

A1 Birtley to Coal House

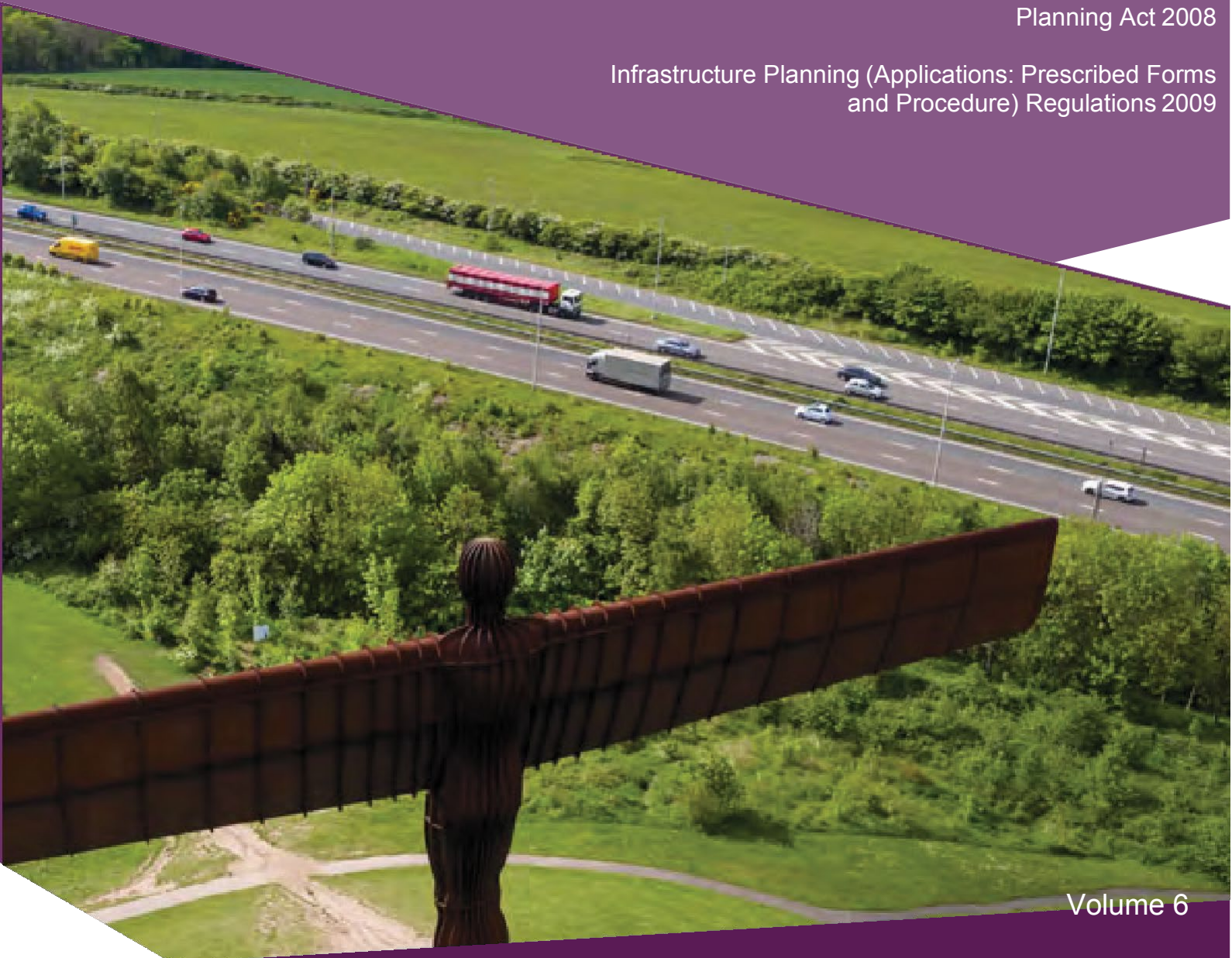
Scheme Number: TR010031

6.1 Environmental Statement Chapter 10 Material Resources

APFP Regulation 5(2)(a)

Planning Act 2008

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



Infrastructure Planning

Planning Act 2008

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

**A1 Birtley to Coal House
Development Consent Order 20[xx]**

Environmental Statement

| | |
|---|--|
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10. MATERIAL RESOURCES

10.1. INTRODUCTION

- 10.1.1. This chapter reports the outcome of the material resources assessment of the Scheme. This assessment has been carried out following the methodology set out in Interim Advice Note (IAN)153/11 Environmental Assessment of Material Resources (**Ref. 10.1**). This chapter summarises the legislative and policy framework and describes the methodology followed for the assessment along with the assessment assumptions and limitations. The chapter identifies the potential impacts as a result of the Scheme, details the design, mitigation and enhancement measures that have been identified and reports the assessment of the significant effects of the Scheme. Details of monitoring that should be carried out for the Scheme are also provided. This chapter is intended to be read as part of the Environmental Statement (ES) and in conjunction with its associated figures and appendices.
- 10.1.2. A full description of the Scheme is described in **Chapter 2 The Scheme** of this ES (**Application Document Reference: TR010031/APP/6.1**).

Allerdene Bridge Options

- 10.1.3. In the materials assessment, the differences between the Allerdene embankment option and Allerdene viaduct option, as detailed in **paragraphs 2.7.11 to 2.7.18** of this ES, do affect the assessment. This is primarily due to the difference in the quantity of material consumption and waste arisings for each option. The assessment for the viaduct option uses data which covers material types and quantities for a six- and seven-span option, utilising the data with the greatest associated impact to use a worst-case scenario approach. For the purposes of the materials assessment, Allerdene embankment option and Allerdene viaduct option have been assessed separately.

10.2. COMPETENT EXPERT EVIDENCE

- 10.2.1. As detailed in **Table 10-1**, the professionals contributing to the production of this ES chapter have sufficient expertise to ensure the completeness and quality of this ES.

Table 10-1 – Material professional competence

| Name | Role | Qualifications and Professional Membership | Experience |
|----------------|--------|---|--|
| Caroline Jones | Author | <ul style="list-style-type: none"> – BSc (Hons) Geography – IEMA Practitioner | <ul style="list-style-type: none"> – Caroline has 15 years' experience in a wide range of environmental projects. Caroline is the author of the Towy Valley Path Scoping Report, Eye Airfield ES. – Co-author of the Materials chapter of the A27 East of Lewis Scoping Report and |

| Name | Role | Qualifications and Professional Membership | Experience |
|------------|----------|---|--|
| | | | Environmental Assessment Report (EAR). |
| Tim Danson | Reviewer | <ul style="list-style-type: none"> – MSc Environmental Diagnostics – BSc (Hons) Environmental Biology & Ecology – IEMA Practitioner – Member of the Chartered Institution Water and Environmental Management – Chartered Scientist | <ul style="list-style-type: none"> – Tim has more than 17 years’ experience of a wide range of sustainability and environmental projects. Tim is currently leading on the production of Materials chapters for nearly twenty Environmental Impact Assessments (EIAs), for a variety of clients (mainly Highways England). – He was also WSP’s lead author and (ongoing) critical friend for a new Design Manual for Roads and Bridges (DMRB) methodology for assessing the impact of materials and waste within EIA, for Highways England. |

10.3. LEGISLATIVE AND POLICY FRAMEWORK

LEGISLATION

10.3.1. The legislative framework applicable to Material Resources is summarised as follows.

International

- a. Environmental Impact Assessment Directive (2014/52/EU) (Ref. 10.2).** The Directive provides the overarching legislative framework for assessing the impacts and significance of effects from schemes on the environment. The directive requires assessments to take account of the *“nature and quantity of materials”* and ensure that *“resource efficiency (is) increased”*.
- b. Waste Framework Directive (2008/98/EC) (Ref. 10.3).** The Directive provides a comprehensive foundation for the management of waste across the European Community and provides a common definition of waste which defines waste as:
 - *“any substance or object that the holder discards or intends or is required to discard”*.

10.3.2. The Waste Framework Directive sets out the waste hierarchy (**Figure 10-1**) against which action to reduce the production and disposal of waste should be taken.

Figure 10-1 - Waste hierarchy



National

10.3.3. The following legislation sets out the conditions to be met for the control of the storage, collection, treatment and disposal of waste in England.

- a. **The Controlled Waste (England and Wales) Regulations 2012 (Ref. 10.4).** The Regulation provides a definition of controlled waste and classifies waste as household, industrial or commercial waste.
- b. **The Waste (England and Wales) Regulations 2011 (Ref.10.5).** Stipulates the requirement for industry and businesses to implement the waste hierarchy.
- c. **Clean Neighbourhoods and Environment Act 2005 (Ref. 10.6).** States that it is the responsibility of construction workers on site to guarantee that waste is disposed in the appropriate manner. In accordance with this, employees must undertake waste disposal activities as outlined in national law.
- d. **Hazardous Waste (England and Wales) Regulation's 2005 (Ref. 10.7).** Introduces measures to control the storage, transport and disposal of hazardous waste. It provides a means to ensure that hazardous waste and any associated risks are appropriately managed.
- e. **Environmental Protection Act 1990 (Ref.10.8).** Outlines the requirement of the manager of a development to ensure that any excess materials or waste as a result of construction activities are recovered or disposed of without any subsequent adverse effects upon the surrounding environment.
- f. **The Control of Pollution Act 1974 (Ref 10.9).** Makes provisions with respect to the generation and revision of 'waste disposal plans' and prohibits the unlicensed disposal of waste.

POLICY

10.3.4. The policy documents listed in **Tables 10-2** and **10-3** set out the national and local vision, goals and ambitions for waste.

National

Table 10-2 – National policy objectives and significance

| Policy | Relevant Policy Objectives | Significance of impact of the Scheme on policy objective |
|---|---|---|
| <p>National Policy Statement for National Networks (NPS NN), 2014 (Ref 10.10)</p> | <p>Sets out the need for and Government’s policies to deliver development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. The policy provides planning guidance for promoters of NSIPs on the road network, and the basis for the examination by the Examining Authority and decisions by the Secretary of State (SoS).</p> <p>In relation to waste management, the Policy outlines the main government objectives (to protect human health and the environment and implementation of the waste hierarchy) and identifies the potential for large infrastructure projects to generate hazardous and non-hazardous waste during construction and operation, which may fall under the Environmental Permitting Regime.</p> <p>The policy statement sets out the basic assessment criteria, to include information on the proposed waste recovery and disposal system for all waste generated by the development and seeks to minimise the volume of waste produced and sent for disposal.</p> <p>The Policy outlines the decision-making considerations, requiring the SoS to be satisfied that:</p> <ul style="list-style-type: none"> – Waste will be properly managed on and off-site, – Waste will be dealt with by available infrastructure and will not have an adverse effect on the capacity of existing waste management facilities, and – Adequate measures have been taken to minimise the volume of waste arisings. | <p>Based on the expected approach to managing materials and waste on the Scheme, it is not expected that the outcomes would adversely impact achievement of or alignment with the policy objective.</p> |
| <p>National Planning Policy Framework, 2019 (Ref 10.11)</p> | <p>Sets out the Government’s planning policies for England.</p> <p>In relation to waste, the Policy makes reference to the planning policy for waste, as summarised later in this table.</p> <p>Chapter 17 of the Policy, Facilitating the sustainable use of minerals, outlines the importance of ensuring a sufficient supply of minerals to meet the countries need for infrastructure, buildings, energy and goods. The chapter focus on the need to manage mineral resources through measures such as safeguarding mineral resources; enhancing contributions from secondary and recycled materials and minerals wastes; preparing annual Local Aggregate Assessments and participating in an Aggregate Working Party; maintaining suitable landbanks (reserves) of mineral supply and co-operating with other Local Authorities.</p> | <p>The Scheme will utilise site-won materials to minimise use of virgin materials and make efforts to maximise sourcing and use of recycled materials. Based on the expected approach to delivering the Scheme, it is not expected that the impact on the policy objectives would be adverse.</p> |
| <p>Waste Management Plan for England, 2013 (Ref 10.12).</p> | <p>Provides a detailed analysis of the present state of waste management at a national level and assesses how the objectives of the Waste Framework Directive will be effectively supported. It states that excavation, construction and demolition waste is the largest contributor to total waste generation in the UK (Waste Management Plan for England, 2013).</p> | <p>The Scheme will generate construction and demolition waste, however based on the expected approach to managing impacts across the Scheme lifecycle, it is not expected that the Scheme would adversely impact achievement of or alignment with the policy objectives.</p> |

| Policy | Relevant Policy Objectives | Significance of impact of the Scheme on policy objective |
|---|--|---|
| <p>National Planning Policy for Waste, 2014 (Ref 10.13).</p> | <p>Outlines the ambition to promote a sustainable approach to resource use and management. It sets out waste planning policies and should be read alongside: The National Planning Policy Framework; the National Waste Management Plan for England and any relevant successor policies, guidance or documents. Policies include:</p> <ul style="list-style-type: none"> – Delivery of sustainable development and resource efficiency, including provision of modern infrastructure, local employment opportunities and wider climate change benefits, by driving waste management up the waste hierarchy. – Ensuring that waste management is considered alongside other spatial planning concerns, such as housing and transport, recognising the positive contribution that waste management can make to the development of sustainable communities. – Helping to secure the reuse, recovery or disposal of waste without endangering human health and without harming the environment. – Ensuring the design and layout of new residential and commercial development and other infrastructure (such as safe and reliable transport links) complements sustainable waste management, including the provision of appropriate storage and segregation facilities to facilitate high quality collections of waste. <p>The National Planning Policy for waste also states that when determining planning applications for non-waste development, local planning authorities should, to the extent appropriate to their responsibilities, ensure that:</p> <ul style="list-style-type: none"> – The likely impact of proposed, non-waste related development on existing waste management facilities 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. – The handling of waste arising from the construction and operation of development maximises reuse/recovery opportunities and minimises off-site disposal. | <p>The proposed approach to managing potential impacts across the Scheme is based on good practice and is in line with a sustainable approach to resource use and management. It is therefore not expected that the Scheme would adversely impact achievement of or alignment with the policy objectives.</p> |
| <p>National Policy Statement for Hazardous Waste, 2013 (Ref 10.14).</p> | <p>Outlines the main objectives on Government Policy for hazardous waste, including:</p> <ul style="list-style-type: none"> – To protect human health and the environment: there are stringent legislative controls in place to control the management of waste with hazardous properties; – Implementation of the waste hierarchy: This aids the production of less hazardous waste, promoting its reuse as a resource (where possible). Disposal of the waste is noted as a last resort; – Self-sufficiency and proximity: This ensures that sufficient disposal facilities are provided across the country to match expected arisings of all hazardous wastes, except those produced in very small quantities, and to enable hazardous waste to be disposed of in one of the nearest appropriate installations; and <p>The policy additionally outlines the key principles for the management of hazardous waste, as follows:</p> <ul style="list-style-type: none"> – Principle 1: Hazardous waste should be managed as to provide the best possible environmental outcome. This is expected to be in line with the waste hierarchy, with the | <p>Quantities of hazardous waste are not anticipated to be substantial based on the current available information. In line with the anticipated approach to managing materials and waste on the Scheme, it is not expected that the Scheme would adversely impact achievement of or alignment with the policy objectives.</p> |

| Policy | Relevant Policy Objectives | Significance of impact of the Scheme on policy objective |
|---|---|--|
| | <p>exception of when life cycle analysis suggests that the best overall environmental option would require a departure from that hierarchy.</p> <ul style="list-style-type: none"> – Principle 2: Requires a reduction in reliance upon landfill, with landfill only being used where there is no alternative recovery or disposal option available. – Principle 3: This principle requires that hazardous waste is not mixed with different categories of hazardous waste or with other waste substances or materials (although co-disposal of some wastes in landfill is allowed). – Principle 4: Stipulates that organic hazardous wastes that cannot be reused, recycled or recovered should be subject to destruction using best available techniques, with energy recovery for all appropriate treatments. No hazardous organic waste should be landfilled unless the requirements of the Landfill Directive are met. – Principle 5: The practice of relying on higher Landfill Directive waste acceptance criteria to enable some hazardous waste to continue to be landfilled must end. | |
| <p>Highways England Sustainable Development Strategy (Ref 10.15).</p> | <p>The strategy sets out Highways England approach and priorities for sustainable development, defined as “encouraging economic growth while protecting the environment and improving safety and quality of life for current and future generations”. Key ambitions of the strategy are:</p> <ul style="list-style-type: none"> – Increased responsible sourcing of materials. – A ‘circular’ approach to managing resources through minimising demand for primary materials and maximising reuse of resources already in use in the network. – Achieve security of supply through improving the stability and demand for ‘high-sustainability-performance’ products. | <p>Based on the anticipated ‘good practice’ approach to the management of materials and waste on the Scheme, it is not expected that the Scheme would adversely impact achievement of or alignment with the policy objectives.</p> |

Local

Table 10-3 – Local policy objectives and significance

| Policy | Relevant Policy Objectives | Impact of the Scheme on policy objective |
|---|---|--|
| <p>Gateshead and Newcastle Strategic Policies: Minerals and Waste (Policy CS20 & CS21) 2015 (Ref 10.16).</p> | <p>The Minerals and Waste Policies are published within a Future Core Strategy document published jointly by Newcastle and Gateshead Councils and adopted in March 2015. The strategy document is central to each councils Local Plan and contains the Minerals and Waste Policies. The principal aims of the Minerals Policy (CS20) are to:</p> <ul style="list-style-type: none"> – Manage and safeguard mineral resources to meet current and future needs through the development of a Mineral Safeguarding Area. This includes protecting minerals of economic importance from unnecessary sterilisation by non-mineral development and considering the feasibility of mineral extraction prior to non-mineral development (subject to certain assessment criteria). – Assess proposals for non-energy mineral extraction both individually and cumulatively in terms of their contribution to national and regional guidelines and social, environmental and economic impacts. – Impose high standards of restoration and aftercare to worked land to ensure it is returned to the most appropriate and beneficial use. <p>The principal aims of the Waste Policy (CS21) are to encourage action in the highest tiers of the</p> | <p>Based on the expected approach to managing materials and waste on the Scheme, it is not expected that the Scheme would adversely impact achievement of or alignment with policy objectives.</p> |

| | | |
|--|--|--|
| | <p>waste hierarchy. This will be achieved through:</p> <ul style="list-style-type: none"> – Assessing proposals for waste management facilities in regard to location criteria, such as achieving on-site waste management, expansion of existing facilities, co-location of waste facilities, situated within employment areas and using previously developed land. – Ensuring the development would not have an adverse impact on the environment and human health. <p>Only permitting development that would result in the loss of a waste management facility where it can be demonstrated that there is no longer a need for that facility, or the capacity can be met elsewhere.</p> | |
|--|--|--|

10.4. ASSESSMENT METHODOLOGY

10.4.1. The following topics have been assessed in this chapter for both the construction and operation phase:

- a.** The consumption of material resources (from primary, recycled or secondary, and renewable sources, and including products offering sustainability benefits) including the generation and use of arisings recovered from site; and the production and disposal of waste to landfill.

10.4.2. The following topic remained scoped out of this chapter (as detailed in the Scoping Report):

- a.** Lifecycle assessment (including embodied carbon and water) of materials and site arisings, and waste. The effort and resources required to undertake a full lifecycle assessment of these elements are deemed disproportionate to the benefit they would offer the assessment of significance of effect. Nevertheless, and in line with the EIA Regulations, an assessment of likely significant effects resulting from the production and disposal of waste, and the use consumption of natural resources, has been assessed within this chapter.
- b.** Due to the very minor work, if any, expected to occur beyond the first year of operation, it is considered likely that effects from materials resources and waste production are deemed to be not significant. Therefore, the assessment of materials and waste effects beyond the first year of operation have been scoped out.

METHODOLOGY

- 10.4.3. The assessment has been carried out in line with IAN153/11 Environmental Assessment of Material Resources (**Ref 10.1**).
- 10.4.4. As the proposed works comprise road widening and improvements, the replacement of Allerdene Bridge (which carries the A1 over the East Coast Main Line (ECML)) and North Dene Footbridge, the Scheme meets the IAN153/11 guidance definition of 'complex improvement and large new construction works'. In accordance with the requirements for complex works set out in the guidance, a detailed assessment of material resources has been undertaken.
- 10.4.5. As part of the detailed assessment, the following assessment tasks have been carried out:
- a. Relevant waste legislation, policies and guidance has been reviewed to identify material use and waste management objectives, commitments and targets.
 - b. The likely types of material resources (including site arisings) and waste (inert and non-inert) have been identified, and quantities estimated for the Scheme.
 - c. Details of the source of materials including site-won arisings and recycled content where available. This also includes the cut and fill balance for the Scheme.
 - d. The types and quantities of forecast waste arisings including hazardous wastes.
 - e. Surplus materials and waste falling under regulatory controls.
 - f. Details on management of waste arisings, (for example on-site storage, pre-treatment or treatment prior to recovery or disposal) where information is available.
 - g. The impacts that will arise from materials and waste from the Scheme. Impacts have been evaluated against the regional and national materials markets and the capacity of regional (or if appropriate, national) waste infrastructure.
 - h. Measures to mitigate impacts. Opportunities to eliminate, reduce, re-use, recycle or recover material resources, site arisings and (potential) waste, have been identified through a review of the Scheme (including proposed building materials, construction methods and design, where available) and in accordance with Industry good practice.
 - i. Identification of viable circular economy opportunities in design have been made.
- 10.4.6. The assessment method used in this chapter is the same for both Allerdene embankment option and Allerdene viaduct option.
- 10.4.7. This ES considers the nature of impacts - adverse/beneficial, permanent/temporary, direct/indirect, from material resource consumption and waste generation to landfill.
- 10.4.8. The main outputs from the detailed assessment are:
- a. The identification of the environmental impacts and the significance of effects associated with material resources (including site arisings) and waste; and
 - b. The measures which will be implemented to eliminate or mitigate impacts, and to fulfil resource efficiency and circular economy opportunities.
- 10.4.9. Assessment results are presented in a format that meets the requirements of Table C of Annex 2 (Detailed Assessment Reporting Matrix) as set out in IAN 153/11.
- ## METHOD OF BASELINE DATA COLLECTION
- 10.4.10. The baseline data collected and presented in this chapter were obtained by desk study.

- 10.4.11. The data acquired during the desk study describe the regional and national availability of materials that would typically be required for the Scheme, and the capacity of regional facilities to recover and dispose of waste generated.
- 10.4.12. Data relating to the volumes of materials, their source and recycled content, volumes of waste and their disposal method have been obtained from design estimates and information provided by buildability support for the Scheme.

Materials

- 10.4.13. An assessment of the impacts of consuming materials required during site construction (to 2023), has been undertaken by considering the origins and sources of materials, including their general availability (production, stock, sales) and the proportion of recovered (reused or recycled) materials they contain.
- 10.4.14. The reuse of excavated materials and other arisings have been evaluated as part of the assessment of materials, to determine whether the adverse effects associated with the consumption of primary resources can be reduced.
- 10.4.15. The assessment considers the forecast volumes of materials that need to be consumed. Thresholds for sensitivity or magnitude of impact from materials are presented in **Table 10-4** and **Table 10-5**. Industry-recognised good practice criteria have been used in **Table 10-4** and **Table 10-5** to provide a robust assessment process. The assessment considers the nature of impacts (adverse/beneficial, permanent/temporary, direct/indirect) from materials, and uses professional judgement to determine the significance of effect.

Landfill Capacity

- 10.4.16. An assessment of the remaining landfill capacity in north-east England (including the Newcastle and Gateshead area) has been used to determine the impacts (and any subsequent significant effects) of waste generated during site construction of the Scheme.
- 10.4.17. The assessment considers the volume of waste (inert, non-hazardous and hazardous) anticipated to be generated by the Scheme and determines the potential impact of each on the remaining landfill capacity in the region. Wherever waste is recovered (diverted from landfill) the influence of this has been taken into account in the assessment of significance of effect.
- 10.4.18. Thresholds for sensitivity or magnitude of impact from waste are presented in **Table 10-4** and **Table 10-5**. Industry-recognised good practice criteria have been used in **Table 10-4** and **Table 10-5** to provide a robust assessment process. The assessment has taken into account the nature of impacts (adverse/beneficial, permanent/temporary, direct/indirect) from waste generated and disposed of and uses professional judgement to determine the significance of effect.

Sensitivity and Magnitude Criteria for Materials and Waste

- 10.4.19. The sensitivity of affected receptors has been assessed on a scale of very high, high, medium, low and negligible, as set out in **Table 10-4**. Magnitude is assessed on a scale of

major, moderate, minor, negligible and no change, as set out in **Table 10-5**, which is based on good practice and professional judgement.

- 10.4.20. When sensitivity and magnitude have been assessed, significance of effects is determined using the matrix provided in **Table 10-6**, reproduced from **Table 2.4** of DMRB Part 5 HA 205/08 (**Ref 10.17**).

Table 10-4 – Thresholds for sensitivity

| Sensitivity | Materials | Waste |
|-------------|--|--|
| Very high | <ul style="list-style-type: none"> – Comprises no re-used/recycled aggregate (alternative materials) – Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock or are known to be insufficient regarding supply and stock | The project will require new (permanent) waste infrastructure to be constructed to accommodate waste |
| High | <ul style="list-style-type: none"> – Offer little or no sustainable features and benefits compared to traditional materials | >50% of project waste requires disposal outside of the region |
| Medium | <p>Comprises re-used/recycled aggregate (alternative materials) below the lower of the relevant regional or national percentage target (refer to notes below)</p> <p>Are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock</p> <p>Offer some sustainable features and benefits compared to traditional materials</p> | 1-50% of project waste requires disposal outside of the region. |

| Sensitivity | Materials | Waste |
|--------------------|---|--|
| Low | <p>Comprises re-used/recycled aggregate (alternative materials) above the higher of the relevant regional or national percentage target (refer to notes below)</p> <ul style="list-style-type: none"> – Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock <p>Offer sustainable features and benefits compared to traditional materials</p> | <p>Waste infrastructure has sufficient capacity to accommodate waste from the Scheme, without compromising integrity of the receiving infrastructure (design life or capacity) within the region</p> |
| Negligible | <p>No reduction or alteration in the availability of material assets at a regional scale in relation to the resources the project will use.</p> | <p>No reduction or alteration in the capacity of waste infrastructure at a regional scale.</p> |

| Sensitivity | Materials | Waste | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|--|--|--------|---|--|------------|-----|-----|--------|-----|-----|------|-----|-----|---------------|-----|-----|---------------|-----|-----|------------|-----|-----|------------|-----|-----|------------------------|-----|-----|------------|-----|-----|------------------------|------------|------------|
| Notes | <p>Recycled aggregate targets 2005 – 2020 (Ref.10.7)</p> <p>The higher target for recycled aggregate between the national average or region shall apply. Where a project is located in more than one region, the region’s target where the majority of the materials are to be sourced shall apply.</p> <table border="1"> <thead> <tr> <th>Region</th> <th>Recycled content target (alternative materials)</th> <th>Total aggregate provision (million tonnes)</th> </tr> </thead> <tbody> <tr> <td>South-East</td> <td>26%</td> <td>502</td> </tr> <tr> <td>London</td> <td>48%</td> <td>197</td> </tr> <tr> <td>East</td> <td>31%</td> <td>382</td> </tr> <tr> <td>East Midlands</td> <td>14%</td> <td>784</td> </tr> <tr> <td>West Midlands</td> <td>27%</td> <td>370</td> </tr> <tr> <td>South-West</td> <td>22%</td> <td>656</td> </tr> <tr> <td>North-West</td> <td>30%</td> <td>392</td> </tr> <tr> <td>Yorkshire & the Humber</td> <td>31%</td> <td>431</td> </tr> <tr> <td>North-East</td> <td>26%</td> <td>193</td> </tr> <tr> <td>England Average</td> <td>25%</td> <td>434</td> </tr> </tbody> </table> | | 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 & the Humber | 31% | 431 | North-East | 26% | 193 | England Average | 25% | 434 |
| 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 & the Humber | 31% | 431 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| North-East | 26% | 193 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| England Average | 25% | 434 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 10-5 - Thresholds for magnitude

| Magnitude | Materials* | Waste |
|------------|--|---|
| Major | >50% of primary materials to be sourced internationally | >1% reduction or alteration in national capacity of waste infrastructure, as a result of accommodating waste from a project |
| Moderate | Sterilises ≥ 1 mineral safeguarding site and/or peat resource | >1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating waste from a project |
| Minor | >50% of primary materials to be sourced nationally (with other primary materials sourced at a lower geographic scale) | |
| Negligible | Requires $\leq 50\%$ of primary materials to be sourced nationally (with other primary materials sourced at a lower geographic scale) | $\leq 1\%$ reduction or alteration in the regional capacity of waste infrastructure |
| No change | No reduction or alteration in the availability of material assets at a regional scale in relation to the resources the project will use | No reduction or alteration in the capacity of waste infrastructure at a regional scale |
| Notes | <i>*for materials: magnitude of impact may be reduced wherever non-renewable/virgin/primary material consumption is reduced e.g. through use of recycled/secondary content, or materials with sustainable features</i> | |

Table 10-6 - Significance of effect matrix

| | | Magnitude of Impact | | | | |
|-------------|------------|---------------------|-------------------|--------------------|---------------------|---------------------|
| | | No change | Negligible | Minor | Moderate | Major |
| Sensitivity | Very High | Neutral | Slight | Moderate or Large | Large or Very Large | Very Large |
| | High | Neutral | Slight | Slight or Moderate | Moderate or Large | Large or Very Large |
| | Medium | Neutral | Neutral or Slight | Slight | Moderate | Moderate or Large |
| | Low | Neutral | Neutral or Slight | Neutral or Slight | Slight | Slight or Moderate |
| | Negligible | Neutral | Neutral | Neutral or Slight | Neutral or Slight | Slight |

SIGNIFICANCE OF EFFECTS

- 10.4.21. The assessment of potential effects as a result of the Scheme considers the construction and operational phases. The construction phase includes demolition, site remediation/preparation, and construction activities as set out in **Chapter 2 The Scheme** of this ES (**Application Document Reference: TR010031/APP/6.1**). The operational phase commences following the substantial construction of the Scheme and subsequent opening.
- 10.4.22. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Scheme and the sensitivity of identified receptors.
- 10.4.23. The following terms in **Table 10-7**, which is based on good practice and professional judgement are used to define the significance of the effects.

Table 10-7 – Descriptions for significance of effect

| Significance Criteria (from Table 10-6) | Materials Significance of Effect | Waste Significance of Effect |
|--|---|---|
| Neutral | Not Significant | Not Significant |
| Slight | Not Significant | Not Significant |
| Moderate | Not Significant | Significant |
| Large | Significant | Significant |
| Very Large | Significant | Significant |

DATA SOURCES

10.4.24. The following data sources have been used to inform this assessment:

- a. Department for Business Innovation & Skills, Monthly Bulletin of Building Materials and Components - January 2018 (**Ref 10.18**)
- b. North-East Aggregates Working Party Annual Aggregates Monitoring Report (2017) (**Ref 10.19**)
- c. Mineral Products Association, Profile of the UK Mineral Products Industry (2018) (**Ref 10.20**)
- d. House of Commons Library UK Steel Industry: Statistics and Policy (2018) (**Ref 10.21**)
- e. Natural England MAGIC mapping website (**Ref 10.22**)
- f. DEFRA, Basis of the UK BAP target for the reduction in use of peat in horticulture – SP0573 (2009) (**Ref 10.23**)
- g. Defra (2018) UK Statistics on Waste (**Ref 10.24**)
- h. Environment Agency, Waste Management Information 2016: North-East (**Ref 10.25**)
- i. Environment Agency, Waste Management Information 2016: England (**Ref 10.26**)
- j. Environment Agency, Remaining landfill capacity, England (2017) (**Ref 10.27**)
- k. Material and waste data provided by the Buildability Support Contractor.

POLICY AND GUIDANCE

10.4.25. The following guidance document has been used in the preparation of this chapter:

- a. IAN 153/11 Guidance on the Environmental Assessment of Material Resources (**Ref 10.1**).

CONSULTATION

10.4.26. Consultation has been undertaken with Gateshead City Council, Durham County Council and the North East Combined Authority (NECA) to discuss the findings of the Materials Resources Chapter and identify any potential development in the region that could influence

the outcome of the assessment. This consultation is summarised in **Appendix 4.4** of this ES (**Application Document Reference: TR010031/APP/6.3**).

- 10.4.27. Comments were received from the Planning Inspectorate (PINS) in relation to the EIA Scoping Report. The responses to the comments are further detailed within the Scoping Opinion Response Table **Appendix 4.1** of this ES (**Application Document Reference: TR010031/APP/6.3**). Comment received included the requirement to give:
- a. Consideration of the operational impacts from the Scheme on materials.
- 10.4.28. In addition, comments on measures to identify, monitor and manage materials, arisings and waste on site are set out in an Outline Construction Environmental Management Plan (CEMP) (**Application Document Reference: TR010031/APP/7.4**).
- ## 10.5. ASSESSMENT ASSUMPTIONS AND LIMITATIONS
- 10.5.1. The assessment of materials is based upon the validity of the collated information, regarding the anticipated materials to be used and waste generated/disposed of.
- 10.5.2. Material and waste types and quantities provided at this stage are indicative as they are provided by the buildability support contractor and based on the information currently available on the Scheme design. This data will be verified at detailed design stage as the Scheme progresses. In particular, estimates have been used for the quantity of grout required for filling disused mines, earthworks (top soil and sub soil) for the Allerdene viaduct option and (overall) project site arisings and waste generation.
- 10.5.3. The impact of Ash Dieback disease and presence of Japanese knotweed and giant hogweed in the location of the Scheme may adversely impact the re-use of site-won earthworks in order to prevent spread of the disease or the invasive species to avoid contamination of unaffected areas. Further details on ash dieback is available in the Arboricultural Report in **Appendix 7.2** of this ES (**Application Document Reference: TR010031/APP/6.3**). Further details on Japanese knotweed and giant hogweed are detailed within the Preliminary Ecological Appraisal (PEA) (**Appendix 8.1** of this ES (**Application Document Reference: TR010031/APP/6.3**)).
- 10.5.4. Information on the potential for incorporating recycled/secondary content in materials has not been provided but will be considered further during the detailed design and construction phase. The incorporation of any recycled/secondary content materials would further reduce the adverse impacts of material resource composition, however, the impact is not considered to materially affect the outcome of this assessment.
- 10.5.5. Baseline data and information for the assessment are (unless otherwise stated) only available to 2017 due to the lag in the Environment Agency issuing the data publicly.
- 10.5.6. UK landfill operators can claim commercial confidentiality for their data at the time of submission; data for sites with a commercial confidentiality in place are therefore unavailable for the analyses presented in this chapter.

10.5.7. Prior to the Scheme, Department of the Environment, Food and Rural Affairs (DEFRA) was consulted to determine whether generation and recovery rates for Construction, Demolition and Excavation (CDE) arisings were available by region. Defra confirmed that it does not publish CDE figures at a regional level, and only national (England) data are accessible through the publicly available Waste Data Interrogator Database; the database is held and operated by the Environment Agency. It was quoted that:

“The methodology used to generate these figures is complex, in order to take into account, the inherent double-counting and data gaps that are present within waste system data, and it would not be feasible to reproduce these on a regional basis.”

10.5.8. Until such a time that CDE generation and recovery rates by region are available, transfer (non-civic), recovery and metal recycling data (available through the Waste Data Interrogator Database) will be used as the closest possible proxy. Given the use of alternative data, the limitation is not considered to be material to the assessment.

10.5.9. The draft Development Consent Order (DCO) contains powers of lateral and vertical deviation. The EIA has taken the Limits of Deviation (LoD) into account and the approach taken is described in **Chapter 4 Environmental Assessment Methodology, paragraph 4.5.4** of this ES (**Application Document Reference: TR010031/APP/6.1**). The outputs of the assessment are not considered likely to change materially as a result of the power of deviation.

10.6. STUDY AREA

10.6.1. The primary Study Area comprises the Scheme Footprint.

10.6.2. The secondary Study Area extends to the availability of construction and recovered material resources within north-east England (Northumberland, Tyne & Wear, Durham and the Tees Valley) and the UK, and the capacity of waste management facilities in the north-east of England.

10.7. BASELINE CONDITIONS

10.7.1. The operation and maintenance of the current Scheme assets will require the consumption of some material resources and will generate arisings that may need to be disposed of as waste.

10.7.2. The following section describes baseline material consumption and waste disposal for the current assets and provides regional/national information and data in the context of which assessment will be undertaken.

10.7.3. Data for material resource availability, landfill capacity and waste recovery is only updated periodically. The most up to date sources of available information has been used at the time of writing.

MATERIAL RESOURCES

Materials Currently Required

- 10.7.4. The operation and maintenance of the current Scheme assets requires a small number of specialist components (for example, light bulbs, signage steelwork for replacement barriers) as well as some bulk products (asphalt for minor re-surfacing) for routine works and repairs of the highway and ancillary infrastructure.
- 10.7.5. The current consumption of construction and other material resources within the Scheme Footprint is, however, deemed minimal as resources required for day to day maintenance and operation of the current asset would be very limited in scale.
- 10.7.6. The do-minimum option (no scheme pursued) would be unlikely to change the current consumption of material resources within the Scheme Footprint, although regular maintenance works on the existing Allerdene Bridge structure are likely to consume more material resources per unit time than comparable (but newer) structures.

UK and Regional Perspective: Availability of Construction Materials

- 10.7.7. **Table 10-8 (Ref. 10.8, Ref.10.9, Ref.10.20 and Ref 10.21)** provides a summary of the availability of the main construction materials in north-east England (Durham, Northumberland, Tees Valley Unitary Authorities and Tyne and Wear) and the UK, as required to deliver typical highways schemes. The overview provides a context in which the assessment of impacts and significant effects from material consumption from the Scheme can be undertaken.

Table 10-8 – Construction materials availability in the north-east of England and the UK

| Material Type | Availability 2017 unless otherwise stated (north-east) | UK |
|------------------------------------|--|----------------------|
| Sand and gravel * | 1.9Mt | 61.7Mt |
| Permitted crushed rock * | 5.1Mt | 144.5Mt |
| Concrete blocks # | 2.6Mt (North) | 6.8Mm ² |
| Primary aggregate * | 6.3Mt (2016) | 203Mt |
| Recycled and secondary aggregate * | 1.3Mt (2016) | 74Mt |
| Ready-mix concrete * | 0.7M m ³ | 25.9M m ³ |
| Steel + | (no data) | 8Mt (2016) |

| Material Type | Availability 2017 unless otherwise stated (north-east) | UK |
|--|--|---------|
| Asphalt * | 0.8Mt | 27.3Mt |
| # stocks | + production | * sales |
| <p>Ref. 10.8 HM Government (1990) The Environmental Protection Act 1990 Ref.10.9 HM Government (1974) The Control of Pollution Act 1974 Ref. 10.20 Mineral Products Association, Profile of the UK Mineral Products Industry, 2018 Edition Ref 10.21 House of Commons Library UK Steel Industry: Statistics and Policy (2018)</p> | | |

- 10.7.8. The availability of construction materials typically required for highways construction schemes in the north-east of England and across the UK, indicates that stocks/production/sales remain buoyant.
- 10.7.9. Consultation with Durham County Council reveals that within the north-east region there are extensive permitted reserves of aggregate minerals i.e. crushed rock, sand and gravel across a number of sites within a reasonable distance of the A1 between Birtley and Coal House junctions.
- 10.7.10. However, the north-east has in general, a lower availability of construction materials by comparison with other regions in England. This has the potential to increase sensitivity, particularly where adverse cumulative impacts are realised.
- 10.7.11. The sensitivity of materials required for the Scheme is assessed to be **medium**, as the availability of construction materials may suffer from some potential issues regarding stock and supply due to the lower availability within the region, and the quantity of recycled aggregate to be used is currently not known.
- 10.7.12. The Gateshead and Newcastle Strategic Policies: Minerals (Policy CS20) (**Ref.10.16**) identifies a borough wide mineral safeguarding area. There are no known peat resources (**Ref. 10.22**) or active peat extractions (**Ref.10.23**) within the primary Study Area.

Site Arisings Currently Generated

- 10.7.13. Current routine operation and maintenance works on the Scheme assets generate minimal volumes of site arisings as day to day operation and maintenance would be very limited in scale.

UK and Regional Perspective: Transfer, Recovery and Recycling

- 10.7.14. Defra data (**Table 10-9**) show that within England, the recovery rate for non-hazardous construction and demolition wastes have remained above 90% since 2010. This exceeds

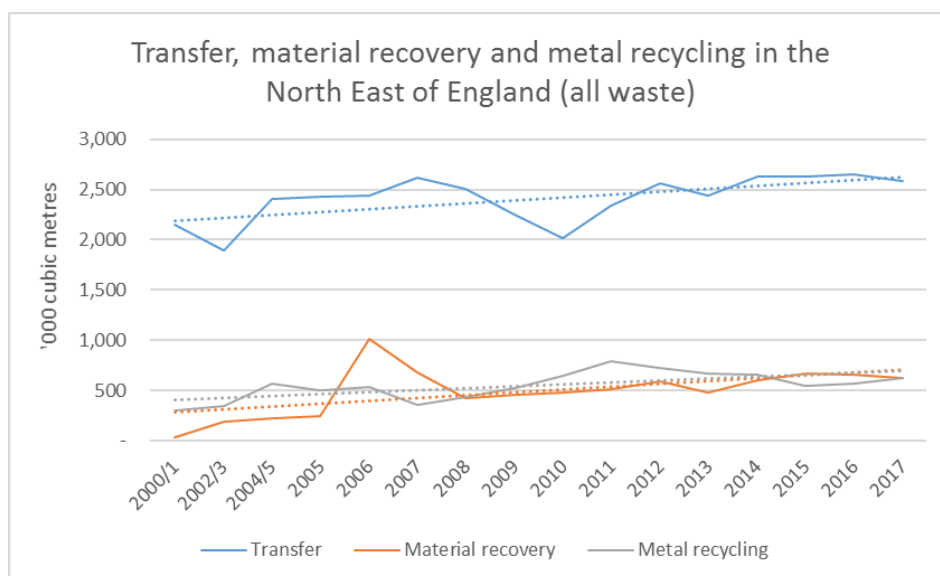
the EU target of 70%, which the UK must meet by 2020 (Ref 10.24). Consultation with Durham County Council confirms this assertion.

Table 10-9 – Non-hazardous construction and demolition waste recovery in England

| Year | Generation (Mt) | Recovery (Mt) | Recovery rate (%) |
|------|-----------------|---------------|-------------------|
| 2010 | 53.6 | 49.4 | 92.2% |
| 2011 | 54.9 | 50.8 | 92.5% |
| 2012 | 50.5 | 46.4 | 92.0% |
| 2013 | 51.7 | 47.6 | 92.0% |
| 2014 | 55.9 | 51.7 | 92.4% |
| 2015 | 57.7 | 53.3 | 92.3% |
| 2016 | 59.6 | 55.0 | 92.1% |

10.7.15. No regional data for CDE production or recovery rates are currently available for north-east England. Instead, data in **Figure 10-2** has been collated to show that rates of waste recovery in the region have risen steadily over the past 17 years (Ref.10.25). Metal recycling shows a recent reduction; however, the trend continues to rise. Data are provided for all waste types in the north-east and hence will include, but are not specific to, CDE wastes.

Figure 10-2 – Transfer, materials recovery and metal recycling in the north-east of England (2000/1 – 2017)



- 10.7.16. Whilst trends for transfer, recovery and metal recycling in the north-east display different characteristics, data indicate that there is likely to be regional infrastructure and capacity for the transfer and recovery for CDE wastes from the Scheme. Construction and demolition recovery trends across England (**Table 10-9**) and data in **Table 10-10** confirm this assertion (**Ref.10.26**).

Table 10-10 – Permitted waste recovery management sites in north-east England (2017)

| Waste recovery facility type | Number of sites |
|------------------------------|-----------------|
| Incineration | 13 |
| Transfer | 176 |
| Treatment | 155 |
| Metal recovery | 154 |
| Use of waste | 1 |
| Total | 499 |

- 10.7.17. The availability of materials recovery infrastructure in the north-east, and across England, suggests that there is strong potential to divert from landfill site arisings generated by the Scheme. Both the importance (positive value) of this infrastructure and (hence) the potential to maximise the re-use/recycling value of site arisings has the potential to materially influence the assessment of materials and waste.

WASTE GENERATION AND DISPOSAL

Waste Currently Generated and Disposed of

- 10.7.18. The operation and maintenance of the Scheme assets currently generates small volumes of waste from routine bridge maintenance, in combination with littering, light replacement, signage replacement, replacement of reflective road studs (cat's eyes), vegetation from verge clearance and minor barrier refurbishments. The anticipated magnitude of impact associated with disposing of this waste is deemed minimal in the context of available regional capacity.

Regional Perspective: Remaining Landfill Capacity

- 10.7.19. At the end of 2017, the north-east landfill sites presented in **Table 10-11** were recorded as having remaining capacity (**Ref 10.27**).

Table 10-11 – Waste capacity in the north-east of England

| Facility Name | Local Authority | Landfill Site Type | Remaining Capacity 2017 (m³) |
|---|------------------------|--|--|
| Port Clarence landfill Site (Haz) | Stockton on Tees | Hazardous Merchant Landfill | 5,030,630 |
| Bishop Middleham Quarry 2 | County Durham | Inert Landfill | 4,904,806 |
| ICI No 3 Teesport | Redcar and Cleveland | Hazardous Merchant Landfill | 2,028,272 |
| Aycliffe Quarry Landfill | Sedgefield | Non Hazardous Landfill with SNRHW cell | 1,991,141 |
| Crime Rigg Quarry | County Durham | Inert Landfill | 1,836,750 |
| Blaydon Quarry Landfill Site | Gateshead | Non Hazardous | 1,788,700 |
| Old Quarrington Quarry Landfill | County Durham | Inert Landfill | 1,781,206 |
| Joint Stocks Landfill Phase 2 | Durham City | Non Hazardous | 1,700,000 |
| Cowpen Bewley Landfill | Stockton on Tees | Non Hazardous | 1,374,099 |
| Marsden Quarry Landfill | South Tyneside | Inert Landfill | 1,103,841 |
| Ellington Road Landfill Site | Wansbeck | Non Hazardous Landfill with SNRHW cell | 1,023,357 |
| Seaton Meadows | Hartlepool | Non Hazardous Landfill with SNRHW cell | 1,000,000 |
| ICI No 2 Teesport | Redcar and Cleveland | Non Hazardous | 818,089 |
| Port Clarence Non-Hazardous Landfill Site | Stockton on Tees | Non Hazardous | 632,950 |

| Facility Name | Local Authority | Landfill Site Type | Remaining Capacity 2017 (m ³) |
|----------------------------------|----------------------|--------------------|---|
| Hollings Hill Quarry Landfill | County Durham | Inert Landfill | 592,268 |
| Houghton-Le-Spring Landfill Site | Sunderland | Non Hazardous | 341,431 |
| Field House Quarry | Sunderland | Inert Landfill | 308,662 |
| Merryshields Quarry | Northumberland | Inert Landfill | 209,023 |
| Coatham Stob Quarry (Area 6) | Stockton on Tees | Non Hazardous | 164,115 |
| CLE 3/8 Landfill Site | Redcar and Cleveland | Non Hazardous | 83,961 |
| Springwell Quarry | Sunderland | Non Hazardous | 18,000 |
| Alcan Ash Lagoons 1-4 | Wansbeck | Non Hazardous | 15,500 |
| Total Capacity | | | 28,746,801 |

10.7.20. Environment Agency data (**Ref 10.27**) confirm at the end of 2017, 22 landfill sites in the north-east were recorded as having 28.7mm³ of remaining capacity. This is split into the following capacities by waste type (**Table 10-12**). The change in capacity from 2016 to 2017 is also shown.

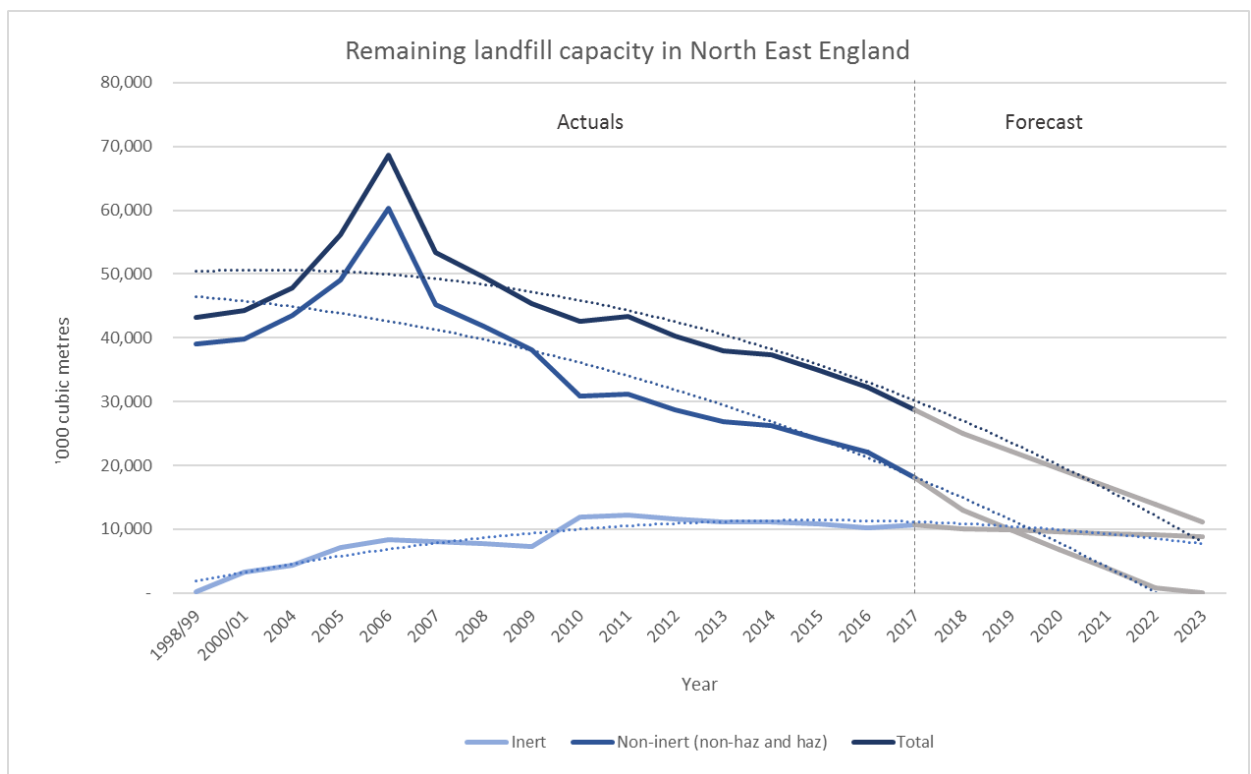
Table 10-12 – Remaining landfill capacity in north-east England

| Landfill type | Capacity in 2016 (m ³) | Remaining capacity m ³ (2017) | 2016 to 2017 capacity comparison (m ³) |
|-------------------------------------|------------------------------------|--|--|
| Hazardous (merchant and restricted) | 6,985,466 | 7,058,902 | 0.7Mm ³ increase |
| Inert | 10,236,951 | 10,736,556 | 0.5Mm ³ increase |
| Non-hazardous (including stable) | 15,044,553 | 10,951,343 | 4.1Mm ³ decrease |

| Landfill type | Capacity in 2016 (m ³) | Remaining capacity m ³ (2017) | 2016 to 2017 capacity comparison (m ³) |
|------------------------|------------------------------------|--|--|
| hazardous waste cells) | | | |
| Total | 32,266,970 | 28,746,801 | 3.5Mm ³ decrease |

10.7.21. The Gateshead and Newcastle Strategic Policies: Minerals and Waste (Policy CS20 & CS21) 2015 does not specify any proposals for the development of additional landfill sites, although utilising former mineral sites for landfill is noted as a future option if required. Durham County Council consultation consider that over the life time of the Proposed Scheme there will be void space remaining in County Durham to accommodate substantial volumes of inert (construction and demolition) waste at sites such as Bishop Middleham Quarry, Old Quarrington Quarry, Crime Rigg Quarry and non-hazardous waste at Aycliffe Quarry. **Figure 10-3** shows the remaining landfill capacity in the north-east of England, and uses simple MSEXcel forecasting calculations to demonstrate long term void capacity to the year of planned Scheme completion (2023) in the absence of future provision.

Figure 10-3 – Landfill capacity in the north-east of England



- 10.7.22. Baseline data indicates that total and non-inert landfill capacity is likely to become an increasingly sensitive receptor over the life of the Scheme to the first full year of operation. **Figure 10-3** shows that waste capacity in the north-east is forecast to reduce by as much as 18% (inert), 100% (non-inert), and 61% (total) from 2017 to 2023, in the absence of future provision.
- 10.7.23. Individually, the sensitivity of different landfill capacity types over the lifetime of the Scheme is assessed to be:
- a. Inert (**low**) as waste infrastructure is deemed to have sufficient capacity to accommodate waste from the Scheme.
 - b. Non-inert (**high**) as over 50% of project waste is expected require disposal outside of the region but no new (permanent) waste infrastructure is considered to be required.
 - c. Total (**high**) (as over 50% of project waste is expected require disposal outside of the region but no new (permanent) waste infrastructure is considered to be required).
- 10.7.24. On average, the sensitivity of landfill capacity is assessed to be **high**.

FUTURE BASELINE

Materials

- 10.7.25. In the future baseline (2033) it is anticipated that the scale of repair and maintenance work will increase, particularly as the residual life of the Allerdene Bridge structure reduces. Materials consumption is expected to include small quantities of materials such as specialist components (for example, light bulbs, signage steelwork for replacement barriers, expansion joints, bearings) as well as some bulk products (asphalt for re-surfacing, and concrete for repairs). The quantity of materials required in the future baseline is expected to remain minimal.

Waste

- 10.7.26. In the future baseline (2033), it is anticipated that the scale of repair and maintenance work will increase, particularly as the residual life of the Allerdene Bridge structure reduces. Small volumes of waste are expected to be generated from routine bridge maintenance, littering, light replacement, signage replacement, replacement of reflective road studs (cat's eyes), vegetation from verge clearance and minor barrier refurbishments, as well as waste generated from more intrusive maintenance such as concrete, steel and road planings. The volume of waste generated is expected to remain minimal in the context of available regional capacity.

10.8. POTENTIAL IMPACTS

- 10.8.1. The Scheme has the potential to consume material resources (including those recovered from site arisings) and generate waste for disposal to landfill during the construction of the carriageway and its supporting infrastructure.
- 10.8.2. The associated potential environmental impacts (both direct and indirect) would occur principally during construction, and potentially in the first year of operation.

- 10.8.3. Potential impacts would be associated with the production, processing, consumption and disposal of material resources.
- 10.8.4. The impacts of the Scheme as a result of the consumption of material resources (including recovered site arisings) and waste generation and disposal, are likely to occur on-site and off-site within the UK and, potentially, internationally.
- 10.8.5. Both the Allerdene embankment option and Allerdene viaduct option have been considered in the Detailed Assessment Reporting Matrix, presented in **Table 10-14** and **Table 10-18**.
- 10.8.6. **Table 10-13** summarises the impacts associated with material consumption, and waste generation and disposal.

Table 10-13 – Potential impacts associated with materials and waste

| Element | Direct Impacts | Indirect Impacts |
|-----------|--|--|
| Materials | Consumption of natural and non-renewable resources | <ul style="list-style-type: none"> – Release of greenhouse gas emissions – Water consumption and scarcity – Nuisance to communities (visual, noise, health) |
| Waste | Reduction in landfill capacity | <ul style="list-style-type: none"> – Release of greenhouse gas emissions – Nuisance to communities (visual, noise, health) |

- 10.8.7. It is important to note that direct impacts as a result of the transportation of material resources and waste to and from site and indirect impacts have not been assessed within this chapter. Refer to the following chapters for impacts relating to these aspects: **Chapter 5 Air Quality, Chapter 11 Noise and Vibration, Chapter 12 Population and Human Health, Chapter 14 Climate** of this ES (**Application Document Reference: TR010031/APP/6.1**).

CONSTRUCTION

Detailed Assessment Reporting Matrix

- 10.8.8. The impacts associated with material resource consumption and waste generation and disposal during the construction of the Scheme are reported in **Table 10-14**. The subsequent tables (**Table 10-15, Table 10-16** and **Table 10-17**) present the supporting data on which the detailed assessment reporting matrix was generated. The data comprises the quantities and likely source of materials required for the construction of the Scheme, and

quantities and expected recovery or disposal routes for arisings and waste generated during construction.

Table 10-14 - Detailed assessment reporting matrix: construction

| Project Activity | Potential impacts associated with material resources/waste | Description of the impacts |
|------------------------------|---|--|
| Site remediation/preparation | <p>Materials</p> <p>Consumption of resources (such as timber and aggregate) during site remediation/preparation is likely to impact primary materials stocks, supplier and production.</p> <p>The main impacts would be the consumption of natural and non-renewable resources. Impacts would result in the depletion of natural resources and local/regional stocks; and degradation of the natural environment.</p> <p>The following material resources are anticipated to be consumed as part of the site remediation and preparation phase:</p> <ul style="list-style-type: none"> - Timber and other products required for the erection of perimeter fencing. - Aggregate and stone for ground improvements at on site, prior to use by heavy plant. <p>At this stage of the works, it is anticipated that there would be minimal difference in material consumption for the Allerdene Bridge options (Allerdene embankment and Allerdene viaduct option).</p> | <p>The planned mitigation measures include local sourcing of materials where practicable. Any impacts associated with material resource consumption would be adverse, permanent and direct.</p> <p>The magnitude of change taking into account planned mitigation measures is considered to be minor, as over 50% of the materials are anticipated to be sourced nationally or at a lower geographic scale.</p> |
| Site remediation/preparation | <p>Waste</p> <p>Generation and disposal of waste to landfill during site remediation/preparation would have an adverse impact on landfill capacity.</p> <p>Wastes likely to be generated and disposed of to landfill during site preparation include:</p> <p>Asbestos was identified to be present in five locations from 51 tests along the proposed route, as detailed in the Chapter 9 Geology and Soils of this ES (Application Document Reference: TR010031/APP/6.1)(and the accompanying appendices)). Quantification was undertaken in those samples where asbestos fibres were identified, all quantification tests recorded concentrations <0.1%. Whilst this currently no data available that describes the volume of arisings that would be contaminated with asbestos, all such excavations would need to be managed in accordance with legal and best practice requirements.</p> <ul style="list-style-type: none"> - It is currently assumed that the Allerdene embankment option would generate approximately 10,368 tonnes of unacceptable earthworks material (U1/U2) which would require disposal to landfill. The Allerdene viaduct option is anticipated to generate 11,058 tonnes of unacceptable earthworks material (U1/U2) for disposal to landfill. <p>Other arisings which will be diverted from landfill generated during site remediation/preparation include:</p> <p>Vegetation and other above ground materials produced by site clearance (potentially including invasive non-native species which, in some cases, would require additional control measures to be adopted e.g. Japanese Knotweed and Giant Hogweed).</p> <p>During the site remediation/preparation phase, it is considered that the impacts of waste generation for the Allerdene embankment option and Allerdene viaduct option are largely the same given only slight differences in the anticipated tonnage of unacceptable earthworks for disposal to landfill.</p> | <p>The planned mitigation measure for the Scheme include that site arisings are diverted from landfill, where practicable, with beneficial effect. However, this may not be possible for certain aspects, resulting in adverse, permanent and direct impacts.</p> <p>The magnitude of change taking into account mitigation measures, is considered to be negligible for inert waste and non-inert waste. Specifically, the anticipated disposal of unacceptable earthworks material (U1/U2) is considered to have ≤1% reduction or alteration in the regional capacity of waste infrastructure.</p> |
| Demolition | Materials | No adverse impacts anticipated. |

| Project Activity | Potential impacts associated with material resources/waste | Description of the impacts |
|---------------------|---|---|
| | <p>No adverse impacts are anticipated associated with materials during the demolition phase. The two Allerdene Bridge options (Allerdene embankment option and Allerdene viaduct option) are not considered to be different in respect of material consumption during demolition.</p> | <p>The magnitude of change is considered as no change.</p> |
| <p>Demolition</p> | <p>Waste</p> <p>Generation and disposal of waste, impacting on landfill capacity and degradation to the natural environment.</p> <p>Wastes generated during demolition are anticipated to include:</p> <ul style="list-style-type: none"> – Broken out concrete, cut steel and road surface planings. – Hazardous or contaminated material found on or beneath the site. – Other demolition wastes. <p>Waste in this phase of the works would, for example, be produced during the demolition of the existing Allerdene Bridge and associated carriageway, and the removal of the North Dene Footbridge (although the intention is to re-use this structure elsewhere on the highway network), concrete crash barriers, and areas of the central reserve.</p> <p>The Allerdene embankment option and Allerdene viaduct option are anticipated to have the same impact on waste generation during demolition.</p> | <p>Planned mitigation measures for the Scheme include for arisings from demolition to be reused and/or recycled on or off site, with beneficial effect. Where diverting site arisings from landfill is not possible, the impacts associated with disposing of waste would be adverse, permanent and direct.</p> <p>The magnitude of change, taking into account planned mitigation measures, is considered to be negligible for inert and non-inert waste. Specifically, due to the anticipated re-use of site arisings during demolition activities the volume of demolition waste disposed of to landfill would result in ≤1% reduction or alteration in the regional capacity of waste infrastructure.</p> |
| <p>Construction</p> | <p>Materials</p> <p>The construction phase would use the greatest amounts of primary and secondary materials, incorporating aggregates and earthworks, metals, concrete asphalt and plastics (refer to Table 10-15 for further details).</p> <p>Material resources would be required for the construction of the Scheme including: replacement of Allerdene Bridge and North Dene Footbridge, construction of new carriageway and associated structures, and the extension of Kingsway Viaduct.</p> <p>Construction materials required are anticipated to include:</p> <ul style="list-style-type: none"> – Bulk materials for earthworks (approximately 295,800 tonnes for the Allerdene embankment option, compared to 40,000 tonnes for the Allerdene viaduct option) – Road paving materials, including sub-base and bituminous materials – Steel – for structures, reinforcement and signage – Concrete including pre-cast or prefabricated elements – Concrete for ground improvements – Grout – Aggregate – Timber for fencing and formwork – Aluminium street furniture and signage – Other general construction materials <p>Re-use of materials from on-site demolition activities and re-use of the structures (for example North Dene Footbridge, crushed concrete, road planings) has been proposed and would be investigated further as the design stage progresses.</p> | <p>The planned mitigation measures include local source of materials. The construction phase scenario for materials has been assessed to have an adverse, permanent and direct impact on the consumption of construction materials.</p> <p>The magnitude of change, taking into account mitigation measures, is considered to be minor, as over 50% of the materials are anticipated to be sourced nationally or at a lower geographic scale.</p> |

| Project Activity | Potential impacts associated with material resources/waste | Description of the impacts |
|---------------------|--|--|
| | <p>The use of materials for the Scheme would result in the consumption of natural resources. As noted in the first bullet point above, the Allerdene embankment option would require a greater quantity of earthworks in comparison to the Allerdene viaduct option, increasing the adverse impacts of material resources consumption. Impacts from this would include the depletion of natural resources and local/regional stocks, and degradation of the natural environment.</p> | |
| <p>Construction</p> | <p>Waste</p> <p>The majority of waste arisings are anticipated to be generated during the construction phase, for example, during the construction of the new Allerdene Bridge and the construction of new lanes, structures and associated assets.</p> <p>It is anticipated that the following wastes would be generated:</p> <ul style="list-style-type: none"> – Waste from vegetation clearance – Timber – Concrete – Road paving materials including sub-base and bituminous materials – Hazardous or contaminated material found or generated on site – Steel waste e.g. reinforcement, lighting posts – General construction waste e.g. packaging, ducting <p>It is anticipated however that the majority of arisings would be diverted from landfill in line with good practice. Where arisings cannot be recovered, the potential impact would comprise a reduction in landfill void capacity.</p> <p>Refer to Table 10-14 and Table 10-15 for further details on site arisings.</p> <p>Waste volumes generated during the construction phase for Allerdene embankment option and Allerdene viaduct option may differ slightly, however the difference in the overall impact is considered minimal.</p> | <p>The planned mitigation incorporates measures such that waste generated will be diverted from landfill through on-site re-use or off site recovery where practicable. Where site arisings cannot be diverted from landfill in line with best practice, impacts would be adverse and direct, and are generally accepted to be permanent in nature.</p> <p>The magnitude of change, taking into account mitigation measures, is considered to be negligible for inert and non-inert waste. This is based on the anticipated volume of waste being disposed of to landfill during the construction phase (160 tonnes of granular material and hazardous waste) resulting in ≤1% reduction or alteration in the regional capacity of waste infrastructure. The anticipated diversion of construction phase wastes from landfill (in the region of 131,426 tonnes for the Allerdene embankment option and 134,960 tonnes for the Allerdene viaduct option) would further reduce the magnitude of change.</p> |

- 10.8.10. The materials set out in **Table 10-15** are those which are likely to be consumed during the construction phase of the Scheme. Primary and secondary materials would be required for construction elements of the Scheme.
- 10.8.11. The information in **Table 10-15** has been gathered from data provided by the Buildability Support contractor and consolidated to show the main materials types required. A more detailed breakdown showing the material application, likely supplier and source can be found in **Appendix 10.1** of this ES (**Application Document Reference: TR010031/APP/6.3**).

Table 10-15 – Materials imported to site during the construction phase

| Materials | Whole Scheme including Allerdene embankment option | | Whole Scheme including Allerdene viaduct option | |
|---------------------|--|---|---|---|
| | Quantity (tonnes) | Likely source and approximate distance from the Scheme (km) | Quantity (tonnes) | Likely source and approximate distance from the Scheme (km) |
| Earthworks | 295,800 | Unknown source (100%) | 40,000 | Unknown source (100%) |
| Concrete | 199,880 | Newcastle on Tyne 10km (99%) Unknown source (1%) | 139,880 | Newcastle on Tyne 10km (99%) Unknown source (1%) |
| Aggregate | 165,950 | Ferryhill 30km (88%) Unknown source (12%) | 112,040 | Ferryhill 30km (82%) Unknown source (18%) |
| Bituminous products | 126,900 | Coxhoe 25km (98%) Unknown source (2%) | 126,900 | Coxhoe 25km (98%) Unknown source (2%) |
| Cement | 50,000 | Unknown source (100%) | 50,000 | Unknown source (100%) |
| Steel | 8,085 | Sheffield 205km (54%) Darlington 50km (22%) | 12,885 | Sheffield 205km (37%) Darlington 50km (46%) |

| Materials | Whole Scheme including Allerdene embankment option | | Whole Scheme including Allerdene viaduct option | |
|------------------|--|---|---|--|
| | Quantity (tonnes) | Likely source and approximate distance from the Scheme (km) | Quantity (tonnes) | Likely source and approximate distance from the Scheme (km) |
| | | Preston 210km (15%) Nottingham 250km (4%) Birmingham 320km (2%) West Midlands 320km (3%) | | Preston 210km (9%) Nottingham 250km (2%) Birmingham 320km (3%) West Midlands 320km (2%) |
| Precast concrete | 783 | Ilkeston 250km (18%) Rotherham 195km (45%) Unknown source (37%) | 783 | Ilkeston 250km (18%) Rotherham 195km (45%) Unknown source (37%) |
| Timber | 430 | Goole 180km (42%) Jarrow 12km (58%) | 700 | Goole 180km (26%) Jarrow 12km (74%) |
| Plastic | 91 | Doncaster 175km (99%) Unknown source (1%) | 91 | Doncaster 175km (99%) Unknown source (1%) |
| Aluminium | 60 | County Louth, Ireland 450km (100%) | 60 | County Louth, Ireland 450km (100%) |
| Ductile iron | 40 | Ilkeston 250km (100%) | 40 | Ilkeston 250km (100%) |
| GRP | Not required | Not applicable | 420 | Filey 150km (100%) |

| Materials | Whole Scheme including Allerdene embankment option | | Whole Scheme including Allerdene viaduct option | |
|--|--|---|---|---|
| | Quantity (tonnes) | Likely source and approximate distance from the Scheme (km) | Quantity (tonnes) | Likely source and approximate distance from the Scheme (km) |
| Other general construction materials (including road lighting accessories, LEDs) | No data available | Unknown source | No data available | Unknown source |
| Total | 848,019 | | 483,799 | |

- 10.8.12. Consultation with DCC confirms the aggregate requirements in **Table 10-15** could be accommodated from existing quarries in the north-east without an adverse impact on these sites capability to meet other sales requirements.
- 10.8.13. Forecasts for waste recovery (diverted from landfill) from the Scheme are given in **Table 10-16**. The information has been gathered from data provided by the buildability support contractor and consolidated to show the key waste types. A more detailed breakdown showing the source of the waste likely disposal method and location can be found in **Appendix 10.1** of this ES (**Application Document Reference: TR010031/APP/6.3**). The use of arisings will be subject to their classification under re-use criteria through the implementation of a materials management plan. This will be completed as the Scheme progresses through construction phase. On site storage arrangements for arisings has been considered in the Scheme design to allow stockpiling of materials for on-site reuse, or prior to off-site recovery or disposal.

Table 10-16 – Forecast site arisings that can be recovered and hence diverted from landfill

| Excavated and other materials | Whole Scheme including Allerdene embankment option | | Whole Scheme including Allerdene viaduct option | |
|-------------------------------|--|---|---|---|
| | Quantity (tonnes) | Recovery method and approximate distance from Scheme (km) | Quantity (tonnes) | Recovery method and approximate distance from Scheme (km) |
| Road planings | 52,530 | Re-use on-site (100%) | 52,530 | Re-use on-site (100%) |

| Excavated and other materials | Whole Scheme including Allerdene embankment option | | Whole Scheme including Allerdene viaduct option | |
|-------------------------------|--|--|---|--|
| | Quantity (tonnes) | Recovery method and approximate distance from Scheme (km) | Quantity (tonnes) | Recovery method and approximate distance from Scheme (km) |
| Concrete | 13,440 | Off site recycling crushing facility Prudhoe 20km (100%) | 13,830 | Off site recycling crushing facility Prudhoe 20km (100%) |
| Sub base | 7,200 | Re-use on-site (100%) | 7,200 | Re-use on-site (100%) |
| Earthworks | 3,800 | Re-use on-site (100%) | 16,910 | Re-use on-site (100%) |
| Earthworks | 50,806 | Off site recovery (unknown destination) 100% | 40,675 | Off site recovery (unknown destination) 100% |
| General waste | 1,500 | Off site waste segregation facility Birtley 3km (100%) | 1,620 | Off site waste segregation facility Birtley 3km (100%) |
| Steel | 1,150 | Off site recovery facilities: Birtley 3km (27%) Prudhoe 20km (73%) | 1,155 | Off site recovery facilities: Birtley 3km (28%) Prudhoe 20km (72%) |
| Granular materials | 640 | Re-use on-site (100%) | 640 | Re-use on-site (100%) |
| Timber | 260 | Off site recovery facility Birtley 3km (100%) | 300 | Off site recovery facility Birtley 3km (100%) |
| Vegetation | 100 | Re-use on-site (100%) | 100 | Re-use on-site (100%) |
| Total | 131,426 | | 134,960 | |

10.8.14. Forecasts for waste which cannot be diverted from landfill, or which have been identified for disposal to landfill are listed in **Table 10-17**. The information has been gathered from data

provided by the buildability support contractor and had been consolidated to show the key waste types. A more detailed breakdown showing the source of the waste and anticipated disposal location can be found in **Appendix 10.1** of this ES (**Application Document Reference: TR010031/APP/6.3**).

Table 10-17 – Forecast site arisings that have been identified for disposal to landfill

| Waste | Whole Scheme including Allerdene embankment option | | Whole Scheme including Allerdene viaduct option | |
|--|---|--|---|--|
| | Quantity (tonnes) | Disposal process and approximate distance from Scheme (km) | Quantity (tonnes) | Disposal process and approximate distance from Scheme (km) |
| Earthworks | 10,368 * | Unknown landfill location (100%) | 11,058 * | Unknown landfill location (100%) |
| Granular materials | 160 | Unknown landfill location (100%) | 160 | Unknown landfill location (100%) |
| Hazardous waste, including materials containing asbestos | 0.1 * | Unknown landfill location (100%) | 0.1 * | Unknown landfill location (100%) |
| Total | 10,528 | | 11,218 | |
| Note | * The estimation of materials to be disposed of to landfill has taken into account the findings of the ground investigation assessment. | | | |

OPERATION

Detailed Assessment Reporting Matrix

- 10.8.15. The impacts associated with material resource consumption and waste generation and disposal during operation of the Scheme are reported in **Table 10-18**. Based on professional judgement, it is considered that operational aspects for the Allerdene embankment option and the Allerdene viaduct option would be similar with regards to materials consumption and waste generation and disposal.
- 10.8.16. Data to forecast the quantity and type of material resources required or the quantity and type of arisings and waste generated during the operation phase is limited to the quantity of bituminous material for routine resurfacing, due to the unknown type, extent and frequency of maintenance or repair activity.

Table 10-18 – Detailed assessment reporting matrix: Operation

| Project Activity | Potential impacts associated with material resources/waste | Description of the impacts |
|----------------------------------|--|--|
| <p>Operation and maintenance</p> | <p>Materials</p> <p>Materials anticipated to be required during operation and maintenance are expected to comprise:</p> <ul style="list-style-type: none"> – Light bulbs – Signage – Bridge bearings – Steelwork for replacement barriers – Asphalt for minor re-surfacing/routine works and repairs of the highway and ancillary infrastructure. It is estimated that 39,732 tonnes of bitumen will be required for resurfacing every five years (11 times during the 60 year lifetime of the road). <p>Any materials required will impact on the consumption of natural resources resulting in the depletion of natural resources and local/regional stocks.</p> | <p>Mitigation measures during operation are anticipated to conform to good practice whereby materials will be sourced locally where practicable. The operation and maintenance phase scenario for materials has been assessed to have an adverse, permanent and direct impact on the consumption of construction materials.</p> <p>The magnitude of change, based on mitigation measures being incorporated, is considered to be negligible as ≤50% of primary materials are anticipated to be sourced nationally or at a lower geographical scale</p> |
| | <p>Waste</p> <p>Waste generation is anticipated to comprise arisings from routine maintenance/replacement, littering and vegetation clearance.</p> <p>Waste generated is anticipated to be comparable to the current A1 Birtley to Coal House arisings, which typically comprise:</p> <ul style="list-style-type: none"> – Waste from routine bridge maintenance – Littering | <p>Mitigation measures during operation are anticipated to conform to good practice whereby waste will be diverted from landfill where practicable. During the operation and maintenance phase scenario, any site arisings which cannot be diverted from</p> |

| | | |
|--|--|--|
| | <ul style="list-style-type: none"> – Light replacement – Signage replacement – Replacement of reflective road studs (cat's eyes) – Vegetation from verge clearance – Minor barrier refurbishments. <p>It is considered that in line with good practice the majority of wastes would be diverted from landfill. However, any which cannot be diverted will impact on landfill capacity and degradation to the natural environment.</p> | <p>landfill in line with good practice, would result in adverse, permanent and direct impacts.</p> <p>The magnitude of change, based on mitigation measures being incorporated, is considered negligible, as there is a potential for some reduction or alteration in the capacity of waste infrastructure at a regional scale, but this is not anticipated to exceed $\leq 1\%$.</p> |
|--|--|--|

10.9. DESIGN, MITIGATION AND ENHANCEMENT MEASURES

10.9.1. Design, mitigation and enhancement measures during construction and operation are considered to be comparable for both the Allerdene embankment option and the Allerdene viaduct option.

DESIGN

10.9.2. During preliminary design the main highway was realigned to preclude the need to demolish Smithy Lane Overbridge.

10.9.3. Measures that would be investigated during detailed design, which have the potential to avoid and mitigate adverse impacts from material resources consumption and the generation and disposal of waste, include:

- a. Minimising resource use by:
 - i. Simplifying layout and form
 - ii. Using standard sizes
 - iii. Balancing cut and fill
 - iv. Maximising the use of renewable material resources, and materials with recycled or secondary content
 - v. Setting net importation as a Scheme goal
- b. Designing pre-fabricated structures and components, where appropriate, so that environmental impacts associated with, for example, material use, material handling material transport, waste generation, waste treatment, waste transport, energy use and disruption on site, are reduced.

- c. Considering how material resources can be designed to be more easily adapted over an asset lifetime, for example the use of weathering steel for Allerdene Bridge (both options) would ensure long term durability with minimal maintenance compared with painted steelwork; Allerdene viaduct option would only require bridge bearings to be replaced every 40 years, compared to every 20 years for the current structure;
- d. Considering the deconstructability and demountability of elements so that they can be reused at the end of their design life.
- e. Identifying materials that can be recovered or reused at the end of their design life as far as practicable.
- f. Specifying materials with the least embedded carbon as far as practicable.
- g. The feasibility of reusing North Dene Footbridge deck elsewhere on the highway network would be investigated. Should this not be possible alternatives for reuse elsewhere would be investigated. Where the North Dene Footbridge deck cannot be reused it would be recycled either on or off-site.

CONSTRUCTION

10.9.4. Measures that would be implemented during construction to avoid and mitigate adverse impacts from material resources consumption and site arisings, and the generation and disposal of waste, include:

- a. As far as possible, material resources from demolition would be re-used in the construction of the new road.
- b. The replacement North Dene Footbridge would comprise pre-constructed elements which would reduce waste production on site.
- c. The following potential options for re-using materials on other Applicate schemes in the north-east are being investigated:
 - i. Crushing (or similar treatment) and re-use of approximately 2,300 tonnes of concrete generated through on-site clearance activities e.g. demolition. The re-use of approximately 20,000m³ of surplus spoil.
- d. A CEMP, incorporating a Site Waste Management Plan (SWMP) and CL:AIRE (**Ref 10.28**) compliant Materials Management Plan (MMP) would be implemented by the Principal Contractor to identify, monitor and manage materials, arisings and waste on site.
- e. Earthworks material classified as unacceptable for reuse (U1/U2), would be treated in order to divert these arisings from landfill.
- f. Use of secondary and recycled materials (e.g. within steel, concrete or aggregate) would be considered to minimise the consumption of primary materials.

OPERATION

10.9.5. During operation, the consumption of materials and generation of waste is considered to be minimal. Any good practice operational measures implemented to increase the quantity of recycled materials over the use of primary materials would mitigate the impact of material consumption.

10.9.6. Any good practice measures to increase recycling or recovery of any waste generated during operation from landfill would mitigate the impact on landfill capacity.

10.10. ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

CONSTRUCTION

- 10.10.1. **Table 10-19** provides a summary of the likely significant effects during construction, using the criteria set out within the methodology (**Section 10.4**), the potential impacts (**Section 10.8**) and the embedded and confirmed mitigation measures (**Section 10.9**). The assessment uses available material and waste data provided by the Buildability Support Contractor based on the Scheme design, and applies the professional judgement of the author to make the assessment. Additional details are provided in the text below the table.
- 10.10.2. The assessment summarised in **Table 10-19** includes both the Allerdene embankment option and the Allerdene viaduct option, as detailed within the table text.
- 10.10.3. In summary and following implementation of mitigation measures, the post-mitigation construction phase effects of the Scheme in relation to material resource consumption and disposal of waste to landfill is considered not significant.

Table 10-19 – Assessment of likely significant effects: Construction

| Topic | Potential impacts | Embedded mitigation | Other committed measures | Justification following mitigation | | Residual significance | How measures will be implemented, measured and monitored |
|-----------|---|--|--|---|---|--|--|
| | | | | Sensitivity | Magnitude | | |
| Materials | <p>Consumption of natural resources.</p> <p>The total estimated volume of imported material is approximately 848,019 tonnes for the Allerdene embankment option and 483,799 tonnes for the Allerdene viaduct option.</p> <p>At this time, no information is available on recycled content.</p> | <p>Simplifying layout and form</p> <p>Balancing cut and fill</p> <p>Use of site-won arisings</p> <p>Use of pre-fabricated structures</p> | <p>Maximise sourcing and use of recycled materials</p> | <p>Medium</p> <p>Due to lower-than-UK-average availability of construction materials within the region, some potential issues regarding stock and supply may be experienced.</p> <p>Furthermore, the quantity of recycled aggregate is currently unquantifiable</p> | <p>Minor</p> <p>Over 50% of the primary materials would be sourced nationally or at a lower geographic scale.</p> <p>No mineral safeguarding areas would be fully sterilised by the Scheme.</p> | <p>Slight - Not significant</p> | <p>Implementation of CEMP incorporating a CL:AIRE compliant MMP</p> |
| Waste | <p>Generation and disposal of waste to landfill.</p> <p>The Allerdene embankment option is estimated to divert 131,426 tonnes of waste from landfill, and dispose of 10,528 tonnes of waste to landfill.</p> <p>The Allerdene viaduct option is estimated to divert 134,960 tonnes of waste from landfill, and dispose of 11,218 tonnes of waste to landfill.</p> | <p>Re-use of site won arisings.</p> <p>Diversion of waste from landfill through implementation of the waste hierarchy.</p> | <p>Consideration of end of life reuse and recovery.</p> <p>Treatment of unacceptable arisings to divert from landfill.</p> | <p>Low (inert waste).</p> <p>Waste infrastructure is considered to have sufficient capacity to accommodate waste from the Scheme.</p> <p>High (non-inert waste)</p> <p>Over 50% of the waste is considered to required disposal outside of the region, but no new (permanent) waste infrastructure would be required.</p> | <p>Negligible (inert waste) as ≤1% reduction or alteration in the regional capacity of waste infrastructure is anticipated.</p> <p>Negligible (non-inert waste) as ≤1% reduction or alteration in the regional capacity of waste infrastructure is anticipated.</p> | <p>Neutral - Not significant (inert waste)</p> <p>Slight – Not significant (non-inert waste)</p> | <p>Implementation of CEMP incorporating a SWMP and CL:AIRE compliant MMP</p> |

- 10.10.4. The following paragraphs provide additional clarification for the assessment of likely significant effects on materials and waste presented in **Table 10-19**.

Materials

- 10.10.5. The consumption of materials during demolition works is considered minimal and therefore no significant adverse environmental effects are anticipated.
- 10.10.6. The total quantity of materials required for the Allerdene embankment option is greater than that for the Allerdene viaduct option, due to the larger volume of earthwork materials being required to construct the embankment (255,800 tonnes). The Allerdene embankment option therefore has a greater impact on the total volume of materials consumed in comparison to Allerdene viaduct option. Primary materials required for the Scheme are a finite resource and whilst they are generally available through local and regional supply, some national or wider sourcing is anticipated.

Waste

- 10.10.7. The majority of arisings at site are anticipated from earthworks activities, the breaking out of concrete from the demolition of existing structures, and from road planings. It is currently anticipated that the Allerdene viaduct option would generate more arisings which can be recovered, but would generate slightly more waste (690 tonnes) for landfill disposal compared to Allerdene embankment option. Therefore, the Allerdene viaduct option has a comparatively greater adverse effect on landfill capacity, however the difference between the two options is minimal. The current forecasts indicate that both the Allerdene embankment option and the Allerdene viaduct option will exceed the UK Construction and Demolition recovery targets of 70%, as set under the Waste Framework Directive (**Ref 10.3**). The Allerdene embankment option is anticipated to have a recovery rate of 91.99%, and the Allerdene viaduct option - 91.69%.

OPERATION

- 10.10.8. **Table 10-20** provides a summary of the likely significant effects during operation using the criteria set out within the methodology (**Section 10.4**), the potential impacts (**Section 10.8**) and the embedded and confirmed mitigation measures (**Section 10.9**). The assessment applies the professional judgement of the author. Additional details are provided in the text below the table.
- 10.10.9. The assessment summarised in **Table 10-20** includes both the Allerdene embankment option and the Allerdene viaduct option.
- 10.10.10. In summary and following implementation of mitigation measures, the operational phase effects of the Scheme in relation to material resource consumption and disposal of waste to landfill is considered not significant.

Table 10-20 - Assessment of likely significant effects: Operation

| Topic | Potential impacts | Embedded mitigation | Other committed measures | Justification following mitigation | | Residual significance | How measures will be implemented, measured and monitored |
|-----------|--|---------------------|---|---|--|---|--|
| | | | | Sensitivity | Magnitude | | |
| Materials | Consumption of natural resources. Minor amendments, changes and maintenance of the Scheme assets. The extent is expected to be minimal, and the potential to consume material resources extremely limited. | None identified. | Good practice measures to increase the quantity of recycled materials over the use of primary materials. | Medium Due to lower-than-UK-average availability of construction materials within the region some potential issues regarding stock and supply may be experienced. Furthermore, the quantity of recycled aggregate is currently unquantifiable. | Negligible ≤50% of primary materials are anticipated to be sourced nationally or at a lower geographical scale. | Slight - Not significant | Not applicable |
| Waste | Generation and disposal of waste to landfill. Minor amendments, changes and maintenance of the Scheme. The extent of these changes is expected to be minimal, and the potential to produce and dispose of waste to landfill, extremely limited. | None identified | Good practice measures to increase recycling or recovery of any waste generated during operation from landfill. | Low (inert waste) Waste infrastructure is considered to have sufficient capacity to accommodate waste from the Scheme. High (non-inert waste) Over 50% of the waste is considered to required disposal outside of the region, but no new (permanent) waste infrastructure would be required. | Negligible (inert waste) as ≤1% reduction or alteration in the regional capacity of waste infrastructure is anticipated. Negligible (non-inert waste) as ≤1% reduction or alteration in the regional capacity of waste infrastructure is anticipated. | Neutral - Not significant (inert waste) Slight – Not significant (non-inert waste) | Not applicable |

10.10.11. The following paragraphs provide additional clarification for the assessment of likely significant effects on materials and waste presented in **Table 10-20**.

Materials

10.10.12. As stated in **Table 10-18**, during the first year of operation and beyond, minor amendments, changes and maintenance of the Scheme assets would be expected. The extent of these changes is expected to be minimal, and the potential to consume material resources extremely limited.

Waste

10.10.13. As stated in **Table 10-18** during the first year of operation and beyond, minor amendments, changes and maintenance of the Scheme assets would be required. The extent of these changes is expected to be minimal, and the potential to produce and dispose of waste to landfill, extremely limited.

10.11. MONITORING

10.11.1. A CEMP incorporating a SWMP and MMP would be developed for the Scheme.

10.11.2. A SWMP would be produced to manage and monitor site waste effectively to reduce waste and potential harm to the environment from the design stage through to the post completion and use stage of a project. The SWMP would monitor the following:

- a. Types and volumes of waste reused, recycled and landfilled.
- b. Where the materials and waste have been reused, recycled and landfilled, both on and off site.
- c. Waste recovery and disposal facilities that would be used and their details of their permits/licences/exemptions, both on and off site.
- d. Waste recovery and disposal contractors that would be used and details of waste carriers licence.
- e. Any waste exemptions that are in place in order to enable waste to be reused.
- f. Waste transfer notes (WTNs) and waste consignment notes to ensure that all waste movements are accompanied by a WTN and that all the requisite information is provided.
- g. Scheme performance objectives and targets to ensure they are met.

10.11.3. As stated in the Design, mitigation and enhancement measures section of **Chapter 9 Geology & Soils** of this ES (**Application Document Reference: TR010031/APP/6.1**), an MMP would be developed for the Scheme to provide a mechanism by which it is possible to monitor the maximum reuse of natural soils and made-ground (contaminated or otherwise) on a development site. The MMP forms part of the CL:AIRE code of practice to determine that the materials will not harm human health or pollute the environment and are no longer considered a waste. The MMP requires answers to a series of questions including:

- a. The parties involved
- b. Suitability for use criteria
- c. Certainty of use
- d. Quantity of use

- e. Contingency arrangements
- f. Tracking and document control
- g. Verification plan

- 10.11.4. The Highways England Carbon Tool, used to calculate, monitor and reduce the embodied impact of materials would be used during construction to support the drive for leaner and less carbon intensive design. Further details are provided in **Chapter 14 Climate** of this ES (**Application Document Reference: TR010031/APP/6.1**).
- 10.11.5. As the detailed design stages of the Scheme progress, the potential to refine materials specifications to incorporate greater recycled content, re-use on-site material resources from demolition, and re-use structures should be investigated and determined.

REFERENCES

- Ref. 10.1** Highways England (2011) IAN 153/11 Environmental Assessment of Materials & Resources [\[link\]](#)
- Ref. 10.2** European Commission (2014) The Environmental Impact Assessment Directive (2014/52/EU)
- Ref. 10.3** European Commission (2008) The Waste Framework Directive (2008/98/EC)
- Ref. 10.4** HM Government (2012) The Controlled Waste (England and Wales) Regulations 2012
- Ref. 10.5** HM Government (2011) The Waste (England and Wales) Regulations 2011
- Ref. 10.6** HM Government (2005) The Clean Neighbourhoods and Environment Act 2005
- Ref. 10.7** HM Government (2005) Hazardous Waste (England and Wales) Regulations 2005
- Ref. 10.8** HM Government (1990) The Environmental Protection Act 1990
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