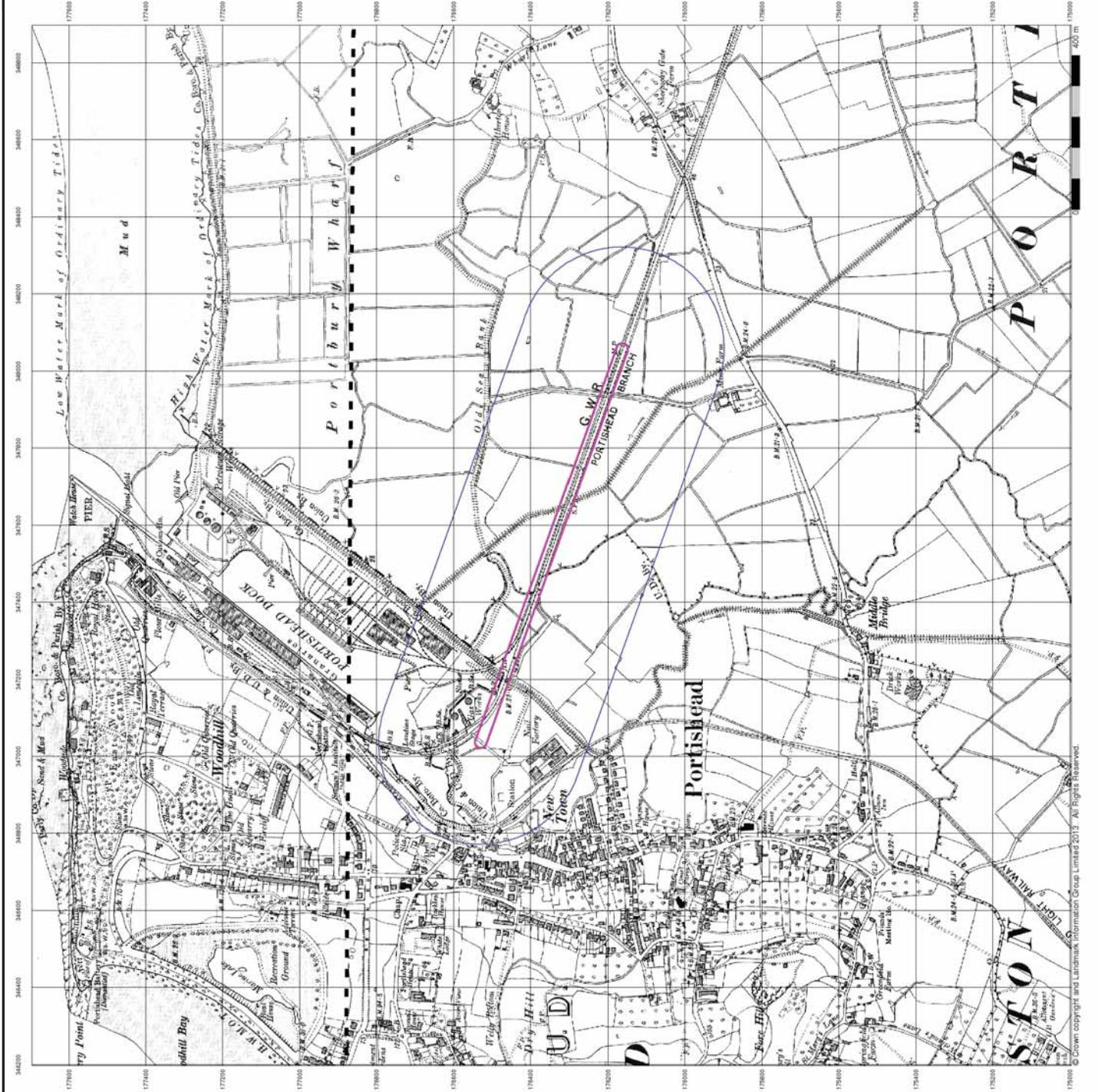
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

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 OBG



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**Somerset  
Published 1932**

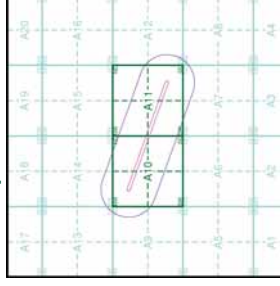
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1990. Since then, the OS revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**

002NW	1932
1:10,560	
002SW	1932
1:10,560	

**Historical Map - Slice A**



**Order Details**

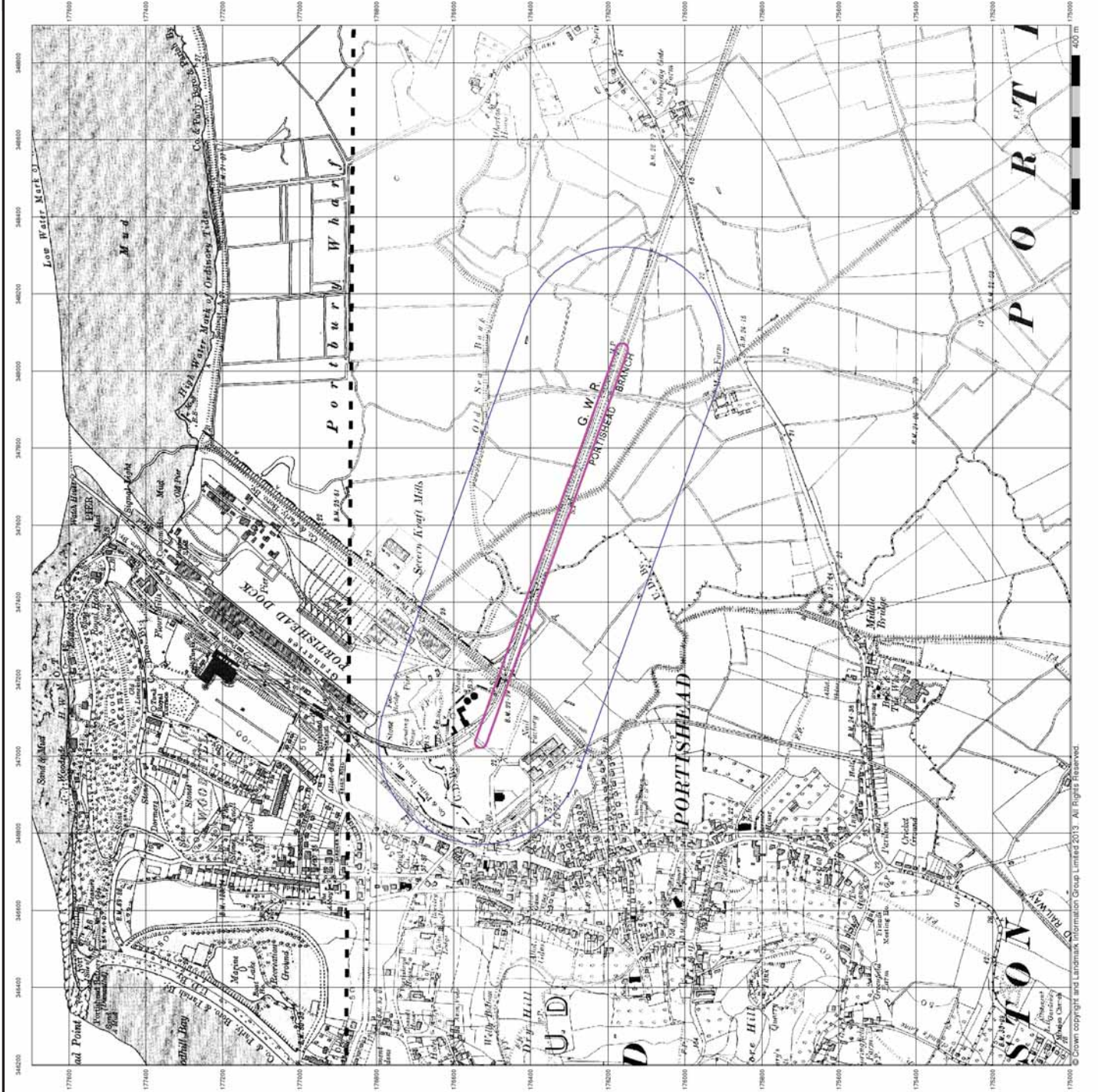
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

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 OBG



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**Somerset  
Published 1938**

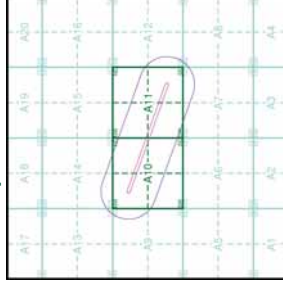
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1988, and the 1:10,560 maps have since then been revised until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**

002NW	1938
1:10,560	
002SW	1938
1:10,560	

**Historical Map - Slice A**



**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

**Site Details**

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



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## Ordnance Survey Plan Published 1961

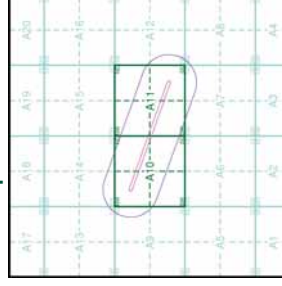
### Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1976. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

ST47NE	1961
1:10,560	
ST47SE	1961
1:10,560	

### Historical Map - Slice A



### Order Details

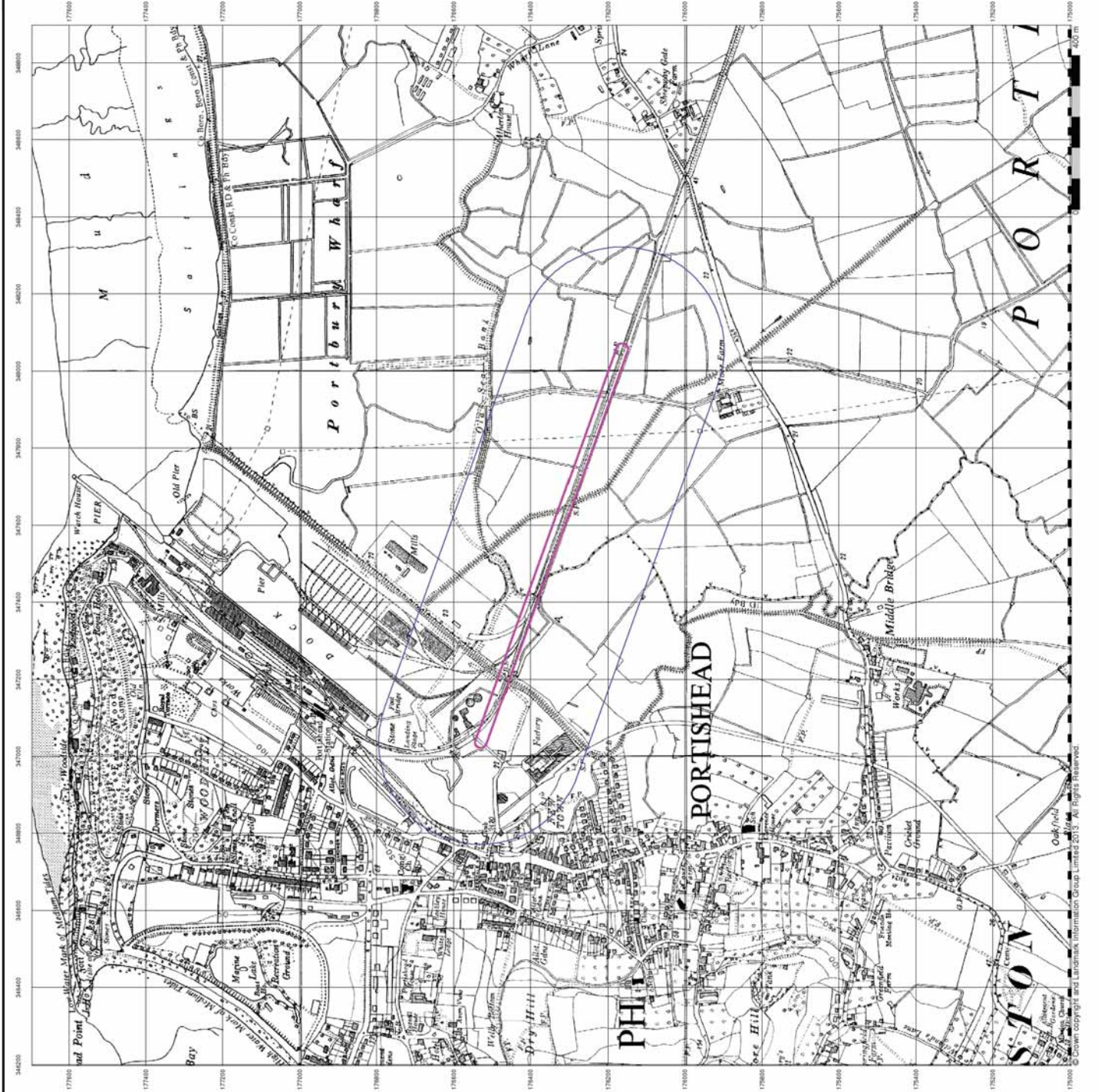
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 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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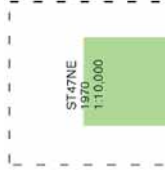


## Ordnance Survey Plan Published 1970

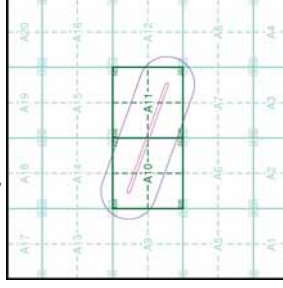
### Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1976. The current revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



### Order Details

Order Number: 54372246.1.1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

Portsmouth Cruising Club, Pump Square, Pill, BRISTOL, BS20 0BG



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**Bristol**  
**Published 1972**

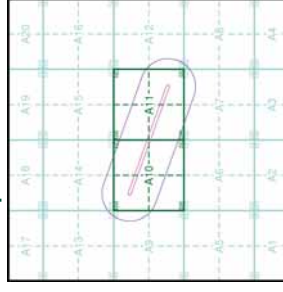
**Source map scale - 1:10,000**

These maps were produced by the Russian military during the Cold War between 1950, 1957, 1972 and 1977, and cover the area around the UK base in Bristol. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use. They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

**Map Name(s) and Date(s)**

- ST47NE  
1972  
1:10,000
- ST47SE  
1972  
1:10,000

**Russian Map - Slice A**

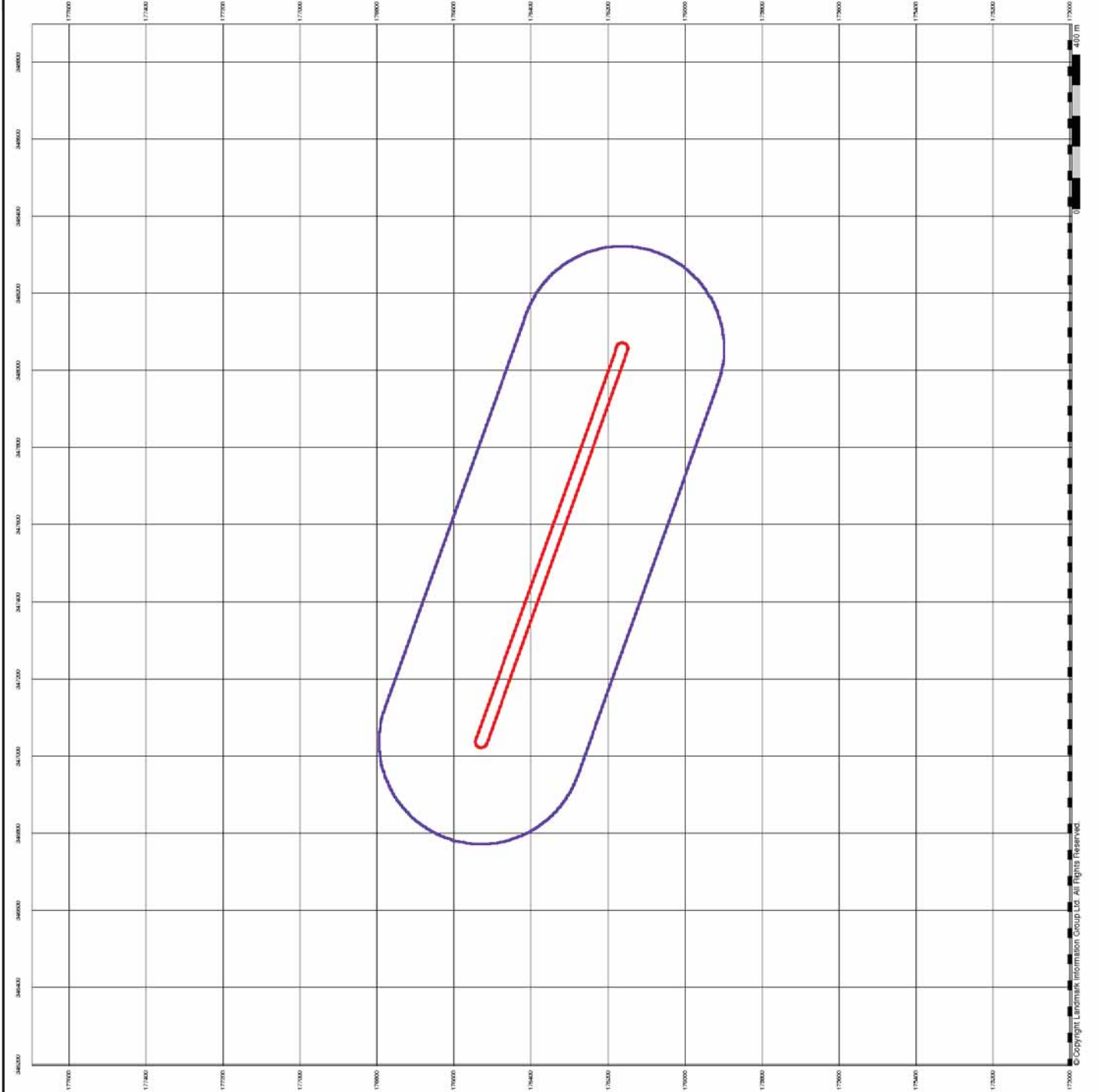


**Order Details**

Order Number: 54372246\_1\_1  
Customer Ref: 489334.aa.01.04  
National Grid Reference: 347550, 176350  
Slice: A  
Site Area (Ha): 3.33  
Search Buffer (m): 250

**Site Details**

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## Ordnance Survey Plan Published 1981

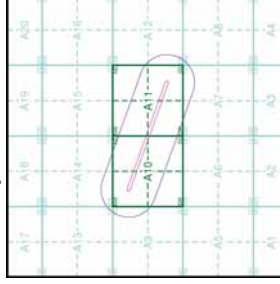
### Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas: these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first revision process was completed in 1976. Since then the revision process has continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

ST47NE	1981
1:10,000	
ST47SE	1981
1:10,000	

### Historical Map - Slice A



### Order Details

Order Number: 54372246.1.1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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# 10k Raster Mapping Published 1999

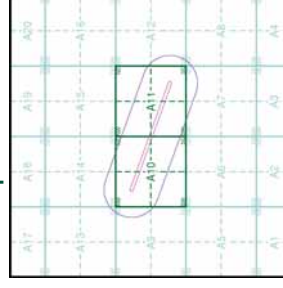
## Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 contour maps. These maps were derived from the 1:25,000 maps which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

### Map Name(s) and Date(s)

- ST47NE | 1999 | 1:10,000
- ST47SE | 1999 | 1:10,000

### Historical Map - Slice A



### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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 OBG



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## 10k Raster Mapping Published 2006

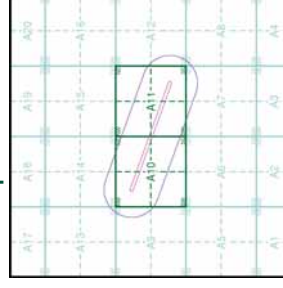
### Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 code which were derived from the 1:25,000 maps which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

### Map Name(s) and Date(s)

ST47NE	2006	1:10,000
ST47SE	2006	1:10,000

### Historical Map - Slice A



### Order Details

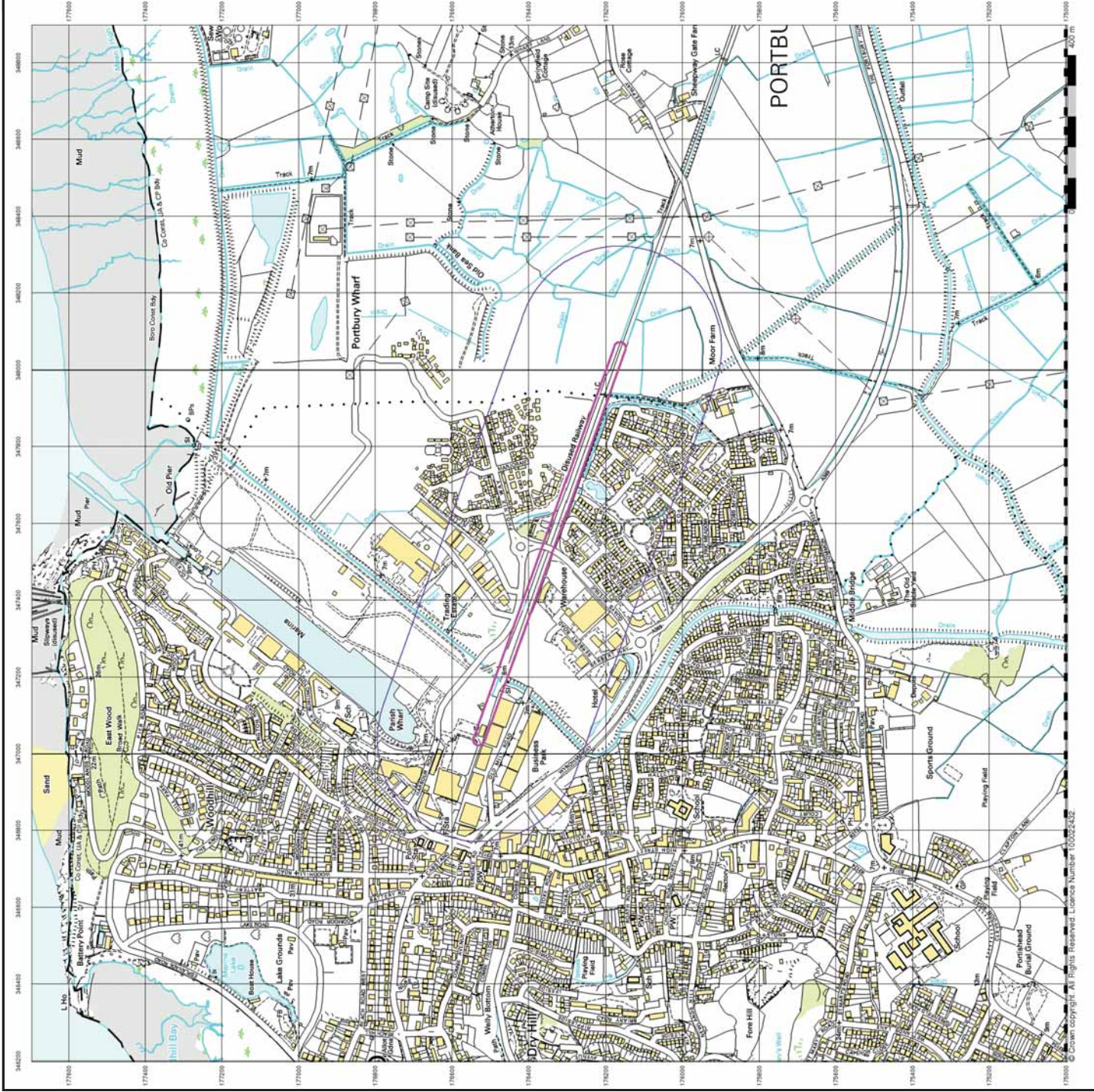
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 250

### Site Details

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 OBG



Tel: 0844 844 9857  
 Fax: 0844 844 9851  
 Web: www.envirocheck.co.uk







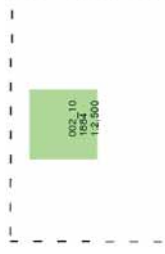


**Somerset  
Published 1884**

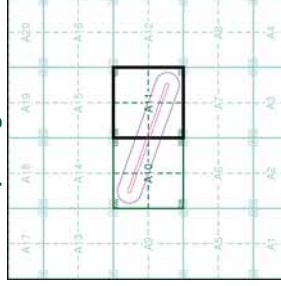
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**

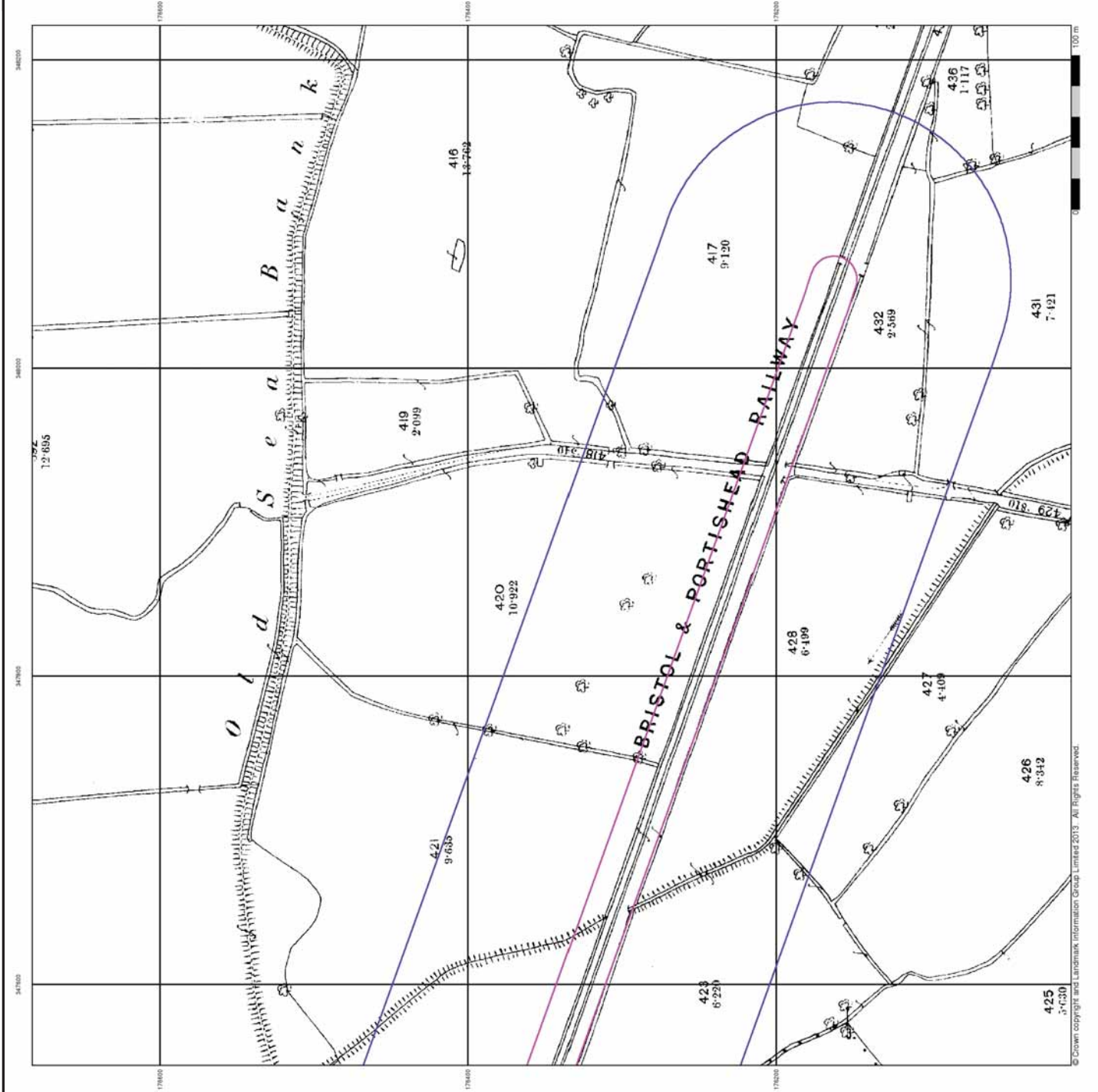


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



**Somerset  
Published 1903**

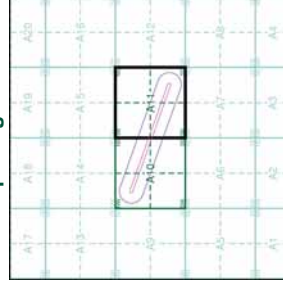
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**

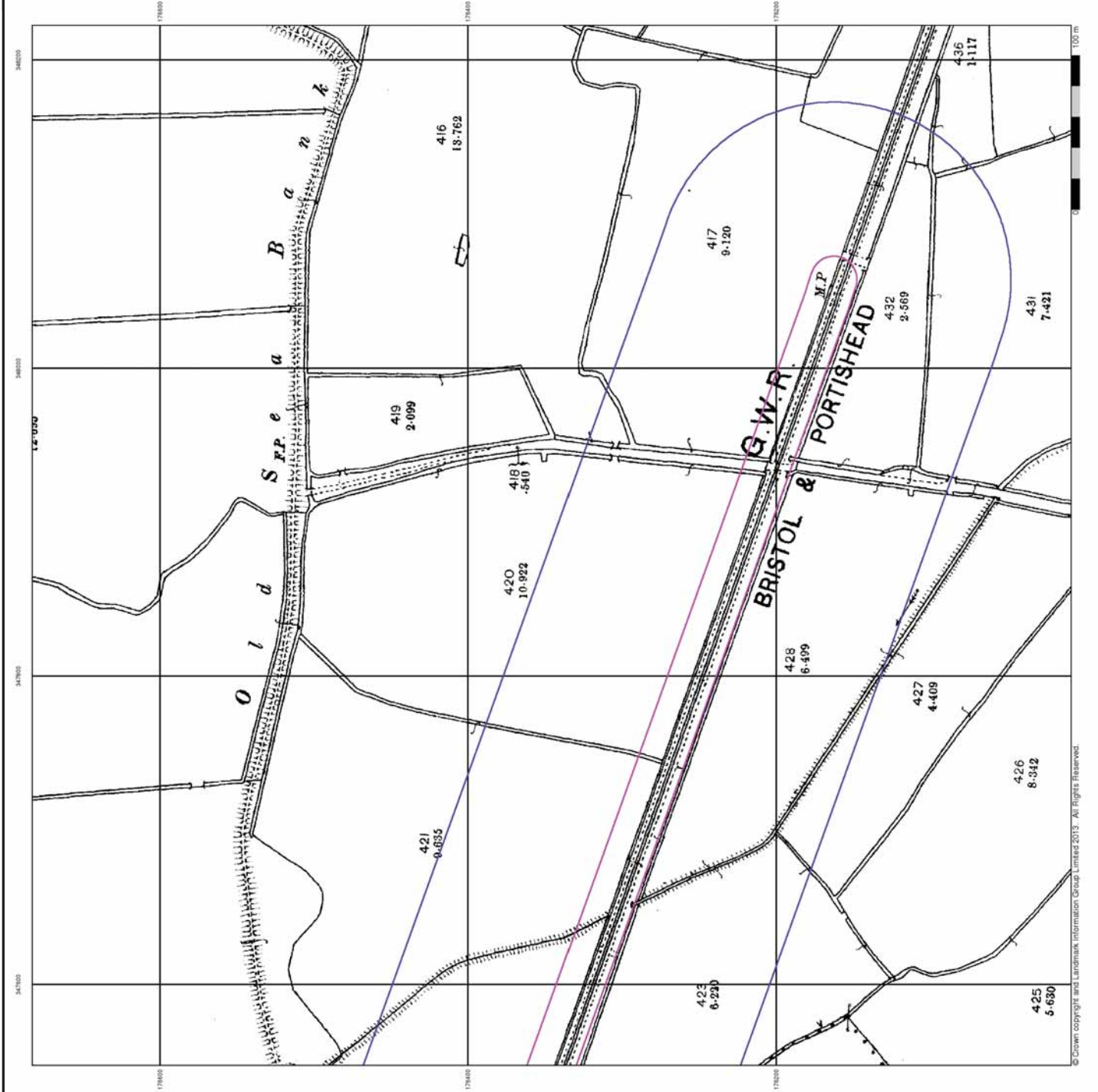


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
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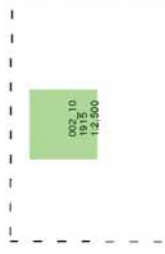
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**Somerset  
Published 1915**

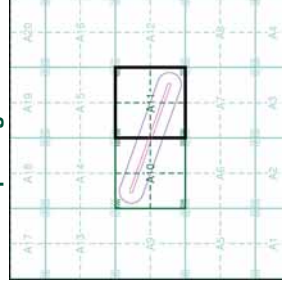
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**



**Order Details**

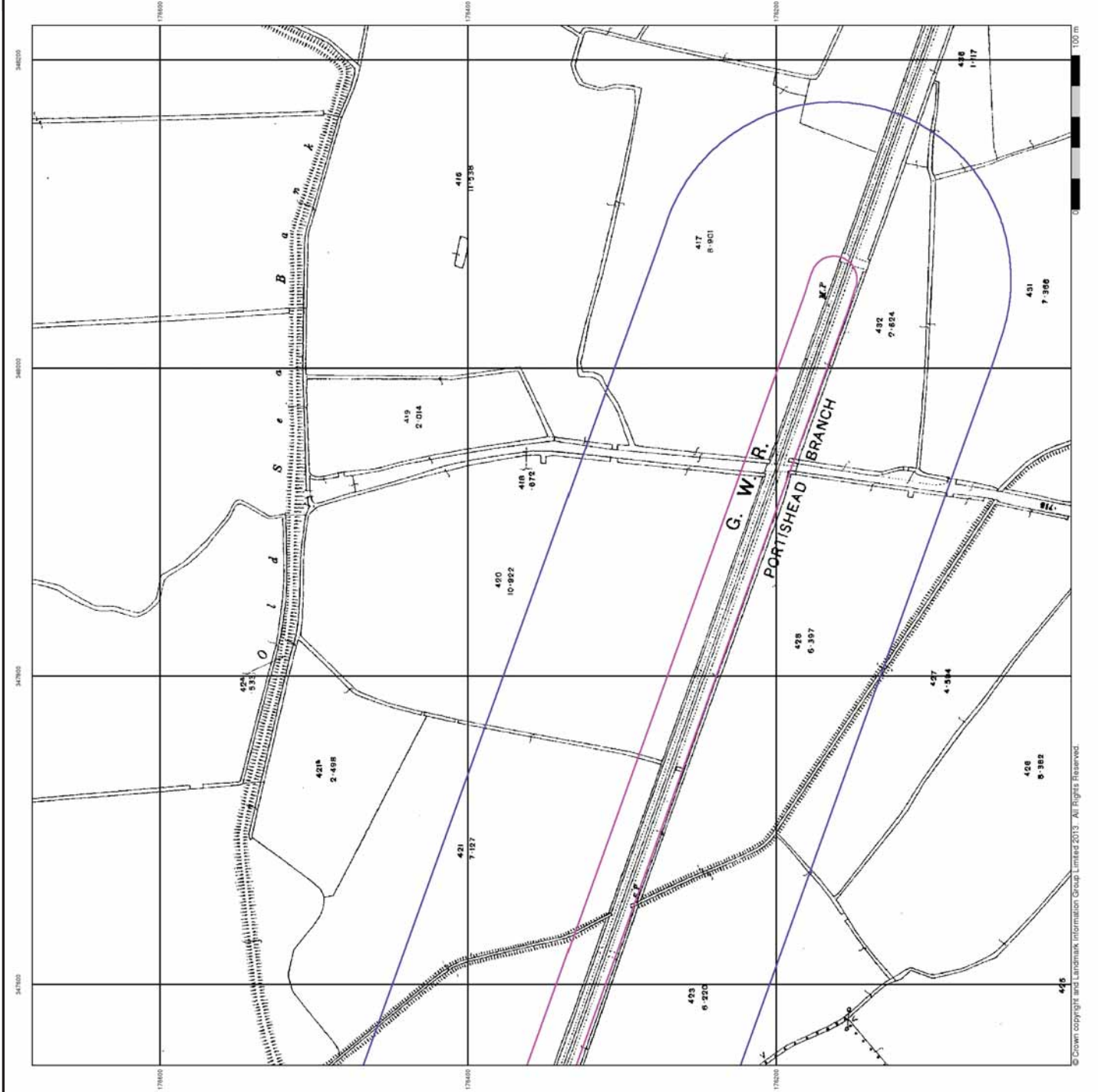
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 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

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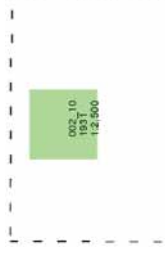


**Somerset  
Published 1931**

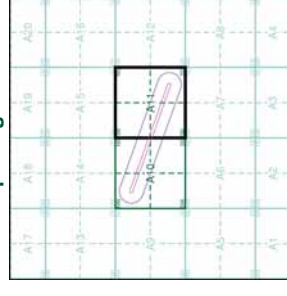
**Source map scale - 1:2,500**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1886 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**

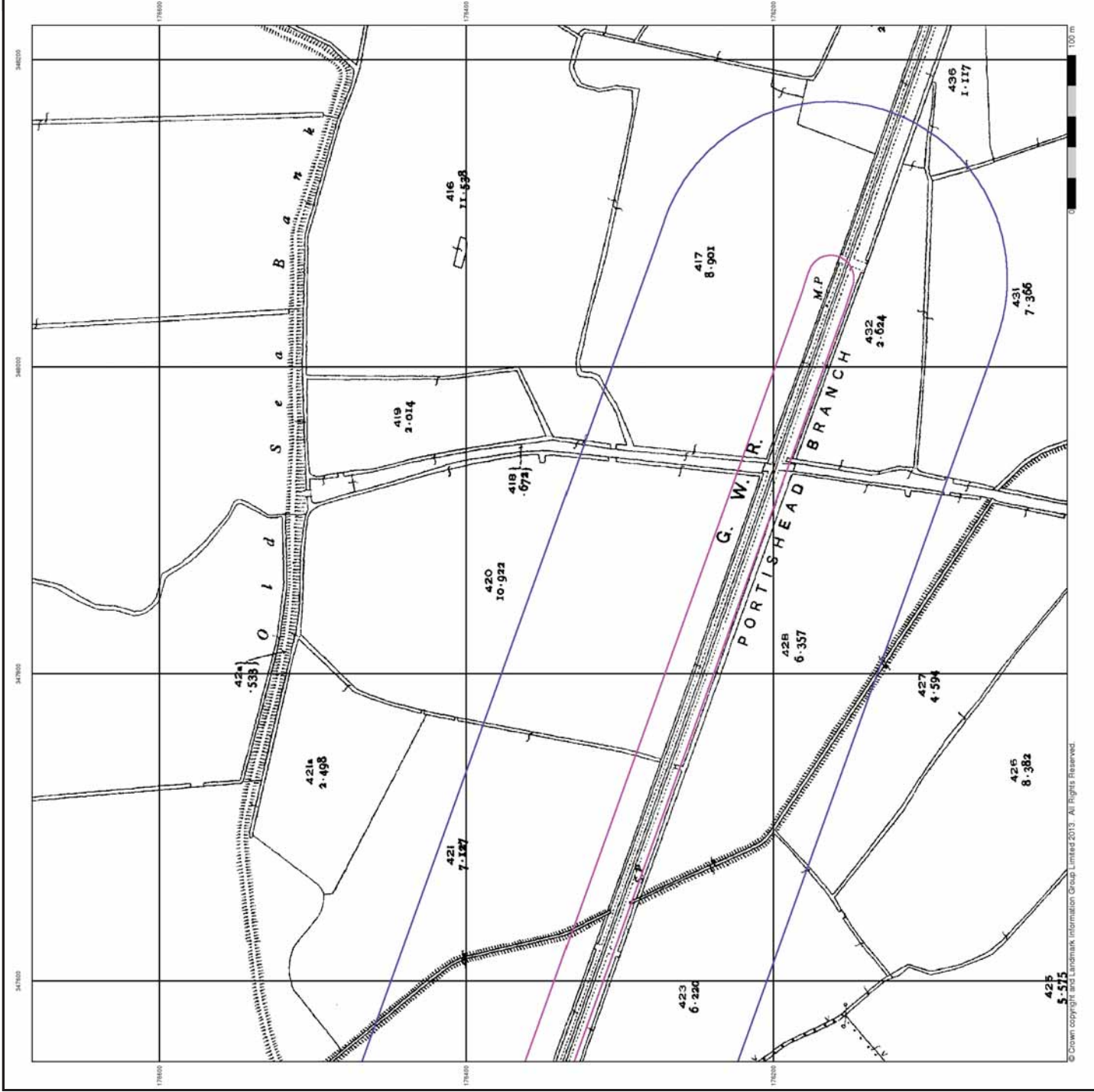


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

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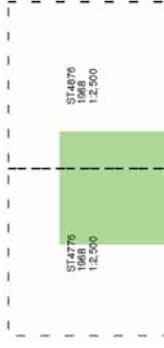


## Ordnance Survey Plan Published 1968

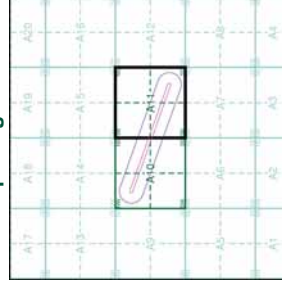
### Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale ordered for England, Wales and Scotland in 1854. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1856 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A11

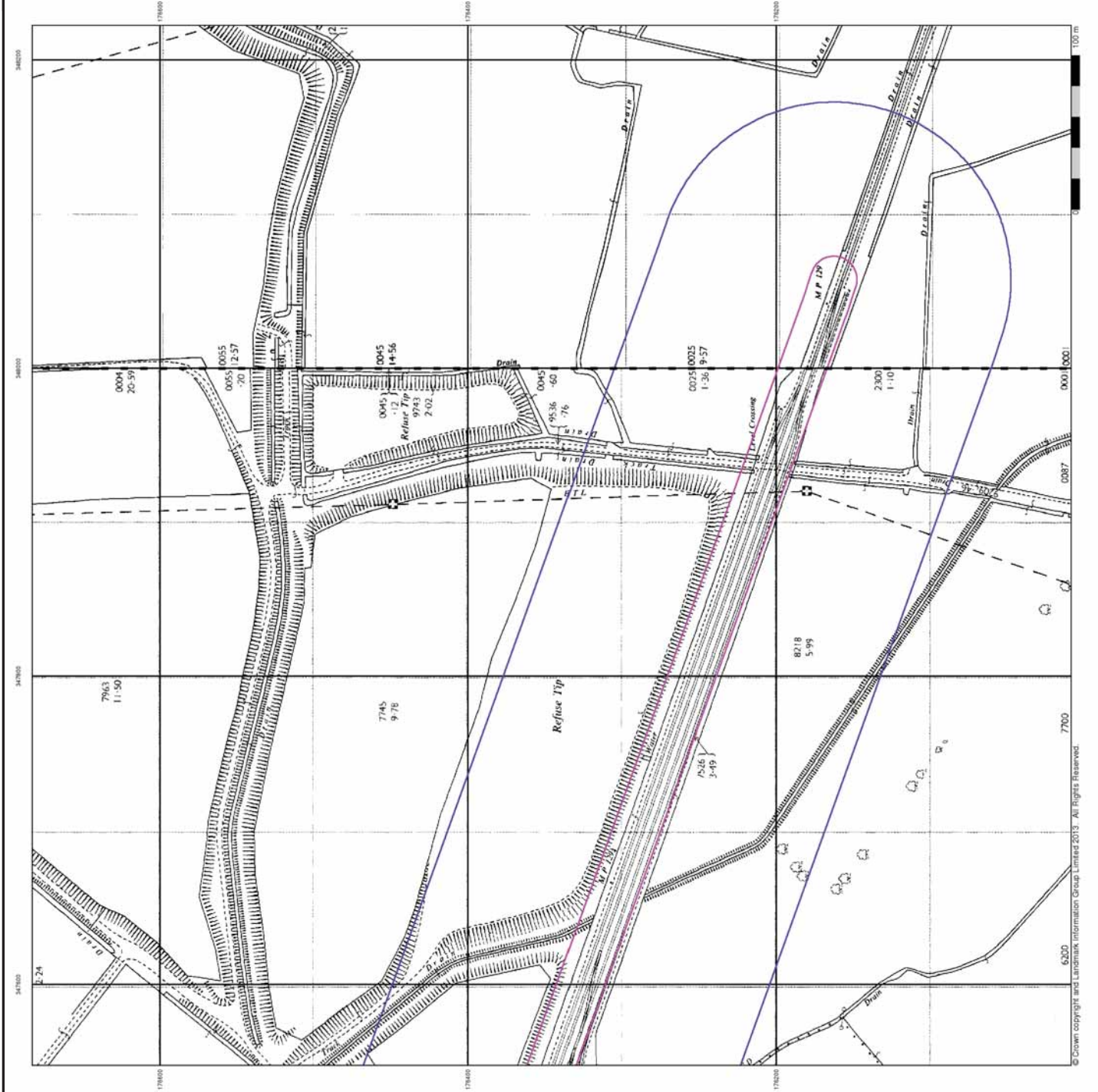


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
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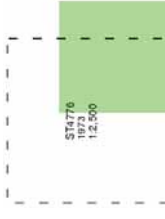
**Supply of Unpublished Survey Information**

**Published 1973**

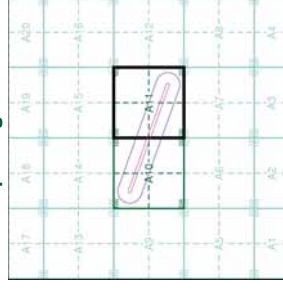
**Source map scale - 1:2,500**

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**

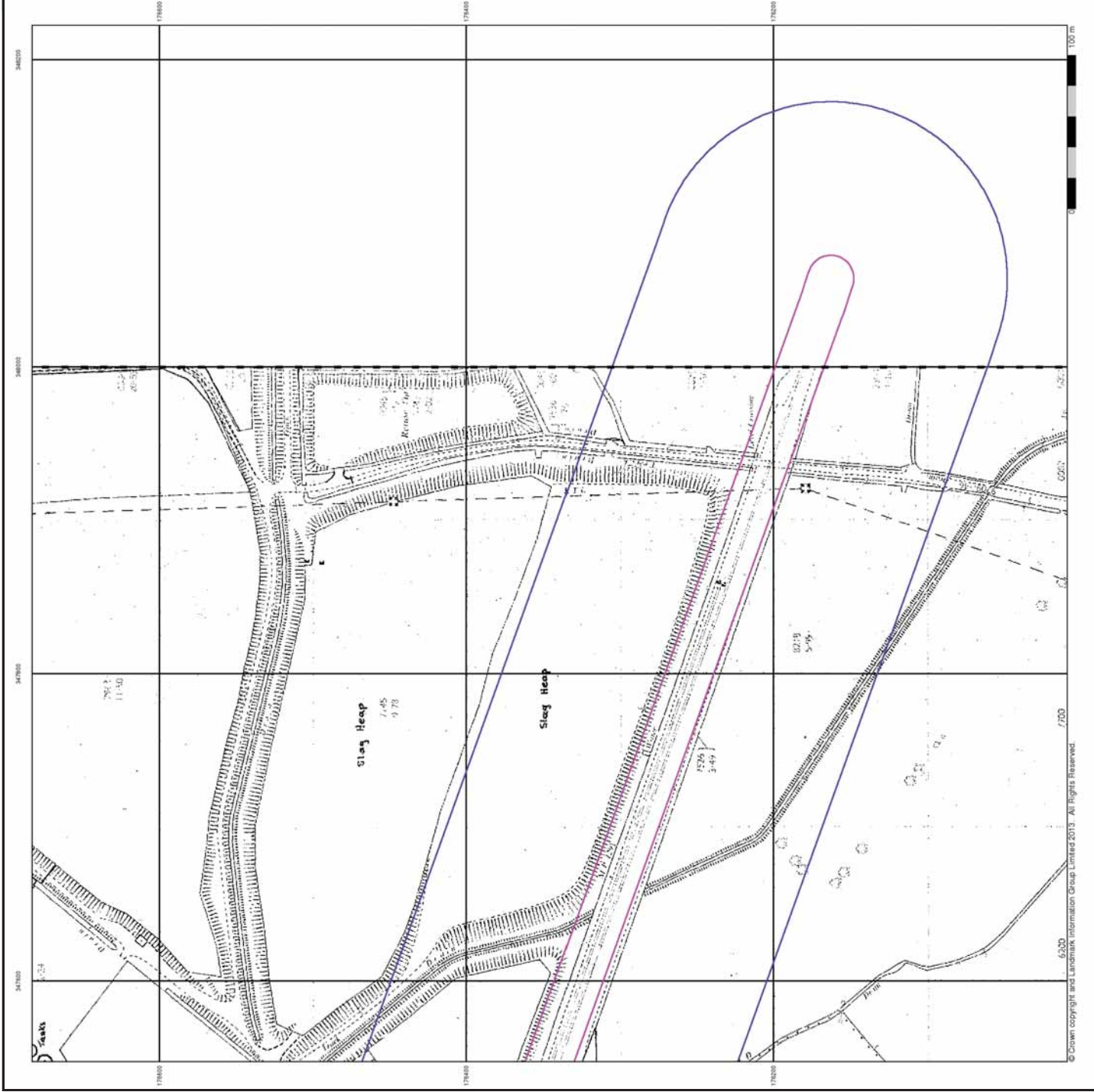


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Portsmouth Cruising Club, Pump Square, Pili, BRISTOL, BS20 0BG



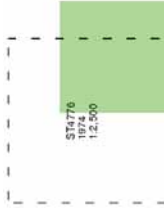


## Ordnance Survey Plan Published 1974

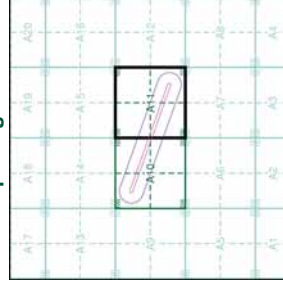
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1856 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A11

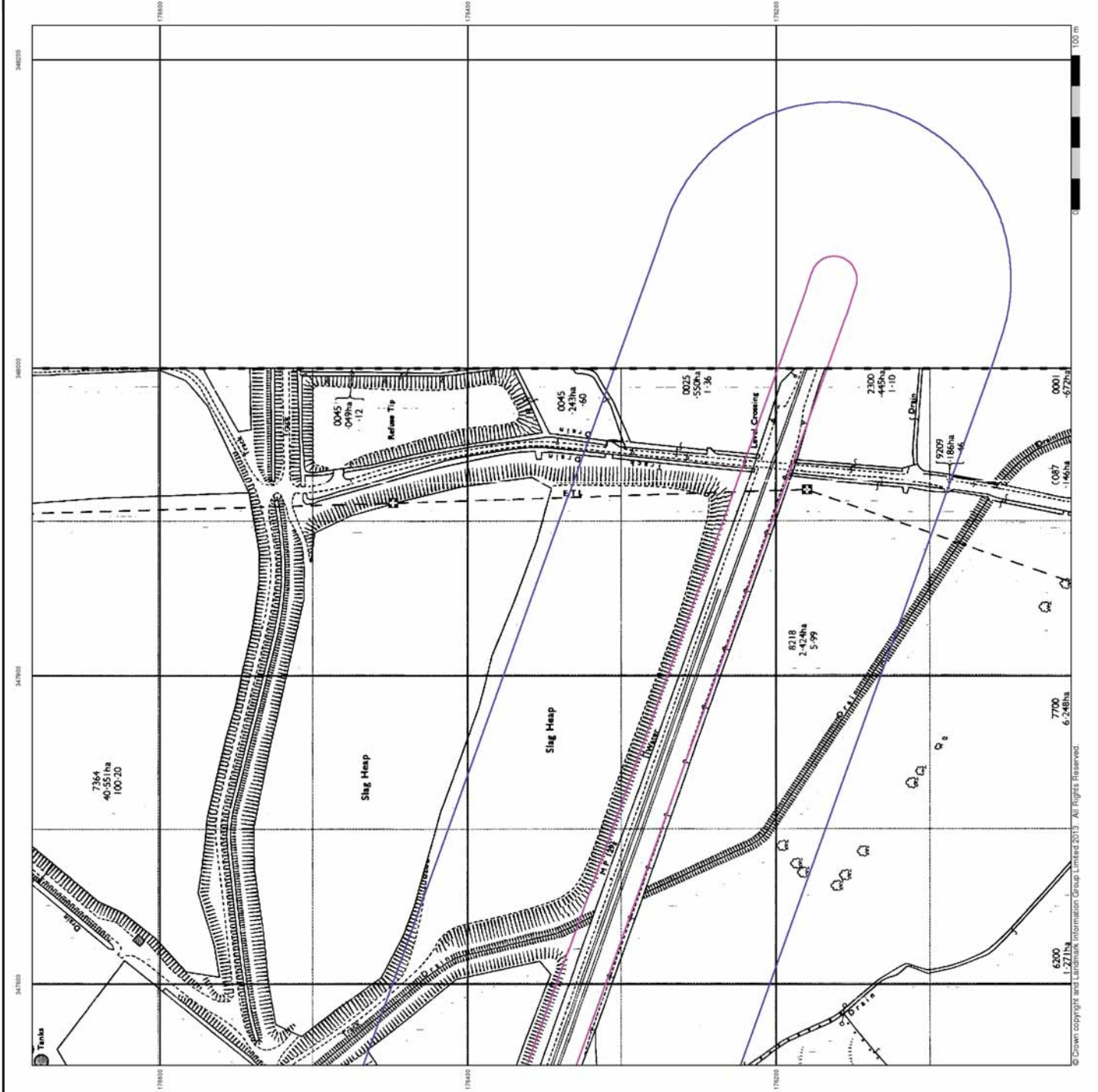


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
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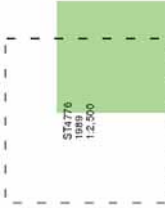


**Additional SIMS  
Published 1989**

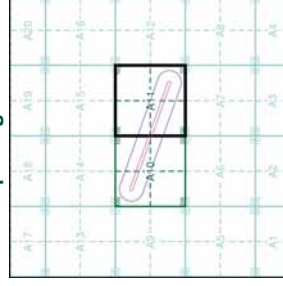
**Source map scale - 1:2,500**

The SIM cards (Ordinance Survey's 'Survey of Information on Microfilm') are further editions of the SIMs which were first published in 1984, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**



**Order Details**

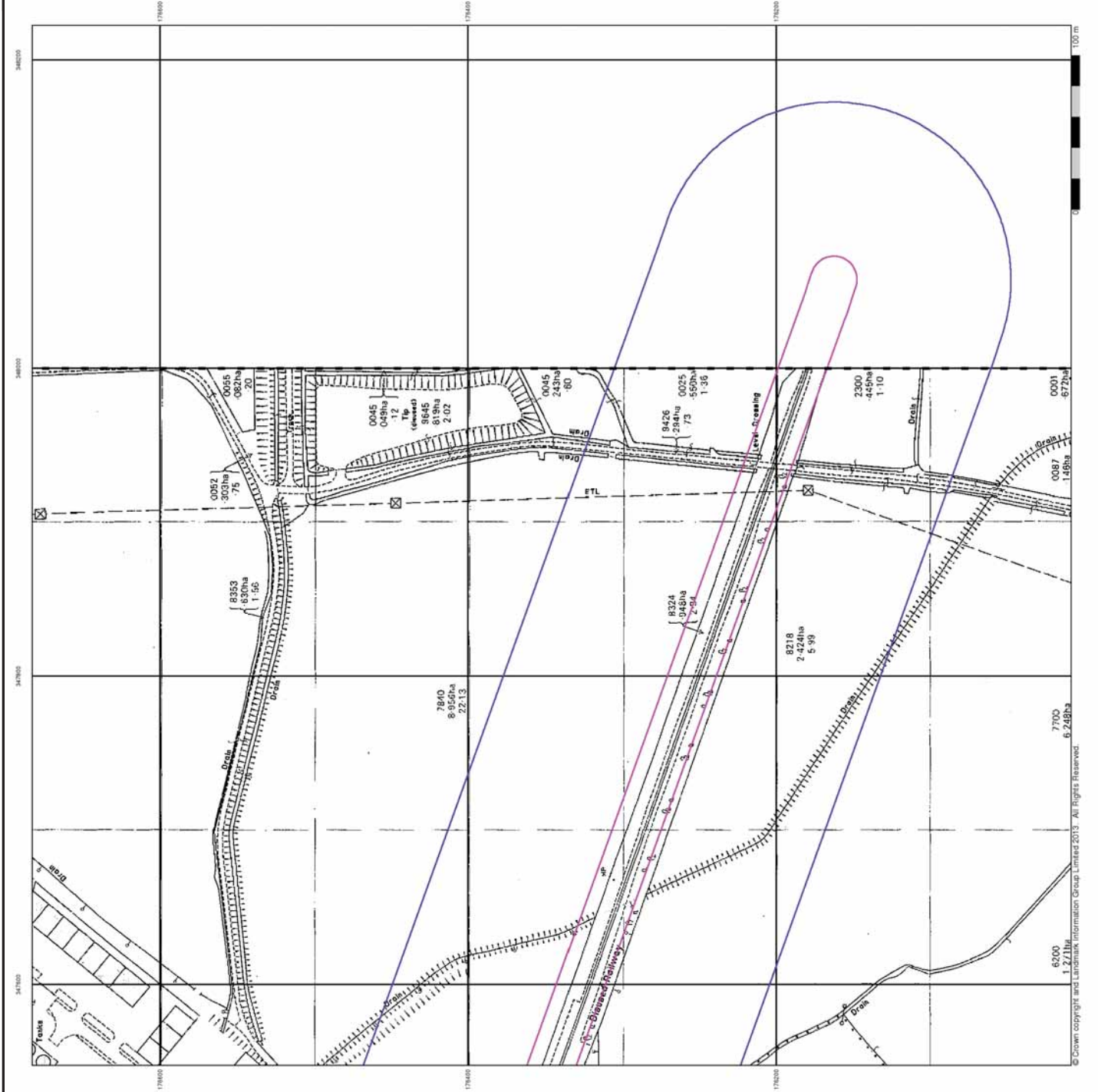
Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

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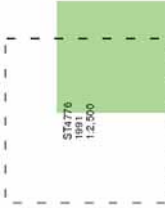


**Additional SIMS  
Published 1991**

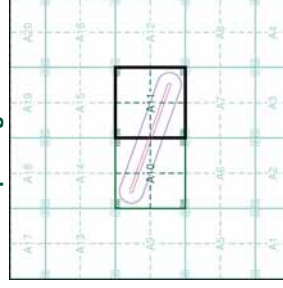
**Source map scale - 1:2,500**

The SIMS cards (Ordinance Survey's Survey of Information on Microfilm) are further editions of the SIMS cards which were first published in 1984, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

**Map Name(s) and Date(s)**



**Historical Map - Segment A11**

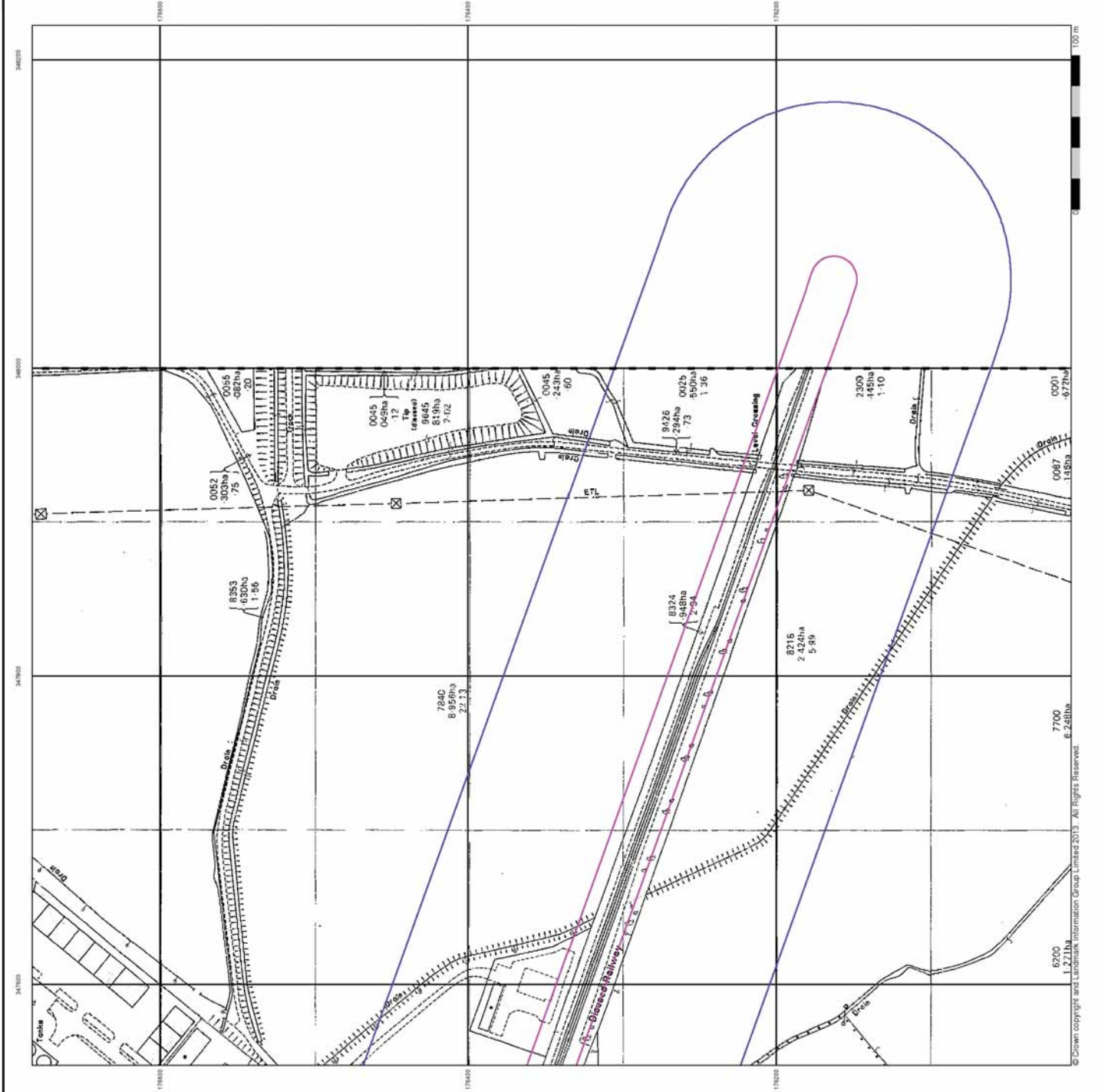


**Order Details**

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

**Site Details**

Fortishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
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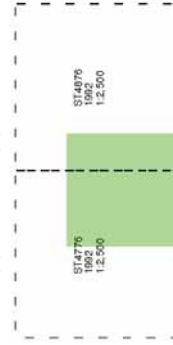
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## Large-Scale National Grid Data Published 1992

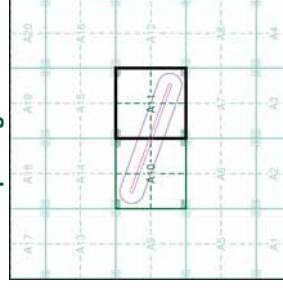
### Source map scale - 1:2,500

Large Scale National Grid Data's superseded SIM cards (Ordnance Survey's Survey of Great Britain on Microfilm) 1992, set back to 1992, and extended until 1993. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

### Map Name(s) and Date(s)



### Historical Map - Segment A11

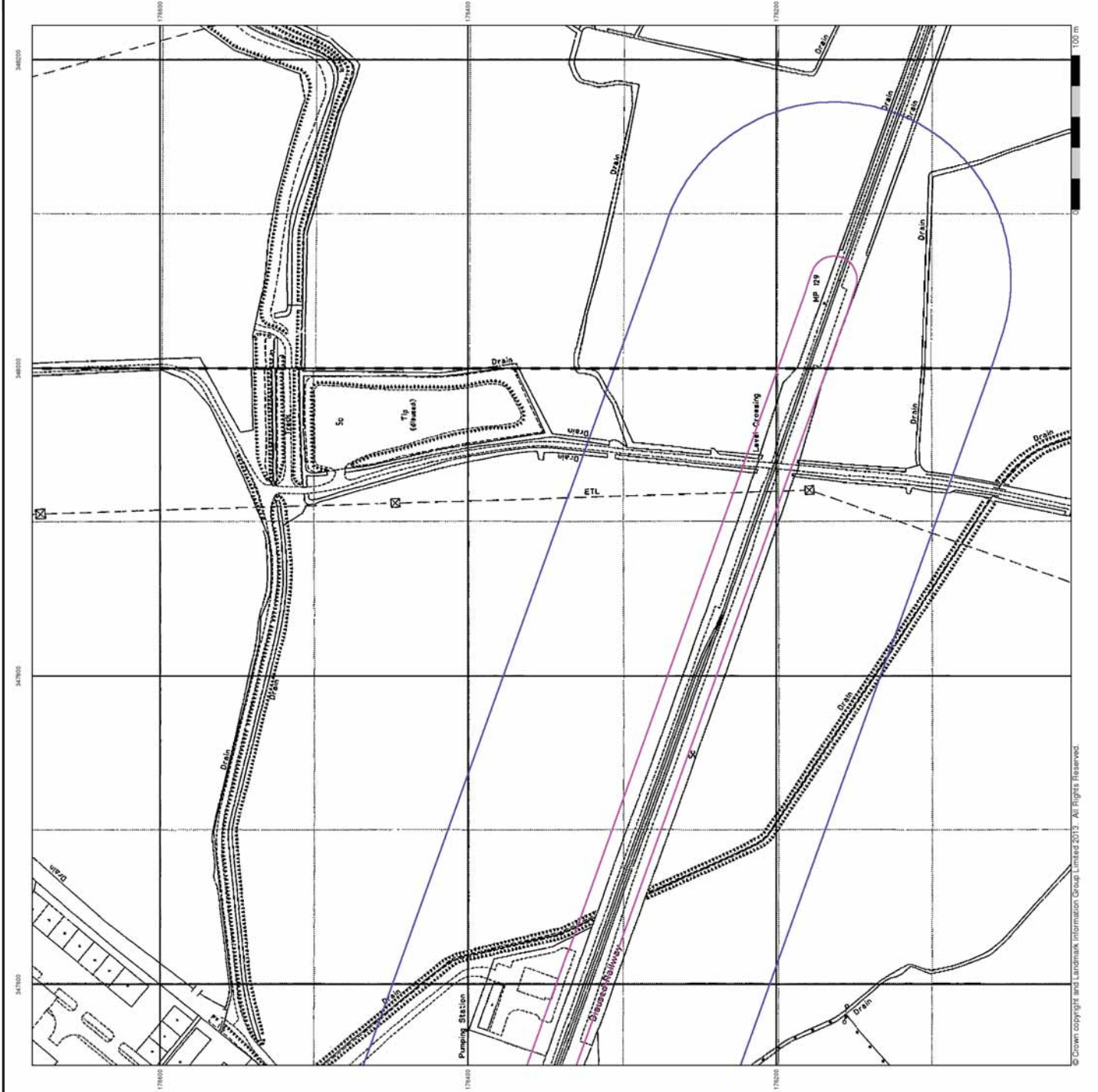


### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

Portishead Cruising Club, Pump Square, Pill, BRISTOL, BS20  
 OBG



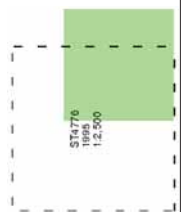


# Large-Scale National Grid Data Published 1995

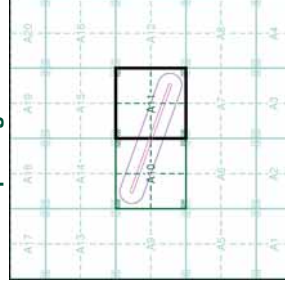
## Source map scale - 1:2,500

Large Scale National Grid Data's superseded SIM cards (Ordnance Survey's Survey of Major Roads on Microfilm) in 1992, and were used to produce this data until 1995. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

### Map Name(s) and Date(s)



### Historical Map - Segment A11



### Order Details

Order Number: 54372246\_1\_1  
 Customer Ref: 489334.aa.01.04  
 National Grid Reference: 347550, 176350  
 Slice: A  
 Site Area (Ha): 3.33  
 Search Buffer (m): 100

### Site Details

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 OBG



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