

# A303 Sparkford to Ilchester Dualling Scheme TR010036

## 6.1 Environmental Statement Chapter 10 Material Assets and Waste

APFP Regulation 5(2)(a)  
Planning Act 2008

Infrastructure Planning (Applications: Prescribed  
Forms and Procedure) Regulations 2009  
July 2018

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Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms  
and Procedure) Regulations  
2009**

**A303 Sparkford to Ilchester Dualling  
Scheme**

Development Consent Order 201[X]

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**6.1 Environmental Statement  
Chapter 10 Material Assets and Waste**

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## 10 Materials Assets and Waste

### 10.1 Introduction

- 10.1.1 This chapter considers the likely significant effects of the proposed A303 Sparkford to Ilchester Dualling scheme (hereafter referred to as the scheme) on material assets and waste. It provides a detailed level assessment of the potential effects on material assets.
- 10.1.2 This assessment has been undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11, Section, Part 5<sup>1</sup> and Interim Advice Note (IAN) 153/11<sup>2</sup>.
- 10.1.3 For the purposes of the assessment, material assets are defined as comprising:
- The provision and use of material resources, including primary, secondary, recycled and manufactured materials.
  - The generation and management of waste.
- 10.1.4 Chapter 2 The Scheme of Volume 6.1 contains a detailed description of the scheme. The drawings referenced in this chapter can be found in Volume 6.2, while the technical appendices are presented in Volume 6.3.

### 10.2 Competent expert evidence

- 10.2.1 The competent expert holds a BSc (Hons) degree in Environmental Protection and a LL.M (Master of Laws) in Environmental Law. The competent expert is also a Chartered Waste Manager and Full Member of the Chartered Institution of Wastes Management (CIWM).

### 10.3 Legislative and policy framework

- 10.3.1 The principal legislative and planning context for the assessment of the environmental effects of the scheme on material assets is presented below.

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<sup>1</sup> Highways Agency (2008) DMRB Volume 11, Section 2, Part 5 *Assessment and Management of Environmental Effects* (HE 205/08) [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/ha20508.pdf> (last accessed February 2018).

<sup>2</sup> Highways Agency (2011) Interim Advice Note 153/11 *Guidance on the Environmental Assessment of Material Resources*. Available online at: <http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian153.pdf> (last accessed March 2018)

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## European legislation

### ***The Waste Framework Directive 2008***

10.3.2 The revised *Waste Framework Directive*<sup>3</sup> sets out a 5-step waste hierarchy for waste management as an important requirement which applies to anyone who produces or manages waste. The waste hierarchy ensures that waste is dealt with in the following order or priority:

- 1) Prevention
- 2) Preparing for re-use
- 3) Recycling
- 4) Other recovery (for example energy recovery)
- 5) Disposal, only as a last resort

10.3.3 The following considerations must be taken into account:

- the general environmental protection principles of precaution and sustainability
- technical feasibility and economic viability
- protection of resources
- the overall environmental, human health, economic and social impacts

## National legislation

### ***The Waste (England and Wales) Regulations 2011, as amended***

10.3.4 The *Waste (England and Wales) Regulations 2011*<sup>4</sup>, implement parts of the revised *Waste Framework Directive 2008*, particularly the principles of Waste Hierarchy.

10.3.5 Site Waste Management Plans<sup>5</sup> (SWMPs) are no longer mandatory for projects commencing after 1 December 2013. They are, however, recommended, and the principles behind the Regulations remain best practice.

### ***Environmental Protection Act 1990***

10.3.6 The *Environmental Protection Act*<sup>6</sup> defines the fundamental structure and authority for waste management and control of emissions into the environment. It outlines:

- the definition of controlled waste

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<sup>3</sup> European Union (2008) *Waste Framework Directive 2008/98/EC*.

<sup>4</sup> Statutory Instrument (2011) *The Waste (England and Wales) Regulations. No.988*.

<sup>5</sup> Department for Transport (2004) *Guidance for Construction Contractors and Climate Voluntary Code of Practice*

<sup>6</sup> Chapter 43 - <http://www.legislation.gov.uk/ukpga/1990/43/introduction> accessed 08/09/2016

- the requirements of the duty of care in respect of waste and transferral of waste
- the requirements for permits and authorisations
- waste collection and waste disposal authorities and their roles

### ***The Landfill (England and Wales) Regulations 2002, as amended***

10.3.7 The *Landfill (England and Wales) Regulations 2002* (as amended)<sup>7</sup> require that landfill sites are classified into one of three categories, dependent on the chemical composition of the material. These are hazardous, non-hazardous, and inert. Prior to disposal, all waste must be pre-treated and waste producers must apply the waste hierarchy in the management of their wastes. If excavated materials are in accordance with Waste Acceptance Criteria (WAC) testing and Soil Guideline Values (SGVs), then a number of re-use and recycling opportunities exist.

### ***The Waste Prevention Programme for England 2013***

10.3.8 The development of a Waste Prevention Programme<sup>8</sup> is a requirement of the revised *Waste Framework Directive (2008/98/EC)*<sup>9</sup> and takes forward a commitment in the government Review of Waste Policy in England 2011<sup>10</sup>. The programme sets a number of objectives to help people and organisations make the most of opportunities to save money by reducing waste.

## **National policy**

### ***National Policy Statement for National Networks***

10.3.9 In the context of this assessment, the *National Policy Statement for National Networks* (NPSNN)<sup>11</sup> states the following:

10.3.10 *“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*

<sup>7</sup> Statutory Instrument (2002) *The Landfill (England and Wales) Regulations*. No. 1559.

<sup>8</sup> Department for Environment, Food and Rural Affairs (2013) *Waste Prevention Programme for England* [online] available online at: <https://www.gov.uk/government/publications/waste-prevention-programme-for-england>, (last accessed March 2018).

<sup>9</sup> European Union (2008) *Waste Framework Directive 2008/98/EC*.

<sup>10</sup> Department for Environment, Food and Rural Affairs (2011) *Government Review of Waste Policy in England* [online] available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69401/pb13540-waste-policy-review110614.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69401/pb13540-waste-policy-review110614.pdf) (last accessed March 2018).

<sup>11</sup> Department for Transport (2014) *National Policy Statement for National Networks* [online] available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/387223/npsnn-web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387223/npsnn-web.pdf) (last accessed June 2018).



*produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.”*

### **National Planning Policy for Waste 2014**

10.3.11 The *National Planning Policy for Waste*<sup>12</sup> replaces *Planning Policy Statement 10: Planning for Sustainable Waste Management* (PPS 10) and sets out detailed waste planning policies. It should be read in conjunction with other national planning policies for England, such as those contained in the *National Planning Policy Framework* (NPPF)<sup>13</sup>, the Department for Environment Food and Rural Affairs (Defra’s) *Waste Management Plan for England*<sup>14</sup> and the *National Policy Statements for Waste Water*<sup>15</sup> and *Hazardous Waste*<sup>16</sup>.

10.3.12 The updated policy maintains the core principles of the ‘plan led’ approach with a continued focus of moving waste up the waste hierarchy.

10.3.13 The document sets out detailed waste planning policies to facilitate a more sustainable and efficient approach to resource use and management. When determining planning applications for non-waste development, the policy requires that local planning authorities should, to the extent appropriate to their responsibilities, 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.
- New, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development and, in less developed areas, with the local landscape.

<sup>12</sup> Department for Communities and Local Government (2014) *National Planning Policy for Waste* [online] available at: <https://www.gov.uk/government/publications/national-planning-policy-for-waste> (last accessed March 2018).

<sup>13</sup> Department for Communities and Local Government (2012) *National Planning Policy Framework* [online] available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf) (last accessed March 2018).

<sup>14</sup> Department for Environment, Food and Rural Affairs (2013) *Waste Management Plan for England* [online] available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/265810/pb14100-waste-management-plan-20131213.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/265810/pb14100-waste-management-plan-20131213.pdf) (last accessed March 2018).

<sup>15</sup> Department for Environment, Food and Rural Affairs (2012) *National Policy for Waste Water* [online] available at: <https://www.gov.uk/government/publications/national-policy-statement-for-waste-water> (last accessed March 2018).

<sup>16</sup> Department for Environment, Food and Rural Affairs (2013) *Hazardous Waste National Policy Statement* [online] available at: <https://www.gov.uk/government/publications/hazardous-waste-national-policy-statement> (last accessed March 2018).

- The handling of waste arising from the operation of developments maximises re-use/recovery opportunities, and minimises off-site disposal.

### ***The Waste Management Plan for England, 2013***

10.3.14 Defra published the *National Waste Management Plan for England* in July 2013<sup>17</sup>. The plan outlines the waste hierarchy as a guide to sustainable waste management.

10.3.15 The *Waste Management Plan for England* sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management. Positive planning plays a pivotal role in delivering England's waste ambitions through ensuring the re-use, recovery or disposal of waste is undertaken without endangering human health or harming the environment and delivering sustainable development and resource efficiency through all schemes.

## **Local policy**

### ***Somerset Waste Core Strategy: Development Plan Document up to 2028***

10.3.16 The *Somerset Waste Core Strategy*<sup>18</sup> guides Somerset County Council's approach to planning for sustainable waste management in Somerset until the year 2028. It covers all forms of waste including household, commercial, industrial and construction waste.

10.3.17 "WCS1 Waste Prevention:

10.3.18 *Somerset County Council, as Waste Planning Authority, will work with local residents, businesses and other partners to maximise the scope for waste prevention.*

*(a) For proposed development, this will mean working with Local Planning Authorities to promote and require the following supporting information to be submitted with planning applications:*

- *a site waste management statement for the construction of minor development (less than 10 dwellings or where the floorspace to be created by the development is less than 1,000m<sup>2</sup>)*
- *a site waste management plan for the construction of 10 or more dwellings or where the floor space to be created by the development is 1,000m<sup>2</sup> or more*

<sup>17</sup> Department for Environment, Food and Rural Affairs (2013) *Waste Management Plan for England* [online] available at: <https://www.gov.uk/government/publications/waste-management-plan-for-england> (Last accessed March 2018).

<sup>18</sup> Somerset County Council (February 2015) *Somerset Waste Core Strategy: Development Plan Document up to 2028* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/policies/somerset-waste-core-strategy/> (last accessed March 2018).



- *a site waste management strategy for the construction of large-scale major projects (200 or more dwellings or where the development covers more than 10,000m<sup>2</sup>) or for multi-site projects within the same application*

*(b) On completion of development, this will mean supporting the Somerset Waste Partnership in its work on waste minimisation including, but not limited to, the delivery of its municipal waste management strategy and its work with the supply chain to reduce the negative impacts of packaging.”*

*10.3.19 “WCS2 Recycling and Reuse:*

*10.3.20 Planning permission will be granted for waste management development that will maximise reuse and/or recycling of waste subject to the applicant demonstrating that the proposed development will, in particular, be in accordance with Development Management Policies 1-9. “*

*10.3.21 “WCS3 Other Recovery:*

*10.3.22 Planning permission will be granted for proposed waste management development that will maximise other recovery from waste, subject to the applicant demonstrating that the proposed development:*

- (a) Will not treat waste that could viably be recycled or composted*
- (b) Will facilitate the recovery of energy from waste*
- (c) Will, in particular, be in accordance with Development Management Policies 1-9*

*10.3.23 Indicative requirements for residual waste treatment are approximately:*

- (d) 93,000 tonnes of residual municipal solid waste; and,*
- (e) 103,500 tonnes of residual commercial and industrial waste.*

*10.3.24 Indicative requirements will be updated via annual monitoring work.”*

*10.3.25 The Somerset Waste Core Strategy states that a site waste management strategy for the construction of large-scale major projects (200 or more dwellings or where the development covers more than 10,000m<sup>2</sup>) or for multi-site projects within the same application, is required to be submitted with planning applications.*

*10.3.26 The Somerset Waste Core Strategy is currently under review, which began in 2016, the final output of the review will be termed the Somerset Waste Plan. This is currently scheduled to be adopted in 2019/20.*

### **Somerset Minerals Plan: Development Plan Document up to 2030**

10.3.27 The *Somerset Minerals Plan*<sup>19</sup> is an essential tool for local decision-making on minerals development, underpinned by robust evidence and shaped to support sustainable development in Somerset. The vision for the *Somerset Minerals Plan* is:

10.3.28 *“To ensure the steady and adequate supply of minerals to meet society’s needs and strengthen the economic well-being of Somerset, making best use of the county’s minerals resources, whilst, protecting the quality of life for local communities in Somerset, and protecting and enhancing the county’s distinctive natural and historic environments.”*

10.3.29 There are 8 objectives stated in the *Somerset Minerals Plan*. Of most relevance to this scheme is the following:

10.3.30 *“Objective H: To protect the natural and historic environment of Somerset from unacceptable adverse impacts associated with minerals extraction and transportation, and reduce the impacts of mineral development on climate change.”*

## **Highways England policy**

### **Highways England Sustainable Development Strategy 2017**

10.3.31 The Highways England *Sustainable Development Strategy*<sup>20</sup> sets out Highways England’s approach and priorities for sustainable development to their key stakeholders. The strategy outlines several ambitions relating to Financial Capital (climate change adaptation), Human Capital (sustainability leadership), Natural Capital (carbon management), Social Capital (responsible sourcing), and Manufactured Capital (circular economy). Of these ambitions, the following are of relevance to this assessment:

- *“We will more actively manage our carbon emissions: we will examine and focus on business areas where efficiencies can be achieved through reducing fuel, energy and raw material consumption, and all waste generation”.*
- *“We will increase our knowledge of where our goods and materials are sourced from...Ensuring we responsibly source resources is essential, as their production and handling can have local, national and global*

<sup>19</sup> Somerset County Council (February 2015) *Somerset Minerals Plan: Development Plan Document up to 2030* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/plans/somerset-minerals-plan/> (last accessed March 2018).

<sup>20</sup> Highways England (2017) *Sustainable Development Strategy: Our Approach* [online] available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/605079/Sustainable\\_Development\\_Strategy\\_6.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/605079/Sustainable_Development_Strategy_6.pdf) (last accessed May 2018).

*impacts – on human and social health and also on the environment and climate change”.*

- *“We will push towards a circular approach to our management of resources: minimising our demand for primary resources extracted from the ground, and maximise the reuse of the resources already in use on the network. Reutilising them in as high a value function as possible”.*

## 10.4 Assessment methodology

- 10.4.1 This section describes the methodology which has been used for the assessment of material assets and waste which may affect, or be affected by, the construction of the scheme.
- 10.4.2 The scope of the materials assessment was presented in Chapter 11 Materials of the ***Environmental Impact Assessment (EIA) Scoping Report (document reference HE551507-MMSJV-EGN-000-RP-LP-0014)*** submitted to the Planning Inspectorate in November 2017. The Scoping Opinion is contained within Appendix 4.1 of Volume 6.3. A schedule of responses detailing how each of the Scoping Opinion comments have been considered as part of this chapter is contained within Appendix 4.2 of Volume 6.3.
- 10.4.3 In line with the EIA Scoping Report the operational phase of the scheme has been scoped out of the assessment. Although operation would give rise to some material resource usage and generation of waste, this would be likely to be minimal, and any effects are not considered to be significant. Only the construction phase remains scoped in to this assessment, as agreed by the Planning Inspectorate within the Scoping Opinion (Appendix 4.1 of Volume 6.3).
- 10.4.4 The assessment has been undertaken in accordance with the principles set out in Chapter 4 Environmental Assessment Methodology in Volume 6.1. The approach for material assets follows the guidance presented in IAN 153/11<sup>21</sup> to a Detailed level, and takes into account the following:
- the types and quantities of materials required for the scheme
  - details of the source or origin of materials, site-won materials to replace virgin materials, materials from secondary or recycled sources, or virgin or non-renewable sources
  - the cut and fill balance
  - the types and quantities of forecast waste arising from the scheme, including the identification of any forecast hazardous wastes
  - surplus materials and waste falling under regulatory controls
  - waste that requires storage on-site prior to re-use, recycling and disposal

<sup>21</sup> Highways England (2011) Interim Advice Note 153/11 *Guidance on the Environmental Assessment of Material Resources* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian153.pdf> (last accessed June 2018).

- waste to be pre-treated on-site for re-use within the scheme
- wastes requiring treatment or disposal off site
- The impacts that will arise from the issues identified in relation to materials and waste
- a conclusion about the magnitude and nature of the impacts and whether they are permanent or temporary and direct or indirect
- the identification of measures to mitigate the identified impacts

## Significance

10.4.5 No industry guidance on significance criteria for the assessment on material assets and waste exists. Therefore, an approach to determining the significance of the potential effects that may arise from the use of material resources and the generation of waste has been developed using professional judgement.

10.4.6 Materials required for the construction of the scheme are likely to be procured from a range of different sources (which are unknown at this stage), all of which will have their own specific environmental effects, which may or may not have been subject to an environmental assessment. Therefore, there are no obvious environmental receptors or resources for materials in the way that there are for other topic areas. Consequently, this precludes the application of a methodology to derive a measure of significance of the use and consumption of materials based on the value or sensitivity of a resource or receptor and the magnitude of an identified effect.

10.4.7 Therefore, the significance of effect will be assigned in accordance with the criteria outlined in Table 10.1 and Table 10.2.

Table 10.1: Effect categories and typical descriptors for material assets and waste generation

Significance category	Description
Neutral	<p>Material assets:</p> <ul style="list-style-type: none"> <li>• No reduction or alteration in the availability of material assets at a regional scale (relating the resources the project has used).</li> </ul> <p>Waste generation:</p> <ul style="list-style-type: none"> <li>• No reduction or alteration in the capacity of waste infrastructure at a regional scale.</li> </ul>
Slight	<p>Material assets:</p> <ul style="list-style-type: none"> <li>• Requires ≤50% of primary materials to be sourced nationally (with other primary materials sources at a lower geographical scale).</li> <li>• Comprises re-used or recycled aggregate (alternative materials) above the higher of the relevant regional or national percentage target (see Table 10.11).</li> </ul> <p>Waste generation:</p> <ul style="list-style-type: none"> <li>• ≤1% reduction or alteration in the regional capacity of waste infrastructure.</li> <li>• Waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.</li> </ul>
Moderate	<p>Material assets:</p> <ul style="list-style-type: none"> <li>• &gt;50% of primary materials to be sourced nationally (with other primary materials sourced at a lower geographic scale).</li> </ul>

Significance category	Description
	<ul style="list-style-type: none"> <li>Comprises re-used or recycled aggregate (alternative materials) below the lower of the relevant regional or national percentage target (see Table 10.11).</li> </ul> Waste generation: <ul style="list-style-type: none"> <li>&gt;1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating waste from a project.</li> <li>1-50% of project waste requires disposal outside of the region.</li> </ul>
Large	Material assets: <ul style="list-style-type: none"> <li>&gt;50% of primary materials to be sourced internationally.</li> <li>Comprises no re-used or recycled aggregate (alternative materials).</li> </ul> Waste generation: <ul style="list-style-type: none"> <li>&gt;1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating waste from a project.</li> <li>&gt;50% of project waste requires disposal outside of the region.</li> </ul>
Very Large	Material assets: <ul style="list-style-type: none"> <li>No criteria: as criteria for Large category above.</li> </ul> Waste generation: <ul style="list-style-type: none"> <li>&gt;1% reduction or alteration in national capacity of waste infrastructure as a result of accommodating waste from a project.</li> <li>The project would require new (permanent) waste infrastructure to be constructed to accommodate waste.</li> </ul>

Notes: 'Region' means the authority comprising the second study area, in this case Somerset.

'Primary materials' describes materials that are from a non-renewable source.

'Peat resource' relates to existing or potential peat extraction sites.

Table 10.2: Significant criteria for material assets and waste generation

Significance	Description
Not Significant	Material assets: <ul style="list-style-type: none"> <li>Category description met for Neutral, Slight or Moderate effect (see Table 10.1).</li> </ul> Waste generation: <ul style="list-style-type: none"> <li>Category met for Neutral or Slight effect (see Table 10.1).</li> </ul>
Significant (one or more criteria met)	Material assets: <ul style="list-style-type: none"> <li>Category description met for Large effect (see Table 10.1).</li> </ul> Waste generation: <ul style="list-style-type: none"> <li>Category met for Moderate, Large or Very Large effect (see Table 10.1).</li> </ul>

## Consultation

10.4.8 No additional consultation specific to material assets and waste has been required. Scheme-wide consultation details are provided in Section 5.5 of Chapter 4 Environmental Assessment Methodology, Volume 6.1.

## 10.5 Assessment assumptions and limitations

10.5.1 The materials assessment has been based on the description of the scheme detailed in Section 2.5 of Chapter 2 (Volume 6.1), including the horizontal and vertical limits of deviation.

10.5.2 The assumptions made for the calculation of material quantities are as per those outlined in Appendix 13.1 Carbon Assessment Report (Volume 6.3).

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These figures are intended for the purpose of the current assessment only, and have been based on a likely worse-case scenario.

- 10.5.3 It has been assumed that 5% of excavated material would be unacceptable for re-use on-site, which equates to 35,139m<sup>3</sup>. Therefore, it has been assumed that the 35,139m<sup>3</sup> of unacceptable material would be exported off-site for disposal in landfill. This assumption has been based on professional judgement and experience on other schemes.
- 10.5.4 An outline Site Waste Management Plan (SWMP) has been produced and is contained within Annex B.1 of the ***Outline Environmental Management Plan (OEMP) (document reference TR010036/APP/6.7)***. This outline SWMP would be developed into a full SWMP by the Principal Contractor. The SWMP is a key part of the Construction Environmental Management Plan (CEMP) and would be a live document based on construction operations as they occur. It will contain specific information on how to manage and dispose of waste generated during the construction of the scheme.
- 10.5.5 This assessment has not considered the environmental effects associated with the off-site extraction of raw materials used for the off-site manufacture of products (which may occur outside of the UK). These stages of the products' or materials' life-cycles are outside of the scope of the assessment due to the range of unknown variables associated with the processes involved. It is also likely that these processes have already been subject to an environmental assessment within the facilities established consents.
- 10.5.6 It is acknowledged that the use of materials resources and the generation and management of waste would be likely to generate adverse environmental effects through the transportation of materials and waste (both to site and from site), from detrimental impacts to air quality and increased local noise levels. However, these effects are more logically dealt with within other chapters of this Environmental Statement, namely Chapter 5 Air Quality and Chapter 11 Noise and Vibration of Volume 6.1, and have, therefore, not been included within the scope of this assessment.
- 10.5.7 The assessment has not considered the effects of contaminated land (such as impact on groundwater and human health), as this has been considered within Chapter 9 Geology and Soils, Volume 6.1. Where the potential for hazardous waste from contaminated land is identified, this chapter addresses the management of this waste. In addition, the assessment has not considered the sterilisation of mineral safeguarding areas or peat resources, as this has been dealt with in Chapter 9 Geology and Soils, Volume 6.1.
- 10.5.8 The procurement of the materials required for the construction of the scheme is unknown at this stage. It has been assumed that not all materials would be



available to be sourced regionally (within Somerset), and that the majority would be sourced nationally (outside of Somerset, within the UK), which represents the (environmentally) worst case scenario.

## **10.6 Study area**

- 10.6.1 Currently, there is no guidance available for defining the study area to be used for materials assessments. As a result, the study area has been determined through professional judgement by the influence of the scheme, and encompasses the extent of potential effects. The assessment has therefore used 2 geographically different study areas to examine the use of material resources and the generation and management of waste.
- 10.6.2 The first study area is based on the area of the completed works within the red line boundary of the scheme (as shown in Figure 2.1 of Volume 6.2), as this constitutes the area within which construction materials would be consumed (used, re-used and recycled) and waste would be generated.
- 10.6.3 The second study area is focused on an area sufficient to identify the suitable waste infrastructure that could accept arisings or waste generated by the scheme, and feasible sources and availability of construction materials typically required for motorway and all-purpose trunk road projects. Therefore, for the purposes of this assessment this study area focuses on the county of Somerset, within which the scheme is located.

## **10.7 Baseline conditions**

### **Material resources**

- 10.7.1 Information on the demand for key construction materials, within the second study area (Somerset) has been used to provide the baseline for material resources. In addition, information for the UK<sup>22</sup> has also been provided as a national comparison. This information has been determined through a desk-study using a number of readily available resources, in particular from the Minerals Products Association, International Steel Statistics Bureau, and Somerset County Council.
- 10.7.2 Table 10.3 outlines the UK demand, in terms of sales, of minerals and mineral products in 2015 / 2016.

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<sup>22</sup> Where information is not available for the UK due to the differing governing authorities for England, Wales and Scotland, England has been used to provide the national comparison.

Table 10.3: UK demand of materials and minerals / mineral products

Mineral	UK demand (year)
Aggregates Of which:	225 million tonnes (2015)
<ul style="list-style-type: none"> <li>Crushed rock</li> <li>Sand and gravel – land won</li> <li>Sand and gravel – marine won</li> <li>Recycled and secondary</li> </ul>	<ul style="list-style-type: none"> <li>104 million tonnes</li> <li>46 million tonnes</li> <li>12 million tonnes</li> <li>63 million tonnes</li> </ul>
Cementitious (including imports) Of which:	13 million tonnes (2015)
<ul style="list-style-type: none"> <li>Cement (including imports)</li> <li>Other cementitious materials (fly ash, ground clay bricks)</li> </ul>	<ul style="list-style-type: none"> <li>11 million tonnes</li> <li>2 million tonnes</li> </ul>
Ready-mixed concrete	54 million tonnes (2015)
Concrete products	27 million tonnes (2015)
Asphalt	24 million tonnes (2015)
Dimension stone	1 million tonnes (2015)
Steel	10.9 million tonnes (2016)

Source: Minerals Products Association 2016<sup>23</sup> and International Steel Statistic Bureau<sup>24</sup>

10.7.3 At a regional level, Table 10.4 outlines aggregate sales and reserves in Somerset for 2015. It is outlined in the *Somerset Local Aggregate Assessment*<sup>25</sup> that Somerset is the largest producer of crushed rock in the south of England, the vast majority of which is extracted from the quarries in the east Mendip Hills, with an average of over 10 million tonnes per year produced in recent years. The permitted reserves of crushed rock in Somerset at the end of 2015 were approximately 380 million tonnes (Table 10.4).

10.7.4 Somerset currently has no land-won sand and gravel workings and superficial deposits of sand and gravel in Somerset are generally limited. Somerset has not extracted sand and gravel during the past 10 years, as the production at Whiteball (which straddles the Somerset-Devon border) has been supplied by the extraction on Devon's side of the border. Therefore, Somerset does not have a 10-year average that can inform any potential future supply from the county. However, the Whiteball operations supply aggregates into both counties and have always contributed towards Somerset's shared apportionment with Devon and Cornwall. Devon's *Local Aggregate Assessment*<sup>26</sup> reported sand and gravel permitted reserves at the end of 2015 of 7 million tonnes, with a landbank period of 12.5 years (Table 10.4).

<sup>23</sup> Minerals Products Association (2016) *The Mineral Products Industry at a Glance: 2016 Edition* [online] available at:

[http://www.mineralproducts.org/documents/Mineral\\_Products\\_Industry\\_At\\_A\\_Glance\\_2016.pdf](http://www.mineralproducts.org/documents/Mineral_Products_Industry_At_A_Glance_2016.pdf) (last accessed February 2018)

<sup>24</sup> International Steel Statistics Bureau (2017) *Steel Demand* [online] available at:

<http://issb.co.uk/news/news/uk.html> (last accessed February 2018)

<sup>25</sup> Somerset County Council (2015) *Somerset Local Aggregate Assessment: Fourth Edition* incorporating data from 2006-2015 [online] available at: <http://www.somerset.gov.uk/policies-and-plans/plans/somerset-minerals-plan/> (last accessed March 2018)

<sup>26</sup> Devon County Council (2016) *5<sup>th</sup> Devon Local Aggregate Assessment 2006-2015: Version 2* [online] available at: <https://new.devon.gov.uk/planning/planning-policies/minerals-and-waste-policy/local-aggregate-assessment> (last accessed March 2018)

10.7.5 Marine dredged sand and gravel originating from the Bristol Channel is landed at Dunball Wharf. Approximately 55,000 tonnes of marine-dredged sand and gravel was landed at this wharf in 2015.

Table 10.4: Aggregate sales and reserves in Somerset for 2015

Aggregate	Sales	Average (10 year) sales	Average (3 year) sales	LAA rate* (per year)	Reserves	Land-bank (years)
Sand and gravel	-	-	-	-	7	12.5
Crushed rock	12.55 million tonnes	10.85 million tonnes	11.66 million tonnes	10.85 million tonnes	380 million tonnes	28.4
Marine aggregates	55,000 tonnes	-	41,647 tonnes	41,647 tonnes	-	-
Secondary aggregates	19,501 tonnes	45,075 tonnes	78,023 tonnes	45,075 tonnes	-	-
Recycled aggregates	65,130 tonnes	47,828 tonnes	7,481 tonnes	47,828 tonnes	-	-

Source: Somerset County Council Local Aggregate Assessment: Fourth Edition<sup>25</sup>

Notes: \*Local Aggregate Assessment (LAA) rate is the planned level of provision

## Generation and management of waste

10.7.6 The most recent information available relating to current waste generation and operational waste infrastructure in Somerset region has been gathered to provide the baseline for this assessment. As stated above, information for the UK<sup>27</sup> has also been provided as a national comparison. Information on the current waste arisings and the capacity of waste management infrastructure has been determined through a desk-top study, using a number of readily available resources, in particular data from the Environment Agency, Defra, South Somerset District Council, and Somerset County Council.

### Waste generation

10.7.7 The latest data from the Environment Agency indicated that Somerset produced over 1.8 million tonnes of waste in 2016 (Table 10.5). England produced over 200 million tonnes of waste in 2016 (Table 10.5), which was managed in 6,382 permitted waste facilities<sup>28</sup>.

<sup>27</sup> Where information is not available for the UK due to the differing governing authorities for England, Wales and Scotland, England has been used to provide the national comparison.

<sup>28</sup> Environment Agency (2017) *Waste Management for England 2016* [online] available at: <https://www.gov.uk/government/publications/waste-management-for-england-2016> (last accessed March 2018)

Table 10.5: Waste breakdown by site type (2016)

Site Type	Somerset (tonnes)	England (tonnes)
Landfill	420,000	44,715,000
Transfer	266,000	46,684,000
Treatment (excluding metal recycling sector)	575,000	72,419,000
Metal Recovery	86,000	13,767,000
Incinerated	0	11,639,000
Use of Waste	157,000	1,628,000
Land Disposal	381,000	12,174,000
<b>Total</b>	<b>1,885,000</b>	<b>203,026,000</b>

Source: Environment Agency (2017) Waste Management for England 2016

10.7.8 With respect to construction and demolition waste, the Environment Agency recorded that 36,000 tonnes of inert construction and demolition waste was landfilled in Somerset in 2016. There are no figures available showing how much construction and demolition waste was recovered or recycled or how much was contaminated waste. However, the ENV23 – *Statistics on Waste*<sup>29</sup> outlines that of the 49,000 tonnes of non-hazardous construction and demolition waste generated in England in 2014, 44,900 tonnes were recovered (which is 91.4% of the total generated).

10.7.9 It was also recorded by the Environment Agency that 157,000 tonnes of waste material were used in construction (under permits) in Somerset, 703,000 tonnes in England in 2016.

10.7.10 Regarding hazardous waste, Table 10.6 below outlines the quantities managed and deposited in 2016 in Somerset and England. Of the 34,346 tonnes managed in Somerset, 15,383 tonnes were specified as construction and demolition waste and asbestos, and of the 26,161 tonnes deposited in the Somerset, 17,707 tonnes were specified as construction and demolition waste and asbestos.

Table 10.6: Hazardous waste managed and deposited in 2016

Hazardous waste	Somerset (tonnes)	England (tonnes)
Managed	34,346	4,558,077
Deposited	26,161	4,925,309

Source: Environment Agency (2017) Waste Management for England 2016

Note: The data is a summary of the registered hazardous waste movements. The same waste may have been moved between multiple facilities and each separate movement is recorded.

### **Potential hazardous waste arisings**

10.7.11 To identify potential sources of contamination an initial review of the landfill sites, both authorised and historic, within the first study area was undertaken, these are shown on the Environmental Constraints Plan in Figure 2.2 of Volume 6.2. Potential sources of contamination outside of the first study area have not

29 Defra (2016) ENV23 – *UK Statistics on Waste* [online] available at: <https://www.gov.uk/government/statistical-data-sets/env23-uk-waste-data-and-management> (last accessed February 2018)

been considered, as these are considered unlikely to affect the scheme in terms of the generation of contaminated waste.

- 10.7.12 There is 1 historic landfill within (and adjacent to) the boundary of the scheme, details of this landfill are contained in Table 10.7.

Table 10.7: Historic landfill sites within the redline boundary of the scheme

Site Name	Site Address	Type/wastes accepted	Status	Distance from scheme
Land Adjacent to Hazlegrove Park	Sparkford Bypass, Sparkford	Accepted inert and household waste.	Last received waste: 20 June 1990.	Adjacent / within the boundary of the scheme

Source: Environmental Agency (2016) Historic Landfill Data

- 10.7.13 In addition, there may also be potential contamination risks from infilled historic quarries, fuel stations or garages and underground tanks, presence of Made Ground, and Ministry of Defence (MoD) land. For more information on the potential contamination risks see Chapter 9 Geology and Soils of Volume 6.1.

### **Waste management facilities**

- 10.7.14 The Waste Management for England 2016<sup>30</sup> data provides the most up-to-date information on the remaining capacity of landfill in Somerset. This information is provided in Table 10.9 below.

Table 10.9: Landfill capacity in 2016 in Somerset

Landfill type	Somerset (m <sup>3</sup> )
Hazardous Merchant	214,000
Hazardous Restricted	-
Non-Hazardous with SNRHW* cell	1,630,000
Non-Hazardous	1,410,000
Non-Hazardous Restricted	-
Inert	654,000
<b>Total</b>	<b>3,908,000</b>

Source: Environment Agency (2017) Waste Management for England 2016

Notes: \*Stable Non- Reactive Hazardous Waste (SNRHW)

- 10.7.15 The most recent data from Somerset County Council on the capacity of their waste management facilities and remaining capacity of landfill is outlined in their most recent Annual Monitoring Report<sup>31</sup> from 2016. This information is provided in Table 10.10 below.

<sup>30</sup> Environment Agency (2017) *Waste Management for England 2016* [online] available at: <https://www.gov.uk/government/publications/waste-management-for-england-2016> (last accessed March 2018)

<sup>31</sup> Somerset County Council (2016) *Minerals and Waste Annual Monitoring Report: 1 April 2015 to 31 March 2016* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/policies/minerals-and-waste/> (last accessed March 2018)

Table 10.10: Waste management capacity in Somerset in 2011

Site type	Capacity (tonnes per annum)	Capacity (m <sup>3</sup> )
Recycling	1,213,603	
Other recovery	45,000	
Non-hazardous landfill		5,146,000
Inert landfill		900,000

Source: Somerset County Council (2016) Annual Monitoring Report

10.7.16 It is noted in the *Annual Monitoring Report* and the *Waste Core Strategy*<sup>32</sup> that the remaining capacity at Walpole, Dimmer and Whiscombe landfill sites is sufficient to meet Somerset's requirements for non-hazardous landfilling until at least 2028. The *Waste Core Strategy* outlines that these 3 non-hazardous landfills accept waste from all 3 major waste streams: commercial and industrial, municipal solid waste and construction and demolition waste.

10.7.17 The capacity of inert landfill disposal in Somerset, from 2 operational inert landfills, is now extremely limited and is likely to be used up within the next few years at current disposal rates.

### ***Regional and national recycling aggregate targets***

10.7.18 Specific to construction and demolition waste Somerset County Council<sup>33</sup> has the following waste recycling target rates:

- 74% (2016)
- 76% (2020)
- 79% (2028)

10.7.19 The Department for Communities and Local Government (DCLG) have the following targets for aggregate recycling between 2005 - 2020, outlined in Table 10.11 below.

<sup>32</sup> Somerset County Council (2013) *Waste Core Strategy Development Plan Document up to 2028* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/policies/minerals-and-waste/> (last accessed March 2018)

<sup>33</sup> Somerset County Council (2013) *Waste Core Strategy Development Plan Document up to 2028* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/policies/minerals-and-waste/> (last accessed March 2018)



Table 10.11: Recycled aggregate targets 2005 - 2020

Region	Recycled content target (alternative materials)	Total aggregate provision (million tonnes)
South East	26%	502
London	48%	197
East	31%	382
East Midlands	14%	784
West Midlands	27%	370
South West	22%	656
North West	30%	392
Yorkshire and the Humber	31%	431
North East	26%	193
<b>England</b>	<b>25%</b>	<b>3908</b>

Source: National and regional guidelines for aggregates provision in England 2005-2020<sup>34</sup>

## 10.8 Potential impacts

### Construction

10.8.1 In accordance with IAN 153/11, the construction phase considers site preparation, demolition and construction. The following impacts are predicted for the scheme during construction.

#### *Use of material resources*

10.8.2 Material resources include raw materials such as aggregate and minerals from primary, secondary and recycled sources, and manufactured construction products. Manufactured construction products can include the materials required for the construction of the road surface, pre-cast elements for the construction of structures such as bridges, gantries and signage, barriers, lighting and fencing.

10.8.3 Road schemes generally require large quantities of both primary raw materials and manufactured construction products. Many material resources may originate off-site, purchased as construction products. However, some materials may arise on-site, for example excavated soils and sub-strata.

10.8.4 The receptors likely to be subject to impacts as a result of material resource use include quarries and other sources of minerals, and other finite raw material resources. The potential impacts associated with the use of material resources on these receptors include:

- The availability of material resources and the subsequent impact on the demand for materials.

<sup>34</sup> DCLG (2009) *National and regional guidelines for aggregates provision in England 2005-2020* [online] available at: <https://www.gov.uk/government/publications/national-and-regional-guidelines-for-aggregates-provision-in-england-2005-to-2020> (last accessed May 2018).

- The depletion of non-renewable resources.

### **Generation and management of waste**

- 10.8.5 In considering the generation and management of waste, it is important to define when, under current legislation and understanding, a material is considered to be a waste. The EU *Waste Framework Directive 2008/98/EC* defines waste as ‘*any substance or object which the holder discards or intends or is required to discard*’.
- 10.8.6 Waste arises predominantly from excavations and demolitions of existing structures, and from materials brought to site that are not used for their intended purposes, such as damaged items, cut offs and surplus materials. Some types of waste are harmful to human health, or to the environment, either immediately or through an extended period of time. These are defined as hazardous wastes.
- 10.8.7 The receptors likely to be subject to impacts as a result of waste generation and management are landfills and other waste management infrastructure. The potential impacts assessment with the generation and management of waste on these receptors include:
- Temporary occupation of waste management infrastructure capacity (from treatment of waste).
  - Permanent reduction to landfill capacity (from disposal of waste).

## **10.9 Design, mitigation and enhancement measures**

- 10.9.1 Measures would be implemented to reduce the effects of material resource use and waste generation by the scheme during the construction phase. There is substantial overlap in the mitigation for both aspects (material resource use and waste generation), due to the synergy between the re-use of materials and the avoidance of waste generation.

### **Design measures**

- 10.9.2 The design of the scheme has been value engineered which has enabled material savings of approximately 55%. Changes in the scheme design to enable these savings included:
- The reduction in the overall footprint of the scheme by re-using the existing A303 where practicable.
  - The reduction in the length and width of slip roads where practicable.
  - The reduction in the number of structures required from 4 to 2.
  - The use of open surface drainage features, such as channels and ditches, which has reduced the need for pipes.

10.9.3 Value engineering of the design would continue to be undertaken which would ultimately result in further material savings.

## Mitigation measures

10.9.4 An **OEMP (document reference TR010036/APP/6.7)** has been produced to support this Development Consent Order (DCO) application and would be developed into a full CEMP by the appointed contractor. Mitigation measures that would be implemented on-site to ensure efficient use of material resources and reduction of waste arisings, and to reduce the potential impacts identified in Section 10.8 above are as follows:

- Materials would be delivered on an as required basis to avoid damage or contamination and, therefore, limit the likelihood of waste.
- Where site-won material is not available or suitable for re-use, secondary or recycled materials would be procured where available and practicable.
- The design of the temporary roads would incorporate geogrid or lime stabilisation methods to reduce the amount of granular fill required.
- All suitable excavated material would be re-used in the construction of the scheme and in landscaping features to reduce the requirement to import materials for construction and reduce the need to remove surplus materials from site.
- Temporary stockpiling of fill materials, prior to incorporation in the scheme, would be avoided where possible. This ensures double handling and damage is minimised and therefore, avoids the generation of waste. However, where required, materials would be stockpiled in accordance with best practice and managed appropriately to limit the likelihood of damage or contamination.
- Locally sourced materials and suppliers would be identified and used where practicable.
- Pre-cast elements would be used, where practicable, to ensure efficient use of materials and avoid the generation of waste arisings from cut-offs.
- The waste hierarchy (as described in paragraph 10.3.3) would be implemented throughout the construction to minimise disposal and maximise re-use and recycling of waste arisings. Opportunities for re-use and recycling of waste include (but are not limited to):
  - Re-using excavated soils on-site in the landscaping features of the scheme.
  - Chipping green waste on-site for use in the landscaping for the scheme.
  - Composting of green waste.
  - Recycling of inert material by crushing, blending and subsequent re-use, as an aggregate.
  - Re-using waste on other nearby schemes.

- Re-using waste for uses with clear benefits to the environment, for example in the remodelling of agricultural land or in the restoration of nearby quarries or other excavation sites.
- Facilities would be provided on-site to separate out waste, for example for recycling.

- 10.9.5 In relation to the point above regarding the re-use of waste with benefits to the environment, the *Somerset Waste Core Strategy*<sup>35</sup> outlines that Somerset has a long history of aggregate and building stone production, and therefore, there may be opportunities for the re-use of inert waste in quarry restoration, subject to permitting requirements and the suitability of waste. This will be investigated by the appointed contractor.
- 10.9.6 Where waste must be taken to a recycling or disposal site, the contractor must ensure that the sites have the appropriate permits to ensure that environmental risks are reduced, such as damage to hydrological systems. In addition, the suitable facility would be located as close to the works as possible to minimise the impacts of transportation, in particular the release of carbon emissions. The appointed Contractor would identify the closest and relevant treatment and disposal sites.
- 10.9.7 An outline SWMP has been produced and is contained in Annex B.1 of the ***OEMP (document reference TR010036/APP/6.7)*** and will be developed into the full SWMP by the appointed contractor. The SWMP would ensure that waste is managed in accordance with the waste hierarchy and other relevant legislative requirements, and would detail information on the waste carriers and waste management facilities that would be used.
- 10.9.8 An Outline Materials Management Plan (MMP) (contained in Annex B.2 of the OEMP) has been produced to identify ways to re-use site-won or excavated materials within the construction of the scheme provided it meets the requirements of the CL:AIRE Code of Practice (CoP)<sup>36</sup>. Refer to Chapter 9 Geology and Soils (Volume 6.1) for further information. The Outline MMP would be developed into a full MMP by the appointed contractor.
- 10.9.9 Additionally, an Outline Soil Management Plan (SMP) (contained in Annex B.3 of the OEMP) has also been produced which sets out how soils are to be managed in accordance with Defra's CoP. This would ensure that the quality of soil resources, won from the site, are maintained during construction so that they remain suitable for re-use, do not become contaminated and ultimately do

<sup>35</sup> Somerset County Council (February 2015) *Somerset Waste Core Strategy: Development Plan Document up to 2028* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/policies/somerset-waste-core-strategy/> (last accessed May 2018)

<sup>36</sup> Contaminated Land Applications In Real Environments (CL:AIRE) (2011) *The Definition of Waste: Development Industry Code of Practice* [online] available at: <https://www.claire.co.uk/projects-and-initiatives/dow-cop/28-framework-and-guidance/111-dow-cop-main-document> (last accessed May 2018).

not become waste. Refer to Chapter 9 Geology and Soils (Volume 6.1) for further information. This Outline SMP would be developed into a full SMP by the appointed contractor.

10.9.10 The preparation of a CEMP, SWMP, MMP and SMP would ensure that any adverse effects associated with material resource use and waste generation are managed.

## 10.10 Assessment of likely significant effects

### Material resource use

10.10.1 The estimated quantities of materials required for the construction of the scheme are outlined in Table 10.13.

Table 10.13: Summary of the material resources required for the scheme

Scheme activity	Material resources required for the scheme	Estimated quantities of material resources required
Site remediation / preparation	No material resources would be required for site preparation.	Not applicable.
Demolition	No materials resources would be required for demolition.	Not applicable.
Site construction (including earthworks)	Fill (for earthworks)	624,576m <sup>3</sup>
	New pavement construction, which would require: <ul style="list-style-type: none"> <li>asphalt</li> <li>fill and aggregate</li> </ul>	177,184m <sup>2</sup>
	Steel containment barrier	1,768m
	Concrete containment barrier	5,595m
	Parapet	290m
	Kerbs	12,183m <sup>2</sup>
	Plastic drainage	4,436m
	Concrete drainage pipes (excluding culverts)	14,088m
	Concrete manhole	181 (number)
	Pipe culvert (concrete)	301 (number)
	Steel (for structures)	310 tonnes
	Concrete bridge deck slab (for structures)	482m <sup>3</sup>
	Concrete wingwalls (for structures)	2,063m <sup>3</sup>
	Concrete abutments (for structures)	3,059m <sup>3</sup>
	Lighting ducts	1,588 (number)
	Lighting columns	24 (number)
	Traffic signs supporting structure (steel)	Quantities unknown at this stage – unlikely that significant quantities would be required

Scheme activity	Material resources required for the scheme	Estimated quantities of material resources required
	Communications infrastructure	Quantities unknown at this stage – unlikely that significant quantities would be required
	Topsoil (for re-soiling)	119,594m <sup>3</sup>
Operation and maintenance of asset	Not assessed	N/A

Source: Table adapted from Table A in Annex 1 of IAN 153 / 11

10.10.2 As can be seen in Table 10.13 the majority of the materials required for the construction of the scheme comprise of aggregate and concrete (which is an aggregate based product).

10.10.3 The earthworks for the scheme have been balanced, as far as possible. This means that all required fill materials would be supplied from the re-use of excavated materials, as follows. There would be 702,786m<sup>3</sup> (Table 10.15) of excavated materials, of which 667,647m<sup>3</sup> is assumed to be acceptable for re-use on-site, therefore this would supply the required 624,576m<sup>3</sup> (Table 10.13) for fill (with a surplus of 43,071m<sup>3</sup> of excavated material). In addition, the 119,594m<sup>3</sup> (Table 10.13) required for re-soiling would be mostly provided from the 117,251m<sup>3</sup> of topsoil stripped (Table 10.15), with the additional 2,343m<sup>3</sup> required to be imported to site.

10.10.4 Backfill for structures would be imported to site, as material meeting the required specification is not expected to be won from the site arisings. In addition, it is unlikely that suitable materials for the road construction would be available from site won material, such as capping material and sub-base, which would need to be imported. The volumes of imported material would depend greatly on the characteristics of the existing ground and the subsequent carriageway design but are anticipated to be approximately 60,000m<sup>3</sup>.

10.10.5 Structures that would need to be built as part of the scheme include the Downhead overbridge and the underpass a Hazlegrove only. As outlined in the construction strategy for the scheme (contained in Chapter 2 The Scheme of Volume 6.1) some elements of these structures would be cast in-situ and some would be pre-cast. In addition, it is unknown at this stage whether the concrete central reserve barrier would be cast in-situ or pre-cast; in this instance pre-cast has been assessed as this would be the worst-case scenario.

10.10.6 Elements such as steel for structures and barriers, lighting columns and ducts, signs and communications infrastructure would require importing to site.

10.10.7 The detailed assessment of the effects on material resources can be seen in Table 10.14.



Table 10.14: Detailed assessment of material resource use

Project activity	Potential impacts associated with material resource use	Description of the effects
Site construction	Impacts on the availability of material resources, and subsequent impacts on the demand for key construction materials.	<p>The implementation of mitigation measures as outlined in section 10.9 would ensure the efficient use of material resources on-site. Although all required fill material for the earthworks can be provided from site-won material, which constitutes a recycling target higher than the England target outlined in Table 10.11, other construction materials would be required which would be imported to site. It is unlikely that any materials would be sourced internationally, therefore, as a worse case it is assumed that &gt;50% of materials would need to be sourced nationally (with other primary materials sourced at a lower geographic scale). Effects would be direct, permanent and adverse.</p> <p><b>Effect category: Moderate</b>  <b>Significance of effect: Not Significant</b></p>
	Depletion of non-renewable resources.	<p>The majority of materials required for construction comprise of aggregates, or aggregate based products, which is a primary material. Although all required fill material for the earthworks can be provided from site-won material, other elements of the construction (such as backfill for structures) would require aggregates or aggregate based products which would be imported to site. However, the baseline has indicated adequate supply of aggregates within Somerset, therefore where further supplies of aggregates are required the majority of these can be procured within Somerset. This would meet the significance criteria, 'requires ≤50% of primary materials to be sourced nationally (with other primary materials sourced at a lower geographic scale)'. Effects would be adverse, permanent and direct.</p> <p><b>Effect category: Slight</b>  <b>Significance of effect: Not Significant</b></p>

Source: Table adapted from Table C in Annex 2 of IAN 153/11

## Generation and management of waste

10.10.8 Table 10.15 outlines the waste streams that are likely to be generated by the construction of the scheme.

Table 10.15: Summary of anticipated waste arisings

Scheme activity	Waste arisings from the scheme	Quantities of waste arisings	Additional information on waste arisings
Site remediation / preparation	Green waste	Area of vegetation clearance: 100,449m <sup>2</sup>  Plus 14 individual trees (911m <sup>2</sup> )	Waste would be segregated and stored appropriately on-site in accordance with best practice.  Any hazardous waste would be handled, stored, and disposed of in accordance with the SWMP.  All waste would be re-used on-site where possible.  All stripped topsoil would be re-used on-site.
	Topsoil	117,251m <sup>3</sup>	
	Contamination soils and waste (hazardous waste)	Quantities unknown – unlikely to be significant	
Demolition	Demolition of 1 agricultural barn: <ul style="list-style-type: none"> <li>Inert waste (concrete, brick)</li> <li>Metal</li> </ul>	Quantities unknown – unlikely to be significant	Waste would be dealt within in accordance the waste hierarchy.
Site construction	Excavated material	Total excavated material: 702,786m <sup>3</sup>  5% of excavated material assumed to be unacceptable for re-use on-site: 35,139 m <sup>3</sup>  Surplus excavated material acceptable for re-use on-site: 43,071m <sup>3*</sup>	Potential for all suitable excavated material to be re-used on-site either as embankment fill or in the landscaping.  Waste would be minimised as far as possible through re-use on-site.
	Waste from materials brought to site that are not used for their original purpose for example damaged items, cut offs and surplus materials	Quantities unknown – as a worst case, likely to be 10% of construction materials	
	Other potential waste streams include: <ul style="list-style-type: none"> <li>redundant pavement</li> <li>road planings</li> <li>waste from materials brought to site that are not used for their original purpose for example damaged</li> </ul>	Quantities unknown – unlikely to be significant	

Scheme activity	Waste arisings from the scheme	Quantities of waste arisings	Additional information on waste arisings
	items, cut offs and surplus materials		

Source: Table adapted from Table B in Annex 1 of IAN 153 / 11

Notes: \*Total excavated material excluding unacceptable material and fill material

10.10.9 As outlined in paragraph 10.10.4 above, it is assumed that 5% of excavated material, which equates to 35,139m<sup>3</sup> (Table 10.15), would be unacceptable for re-use on-site and would therefore constitute waste. It was also outlined that the design of the scheme has ensured a balance in the earthworks as far as possible, however, as the remaining excavated material would equate to 667,647m<sup>3</sup> and the total volume of fill material required is 624,576m<sup>3</sup>, there is likely to be a surplus of 43,071m<sup>3</sup> of excavated material. Therefore, in total there would be a surplus of 78,210m<sup>3</sup>; of which 35,139m<sup>3</sup> would be unacceptable for re-use on-site and 43,071m<sup>3</sup> would be acceptable for re-use on-site (such as in the landscaping for the scheme). The 35,139m<sup>3</sup> of unacceptable material would be managed in accordance with the waste hierarchy, with preference given to its re-use on other sites or for recycling. In addition, as outlined in section 10.3.3, the stripped topsoil would be re-used on-site and therefore would not constitute waste.

10.10.10 There is potential for hazardous waste to arise from the site preparation phase due to the sources of contaminated land in the area, as described in section 10.7 and in Chapter 9 Geology and Soils of Volume 6.1. Prior to the commencement of construction, a ground investigation (GI) and contaminated land risk assessment (CLRA) would be undertaken to inform the characterisation of potential contamination risks, as described in Chapter 9 Geology and Soils of Volume 6.1. If contaminated waste is encountered during construction, the SWMP would outline the correct procedures for handling and storing of hazardous waste to ensure cross-contamination does not occur. In addition, further investigation and testing would be undertaken as outlined in Chapter 9 Geology and Soils of Volume 6.1, to determine whether the soils can be re-used on-site, require treatment, or would require disposal off-site.

10.10.11 The detailed assessment of the effects of the generation and management of waste can be seen in Table 10.16.

Table 10.16: Detailed assessment of generation and management of waste

Project activity	Potential impacts associated with and the generation and management of waste	Description of the effects
Site remediation / preparation, demolition and site construction	Production of non-hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	<p>Approx. 530,377m<sup>2</sup> of mainly arable land would be cleared with removal of hedgerows and trees, resulting in green waste. There may also be non-hazardous waste from existing highways infrastructure and the demolition of 1 agricultural barn. The implementation of measures outlined in section 10.9 would be likely to reduce the effects through the re-use and recycling of waste. In addition, However, the baseline has identified that the waste infrastructure has sufficient capacity to accommodate waste from the scheme without compromising the integrity of the receiving infrastructure within the region, if disposal to landfill is required. Effects would be direct and adverse.</p> <p><b>Effect category: Slight</b>  <b>Significance of effect: Not Significant</b></p>
	Production and treatment of hazardous waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	<p>Unlikely that large volumes would be generated. The baseline has identified that the waste infrastructure has sufficient capacity to accommodate waste from the scheme without compromising the integrity of the receiving infrastructure within the region, if disposal to landfill is required. Effects would be direct and adverse.</p> <p><b>Effect category: Slight</b>  <b>Significance of effect: Not Significant</b></p>
	Production of inert waste resulting in the temporary occupation of waste management infrastructure capacity or permanent reduction to landfill capacity.	<p>Any inert waste from the demolition of 1 agricultural barn and from surplus materials or cut-offs are likely to be minimal. Stripped topsoil would be re-used on-site. There would be a surplus of 43,071m<sup>3</sup> excavated material deemed suitable for re-use on-site, however this would be re-used on-site in the landscaping for the scheme. It is assumed that 35,139m<sup>3</sup> of excavated material would be unacceptable for re-use on-site. This waste would be dealt with in accordance with the waste hierarchy as outlined in section 10.8, which would ensure that re-use on other sites and recycling are prioritised. However, the worst-case scenario would be that this waste requires disposal to landfill, and the baseline has identified limited remaining capacity of inert landfill in Somerset. This 35,139m<sup>3</sup> of excavated materials constitutes &gt;1% of the remaining landfill capacity in Somerset, which would result in a reduction or alteration in the capacity of the waste infrastructure. It is assumed 1-50% of this inert waste would require disposal outside of the region. Effects would be adverse, direct and temporary.</p> <p><b>Effect category: Moderate</b>  <b>Significance of effect: Significant</b></p>

Source: Table adapted from Table C in Annex 2 of IAN 153 / 11

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## 10.11 Monitoring

10.11.1 On-balance overall effects on material assets and waste are anticipated to be Not Significant. However, there is anticipated to be a significant effect on inert landfill capacity from the generation and management of waste as a result of the scheme, due to the limited remaining landfill capacity in Somerset.

Therefore, in accordance with best practice the following monitoring measures have been instructed within the Outline SWMP contained in Annex B.1 of the **OEMP (document reference TR010036/APP/6.7)**.

10.11.2 Waste audits will be undertaken throughout the construction phase. This would ensure that re-use and recycling targets are met on-site and would ensure that there is no surplus of materials. By conducting audits regularly this would give an indication of where continual improvements to waste management and minimisation can be made throughout the construction phase.

10.11.3 The SWMP will also be used to measure and monitor the types and quantities of waste taken off-site, to ensure that the waste hierarchy is being implemented wherever possible. As outlined in the Outline MMP contained in Annex B.2 of the **OEMP (document reference TR010036/APP/6.7)**, a verification report will be required to confirm that only the material identified suitable for use in the MMP was used and placed in accordance with that stated in the MMP.

## 10.12 Conclusions

10.12.1 Material resources would be required for the construction of the scheme. The key environmental effects resulting from the use of material resources is the impact on the availability of material resources, subsequent impacts on the demand for key construction materials, and the depletion of non-renewable resources. The materials that would be required in the largest quantities would be aggregates and concrete (which is an aggregate based product).

10.12.2 The scheme would also be likely to generate waste which would require appropriate management on-site. The key environmental effects resulting from the generation and management of waste is the temporary occupation of waste management infrastructure (from treatment of waste) and the permanent reduction in landfill capacity (from disposal of waste).

10.12.3 Following the implementation of appropriate mitigation measures, as outlined within the assessment, it is concluded that there would be on-balance Not Significant effects from the use of material resources and on-balance Not Significant effects from the generation and management of waste as a result of the construction of the scheme. A Significant effect is reported as a result of the generation and management of inert waste due to the limited remaining capacity of inert landfill in Somerset.

10.12.4 The evidence provided in the ES supports the accordance statement provided in the ***Case for the Scheme (document reference TR010036/APP/7.1)***.