PORTISHEAD BRANCH LINE PRELIMINARY ENVIRONMENTAL INFORMATION REPORT
VOLUME 2

CHAPTER 12

Materials and Waste

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

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CHAPTER 12

Materials and Waste

12.1 Introduction

12.1.1 The Portishead Branch Line DCO Scheme (MetroWest Phase 1) ("the DCO Scheme"), comprising the nationally significant infrastructure project ("NSIP") and its associated development, has the potential to give rise to likely significant environmental impacts and effects in relation to use and consumption of materials and the production and management of waste. This chapter:

- describes the relevant legal and policy framework which will inform the undertaking of the assessment;
- describes the methodology used for the identification and assessment of likely significant material and waste effects in this Preliminary Environmental Information Report ("PEI Report");
- describes the materials and waste baseline having regard to the existing train movements and maintenance;
- describes the measures that have been adopted as part of the DCO Scheme;
- identifies and assesses the likely significant effects that could result from the DCO Scheme during the construction, operation and decommissioning phases;
- considers mitigation of likely significant effects and assesses residual effects;
- considers the cumulative effects of other developments in combination with the DCO Scheme on materials and waste;
- identifies the limitations encountered in compiling the PEI Report; and
- provides a summary of the residual effects for the mitigated DCO Scheme.

12.1.2 This chapter considers the potential environmental effects associated with the use and consumption of materials and the production and management of waste during the construction of the DCO Scheme, in accordance with the methodology outlined in Highways England's (sic HA) Interim Advice Note (IAN) 153/11 *Guidance on The Environmental Assessment of Material Resources,* taking into account updated assessment guidance, where appropriate, provided in the draft Design Manual for Roads and Bridges ("DMRB"), Volume 11, Section 3 Materials guidance (HD 212/11)[1] (see section 12.3 below).

12.1.3 During the operation of the DCO Scheme, the use of material resources and the generation of waste is likely to be negligible. Materials use and waste during the operation of the DCO Scheme have therefore been scoped out of this assessment. Paragraph 3.28 of the Scoping Opinion, provided by the Secretary of State, supports this approach on the basis that potential impacts from any related works and activities are unlikely to be significant. 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 Governance for Railway Investment Projects (GRIP) 5 Designer

[1] The Department of Transport's DMRB Volume 11 guidance provides environmental assessment advice which reflects both legislative and best practice requirements. It seeks to ensure information about the environmental effects of projects is collected, assessed and used to inform option choice, design and decision making in a timely and cost effective manner. In the absence of rail specific guidance, the assessment has utilised Highways England's environmental assessment guidance due to it providing a comprehensive and consistent approach to project-based environmental assessment and its reporting.

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 the DCO Scheme boundary and in accordance with the rail operating company's existing Environmental Management Systems.

12.1.4 The use of materials, including the management of waste, may also give rise to other impacts which might include, for example, impacts on geology and soils, air quality, water quality and noise (for example as a result of storing, processing or transporting waste). However, these impacts would occur as a result of other activities and operations on the DCO Scheme site(s) that use materials and generate waste. As such they are not solely associated with materials and waste. To ensure no duplication of assessments, such impacts are covered in the respective chapters in this PEI Report and are not included within the scope of this Materials and Waste assessment.

12.1.5 This chapter should be read in conjunction with Chapter 4 Description of the Proposed Works and Chapter 10 Geology, Hydrogeology, Ground Conditions and Contaminated Land.

12.2 Legislation and Policy Framework

EU and National Legislation

12.2.1 The use and consumption of material resources and the production and management of waste are subject to a complex framework of legislative and policy instruments at European, national and local level. In addition to material and waste-specific policies, legislation and guidance, the legislative framework for sustainable development is relevant in assessing the environmental impacts and effects of material resource use and waste.

12.2.2 The key legislative and policy instruments influencing the construction of the DCO Scheme and the consideration of the environmental assessment of material resources and waste are identified below.

12.2.3 Council Directive 85/337/EEC *on the assessment of the effects of certain public and private Schemes on the environment* (as amended) was transposed in England for projects such as the DCO Scheme, for which a scoping opinion had been requested (and provided) prior to 16 May 2017, by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009. These state that the Environmental Statement ("ES") should include a description of the proposed development and information on the characteristics of the production processes, for instance the nature and quantity of the materials used. The ES should *inter alia* include a description of the likely significant effects of the DCO Scheme on the environment resulting from the use of natural resources and the emission of pollutants, the creation of nuisances and the elimination of waste.

12.2.4 The Climate Change Act 2008 establishes a framework to develop an economically credible emissions reduction path that included committing the UK to reducing emissions by at least 80% in 2050 from 1990 levels.

12.2.5 The revised EU Waste Framework Directive (2008/98/EC) provides the legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of 'waste'. It also establishes major principles such as an obligation to

handle waste in a way that does not have a negative impact on the environment or human health and application of the waste hierarchy[2].

12.2.6 The Environmental Permitting (England and Wales) Regulations 2016 (as amended) require site operators to obtain an environmental permit, or exemption from permitting, for certain activities involving the use, treatment, disposal or storing of waste.

12.2.7 The Waste (England and Wales) Regulations 2011 (as amended) require producers of waste to confirm that they have applied the waste management hierarchy when transferring waste and to include a declaration on their waste transfer note or consignment note. The Regulations also require waste collection authorities to collect waste paper, metal, plastic and glass separately where technically, economically and environmentally appropriate.

12.2.8 The Environmental Protection Act 1990 (Section 34) imposes a duty of care on waste holders to ensure that all waste is stored, transported, treated and disposed of safely without harming the environment in accordance with the Waste Duty of Care requirements, including the Waste duty of care: Code of Practice (March 2016).

National Policy

12.2.9 The National Policy Statement for National Networks ("NPSNN") advises on carbon emissions, safeguarding mineral resources and waste management in the context of national network nationally significant infrastructure projects ("NSIP"). Table 12-1 below identifies those policies of direct relevance to this assessment and the location where they are considered in this PEI Report.

Table 12-1: Summary of relevant NPSNN advice regarding materials and waste

Summary of NPS provision	Consideration within the PEI Report
Paragraphs 5.16 to 5.19 advise on carbon emissions. Paragraph 5.19 states *"Evidence of appropriate mitigation measures (incorporating engineering plans on configuration and layout, and use of materials) in both design and construction should be presented. The Secretary of State will consider the effectiveness of such mitigation measures in order to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high."*	The measures to be adopted as part of the DCO Scheme include implementing WRAP's Design for Resource Efficient Construction Principles ("DfRE") in order to make the best use of materials over the lifecycle of the DCO Scheme's built assets, to minimise construction related carbon emissions.
Paragraphs 5.39 to 5.45 advise on waste management. Paragraphs 5.39 to 5.41 introduce government policy which is intended to protect human health and the environment by producing less waste and using waste as a resource where possible. The waste hierarchy is to be applied (prevent; reuse; recycle; recover (for heat); and disposal (to landfill)). Where appropriate, the Environmental Permitting regime is to be followed. Paragraph 5.42 states that *"The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome."*	The detailed arrangements for managing waste produced during the construction of the DCO Scheme will be documented in a Site Waste Management Plan ("SWMP") to be prepared and implemented, in a manner to suit the requirements of the DCO Scheme, prior to the start of construction. The Code of Construction Practice will accompany the DCO Application. The use of materials and the disposal of waste during the operational phase of the DCO Scheme have been scoped out of the ES.

[2] The "waste hierarchy" ranks waste management options according to what is best for the environment. It gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for reuse, then recycling, then recovery, and last of all disposal.

Table 12-1: Summary of relevant NPSNN advice regarding materials and waste

Summary of NPS provision	Consideration within the PEI Report
Paragraph 5.169 states that *"Applicants should safeguard any mineral resources on the proposed site as far as possible".*	As reported in Section 12.4.13, the DCO Scheme is following the existing railway and highways alignments and is not located within an area designated by either North Somerset District Council or Bristol City Council as a 'Minerals Safeguarding Area' and is therefore unlikely to result in the sterilisation of existing mineral resources.

12.2.10 The Waste Management Plan for England 2013 sets out the obligations for England which have been transposed from the revised EU Waste Framework Directive (2008/98/EC). These obligations include amongst others ensuring that by 2020 that at least 70% by weight of construction and demolition waste is subjected to material recovery.

12.2.11 The National Planning Policy for Waste 2014 requires local planning authorities to ensure that the likely impact of proposed non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities; and the handling of waste arising from the construction and operation of development maximises reuse / recovery opportunities, and minimises off-site disposal.

12.2.12 Network Rail's Environment Policy 2015 sets out their approach to environmental management which is key to achieving their vision – "*A better railway for a better Britain*"; improving environmental performance and leaving a sustainable environmental legacy for future generations. The following key principles are relevant to this assessment:

1. *"We will identify our significant environmental impacts and take action to prevent pollution to air, water and land which may occur as a result of our operations";*
2. *"We will buy and use natural resources in a responsible and sustainable manner";*
3. *"We will reduce the amount of material we use and minimise the amount of waste we produce"; and*
4. *"We will become more energy efficient and reduce our carbon emissions".*

12.2.13 Network Rail's 'Contract Requirements – Environment' require contractors to have a Site Waste Management Plan, even where this is no longer a legal requirement.

Local Policy

12.2.14 An overview of the local policy framework is provided in Chapter 6 Planning Framework. This section identifies relevant policies with regards to materials and waste.

12.2.15 The West of England[3] Joint Waste Core Strategy sets out the strategic spatial planning policy for the provision of waste management infrastructure across the plan area. The local planning framework for North Somerset District Council and Bristol City Council is set out in their respective development plans, which include policies on materials and waste. The policies relevant to this assessment are identified in Table 12-2 below.

[3] The West of England is a sub-region that includes the four unitary authorities of Bath and North East Somerset Council, Bristol City Council, North Somerset Council and South Gloucestershire Council.

Table 12-2: Summary of local policy

Policy No.	Title	Policy Summary
West of England Joint Waste Core Strategy ("JWCS") (2011)		
1	Waste Prevention	"Waste Prevention will be promoted by the provision of information, appropriate to the planning application, on the following matters: • the type and volume of waste that the development will generate (both through the construction and operational phases); • on-site waste recycling facilities to be provided (both through the construction and operational phases); *a) the type and volume of waste that the development will generate (both through the construction and operational phases);* *b) on-site waste recycling facilities to be provided (both through the construction and operational phases);* *c) the steps to be taken to minimise the use of raw materials in the construction phase through sustainable design and the use of recycled or reprocessed materials;* *d) the steps to be taken to reduce, reuse and recycle waste that is produced through the construction phase;* *e) If waste generated during construction is to be disposed of elsewhere the distance it will be transported;* f) *the steps to be taken to ensure the maximum diversion of waste from landfill (through recycling, composting and recovery) once the development is operational."*
North Somerset District Council Core Strategy (Adopted 2017)		
CS1	Addressing climate change and carbon reduction	The Council is committed to reducing carbon emissions and tackling climate change. One of the principles to guide development is the reduction, reuse and recycling of waste with particular emphasis on waste minimisation on development site.
North Somerset Council (2015) Creating Sustainable Buildings and Places in North Somerset: Guidance for energy efficiency, renewable energy and the transition to zero carbon development - Supplementary Planning Document		
Para. 4.14	Material Use	*"Buildings should be designed to use materials as effectively as possible, starting with the materials used in construction. Using sustainable materials, such as those with recycled content and renewable materials can minimise the negative impact of material use. The distance from which materials are sourced and therefore the impact of their transportation should also be taken into consideration in material choice. Locally sourced materials are the preference in most cases."*
Para. 4.15	Waste Management	*"Developers must consider the reuse of materials to create new buildings and should also consider how existing buildings on a site can be retained and adapted for reuse."*
Bristol City Council Development Framework Core Strategy (Adopted June 2011)		
BCS13	Climate Change	This policy requires Bristol to take account of the impact of climate change. Development should mitigate its impact on climate change and adapt to the effects of climate change. *"Development should mitigate climate change through measures including: the efficient use of natural resources in new buildings".*

Table 12-2: Summary of local policy

Policy No.	Title	Policy Summary
BCS15	Sustainable Design and Construction	This policy aims to ensure that new developments minimise their environmental impact and emissions of CO_2. *"Sustainable design and construction will be integral to new development in Bristol. In delivering sustainable design and construction, development should address the following key issues: waste and recycling during construction and in operation; conserving water resources; the type, life cycle and source of materials to be used; and flexibility and adaptability, allowing future modification of use or layout, facilitating future refurbishment and retrofitting*."

12.2.16 Network Rail's (2016) Infrastructure Projects Great Western and Crossrail ("GW&C") Region Sustainable Development Strategy sets out how the region will deliver sustainability improvements in line with the Network Rail Sustainable Development Strategy. This document details eight regionally specific objectives and the targets set within those objectives for the GW&C Region. Individual plans may be developed for the major programmes within the region to sit under this strategy and be implemented at a programme level. The document applies to all project teams and suppliers working within GW&C for or on behalf of Network Rail's Infrastructure Projects.

12.2.17 Those materials and waste related objectives which have been identified as regional priority areas for the sustainability strategy and the targets which have been set within these objectives are identified below:

1. *Every project to hold a design out waste workshop*
2. *90% Diversion of waste from landfill*
3. *Projects identified in the Carbon efficiency action plan to use the Carbon reporting tool and demonstrate value*
4. *Every project to carry out a responsible sourcing assessment*
5. *Sustainability to be included on the agenda of all monthly procurement meetings.*
6. *Every location to have an energy champion implementing their energy efficiency plan*

Summary of Legislation and Policy

12.2.18 The review of legislation and policy has identified a number of statutory and policy requirements and advice influencing materials resource use and waste management which are applicable to the DCO Scheme. These are detailed in Table 12-3.

Table 12-3: Applicable statutory, policy and advisory requirements

Applicable statutory, policy and advisory requirements	Reference
Carry out a responsible sourcing assessment covering the key material elements used to construct the DCO Scheme.	Bristol City Council Development Framework Core Strategy; North Somerset District Council Creating Sustainable Buildings and Places in North Somerset: Supplementary Planning Document; and Network Rail Infrastructure Projects GW&C Region Sustainable Development Strategy
The DCO Scheme should implement WRAP's Design for Resource Efficiency Principles in order to make the best use of materials,	National Policy Statement for National Networks; Network Rail's Environment Policy 2015; Bristol City Council

Table 12-3: Applicable statutory, policy and advisory requirements

Applicable statutory, policy and advisory requirements	Reference
over the lifecycle of the DCO Scheme's built assets to minimise construction related carbon emissions. If identified in the Carbon efficiency action plan, the DCO Scheme shall use the Carbon reporting tool (Rail Carbon Tool, or equivalent) to identify opportunities to avoid, reduce, or substitute construction related carbon emissions; and demonstrate value.	Development Framework Core Strategy; and Network Rail Infrastructure Projects GW&C Region Sustainable Development Strategy
Contribute to national planning policy by not causing unacceptable impacts on existing waste management facilities and on sites and areas allocated for waste management; and through maximising the reuse/recovery of CD&E waste, and minimising off-site disposal.	National Planning Policy for Waste 2014
Undertake a waste audit (which may the form of a Site Waste Management Plan) demonstrating how waste is to be managed in a sustainable manner as part of the DCO Scheme, exploring how the use of raw materials can be minimised and how waste created can be reused, with priority given to the reuse of materials on site.	West of England Joint Waste Core Strategy
Hold a designing out waste workshop and prepare a Site Waste Management Plan, targeting 70 - 90% recovery of non-hazardous construction, demolition and excavation waste in order to contribute to achievement of Government/ Network Rail policy objectives.	Network Rail Infrastructure Projects GW&C Region Sustainable Development Strategy; and Waste Plan for England 2013.
Take all reasonable steps to apply the following waste management hierarchy when transferring waste during the construction of the DCO Scheme: (a) prevention; (b) preparing for reuse; (c) recycling; (d) recovery; (e) disposal.	Waste (England and Wales) Regulations 2011; and West of England Joint Waste Core Strategy.
The Principal Contractor when making arrangements for the collection of waste paper, metal, plastic or glass, should make provision for separate collection in accordance with requirements of waste collector.	The Waste (England and Wales) Regulations 2011 (as amended).
Consider the need to apply for an Environmental Permit or Exemption from Permitting if undertaking one of the following activities: using waste, treating waste, disposing of waste, storing waste, discharging waste water.	Environmental Permitting Regulations 2016 (as amended).
All waste generated by the DCO Scheme should be stored, transported, treated and disposed of safely in accordance with the legal requirements.	The Environmental Protection Act 1990.
The DCO Scheme should classify waste to check if it is hazardous (e.g. ballast material); separate and store hazardous waste safely; and check that waste carriers are registered and where waste is sent for disposal or recovery the receiving sites are appropriately permitted.	The Hazardous Waste (England and Wales) Regulations 2005 (as amended).

12.3 Methodology

Guidance and Best Practice

12.3.1 The approach to the assessment of the DCO Scheme on materials and waste is based on the following guidance and best practice from government and professional bodies.

Guidance

1. Highways Agency (2011) Interim Advice Note (IAN) 153/11 Guidance on The Environmental Assessment of Material Resources;
2. Highways Agency (2012) draft guidance DMRB Volume 11, Section 3, Part 6 HD 212/11 Materials;
3. Network Rail (2016), Infrastructure Projects GW&C Region Sustainable Development Strategy;
4. WRAP (2013), Resource efficiency benchmarks for construction Schemes; and
5. Environment Agency (2015), Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste
6. Defra, Waste Duty of Care Code of Practice.

Best Practice

1. WRAP, Design for Resource Efficient Construction Principles (including WRAP, Designing out Waste: A Design Team Guide for Civil Engineering);
2. British Standard Institution, Publicly Available Specification (PAS) 2080:2016 Carbon Management in Infrastructure;
3. Rail Safety Standards Board, Rail Carbon Tool;
4. Buildings Research Establishment, BES 6001 Responsible Sourcing of Construction Products;
5. CL:AIRE, The Definition of Waste: Development Industry Code of Practice; and
6. WRAP Site Waste Management Plan ("SWMP") Templates.

12.3.2 The assessment primarily focuses on the potential environmental impacts arising from the construction, operation and decommissioning of the DCO Scheme in the form of:

1. Embodied carbon emissions associated with material extraction, manufacturing and any pre-distribution transportation;
2. The depletion of natural resources (primary aggregates have been chosen to act as a surrogate for indicating the DCO Scheme's use of natural resources);
3. The generation and management of construction waste on-site; potential impact on the available waste management infrastructure; and
4. The potential of the alignment of the DCO Scheme proposals with the legislative and policy framework for sustainable development, material resources and waste.

Consultations

12.3.3 A summary of consultations undertaken to date is presented in Table 12-4 below. Further information on the consultation process is presented in Chapter 5 Approach to the Environmental Statement and the Consultation Report on the informal stakeholder consultations undertaken in 2015 is available on the TravelWest website which can be accessed via the following link http://travelwest.info/metrowest.

Table 12-4: Summary of consultation responses

Organisation and date	Summary of response	Consideration within PEI Report
Scoping Opinion Responses (August 2015)		
Planning Inspectorate	Para 2.50. The environmental effects of all wastes to be processed and removed from the site should be addressed. The ES will need to identify and describe the control processes and mitigation procedures for storing and transporting waste off site. All waste types should be quantified and classified.	The control processes and mitigation procedures for storing and transporting waste off site are described in Sections 12.2.6 – 12.2.8. The key waste types are quantified and classified in Section 12.6.2 and Sections 12.6.17 – 12.6.21, where possible, in accordance with the current level of design information.
	Para. 2.62. The applicant's assessment should outline the measures considered to ensure ease of disassembly and reuse/recycling of materials during future maintenance works.	The DCO Scheme will implement those designing for the future / designing for deconstruction and flexibility principles outlined in Section 12.5.3.
	Para. 2.6.3. Decommissioning. The ES needs to include a high level environmental assessment of the decommissioning phase. Decommissioning works are taken into account in the design and use of materials, so that structure can be taken down with a minimum of disruption.	The decommissioning phase impacts on materials and waste have been scoped out for the reasons explained in Section 12.3.18 – Section 12.3.23.
	Para 3.6.8. A detailed assessment should be undertaken where detailed information about the types and quantities of materials and waste is available (e.g. a detailed bill of quantities).	There was limited information at the time of assessment on the anticipated types and quantities of materials required during construction due to the DCO Scheme being at an early stage in its design. The use of resource efficiency benchmarking data for completed buildings and infrastructure projects has therefore been used in the absence of this information to undertake a worst case assessment.
	Para 3.69. The Secretary of State supports the proposed preparation of a Site Waste Management Plan (SWMP) and this should be appended to the ES. Paragraph 5.42 of the NPS also explains the information on waste management that should be included in the ES.	A SWMP will be prepared and implemented, in a manner to suit the requirements of the DCO Scheme, prior to starting on site. The SWMP will be a live document which is updated at varying points within the lifecycle of the DCO Scheme. The SWMP information that will be included in the ES will therefore be limited to a list of waste prevention actions taken before the development of the Principal Contactor's SWMP.

Definition of the Study Area

12.3.4 The study areas selected address two principal topics: (1) the use and consumption of material resources required for the DCO Scheme; and (2) the production and management of waste arising as a result of undertaking these works.

12.3.5 Responsibility for the procurement of materials and final disposal of wastes will lie with the contractor(s) appointed to construct the DCO Scheme.

12.3.6 The study areas for this topic are defined geographically in Section 12.3.7 below based on a current understanding of the likely receptors associated with the use and consumption of materials and the production and management of waste.

Key Receptors

12.3.7 The key receptors for the Materials and Waste topic are:

- The global climate system as the ultimate receptor of any new greenhouse gas ("GHG") (embodied carbon) emissions generated from the proposed construction works;
- The primary aggregate workings within the South West Aggregates Working Party ("SWAWP") area, specifically the Bath and North East Somerset, Bristol, Bournemouth, Cornwall, Dartmoor NP, Devon, Dorset, Exmoor NP, Gloucestershire, Isles of Scilly, North Somerset, Plymouth, Poole, Somerset, South Gloucestershire, Swindon, Torbay and Wiltshire Mineral Planning Areas ("MPA"), which are assumed to be the primary source of the aggregates used in the proposed works;
- The waste management infrastructure within the West of England sub-region which are likely to be used to manage the majority of waste generated through the proposed works; and
- The European, national, regional and local policy framework for sustainable development, material resources and waste.

Defining the Baseline

12.3.8 The following baseline data have been gathered from desk-based reviews of existing information, 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 (where available);
- The key legislative and policy instruments influencing the consideration of the environmental assessment of material resources and waste;
- The sensitivity of the global climate system to continued GHG emissions;
- An assessment of the regional available land-bank for sand and gravel, and crushed rock (chosen to act as a proxy indicator of regional natural resources), facilitated by a review of The South West Aggregates Working Party Annual Report 2013; and
- A strategic assessment of the waste management infrastructure available to transfer, treat and dispose of the waste anticipated to be generated by the DCO Scheme, via a review of the GOV.UK South West England Waste Management Data Tables and a review of Network Rail's in-house recycling capabilities.

Assessment of Construction Impacts

12.3.9 The scoping assessment has identified that the potential exists for environmental impacts and effects to occur from the use and consumption of materials and the production and management of waste during the construction of the DCO Scheme.

12.3.10 Based on the findings at the scoping level, it was recommended that the DCO Scheme be first assessed at the simple level of assessment in the PEI Report (i.e. unless potentially significant impacts / effects were foreseen and detailed information about the types and quantities of materials and waste was available at the time of assessment, where the assessment would be carried forward to the detailed level of assessment) [4].

12.3.11 The simple assessment is typically undertaken at options identification and the preliminary design stage where it is not usually possible to quantify precisely the material requirements and forecast waste generation (i.e. where environmental assessments are undertaken and the method of construction has not yet been determined).

12.3.12 IAN 153/11 states "*that the purpose of the simple assessment is to assemble data and information that is readily available to come to a better understanding of the likely environmental effects of the proposed scheme. The outcomes will inform the final design or contribute to reaching an understanding of the likely environmental effects which identify the need for any further detailed assessment*".

12.3.13 The assessment will primarily focus on the environmental impacts and effects arising from construction in the form of embodied carbon emissions associated with the production of materials; the depletion of natural resources; the generation, management of waste on site; potential impact on the available regional waste management infrastructure; and the alignment of the DCO Scheme proposals with the legislative and policy framework for sustainable development, material resources and waste.

12.3.14 For the purposes of assessing the effects associated with materials use and waste the simple assessment is a largely qualitative exercise which aims to identify the following:

- baseline data for the DCO Scheme in question;
- information about design, construction methods and techniques (where available);
- the materials required for the DCO Scheme and where information is available, the quantities and provenance;
- the anticipated waste arisings from the DCO Scheme, and where information is available, the quantities and type (e.g. inert, non-hazardous, hazardous) and any additional information about wastes forecast to be produced;
- the alignment of the DCO Scheme proposals with the regulatory and policy context, and stated Scheme objectives;
- the results of any consultation (i.e. with the Environment Agency and Local Planning Authorities) (if required);

[4] IAN 153/111 and HD 212/11 advises, that where a Scheme is at the outline design stage and quantifiable information on material resource use and waste generation is not available it should still be possible to undertake a "Simple level" assessment, based on the information available, to provide an indication of the relative magnitude of materials use and forecast waste generation from the Scheme. Although where potentially significant impacts/effects are foreseen and detailed information about the types and quantities of materials and waste is available, the assessment should be carried forward to the "detailed level" of assessment. The "simple" and "detailed" assessment stages should therefore be regarded as consequential (rather than sequential) in that the results of one assessment level would determine what, if any, further assessment work is required. Which level of assessment to apply at any stage in the design process will be informed by the scoping results, the project planning stage and the level of information available, and the likely environmental impacts and effects.

- the impacts / effects that will arise from the issues identified and whether these are likely to be significant; and
- a conclusion about whether this level of assessment is sufficient to understand the impacts / effects of the DCO Scheme or whether detailed assessment is necessary, and the identification of any mitigation measures.

12.3.15 The assessment will follow the methodology outlined in the draft DMRB Volume 11, Section 3, Part 6 Materials guidance (HD 212/11) (supplemented by professional judgement where required) to determine the value and/or sensitivity of the identified receptors; the magnitude of impact; and the significance of effect associated with the use and consumption of materials and the production and management of waste.

Assessment of Operational Impacts

12.3.16 During the operation of the DCO Scheme, the use of material resources and the generation of waste is likely to be negligible. Operational materials use and waste have therefore been scoped out of this assessment. Paragraph 3.28 of the Scoping Opinion, provided by the Secretary of State, supports this approach on the basis that potential impacts from any related works/activities are unlikely to be significant.

12.3.17 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 Governance for Railway Investment Projects (“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 the DCO Scheme boundary and in accordance with the rail operating company's existing Environmental Management Systems.

Assessment of Decommissioning Impacts

12.3.18 No specific plans have been formulated for the decommissioning phase of the Portishead Branch Line. It is expected that the services will continue for as long as there is a business case for doing so. Closure of railways is a regulated process, overseen by the Office of Rail and Road. Disposal of railway assets is also regulated by the Office of Rail and Road under the terms of Network Rail's licence.

12.3.19 Railways are not designed to be decommissioned, although in accordance with paragraph 5.85 of the NPSNN, development plan policies [and Network Rail's Sustainable Development Strategy], consideration will be given to the sustainability of materials used in construction, including their embodied carbon content, where choice is available and some information on this is provided here in Chapter 12. For the NSIP, in the event that the train operating company decides to cease services on the Portishead Branch Line, it is likely that the railway assets will remain in place, as occurred after traffic ceased in the 1980s. Previous practice following railway closures suggests that the railway formation will remain available either for re-development over time or finding an alternative transport use such as a guided busway or a cycle path. Such proposals would be subject to their own assessment including consideration of environmental effects. As such proposals are not reasonably foreseeable, the likely impacts cannot be assessed.

12.3.20 For any abandoned part of the railway track bed, vegetation would gradually encroach upon the railway line, with herbaceous plants, shrubs and trees gradually recolonising the railway corridor. The assets comprising the trackbed would gradually fall into disrepair due to the action of erosion and corrosion from rain, plants and animals. As the railway to be authorised by the DCO is largely laid at surface level between Portishead and Pill it is not anticipated that there would be significant need for ongoing maintenance work for

embankments or cuttings. Ongoing maintenance of the cuttings and embankments would still be required along the operational railway from the Port to the main line. Network Rail would probably recover (and ideally re-use) items of values such as wiring, signalling equipment and principal supply points ("PSP").

12.3.21 Remaining assets such as fencing would continue to be maintained. The bridges carrying highways over the DCO scheme and public rights of way would continue to be maintained to standards appropriate for the public use, as a result of the obligations of North Somerset District Council as local highway authority.

12.3.22 It is anticipated the line between Royal Portbury Dock and Parson Street would remain open for services to the Port. The currently operational railway would remain open for freight traffic even if passenger services ceased and any decision regarding the cessation of freight services would be one for the Freight Operating Companies and Bristol Port Company, so decommissioning the operational railway is not considered relevant or foreseeable for assessing the DCO Scheme. Were any decommissioning of all or part of the operational railway to be proposed in the future, a separate project would be developed, which would be accompanied by a specific assessment of the implications for the SAC.

12.3.23 It is not anticipated that the associated development comprising highway works or car parks at Portishead would be altered as a result of the cessation of rail passenger services between Portishead and Bristol. Similarly, it is anticipated the car parks at Pill would remain as car parks albeit for all of the car parks development proposals might come forward over time and would be assessed for their planning impacts and any environmental effects at such time as such schemes came forward for the local planning authority to consider. Changes to the UK's use of fuel for transport mean that the nature of emissions from vehicles undertaking any removal of items could only be a matter of speculation.

Assessment of Cumulative Effects

12.3.24 The assessment of cumulative effects will assess the impact of the DCO Scheme in combination with other committed developments. These will include other DCO projects within approximately 5 km and projects within approximately 0.5 km of the Portishead Branch Line, as discussed with the local planning authorities North Somerset District Council and Bristol City Council.

12.3.25 In addition, the assessment of cumulative effects will also consider other works being undertaken by Network Rail under their permitted development rights. This includes other works required for MetroWest Phase 1, namely improvements at Parson Street Junction, Parson Street Station, Liberty Lane Freight Depot, the Bedminster Down Relief Line, Avonmouth/Severn Beach signalling, and Bathampton Turnback. These works are within Network Rail's operational boundary and will be implemented using their General Permitted Development rights. Further environmental assessments of these works will be undertaken by Network Rail under the GRIP management procedures.

Use of Significance Criteria

Introduction

12.3.26 Environmental impacts are defined as an environmental change resulting from the DCO Scheme, while the effect is the consequence of that change on the receptor. Various descriptors are used to characterise impacts:

- Direct, indirect, secondary, cumulative;
- Adverse or beneficial;
- Geographical extent;

- Size of the change;
- Duration and frequency: short, medium and long term; permanent or sporadic;
- Likelihood of occurrence; and
- Uncertainty.

12.3.27 Determination of the significance of an environmental effect is derived as a measure of the magnitude and nature of the impact and an understanding of the importance/sensitivity of the affected resource/receptor.

12.3.28 For materials and waste there are currently no accepted methodology/thresholds for defining impacts and determining the threshold of significance for rail projects. As definitive rail guidelines for defining the impact are not available the assessment has been carried out based on the methodology provided in the 2012 draft DMRB Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Materials guidance (HD 212/11), due to it providing a comprehensive and consistent approach to project-based environmental assessment and its reporting.

Embodied Carbon Methodology

12.3.29 The assessment for embodied carbon emissions has been based on quantifying the magnitude of change associated with the material requirements of the DCO Scheme in absolute terms. The magnitude of the environmental impact has been assigned, where possible, through the use of a proxy in the shape of the embodied carbon emissions, associated materials and construction products (HD 212/11).

12.3.30 The carbon assessment boundary used in this assessment is based on the 'Product Stage', as defined in the Publicly Available Specification (PAS) 2080:2016 *Carbon Management in Infrastructure* as the total carbon dioxide equivalent emissions associated with:

- raw material extraction, precursor product processing, and final product manufacture, and the energy use and waste management within these processes, and
- transportation of materials and goods within the supply chain, up to the point of the final factory gate.

12.3.31 As per the HD 212/11 requirements, the assessment does not include the carbon emissions associated with the boundary of PAS 2080:2016 'Construction Process Stage' due issues around the availability of data and the complexity in modelling the fuel/ electricity consumption associated with this Construction Process Stage. This stage is defined by as the total carbon dioxide equivalent emissions associated with:

- transportation of products / materials and construction equipment from the point of production (or point of storage in the case of plant and machinery) to the construction site;
- environmental conditions required to keep materials in a required state;
- processing waste materials (due to spillage or damage during transportation) and the provision of new material;
- construction-site works activities including:
  - temporary works, ground works, and landscaping;
  - materials storage and any energy, or otherwise, needed to maintain necessary environmental conditions;
  - transport of materials and equipment within the site;
  - installation of materials and products;

- emissions associated with site water demand;
- waste management activities (transport, processing, final disposal) associated with waste arising from the construction-site; and
- production, transportation, and waste management of materials and products lost during works.

12.3.32 There is currently no accepted methodology for determining the sensitivity of the global climate system to new GHG emissions. However, given the Institute of Environmental Management and Assessment's ("IEMA") principle that all new greenhouse gas emissions might be considered significant, it is therefore proposed to report the estimated embodied carbon content through contextualising the magnitude of impact against national carbon budgets (i.e. in order to provide an additional sense of scale). This approach is consistent with the latest good practice guidance promoted by IEMA (IEMA, 2017) on assessing greenhouse gas emissions and evaluating their significance.

Depletion of Natural Resources Methodology

12.3.33 The assessment for natural resources has been based on quantifying the magnitude of change associated with the use of primary aggregates on the DCO Scheme, which has been chosen to act as a proxy indicator of the DCO Scheme's consumption and use of natural resources.

12.3.34 The value and/or sensitivity of the regional natural resource (sand and gravel, and crushed rock) has been described using the terminology provided in Table 12-5.

Table 12-5: Value and/or sensitivity of the receptor (scale based on professional judgement)

Value	Description
Very High	There are no supplies of mineral resources within the study area
High	There are limited supplies of mineral resources within the study area
Medium	There are adequate supplies of mineral resources within the study area
Low	There are good supplies of mineral resources within the study area

12.3.35 The magnitude of the impact for natural resources has been assessed against the scale provided in Table 12-6.

Table 12-6: Magnitude of the impact (scale based on professional judgement)

Magnitude	Description
Major	Considerable impact (by weight or volume) of more than local significance in relation to the use of minerals resources
Moderate	Measurable impact (by weight or volume) of more than local significance in relation to the use of minerals resources
Minor	Impact (by weight or volume) of less than local significance in relation to the use of minerals resources
Negligible	Negligible impact (by weight or volume) of no measurable local significance in relation to the use of minerals resources

12.3.36 Table 12-7 has then been used to determine the significance level of the environmental effect based on the value/sensitivity of the receptor and the magnitude of the impact.

Table 12-7: Significance of effect

		Value/Sensitivity of the Receptor			
		Very High	**High**	**Medium**	**Low**
Magnitude of Impact	**Major**	Very Large	Very Large/Large	Large/Moderate	Moderate/Slight
	Moderate	Very Large/Large	Large/Moderate	Moderate	Slight
	Minor	Large/Moderate	Moderate/Slight	Slight	Slight/Neutral
	Negligible	Slight	Slight	Slight/Neutral	Neutral

Waste Assessment Methodology

12.3.37 Assessing the scale and significance of the impacts associated with the production and management of waste has been based on a combination of the waste management methods identified and the effects that the forecast waste arisings from the DCO Scheme will have on the available waste management infrastructure in accordance with DMRB HD 212/11) . In this way, the assessment reflects both the relative quantities of waste produced and the position within the waste hierarchy (prevention, prepare for reuse, recycling, recovery and disposal) of the chosen waste management methods likely to be employed by the DCO Scheme.

12.3.38 The value/sensitivity of the receptor has been assigned using the terminology described in Table 12-8.

Table 12-8: Value and/or sensitivity of the receptor

Value	Description
Very High	There is no available waste management capacity for any waste arising from the DCO Scheme
High	There is limited waste management capacity in relation to the forecast waste arisings from the DCO Scheme
Medium	There is adequate waste management capacity for the majority of wastes arising from the DCO Scheme
Low	There is adequate available waste management capacity for all wastes arising from the DCO Scheme

(Source: DMRB HD 212/11)

12.3.39 The magnitude of the impact has been assessed against the scale provided in Table 12-9.

Table 12-9: Magnitude of the impact

Magnitude	Description
Major	Waste is predominantly disposed of to landfill or to incineration without energy recovery with little or no prior segregation
Moderate	Wastes are predominantly disposed of to incineration with energy recovery
Minor	Wastes are predominantly segregated and sent for recycling or further segregation at a materials recovery facility
Negligible	Wastes are predominantly reused on site or at an appropriately licensed or registered exempt site elsewhere

Table 12-9: Magnitude of the impact

Magnitude	Description
Major	Waste is predominantly disposed of to landfill or to incineration without energy recovery with little or no prior segregation

(Source: DMRB HD 212/11)

12.3.40 Table 12-10 has then been used to determine the significance level of the environmental effect based on the value/sensitivity of the receptor and the magnitude of the impact.

Table 12-10: Significance of effect

		Value/Sensitivity of the Receptor			
		Very High	**High**	**Medium**	**Low**
Magnitude of Impact	**Major**	Very Large	Very Large/Large	Large/Moderate	Moderate/Slight
	Moderate	Very Large/Large	Large/Moderate	Moderate	Slight
	Minor	Large/Moderate	Moderate/Slight	Slight	Slight/Neutral
	Negligible	Slight	Slight	Slight/Neutral	Neutral

(Source: DMRB HD 212/11)

12.3.41 The EIA Regulations require an ES to include a description of the likely significant effects of the development on the environment but neither it, nor IAN 153/11 nor HD 212/11, give advice as to what level of significance is considered significant for the purposes of EIA. In the absence of this information, the assessment has used the 'Descriptors of the Significance of Effect Categories' provided in DMRB Volume 11, Section 2, Part 5 'Assessment and Management of Environmental Effects' (HA 205/08), which are reproduced in Table 12-11 below to frame discussions of significance.

Table 12-11: Descriptors of the significance of effect categories

Significance Category	Typical Descriptors of Effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

(Source: HA 205/08)

12.3.42 For the purposes of this assessment, significance of effect categories of Large and Very Large for the depletion of natural resources and waste management (as shown in Table 12-7 and Table 12-10 above), are likely to be considered 'significant' in the context of the EIA Regulations and guidance provided in HA 205/08. It has not been possible, for the

reasons discussed above, to derive a measure of the significance of effect from the DCO Scheme's embodied carbon emissions using the standard EIA terminology described above. It is therefore proposed to contextualise the magnitude of impact against national carbon budgets in order to provide an additional sense of scale.

12.4 Baseline, Future Conditions and Value of Resource

Existing Material Resource Use and Waste Generation

12.4.1 The railway between Portishead and Pill is not in operational use (disused section) and therefore any existing use of materials or waste generation is negligible.

12.4.2 The use of material resources and the generation of waste during the routine maintenance activities associated with the operation of the existing Portbury Freight Line is also likely to be negligible, as is any use of material resources and waste associated with the maintenance of the existing highway network.

12.4.3 The baseline condition of the Portishead Branch Line (including Stations, Railway Line and Structures), Portbury Freight Line and Highways Network is detailed in Chapter 4 Description of the Proposed Works.

Material Resources

Climate Change

12.4.4 The Intergovernmental Panel on Climate Change (IPPC, 2013) 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*".

12.4.5 Furthermore, IPCC (2014) reports that in order to remain below a 2°C threshold (the level defined as dangerous climate change impacts by the IPPC), global greenhouse gas emissions must remain within a carbon budget of 1,000 billion tonnes.

12.4.6 As described above, the adoption of the HD 212/11 methodology precludes the need to assign a value or sensitivity to the global climate system for the purposes of this assessment.

Natural Resources (Primary Aggregates)

12.4.7 'Primary aggregate' is defined by the British Geological Society as "*aggregate produced from naturally occurring mineral deposits and used for the first time*".

12.4.8 The Department for Environment Food & Rural Affairs (Defra, 2011) identifies "*primary aggregates as being at risk of future scarcity for the UK construction and civil engineering sector*". In the UK aggregate minerals such as sand, gravel and crushed rock are not physically scarce. However, Defra (2011) states that there is considerable concern regarding security of domestic supply due to the local geopolitical context.

12.4.9 Whilst there is no danger of physically running out of such resources, Defra (2011) suggests that competition for land (frequently with environmental designations, such as, National Parks) and negative public perceptions towards mineral development have made it increasingly difficult for aggregate companies to secure permits to exploit these resources.

12.4.10 The NPPF requires Mineral Planning Authorities to maintain a minimum landbank of seven years for sand and gravel and a minimum landbank 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.

12.4.11 The South West Aggregates Working Party Annual Report 2013 provides the following summary of land won primary aggregates production and permitted reserves in the study area.

- Sand and gravel: production (sales) of land won sand and gravel was 3.2 million tonnes (Mt) in 2013, about the same as was recorded in 2012. Dorset continues to be the main production area and in 2013 accounted for 50% of sales. Permitted reserves in the region amounted to 32.6 Mt in 2013, representing a fall of ~15% on 2012 reserves and a landbank of just ten years when based on the average of three years of production (2011-2013). Approximately 50% of the South West's reserves were held at sites in Dorset which had a landbank of about 14 years.
- Crushed rock: production (sales) of crushed rock aggregates (limestone, igneous rock and sandstone) was 17.89 Mt in 2013, a very slight increase on 2012 (17.34 Mt) and the same as production in 2011. Somerset continues to be the main production area with about 56% of sales. Permitted reserves in the region in 2013 amounted to about 905 Mt at active and inactive sites. This represented a landbank of about 51 years of production when based on the average of three years of production (2011-2013). All crushed rock producing MPAs except Gloucestershire had a substantial landbank of permitted reserves (>30 years) in 2013. Approximately 47% of the South West's permitted reserves were held by sites in Somerset with the bulk of the remaining reserves being shared almost equally between the West of England, Cornwall and Devon.

12.4.12 These data therefore suggest that there is likely to be an adequate supply of sand and gravel in the region and substantial reserves of crushed rock. Landbanks are affected by planning permissions granted and the rate of working at existing sites. The figures provided represent the most recently available.

12.4.13 The baseline review has identified that there is likely to be adequate reserves of sand and gravel and substantial reserves of crushed rock in the study area. Policy, strategic and legislative drivers are likely to ensure that sufficient capacity is provided (i.e. new planning permissions granted and through the working of existing reserves). For the purposes of assessment this is likely to equate to the study area having a Moderate sensitivity to the depletion of primary aggregates (i.e. the study area has an adequate supply of mineral resources).

12.4.14 The DCO Scheme is following the existing railway alignment and is not located within an area designated by North Somerset District Council or Bristol City Council as a 'Minerals Safeguarding Area' or 'Preferred Area for Minerals Working' and is therefore unlikely to result in the sterilisation of existing mineral resources.

Waste Management

Existing Regional Waste Management Practices

12.4.15 The existing waste management practices in the West of England sub-region have been determined through a review of information provided in the West of England Partnership (2011) West of England Joint Waste Core Strategy.

Construction, demolition and excavation waste

12.4.16 Approximately 2.3 Mt of construction, demolition and excavation waste is produced within the West of England per annum. This waste stream is largely made up of inert waste. The majority of this material (~60%) is recycled or re-used, with the remainder being disposed of to landfill, or used for various engineering and restoration Schemes at exempt sites, predominantly within the West of England.

Commercial and industrial waste

12.4.17 Commercial and industrial waste generated within the plan area is estimated to be 900,000 tonnes per year. An estimated 34% of this waste is recycled and composted and there are a number of commercial transfer stations and recycling operations throughout the West of England. The majority of waste remaining is sent to landfill for disposal, with most going to facilities in the neighbouring counties of Gloucestershire, Wiltshire, and Somerset.

Hazardous waste

12.4.18 Approximately 85,000 tonnes of hazardous waste were generated in the West of England in 2007/8. Hazardous waste treatment and disposal facilities are highly specialised and generally operate at a regional and often national scale. There are no hazardous waste landfill facilities within the plan area.

Available Waste Management Infrastructure

12.4.19 The available waste management infrastructure in the West of England sub-region has been ascertained through an outline review of GOV.UK's (2015) Waste Management in South West Data Tables. These data, the most recently available, suggest that the West of England sub-region had the following waste management facilities and capacities at the end of 2015:

- Non-hazardous landfill (963,000 m^3);
- Inert landfill (4,700,000 m^3);
- Hazardous waste incineration (9,000 t/annum);
- Municipal and/or Industrial & Commercial waste incineration (126,000 t/annum).

12.4.20 These data also suggest that the West of England sub region had the following types of commercial waste management facilities at the end of 2015:

- Hazardous waste transfer;
- Household waste, industrial, commercial waste transfer;
- Clinical waste transfer;
- Non-biodegradable waste transfer;
- Material recovery facilities;
- Physical treatment;
- Physico-chemical treatment;
- Chemical treatment;
- Composting;
- Biological treatment;
- Vehicle depollution;
- Metal recycling.

12.4.21 Network Rail's National Delivery Service logistics function also handles more than 1.5 Mt of redundant track materials nationally per annum (e.g. track, sleepers, switches, crossings and ballast), of which the clear majority (90-95%) is reused, recycled and recovered through a network of local depots and National Track Materials Recycling Centres ("NTMRC") in Westbury (Wiltshire), Crewe (Cheshire), Doncaster (South Yorkshire), Eastleigh (Hampshire) and March (Cambridgeshire). Redundant track materials are therefore not usually managed outside the National Delivery Service.

12.4.22 Whitemoor Yard is the largest of the NTMRC's, and the only Network Rail facility known to process dirty (or hazardous) ballast materials. The facilities at Whitemoor Yard comprise: used track material processing; sleeper storage and crushing; switches and crossings

processing; ballast washing and decontamination; ballast processing and storage; and wagon maintenance.

12.4.23 These data suggest that there is unlikely to be any specific constraints to the DCO Scheme with regards to inert and non-hazardous waste infrastructure in the West of England sub-region. However, there appears to be limited disposal infrastructure for hazardous waste within the region. The closest hazardous waste landfill facilities are located in Gloucestershire (Wingmoor Farm East Landfill, near Cheltenham) and Wiltshire (Parkgate Farm Landfill, Purton near Swindon). As previously discussed, the closest Network Rail facility accepting hazardous ballast materials is located in Cambridgeshire.

12.4.24 The baseline review suggests that there is likely to be adequate waste management capacity for the majority of wastes arising from the construction of the DCO Scheme, with the possible exception of any hazardous waste streams. For the purposes of assessment this is likely to equate to the available waste management infrastructure having a Medium sensitivity to any waste generated as a result of constructing the DCO Scheme (i.e. there is adequate waste management capacity for the majority of wastes arising during the construction of the Scheme).

12.5 Measures Adopted as Part of the DCO Scheme

12.5.1 A number of measures have been included as part of the project design in order to minimise certain environmental effects. This includes:

- careful designing of the project to ensure key receptors are avoided where possible;
- construction adopting best practices techniques, which will be set out in Code of Construction Practice ("CoCP") this document will be submitted with the DCO application; and
- compliance with regulatory and legislative regimes as required by law.

12.5.2 The ES will fully set out and detail any further mitigation measures which have been adopted for materials and waste.

12.6 Assessment of Effects

Construction Phase

12.6.1 Based on the Network Rail MetroWest Phase 1 Outline Construction Strategy, (NR 2016) and WRAP (2013) SMARTWaste benchmarking data for railway and highway projects, the key materials used, and wastes generated during the construction of the DCO Scheme are likely to be similar to those detailed in Table 12-12.

Table 12-12: Material use and waste arisings during the construction phase (track, stations, highways)

Materials use	Waste arisings
• Plastic reptile fencing; • Plastic (HDPE/MDPE) pipes and chambers; • Glass reinforced plastic chambers; • Concrete and brick headwalls; • Type 1 sub-base / formation / bulk fill; • Granular backfill; • Top ballast and bottom stone; • Sand blanket material; • Geotextile matting / geo-composite separator; • Concrete sleepers; • Long welded rail; • Metal rail fastenings; • Functional supply points, location cases, comms cabinets etc.	• Vegetation removal (non-hazardous); • Drainage ditch materials (hazardous or non-hazardous); • Clean ballast, dirty ballast, contaminated ballast and formation materials (hazardous or non-hazardous); • Existing bullhead steel track (non-hazardous); • Timber sleepers (hazardous or non-hazardous); • Existing drainage assets (non-hazardous);

Table 12-12: Material use and waste arisings during the construction phase (track, stations, highways)

Materials use	Waste arisings
• Global System for Mobile communications masts; • Signals; • Concrete / glass reinforced plastic lineside cable troughing; • Telecoms and signals cabling; • Asphalt; • Bricks and blockwork; • Concrete; • Precast retaining walls; • Precast concrete sections • Floor coverings • Furniture • Insulation • Metals • Oils • Plastics • Tiles • Ceramics • Timber	• Asphalt (hazardous or non-hazardous); • Vegetation and scrub (non-hazardous); • Bricks and binders (inert); • Canteen/office/ad hoc waste (non-hazardous); • Concrete (inert); • Electrical equipment (hazardous or non-hazardous) • Asbestos containing materials (hazardous) • Insulation materials (non-hazardous) • Aqueous liquids (non-hazardous) • Metals (non-hazardous) • Mixed (non-hazardous) • Packaging (non-hazardous) • Plastics (non-hazardous) • Timber (non-hazardous)

12.6.2 The construction cost estimate for the combined rail and highways works is significantly greater than the £300,000 scoping threshold proposed in IAN 153/11. Therefore, it is assumed on the basis of the principle of proportionality, that the potential exists for environmental impacts and effects from the use of materials and the generation of waste to occur.

12.6.3 IAN 153/11 states that "*significant environmental impacts are likely to arise from those materials which are used in the largest quantities or are high in embodied carbon, wastes which arise in the largest quantities, which have hazardous properties or comprise a large proportion of the value of the DCO Scheme*".

12.6.4 There is limited information available at this stage regarding the precise material requirements and waste quantities associated with the DCO Scheme. In the absence of this information an outline estimate of embodied carbon emissions, aggregates consumption and waste arisings has been calculated using the construction cost estimate, along with WRAP (2013) resource efficiency benchmarking data for completed infrastructure projects. These figures are summarised below and have been used to ascertain the indicative magnitude of impact from constructing the DCO Scheme in line with the assessment criteria provided in Section 12.3.

12.6.5 Table 12-18 summarises the potential impacts, mitigation and residual impacts associated with the construction of the DCO Scheme.

Embodied Carbon Emissions

12.6.6 An outline estimate of embodied carbon emissions has been calculated using the WRAP resource efficiency (embodied carbon) benchmarks for completed new build and refurbishment infrastructure projects. These figures are summarised in Table 12-13 and provide an indicative worse case assessment of the magnitude of impact arisings from embodied carbon emissions during the construction of the DCO Scheme.

Table 12-13: Estimated embodied carbon impact of constructing the DCO Scheme

WRAP embodied carbon emissions benchmark (average) and project type	Number of benchmarked projects and benchmark robustness (high, medium, low)	Estimated total embodied carbon emissions (t)
42 tCO2e / £100 k (new build and refurbishment infrastructure projects)	22 (High)	27,300

12.6.7 The environmental impact from the embodied carbon emissions associated with the construction of the DCO Scheme has been assessed as having a **likely, long-term, permanent, indirect, adverse, cumulative effect** on the global climate system. This is a result of the DCO Scheme having the potential to generate new GHG emissions as a result of the consumption and use of construction materials and products.

12.6.8 The residual embodied carbon emissions cannot be absolutely predicted and will ultimately depend on the Principal Contractor's design and procurement decisions, particularly those involving the selection of construction materials, products and concrete additives. The final embodied carbon footprint will therefore not be known until the Principal Contractor has completed the construction of the DCO Scheme and completed a construction stage carbon footprint.

12.6.9 However, compared to the UK's 3rd carbon budget (2018 to 2022) (the period in which construction is likely to be undertaken) of 2,544 MtCO2e, the DCO Scheme's estimated embodied carbon emissions represent a very small proportion (<0.001%) of the UK's 5-year Carbon Budget. Furthermore, the embodied carbon emissions associated with the DCO Scheme's use of material resources will be largely regulated through the European Union's Emissions Trading Scheme ("ETS") (a Europe wide emissions cap and trade scheme with a decreasing 'cap' or limit over time) and other policy tools as part of the UK Climate Change Act 2008 target of reducing greenhouse gas emissions by at least 80% of 1990 levels by 2050 (this includes reducing emissions from the devolved administrations (Scotland, Wales and Northern Ireland). This means that, overall, most of the DCO Scheme's embodied carbon emissions are unlikely to contribute to an increase in Europe-wide carbon emissions[5].

12.6.10 GHG emissions not regulated by the EU ETS, predominantly from construction, will be managed through other policy tools as part of the Climate Change Act target of at least an 80% reduction in emissions by 2050, including but not limited the Energy Saving Opportunities Scheme ("ESOS"), the Climate Change Levy ("CCL") or associated Climate Change Agreements ("CCA"), and the Carbon Reduction Commitment Energy Efficiency Scheme ("CRCEES") for example.

12.6.11 It is also accepted that the DCO Scheme cannot influence all of the elements that underpin its embodied carbon footprint. Some of the elements of the embodied carbon emissions are only likely to be influenced by the UK Government, whilst others are related to the commercial decision of private manufacturing companies which are outside the direct control of the DCO Scheme.

[5] Carbon budgets are currently accounted on a 'net' basis, allowing for trading in the EU ETS. If the UK were to leave the ETS, as a result of leaving the European Union for example, an accounting adjustment would be required in order preserve the intent of the budgets. However, regardless of the accounting adjustment, the UK would need to continue the expansion of low-carbon power generation in order to meet its 2050 targets.

Depletion of Natural Resources

12.6.12 The precise quantities and sources of primary aggregates required during the construction of the DCO Scheme were unknown at the time of assessment.

12.6.13 A scheme of this magnitude is likely to require significant quantities of aggregates for use in infrastructure construction, earthworks, foundations, utilities, structures and buildings (e.g. Portishead Station).

12.6.14 An outline estimate of aggregates use has been calculated using the WRAP resource efficiency (materials used) benchmarks for a completed new building and infrastructure projects. These figures are summarised in Table 12-14 and provide a worst case indicative assessment of the magnitude of impact arisings from the depletion of natural resources during the construction of the DCO Scheme.

Table 12-14: Estimated use of primary aggregates

WRAP aggregates weight /construction value (average)	Number of benchmarked projects and benchmark robustness (high, medium, low)	Estimated total aggregates use (t)
688 t / £100 k (new build and refurbishment infrastructure projects)	6 (Medium)	440,050

12.6.15 The environmental impact of the use of primary aggregates during the construction of the DCO Scheme has been assessed as having a **likely**, **short-term, permanent, direct, slight adverse, cumulative effect** on the regional natural resources. This assessment is based on the following determining factors:

- Minor impact (by weight or volume) of more than local significance in relation to the use of primary aggregates;
- The South West has adequate reserves of primary aggregates (i.e. Moderate sensitivity of the resource/receptor);
- Policy, strategic and legislative drivers are likely to ensure that sufficient capacity is provided (i.e. new planning permissions granted and through the working of existing reserves).

Excavation and New Build Construction Waste

12.6.16 The outline construction strategy for the DCO Scheme has identified that approximately 50,000 tonnes of ballast is expected to be cut as part of the track formation works on the disused line between Portishead and Portbury Junction. These materials are likely to include a combination of clean and contaminated ballast and general spoil materials.

12.6.17 Track bed sampling has demonstrated elevated levels of some contaminants in the ballast, predominantly lead and zinc, at discrete locations along the disused section of the railway and along the freight line between Portbury Dock Junction and the Ashton Junction. Further testing is on-going to determine appropriate waste classification, assessment, handling, treatment, and disposal.

12.6.18 As there are only outline designs for the DCO Scheme it is difficult to provide an entirely accurate estimate of the amount of waste which will be produced for the new build construction works. Notwithstanding, waste arising estimates have been calculated where possible based on the DCO Scheme parameters, along with WRAP (2013) resource efficiency benchmarks on the amount of waste produced during completed new build and refurbishment infrastructure projects.

12.6.19 These figures are summarised in Table 12-15 and can be used to provide an indicative magnitude of impact associated with the generation of waste during the construction of the DCO Scheme.

Table 12-15: Estimated new build construction waste arisings during the construction of the DCO Scheme

WRAP construction waste benchmark (average)	Number of benchmarked projects and benchmark robustness (high, medium, low)	Estimated total waste arisings (t)
11.4 t /£100 k (new build and refurbishment infrastructure projects)	85 (High)	7,410

12.6.20 Table 12-16 provides a summary of the estimated distribution of waste products likely to arise during construction. These figures are derived from WRAP benchmarking data for completed railway and highway projects.

Table 12-16: Estimated waste composition during the construction of railway and highways schemes

Waste Product (European waste catalogue number)	Railways (%)	Highways (%)
Asphalt (17 03 02)	3.44	4.47
Binders (17 01 01)	0.17	0.004
Bricks (17 01 02)	0.19	0.92
Canteen/office/*ad hoc* waste (20 03 01)	1.16	2.15
Concrete (17 01 01)	12.17	8.30
Electrical equipment (20 01 36)	0.01	0.00
Furniture (20 03 07)	0.00003	0.002
Gypsum (17 08 02)	0.04	0.01
Hazardous (17 09 03*)	1.09	0.00
Inert (17 01 07)	13.78	26.43
Insulation (17 06 04)	0.33	0.03
Liquids (16 10 02)	0.002	1.24
Metal (17 04 07)	0.69	0.26
Mixed (17 09 04)	8.76	16.15
Oils (13 01 13*)	0.00	0.003
Other	22.63	0.64
Packaging (15 01 06)	0.45	0.88
Plastics (17 02 03)	0.03	0.25
Soils (17 05 04)	32.82	34.96
Tiles and Ceramics (17 01 03)	0.001	0.0004
Timber (17 02 01)	2.25	3.30
Total	***100%***	***100%***

12.6.21 The environmental impact of waste from the construction of the DCO Scheme has been assessed as having a **short-term, temporary, direct, slight adverse, cumulative effect** on the available regional waste infrastructure. This assessment is based on the following determining factors:

- Construction, demolition and excavation wastes are likley to be predominately reused on site or segregated and sent for off site reuse, recycling or recovery within Network Rail's National Delivery Service and the West of England sub-region (i.e. minor magnitude of impact);
- There is likely to be adequate capacity, within Network Rail's National Delivery Service and West of England sub-region, to manage the majority of the construction, demolition and excavation wastes arising during the construction of the DCO Scheme (i.e. medium sensitivity of the resource/receptor); and
- Policy, strategic and legislative drivers are likely to ensure that sufficient capacity is provided.

Operational Phase

12.6.22 The operational impacts on materials and waste have been scoped out for the reasons explained in Section 12.1.3.

Decommissioning Phase

12.6.23 For the reasons set out at 12.3.18 – 12.3.23 it is not possible to identify realistic options for decommissioning for assessment and no basis on which to consider that there would be reasonably foreseeable significant environmental impacts on materials and waste resulting from decommissioning.

12.7 Mitigation and Residual Effects

12.7.1 At this stage the detailed design for the DCO Scheme has not been fully developed and hence mitigation detail cannot, as yet, be accurately defined.

12.7.2 Railways are not designed to be decommissioned, although in accordance with paragraph 5.85 of the NN NPS and development plan policies consideration will be given to the sustainability of materials used in construction, including their embodied carbon content, where choice is available. However, the DCO Scheme design teams are seeking to apply WRAP's Design for Resource Efficient Construction Principles in order to make the best use of materials over the lifecycle of the DCO Scheme's built assets, to minimise construction related carbon emissions and waste arisings.

12.7.3 Other mitigation measures will be considered as appropriate where adverse (but not significant effects with regards to the EIA Regulations) are identified. The project team is currently finalising the design of the project and appropriate measures will be described and documented in the ES. The ES will also report further on discussions with key stakeholders prior to submission of the DCO application.

12.8 Cumulative Effects

Other Schemes along the Portishead Branch Line

12.8.1 A summary of other projects along the Portishead Branch Line and an assessment of the cumulative impacts is provided in Section 18 and Appendices 18.1 and 18.2.

12.8.2 Constructing the DCO Scheme is likely to generate concurrent or sequential cumulative environmental impacts and effects with regards to the generation of embodied carbon emissions, the depletion of natural resources and the generation of waste as a result of constructing the DCO Scheme before, at the same time, or after, the other Schemes along the Portishead Branch Line.

12.8.3 The majority of these Schemes have not quantified their embodied carbon emissions, use of natural resources and waste generation so it is therefore not possible to determine the significance of any cumulative effect. However, given the nature and the scale of the other Schemes identified along the alignment, the relative scale of materials use and waste generation are considered low compared with the DCO Scheme.

Other Works for MetroWest Phase 1

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

12.8.5 Network Rail is undertaking an environmental appraisal, environmental risk register and environmental action plan of the works required for the Bedminster Down Relief Line, Parson Street Junction and station, Liberty Lane Freight Depot, Severn Beach / Avonmouth Signalling and Bathampton Turnback as part of the reporting for Network Rail's GRIP 3 process. This process will identify the potential impacts and capture the need for mitigation during design and construction. The results will be carried forward from the present GRIP 3 / 4 phase, into the detailed design phase (GRIP 5) and construction (GRIP 6).

12.8.6 Given the small scale nature of these works and the distances between these Schemes and the Portishead Branch Line, it is considered that there are no significant cumulative effects during the construction of these Schemes on materials and waste.

12.9 Limitations Encountered in Compiling the PEI Report

12.9.1 There was limited information at the time of assessment on the anticipated types and quantities of materials required during construction due to the ongoing development of the DCO Scheme design. It was therefore not possible to quantify precisely the embodied carbon emissions, use of primary aggregates and waste likely to arise to arise during the construction of the DCO Scheme.

12.9.2 The use of resource efficiency benchmarking data for completed infrastructure projects has therefore been used in the absence of this information to undertake a worst case assessment. The construction cost estimate which forms the basis of the embodied carbon emissions, aggregates consumption and waste forecasting, will inevitably be subject to some minor changes as the DCO Scheme evolves through the value engineering and constructability process and as a result of ongoing consultation and economic appraisal to ensure delivery and viability. However, as the assessment has been undertaken on a worst case scenario basis such changes are unlikely to be materially significant as to affect the robustness of the assessment.

12.9.3 There is also limited additional information available at this stage regarding:

- The Principal Contractor's design and procurement decisions, particularly those involving the selection of construction materials, products and concrete additives etc.
- The materials arising on site that likely to be recycled and reused within the DCO Scheme to replace materials sourced from off site;
- The geographical sources of imported materials; whether they are from virgin or from recycled or secondary sources, incorporate recycled or secondary content, are from sources with existing recognised responsible souring certification, etc.;

- Whether any imported materials from recycled or secondary sources are regulated under the Environmental Permitting Regulations 2016 (as amended);
- The reuse on site of materials generated from construction, demolition or excavation activities; and the chosen waste management methods / locations (recycling, recovery, disposal) for those surplus materials and wastes that cannot be reused on site;
- Whether waste be stored on site prior to reuse or removal from site; or whether waste be treated or processed on site prior to reuse or removal from site;
- The chosen waste management methods (recycling, recovery, disposal) and precise geographical locations for managing each waste stream that cannot be re-used onsite.

12.9.4 Notwithstanding, the above limitations are not untypical of materials and waste assessments undertaken during outline design stage, and the information presented in this chapter is considered robust and of an appropriate level of detail in line with the simple assessment methodology promoted by the IAN 153/11 and draft HD 212/11 guidance.

12.10 Summary

12.10.1 This chapter has assessed the environmental impacts of material resource use and waste generation during the construction of the DCO Scheme.

12.10.2 The construction of the DCO Scheme will require the use and consumption of material resources and hence will result in potential impacts on the environment through the depletion of natural resources and the embodied carbon associated with extraction, manufacturing and any pre-distribution transportation.

12.10.3 The construction phases of the DCO Scheme will also result in surplus materials and waste, leading to potential impacts on the available waste management infrastructure (i.e. through the permanent use of landfill void space and/or the short-term use of waste treatment capacity).

12.10.4 The potential for greater environmental impacts and effects is likely to arise from those materials which are used in the largest quantities or are high in embodied carbon, wastes which arise in the largest quantities, which have hazardous properties or comprise a large proportion of the value of the DCO Scheme.

12.10.5 Where impacts are identified in the course of more detailed design, these will be addressed through ensuring that the construction of the DCO Scheme responds to national regulatory standards and local policy advice (as summarised in Tables 12-1 and 12-2). Design measures are likely to have regard to:

- Designing for resource efficient construction;
- Employing carbon footprinting techniques to identify opportunities to avoid, reduce, or substitute construction related carbon emissions;
- Carrying out a responsible sourcing assessment covering the key material elements used to construct the Scheme;
- Facilitating the prevention, reuse, recycling and recovery of CD&E waste through the implementation of a SWMP; and
- Ensuring that all waste is stored, transported, treated, reprocessed and disposed of safely without harming the environment in accordance with the Waste Duty of Care requirements.

12.10.6 The environmental impact from the embodied carbon emissions associated with the construction of the DCO Scheme has been qualitatively assessed as having a likely, **long-term, permanent, indirect, adverse, cumulative effect** on the global climate system. This is a result of the DCO Scheme generating new GHG emissions as a result of the consumption and use of construction materials and products.

12.10.7 The environmental impact the use of primary aggregates during the construction of the DCO Scheme has been assessed at this stage as having a likely, **short-term, permanent, direct, slight adverse, cumulative effect** on the regional natural resources.

12.10.8 The environmental impact of waste from the construction and decommissioning of the DCO Scheme has been assessed at this stage as having a likely, **short-term, temporary, direct, slight adverse, cumulative effect** on the available regional waste infrastructure.

12.10.9 It is the conclusion of this PEI Report that the simple assessment level is sufficient to understand the effects the DCO Scheme. However, should detailed information about the types and quantities of materials and waste be available at the time of producing the ES (i.e. in the form of a detailed bill of quantities), then the 'simple assessment' be carried forward to the 'detailed level' of assessment.

Table 12-17: Impacts, mitigation and residual impacts of the DCO Scheme on materials and waste

Aspect of the DCO Scheme	Impact	Receptors	Mitigation	Residual Impact
Construction activities				
Increased use of "material resources".	Embodied carbon emission.	Global climate system.	Scope to design for resource efficient construction to minimise construction related carbon emissions.	Potential impact from new embodied carbon emissions associated with material extraction, manufacturing and any pre-distribution transportation. Scope to avoid and / or reduce construction related carbon emissions through design and construction. • **Description of impact: Adverse, indirect, permanent, cumulative** • **Sensitivity of the receptor: Not applicable** • **Magnitude of impact: Not applicable** • **Significance of effect: Not applicable** • **Significant for the purposes of EIA: Cannot be determined**
Increased use of "material resources".	Depletion of natural resources	Natural resources.	Scope to increase the responsible sourcing of the key material elements used during construction.	Potential impact of more than local significance in relation to the use of natural resources. Scope to specify the responsible sourcing of key material elements used during construction. • **Description of impact: Adverse, direct, permanent, cumulative** • **Sensitivity of the receptor: Moderate** • **Magnitude of impact: Minor** • **Significance of effect: Slight adverse** • **Significant for the purposes of EIA: No**

Table 12-17: Impacts, mitigation and residual impacts of the DCO Scheme on materials and waste

Aspect of the DCO Scheme	Impact	Receptors	Mitigation	Residual Impact
Increased disposal of "waste".	Depletion / use of available waste management capacity. Harm to human health and/or the environment from inappropriate waste management.	Waste management infrastructure.	Scope to design out waste; and reduce the likelihood of harm to human health or the environment from inappropriate waste management.	Potential impact (by type and quantity) of more than local significance in relation to the receiving waste management infrastructure. • **Description of impact: Adverse, direct, temporary, cumulative** • **Sensitivity of the receptor: Medium** • **Magnitude of impact: Minor** • **Significance of effect: Slight adverse** • **Significant for the purposes of EIA: No**

12.11 References

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12.12 Abbreviations

B&NES	Bath & North East Somerset Council
BCC	Bristol City Council
BES	British Environmental Standard
BRE	Buildings Research Establishment
CCA	Climate Change Agreements
CCL	Climate Change Levy
CD&E	Construction, demolition, and excavation
CoCP	Code of Construction Practice
CRCEES	Carbon Reduction Commitment Energy Efficiency Scheme
DCO	Development Consent Order
DfRE	Design for Resource Efficiency
DMRB	Design Manual for Roads and Bridges
EIA	Environmental impact assessment
ES	Environmental Statement
ESOS	Energy Saving Opportunities Scheme
ETS	Emissions Trading Scheme
EU	European Union
FSC	Forestry Stewardship Council
GHG	Greenhouse Gases
GRIP	Governance for Railway Investment Projects
GW&C	Great Western and Crossrail
HA	Highways Agency
IAN	Interim Advice Note
IEMA	Institute of Environmental Management and Assessment
IPPC	Intergovernmental Panel on Climate Change
JWCS	Joint Waste Core Strategy
MPA	Minerals Planning Authority
Mt	million tonnes
NPPF	National Planning Policy Framework
NPSNN	National Policy Statement for National Networks
NR	Network Rail
NSDC	North Somerset District Council
NSIP	Nationally significant infrastructure project
NTMRC	National Track Materials Recycling Centre
PAS	Publicly Available Specification
PEFC	Programme for the Endorsement of Forest Certification
PEI Report	Preliminary Environmental Information Report
SGC	South Gloucestershire Council
SWAWP	South West Aggregates Working Party
SWMP	Site Waste Management Plan
t/annum	tonnes per annum (per year)
tCO_{2e}	tonnes of carbon dioxide equivalent
WRAP	Waste and Resources Action Programme

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