# ENVIRONMENTAL STATEMENT – VOLUME 1 – CHAPTER 13 MATERIALS AND WASTE

## Drax Bioenergy with Carbon Capture and Storage

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations, 2009 – Regulation 5(2)(a)**

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# 13. MATERIALS AND WASTE

## 13.1. INTRODUCTION

13.1.1. This chapter reports the outcome of the assessment of likely significant environmental effects arising from the Proposed Scheme on Materials and Waste.

13.1.2. Impacts during the construction and operational phases of the Proposed Scheme have been assessed. A full description of the Proposed Scheme is provided in **Chapter 2 (Site and Project Description)** of this ES (document reference 6.1.2). For the reasons described in **Table 13.2**, impacts and effects during decommissioning have been scoped out of the assessment.

13.1.3. This chapter (and its associated appendices (**Volume 3**)) is intended to be read as part of the wider ES with particular reference to **Chapter 5 (Traffic and Transport)** (document reference 6.1.5); **Chapter 6 (Air Quality)** (document reference 6.1.5); **Chapter 7 (Noise and Vibration)** (document reference 6.1.7); **Chapter 8 (Ecology)** (document reference 6.1.8); **Chapter 9 (Landscape and Visual Amenity)** (document reference 6.1.9); **Chapter 11 (Ground Conditions)** (document reference 6.1.11); **Chapter 12 (Water Environment)** (document reference 6.1.12); **Chapter 14 (Climate Change Resilience)** (document reference 6.1.14); **Chapter 15 (Climate - Greenhouse Gases)** (document reference 6.1.15); and **Chapter 16 (Population, Health and Socio-economics)** (document reference 6.1.16).

13.1.4. This chapter:

- **a.** Summarises the legislative and policy framework;
- **b.** Describes consultation undertaken to date;
- **c.** Describes the methodology followed for the assessment;
- **d.** Identifies the potential impacts as a result of the Proposed Scheme;
- **e.** Details the design, mitigation and enhancement measures that have been so far identified, and the effectiveness and certainty with which they are expected to be applied;
- **f.** Reports the assessment of the significant environmental effects of the Proposed Scheme; and
- **g.** Details the monitoring that should be carried out for the Proposed Scheme.

13.1.5. The Proposed Scheme has the potential to affect materials and waste as a result of:

- **a.** During construction:
  - i. Consumption of natural and non-renewable resources.
- **b.** During construction and operation:
  - i. Reduction in landfill capacity.

### OPTIONALITY

13.1.6. For the purposes of this chapter, and as described in Chapter 2 (Site and Project Description) paragraph 2.3.4 the assessment presented in this chapter is not affected by the options presented in the construction programme as it is anticipated that the types and quantities of materials required for construction, and the waste generated by the Proposed Scheme would remain the same for both.

## 13.2. LEGISLATIVE AND POLICY FRAMEWORK

### LEGISLATIVE FRAMEWORK

13.2.1. The applicable legislative framework is summarised as follows.

#### International

**The Revised EU Waste Framework Directive 2008/98/EC**

13.2.2. The Revised EU Waste Framework Directive provides a comprehensive foundation for the management of waste across the European Community and defines waste as: “any substance or object that the holder discards or intends or is required to discard”.

#### National

**Environment Act 2021**

13.2.3. The Environment Act 2021 sets out clear statutory targets for the recovery of the natural world in four priority areas, one of which is waste: Part 3 specifically refers to waste and resource efficiency, incorporating producer responsibility obligations; resource efficiency; managing waste; and waste enforcement and regulation.

**The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020**

13.2.4. The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 make provisions and amendments to other statutory instruments relating to waste regulations to ensure that environmental permitting and waste regimes continue to operate effectively, now that the UK has exited the EU.

**The Environmental Permitting (England and Wales) Regulations 2016 (as amended)**

13.2.5. The Environmental Permitting (England and Wales) Regulations 2016 aim to streamline the legislative system for industrial and waste installations into a single permitting structure for those activities which have the potential to cause harm to human health or the environment.

**The Controlled Waste (England and Wales) Regulations 2012 (as amended)**

13.2.6. The Controlled Waste (England and Wales) Regulations 2012 classifies waste as household, industrial or commercial waste. It allows Local Authorities to implement charges for the collection of waste from non-domestic properties.

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

13.2.7. The Waste (England and Wales) Regulations SI 2011/988 2011 regulations stipulate the requirement for industry and businesses to implement the Waste Hierarchy. It is important to note that the Waste (England and Wales) (Amendment) Regulations 2014 amend the 2011 regulations to clarify that the transfer of controlled waste can be recorded on alternative documentation, such as invoices, instead of waste transfer notes.

### The Clean Neighbourhoods and Environment Act 2005

13.2.8. Part 5, Chapter 3 of The Clean Neighbourhoods and Environment Act 2005 specifically refers to site waste, where there may be a regulatory requirement to prepare Site Waste Management Plans (SWMPs) and ensure compliance with them. Penalties for offences in relation to a failure to comply with a requirement under the regulations may be enforced.

### The Hazardous Waste (England and Wales) Regulations 2005

13.2.9. The Hazardous Waste (England and Wales) Regulations 2005 introduce measures to control storage, transport and disposal of hazardous waste. These regulations provide a means to ensure that hazardous waste and any associated risks are appropriately managed.

### The Waste Minimisation Act 1998

13.2.10. The Waste Minimisation Act 1998 enables local planning authorities to take the appropriate steps to reduce and minimise the generation of household, commercial or industrial waste within their area.

### The Environmental Protection Act 1990

13.2.11. The Environmental Protection Act 1990, as of 2008, defines within England, Scotland and Wales, the fundamental structure and authority for waste management and control of emissions into the environment. The Act 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.

### The Control of Pollution (Amendment) Act 1989

13.2.12. The Control of Pollution (Amendment) Act 1989 makes it a criminal offence for a person who is not a registered carrier to transport controlled waste to or from any place in Great Britain. The Act also provides for the seizure and disposal of vehicles used for illegal waste disposal.

## POLICY FRAMEWORK

13.2.13. The applicable policy framework is summarised as follows:

## National

### Overarching National Policy Statement for Energy (EN1) (NPS EN-1) (DECC, 2011)

13.2.14. The Overarching National Policy Statement (NPS) for Energy sets out the Government's policy for delivery of major energy infrastructure and will be the primary basis for decision making. Section 5.14 Waste Management outlines government policy on hazardous and non-hazardous waste and sustainable waste management implemented through the waste hierarchy. The overall aim is to produce less waste by reusing it as a resource wherever possible, or to dispose of it in a way that is least damaging to the environment and human health. Paragraph 5.14.6 of the NPS refers to the specific requirement to prepare a SWMP, which should include information on the proposed recovery and disposal of waste, along with an assessment of the impact of waste arising from the development on the capacity of waste management facilities in the area.

### Draft Overarching National Policy Statement for Energy (EN-1) (Department for Business, Energy & Industrial Strategy, 2021)

13.2.15. The draft NPS for Energy sets out national policy for energy infrastructure. In Section 5.15 of the policy (Resource and Waste Management), government expectations on hazardous and non-hazardous waste are outlined, which are intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Applicants should ensure that through construction best practices, material is reused or recycled on site where possible, or sourced from recycled or reused sources, and low carbon materials, sustainable sources and local suppliers are used.

### National Planning Policy Framework (2021) (Ministry of Housing, Communities and Local Government, 2021)

13.2.16. The National Planning Policy Framework highlights that the purpose of the planning system is to contribute to the achievement of sustainable development through three overarching objectives: economic, social and environmental. The environmental objective requires the planning system to contribute and enhance the natural and local environment by "*using natural resources prudently"* and *"minimising waste and pollution"*.

### Waste Management Plan for England (2021) (DEFRA, 2021)

13.2.17. The Waste Management Plan for England provides a detailed analysis of the present state of waste management at the national level and assesses how the objectives of the Waste Framework Directive will be effectively supported. It outlines the Waste Hierarchy, which gives top priority to waste prevention, followed by preparing for reuse, recycling, other types of recovery and finally disposal (e.g., landfill).

**National Policy Statement for Hazardous Waste (2013) (DEFRA, 2013)**

13.2.18. This NPS document outlines the Government's main objectives for hazardous waste and the key principles for management of hazardous waste.

**National Planning Policy for Waste (2014) (DCLG, 2014)**

13.2.19. The National Planning Policy for Waste outlines the Government's 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.

**Our Waste, Our Resources: A Strategy for England (2018) (DEFRA, 2018)**

13.2.20. Our Waste, Our Resources: A Strategy for England sets out how the Government will preserve stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. The strategy also outlines the Government's aims to minimise the damage caused to the natural environment by reducing and managing waste safely and carefully, and by tackling waste crime. It combines actions to take now with firm commitments for the coming years and gives a clear longer-term policy direction in line with the 25 Year Environment Plan.

### Local

**North Yorkshire Minerals and Waste Joint Plan 2015–2030 (February 2022) (NYCC, 2022)**

13.2.21. The Minerals and Waste Joint Plan (the Joint Plan) has been jointly prepared by the three authorities of North Yorkshire County Council (NYCC), City of York Council and North York Moors National Park. It was formally adopted by NYCC in February 2022. The Joint Plan contains the vision and strategic objectives for future mineral development and sustainable waste management in the North Yorkshire sub-region until the end of 2030.

13.2.22. Waste Policy W01 outlines aims to move waste up the Waste Hierarchy through waste minimisation; increased recovery of waste; provision of waste treatment to help divert waste from landfill. Policy W02 provides details on the strategic management of waste in the Joint Plan area. Policy W05 specifically details aims to meet waste management capacity requirements for construction, demolition and excavation (CD&E) waste, through increased recycling capacity and infrastructure and reclamation of landfill.

13.2.23. An assessment of the relevant policies is detailed further in the **Planning Statement** (document reference 5.2).

## 13.3. CONSULTATION

13.3.1. **Table 13.1** provides a summary of the consultation undertaken in support of the preparation of this assessment.

**Table 13.1 - Consultation Summary Table**

| Date and Method of Consultation | Consultee | Summary of Key Topics discussed and Key Outcomes |
|---|---|---|
| 21 September 2021 (email) | NYCC | A request has been sent to the local Waste Planning Authority to identify any future committed plans for landfill expansion, resource extraction and material / waste management facilities. |

13.3.2. An **EIA Scoping Opinion (Appendix 1.2)** (document reference 6.3.1.2) was received by the Applicant from the Planning Inspectorate (PINS) on behalf of the Secretary of State (SoS) on 26 February 2021, including formal responses from Statutory Consultees. The responses from PINS in relation to Materials and Waste and how these requirements are addressed by the Applicant are set out in **Appendix 4.2 (Scoping Opinion Responses)** (document reference 6.3.4.2).

## 13.4. SCOPE OF THE ASSESSMENT

13.4.1. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in **Chapter 4 (EIA Methodology)** (document reference 6.1.4).

13.4.2. This section sets out the scope of the assessment, which has evolved since the preparation of the PEIR, re-iterating the evidence base for scoping out elements following further iterative assessment.

### ELEMENTS SCOPED OUT OF THE ASSESSMENT

13.4.3. The elements of materials and waste shown in Table 13.2 are not considered to give rise to likely significant effects as a result of the Proposed Scheme and have therefore not been considered within this assessment.

**Table 13.2 - Elements Scoped Out of the Assessment**

| Element scoped out | Phase | Justification |
|---|---|---|
| Impacts associated with the extraction of raw resources and the manufacture of products | Construction<br>Operation | The impacts and effects of extraction and manufacture of materials cannot be assured with any accuracy, and hence are scoped out of the assessment[1] |
| Consumption of material resources associated with the Proposed Scheme during the first year of operation[2] | Operation | The first year of operation of the Proposed Scheme is not anticipated to consume material resources beyond those required for routine repair and maintenance. As such, the impacts associated with material resource consumption are considered to be minimal and not significant.<br>The impacts from chemicals consumed as part of the processes to be adopted on the Proposed Scheme are also excluded from further assessment as they already fall within the existing Environmental Permitting regime for the Site. As per PINS comments, this is scoped out on the basis that the Applicant will submit a separate application for a variation to the existing Environment Permit, EPR/VP3530LS, for the Power Station. This will be developed in parallel to the DCO Application and submitted to the Environment Agency at the same time, or shortly after, the DCO Application is submitted to PINS. |
| Impacts resulting from the transportation of material resources and waste to and from the Proposed Scheme | Construction<br>Operation | In response to PINS comments, the impacts associated with transportation are considered as part of the assessments in **Chapter 6 (Air Quality)**, **Chapter 5 (Traffic and Transport)**, and **Chapter 7 (Noise and Vibration)** of this ES. |
| Impacts on human health and controlled waters as a result of contaminated site arisings from the Proposed Scheme | Construction<br>Operation | As agreed by PINS, impacts and effects on human health and controlled waters as a result of contaminated land are considered in the **Chapter 11 (Ground Conditions)** assessment of this ES. |
| Lifecycle assessment (including embodied carbon and water) of materials | Construction<br>Operation | As set out in the Applicant's **Scoping Report (Appendix 1.1)** (document reference 6.3.1.1), this has not been part of the environment assessment process, as the effort and resources required are deemed disproportionate to the benefit they would offer the assessment of significance of effect. |
| Impacts and effects associated with decommissioning of the Proposed Scheme | Decommissioning | Currently, there is no methodology set out in the Institute of Environmental Management and Assessment (IEMA) Guide for the assessment of likely impacts and effects during decommissioning. In addition, there is no data on likely materials and waste that would be expected; collection of this data is considered disproportionate to the EIA process. Furthermore, due to uncertainties relating to future material reuse and waste management technologies, infrastructure and legislation, it is not possible to proportionally assess potential impacts and effects during decommissioning. |
| Impacts and effects of the measures proposed in the Off-Site Habitat Provision Area | Construction<br>Operation | Ecological enhancement measures proposed in this area include:<br>~ Species rich grassland creation;<br>~ Pond and associated wetland creation;<br>~ Woodland and scrub planting; and<br>~ Reuse excavated arisings to create hibernacula in the form of raised banks within the area. |

[1] The assessment includes a description of the nature and quantity of materials and natural resources expected to be used during the construction and operational phases of the proposed Scheme; this approach has been based on the **Scoping Opinion (Appendix 1.2)** provided by PINS.
[2] In accordance with the IEMA Guide (see **13.5** below) Sections 9.2 – 9.4.

| Element scoped out | Phase | Justification |
|---|---|---|
| | | It is anticipated that the management of site arisings would generate minimal waste, particularly as it is expected that only unsuitable arisings would be taken off site to be treated prior to waste management. Therefore impacts and effects associated with activities on this land are considered to be minimal, and not significant. |
| Impacts and effects of the measures proposed in the Off-Site Habitat Provision Area | Construction<br>Operation | Ecological enhancement measures proposed in the Off-Site Habitat Provision area would include:<br>~ Potential enhancement of woodland to good condition, through management measures, including control of invasive non-native species and coppicing; and<br>~ Stripping or inverting top layer of soil from the disused arable land within Fallow Field (equates to 7,260 $m^3$).<br>It is expected that the woodland management measures would generate minimal vegetation waste; the coppiced timber is likely to be retained within the woodland. Therefore, impacts and effects associated with activities on this land are considered to be minimal, and not significant. |

## Elements Scoped into the Assessment

### Construction Phase

13.4.4. **Table 13.3** shows the elements which are considered to have the potential to give rise to likely significant effects during construction of the Proposed Scheme. It is these elements that have therefore been considered within this assessment.

**Table 13.3 - Impacts Scoped In for Further Assessment**

| Element scoped in | Phase | Justification |
|---|---|---|
| Consumption of material resources associated with the construction of the Proposed Scheme | Construction (including any site preparation, remediation and groundworks) | To assess the potential impacts of the Proposed Scheme on regional material resource availability, whilst taking into account the reuse of site won materials and products with recycled / secondary content. |
| Disposal and recovery of waste associated with the construction of the Proposed Scheme | Construction (including any site preparation, remediation and groundworks) | To assess the potential impacts of the Proposed Scheme on existing landfill capacity. |

### Operational Phase

13.4.5. **Table 13.4** shows the elements which are considered to have the potential to give rise to likely significant effects during operation of the Proposed Scheme; these elements have therefore been included within this assessment.

**Table 13.4 - Impacts Scoped In for Further Assessment**

| Element scoped in | Phase | Justification |
|---|---|---|
| Potential impacts from waste process chemicals, e.g., amine-loaded sludge | Operation | Based on the **Scoping Opinion (Appendix 1.2)** from PINS, impacts from waste process chemicals have been scoped into the assessment. The ES therefore includes a description (in Operational Waste) of potential impacts arising from waste derived |

| Element scoped in | Phase | Justification |
|---|---|---|
| | | from the use of process chemicals (see **Table 13.21**) and an assessment of the potential for significant effects. |
| Disposal and recovery of waste associated with the Proposed Scheme beyond the first year of operation | Operation | To assess the potential impacts of the Proposed Scheme on existing landfill capacity. |

## 13.5. ASSESSMENT METHODOLOGY

13.5.1. The IEMA Guide to Materials and Waste in EIA ('IEMA Guide') (Institute of Environmental Management and Assessment, 2020) has been used to assess the potential impacts and effects from the Proposed Scheme, using the process and significance criteria it sets out. Method W1 (Void Capacity, as detailed in the IEMA Guide) has been used to best reflect the scale and nature of the Proposed Scheme.

13.5.2. In accordance with the IEMA Guide, the assessment is a quantitative exercise that aims to identify the:

- **a.** Type and volume of materials to be consumed by the Proposed Scheme, including details of any recycled materials content;
- **b.** Type and volume of waste to be generated by the Proposed Scheme, with details of planned recovery and / or disposal method (for example on-site reuse, off-site recycling, disposal to landfill);
- **c.** Cut and fill balance; and
- **d.** Details of any materials to be specified, where sustainability credentials (particularly those that improve resource efficiency) afford performance beyond expected industry standards.

13.5.3. The sensitivity of materials relates to the regional (and where justified, national) availability and type of resources to be consumed by the Proposed Scheme. The sensitivity of waste relates to the availability of regional (and where appropriate, national) landfill void capacity, in the absence of the Proposed Scheme and future provision.

13.5.4. The magnitude of impacts from the Proposed Scheme that have been considered in the assessment include:

- **a.** Anticipated reductions in availability (stocks, production and / or sales) of materials regionally and nationally; and
- **b.** Anticipated reductions in the landfill void capacity of regional and national infrastructure.

13.5.5. The likely types and estimated quantities of material resources required (including site arisings generated) for the Proposed Scheme have been assessed. Impacts and effects have been evaluated at a regional (and where justified, national) level, in accordance with available information.

13.5.6. The likely types and estimated quantities of waste to be generated by the Proposed Scheme have been assessed. Impacts are evaluated against the capacity of regional (or if appropriate, national) landfill infrastructure.

13.5.7. As stated in **Table 13.2**, due to uncertainties relating to future technologies and infrastructure, it is not possible to proportionally assess impacts during decommissioning. There is also no methodology set out in the IEMA Guide for the assessment of likely impacts and effects from decommissioning. In addition, there is no data on likely materials and waste that would be expected; collection and validation of this data would be disproportionate to the EIA process.

## ASSESSMENT OF SIGNIFICANCE

13.5.8. For the purposes of this assessment, Method W1 (void capacity), as set out in the IEMA Guide, has been used.

### Sensitivity

13.5.9. The criteria for assessing sensitivity of materials and waste is set out in **Table 13.5**. The information provided is based on information in Section 10.2 of the IEMA Guide (Institute of Environmental Management and Assessment, 2020). The sensitivity of materials will be determined by identifying where one or more of the criteria from the following thresholds are met.

13.5.10. The sensitivity of waste is determined by considering the baseline / future baseline of regional (or where justified, national) landfill void capacity across the construction phase, refer to **Table 13.5** below.

**Table 13.5 - Materials and Waste Sensitivity Criteria**

| Sensitivity | Materials criteria<br>*On balance, the key materials required for the construction and / or operation of the Project…* | Inert and non-hazardous waste criteria<br>*Landfill void capacity is expected to…* | Hazardous waste criteria<br>*Landfill void capacity is expected to…* |
|---|---|---|---|
| Negligible | …are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock;<br>**and / or**<br>…are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials* | ...remain unchanged or is expected to increase through a committed change in capacity. | ...remain unchanged or is expected to increase through a committed change in capacity. |
| Low | …are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock;<br>**and / or**<br>…are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials. | ...reduce minimally: by <1% as a result of wastes forecast. | ...reduce minimally: by <0.1% as a result of wastes forecast. |
| Medium | …are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock;<br>**and / or**<br>…are available comprising some sustainable features and benefits compared to industry-standard materials. | ...reduce noticeably: by 1-5% as a result of wastes forecast. | ...reduce noticeably: by 0.1-0.5% as a result of wastes forecast. |
| High | …are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock;<br>**and / or**<br>…comprise little or no sustainable features and benefits compared to industry-standard materials. | ...reduce considerably: by 6-10% as a result of wastes forecast. | ...reduce considerably: by 0.5-1% as a result of wastes forecast. |
| Very High | …are known to be insufficient in terms of production, supply and / or stock;<br>**and / or**<br>…comprise no sustainable features and benefits compared to industry-standard materials. | ... reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand. | ... reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand. |

| **Sensitivity** | **Materials criteria**<br>***On balance, the key materials required for the construction and / or operation of the Project…*** | **Inert and non-hazardous waste criteria**<br>***Landfill void capacity is expected to…*** | **Hazardous waste criteria**<br>***Landfill void capacity is expected to…*** |
|---|---|---|---|
| Notes | * Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that:<br>~ Comprise reused, secondary or recycled content (including excavated and other arisings);<br>~ Support the drive to a circular economy; or<br>~ In some other way reduce lifetime environmental impacts. | | |

### Receptor Value / Sensitivity

#### Magnitude

13.5.11. **Table 13.6** sets out the criteria for assessing the magnitude of impact from materials and waste. The table articulates information set out in Section 10.3 of the IEMA Guide (Institute of Environmental Management and Assessment, 2020). The magnitude of impact from materials uses a percentage-based approach that determines the influence of materials consumption on the baseline market capacity (production, stocks or sales), in construction or operation, in combination with the potential to sterilise one or more allocated mineral site.

13.5.12. The magnitude of impact from waste is assessed by determining the percentage of the remaining landfill void capacity that will be depleted by waste produced during the construction and operational phases of the development.

**Table 13.6 - Materials and Waste Magnitude Criteria**

| **Magnitude** | **Materials Criteria**<br>**The assessment of the Project is made by determining whether the consumption of…** | **Inert and non-hazardous waste criteria**<br>**The percentage depletion of remaining landfill void capacity** | **Hazardous waste criteria**<br>**The percentage depletion of remaining landfill void capacity** |
|---|---|---|---|
| No change | ...no materials are required. | Zero waste generation and disposal from the development. | Zero waste generation and disposal from development |
| Negligible | ...no individual material type is equal to or greater than 1% by volume of the regional* baseline availability. | Waste generated by the development will reduce regional* landfill void capacity baseline[$] by <1%. | Waste generated by the development will reduce national landfill void capacity baseline[$] by <0.1% |
| Minor | ...one or more materials is between 1-5% by volume of the regional* baseline availability;<br>and / or<br>the development has the potential to adversely and substantially[#] impact access to one or more allocated mineral site (in their entirety), placing their future use at risk. | Waste generated by the development will reduce regional* landfill void capacity baseline[$] by 1-5%. | Waste generated by the development will reduce national landfill void capacity baseline[$] by <0.1-0.5% |
| Moderate | ...one or more materials is between 6-10% by volume of the regional* baseline availability;<br>and / or<br>one allocated mineral site is substantially[#] sterilised by the development rendering it inaccessible for future use. | Waste generated by the development will reduce regional* landfill void capacity baseline[$] by 6-10%. | Waste generated by the development will reduce national landfill void capacity baseline[$] by <0.5-1% |
| Major | ...one or more materials is >10% by volume of the regional* baseline availability;<br>and / or<br>more than one allocated mineral site is substantially[#] sterilised by the development rendering it inaccessible for future use. | Waste generated by the development will reduce regional* landfill void capacity baseline[$] by >10%. | Waste generated by the development will reduce national landfill void capacity baseline[$] by >1% |
| Notes | * or where justified, national.<br>[#] justified using professional judgement, based on the scale and nature of the allocated mineral site being assessed.<br>[$] forecast as the worst-case scenario, during a defined construction phase. | | |

### Significance Criteria

13.5.13. In accordance with Section 11 of the IEMA Guide, the significance of effects from materials and waste will be determined by comparing sensitivity and magnitude within the matrix provided in **Table 13.7**.

**Table 13.7 - Matrix to Assign Significance of Effect Category**

| | | Sensitivity of receptor | | | | |
|---|---|---|---|---|---|---|
| | | **Negligible** | **Low** | **Medium** | **High** | **Very high** |
| **Magnitude of impact** | **No change** | Neutral | Neutral | Neutral | Neutral | Neutral |
| | **Negligible** | Neutral | Neutral or slight | Neutral or slight | Slight | Slight |
| | **Minor** | Neutral or slight | Neutral or slight | Slight | Slight or moderate | Moderate or large |
| | **Moderate** | Neutral or slight | Slight | Moderate | Moderate or large | Large or very large |
| | **Major** | Slight | Slight or moderate | Moderate or large | Large or very large | Very large |

13.5.14. Effects that are classified as moderate, large or very large are considered to be significant, for both materials and waste. Effects classified as slight or neutral are considered to be not significant in either case.

## METHOD OF BASELINE DATA COLLECTION

### Desk Study

13.5.15. The baseline data collected and presented in this chapter was obtained by desk study, from publicly available data sources, as listed under Guidance and Data.

### Site Visits and Surveys

13.5.16. For the purpose of this assessment, no site visits or surveys were required.

### Guidance and Data

13.5.17. The following guidance is applicable to the assessment of materials and waste:

**a.** IEMA (2020) Materials and Waste in Environmental Impact Assessment (Institute of Environmental Management and Assessment, 2020).

13.5.18. The following guidance is applicable to the assessment of waste during the operational phase of the Proposed Scheme:

**a.** Waste Duty of Care: Code of Practice (2018) (HM Government, 2018); and

**b.** British Standards Institution (2005) BS5906:2005 Waste management in buildings – Code of practice (BSi, 2005).

13.5.19. The following data sources have been used during the preparation of this chapter:

**a.** Monthly Bulletin of Building Materials and Components (Department for Business, Energy & Industrial Strategy, 2020);

**b.** Yorkshire and Humber Aggregates Working Party Annual Aggregates Monitoring Report 2017 (Yorkshire and Humber Aggregates Working Party, 2018);

**c.** Mineral Products Association, Profile of the UK Mineral Products Industry, 2021 Edition (Mineral Products Association, 2020);

**d.** United Kingdom Steel Production 1969-2020 Data, 2021-2022 Forecast, Historical (Online) (UK Steel Production, 2021);

**e.** North Yorkshire Minerals and Waste Joint Plan 2015-2030 (Adopted February 2022) (NYCC, 2022);

**f.** North Yorkshire Minerals and Waste Joint Plan Interactive Policies Map (NYCC, 2021);

**g.** Natural England MAGIC mapping website (DEFRA, 2021);

**h.** Department for Environment, Food and Rural Affairs (DEFRA), Basis of the UK BAP target for the reduction in use of peat in horticulture – SP0573 (2009) (DEFRA, 2009);

**i.** DEFRA (July 2021) UK Statistics on Waste (DEFRA, 2021);

**j.** Directive 2008/98/EC of the European parliament and of the council of 19 November 2008 on waste and repealing certain directives. The European Parliament and the Council of the European Union (2008);

**k.** Environment Agency, Waste Data Interrogator (2020) Waste Management Information 2020: Yorkshire and the Humber (Environment Agency, 2020);

**l.** Environment Agency, Waste Data Interrogator (2020) Waste Management Information 2020: England (Environment Agency, 2020); and

**m.** Environment Agency, Remaining landfill capacity, England – Version 2 (2020) (Environment Agency, 2020).

## Assessment Assumptions and Limitations

13.5.20. The following assumptions and limitations apply to this chapter:

### Assumptions

**a.** The assessment of effects on material assets and landfill void capacity is based upon collated information, including third party data, which is assumed to be valid;

**b.** As described in **Chapter 2 (Site and Project Description)** the Applicant has full planning permission for the demolition of the redundant Flue Gas Desulphurisation (FGD) Plant and associated restoration works at Drax Power Station (2020/0994/FULM). The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, which has therefore been considered as part of the baseline of the assessment, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. The demolition of Units 1, 2 and 3 are assessed in **Chapter 18 (Cumulative Effects)** of this ES (document reference 6.1.18). For the purposes of this assessment, it is assumed that the arisings from the demolition works of Absorber Units 4, 5 and 6 have been removed, and site levels approximating levels to the underside of slab. However, an allowance has been made for removal of a nominal 100 mm stripping of the surface layer material to allow commencement, with a view to disposal of this material, which is included in this assessment. It is estimated that this stripping would result in a total of 11,374 tonnes of earthworks;

**c.** In line with existing waste policies implemented at Drax Power Station, waste streams will be segregated to prevent cross contamination and to maximise recovery;

**d.** Detailed construction information is not yet available for the Proposed Scheme and this assessment therefore draws on the professional experience of the assessor of other similar projects.

**Limitations**

**a.** For Material Assets, the assessment baseline uses the most recent available published data, which is up to and including 2020 (unless stated otherwise). Future trends are not available for scrutiny and are – at the time of publication – generally accepted to be relatively unpredictable (particularly with supply chain impacts resulting from COVID-19);

**b.** For waste, baseline data and publicly available information for the assessment (unless otherwise stated) use data up to and including 2021;

**c.** Landfill operators can claim commercial confidentiality for their landfill data at time of submission to the Environment Agency; data for sites with a commercial confidentiality agreement in place are therefore unavailable for the analyses presented in this chapter. As publicly available data from the Environment Agency has been used to inform the assessment, any absence of data through confidentiality agreements are considered unlikely to materially affect the findings of this chapter; and

**d.** The materials and construction waste data used for this assessment were taken from a Bill of Quantities (BoQ) prepared in July 2021 by the Applicant. The data is not expected to be affected by changes to the construction programme and only include key material resources required for construction.

## 13.6. STUDY AREA

13.6.1. The study areas that are applicable to the Proposed Scheme are as defined in Section 9.7 of the IEMA Guide:

**a.** The Development Study Area comprises the extent of the scheme footprint and any areas required for temporary access, site compounds, working platforms and other enabling activities (herein, the Order Limits); and

**b.** The Expansive Study Area extends to the availability of construction materials and the capacity of waste management facilities within the UK and the Yorkshire and the Humber region of England (Humberside, North Yorkshire, South Yorkshire and West Yorkshire).

## 13.7. BASELINE CONDITIONS

13.7.1. This section describes baseline material consumption and waste disposal for the current land use and provides regional / national information and data in the context of which environmental assessment can be undertaken.

### EXISTING BASELINE

13.7.2. This section is structured as follows:

#### Materials

13.7.3. The baseline for materials consumption:

**a.** Is determined by the materials currently required for the existing land use and assets; and

**b.** Provides regional and national information and data for material resource availability, in terms of construction materials typically required for this type of scheme.

#### Site Arisings

13.7.4. The baseline for site arisings:

**a.** Is determined by the resources and waste generated through excavation, construction, demolition and other activities on the existing land use and assets; and

**b.** Provides regional and national information and data for existing transfer, recovery and recycling waste management facilities.

#### Waste

13.7.5. The baseline for waste:

**a.** Is determined by the waste generated and disposed of by the existing land use and current assets; and

**b.** Provides regional / national information and data for landfill capacity currently available.

## MATERIALS

### Materials Currently Required

13.7.6. The operation and maintenance of the current assets within the Order Limits will require a number of minor products e.g., lighting, paint, as well as the intermittent use of bulk products for routine works and repairs of the existing buildings, plant, fencing, ancillary infrastructure and access roads (concrete, masonry, timber, aggregate and asphalt for minor re-surfacing).

13.7.7. Although no specific data is currently available on materials required for the maintenance of the existing assets, professional judgement can be used to assert that by comparison with regional and national availability of resources, consumption of construction and other routine materials by the Proposed Scheme is minimal.

### Availability of Construction Materials

13.7.8. **Table 13.8** provides a summary of the availability of the main construction materials in the Yorkshire and the Humber region (Humberside, North Yorkshire, South Yorkshire and West Yorkshire) and the UK (Department for Business, Energy & Industrial Strategy, 2020), (Yorkshire and Humber Aggregates Working Party, 2018), (Mineral Products Association, 2020), (UK Steel Production, 2021).

**Table 13.8 - Bulk Construction Materials availability in Yorkshire and the Humber Region and the UK**

| Material Type | Yorkshire and the Humber | UK |
|---|---|---|
| Sand and gravel * | 2.3 million tonnes (Mt) | 59.1 Mt (GB) |
| Permitted crushed rock * | 11.5 Mt | 116.5 Mt (GB) |
| Concrete blocks # | 2 million square metres ($Mm^2$) (North) (2020) | 6 $Mm^2$ (GB) (2020) |
| Primary aggregate * | 13.8 Mt | 198.8 Mt |
| Recycled and secondary aggregate + \| * | 5.5 Mt (2017) | 71.0 Mt (GB) (2018) |
| Ready-mix concrete * | 1.2 million cubic metres ($Mm^3$) | 24.7 $Mm^3$ |
| Steel + | (no data) | 7.2 Mt |
| Asphalt * | 2.1 Mt | 27.4 Mt |

*# stocks + production * sales*
*Data availability: 2019 unless otherwise stated*
*GB: Great Britain (England, Wales and Scotland) figures used where UK figures (including Northern Ireland) are unavailable*

13.7.9. Based on publicly available data, across the UK, the availability of materials typically required for construction schemes, indicates that stocks / production / sales remain buoyant, although information on steel production is not currently available for the Yorkshire and the Humber region. Whilst it is recognised that COVID-19 continues to adversely impact construction supply chain security, no definitive data in this context is available for this ES.

13.7.10. For the purposes of this assessment, any interruptions to the supply chain due to COVID-19 are considered temporary and it is likely that these will have been resolved prior to the year of commencement of construction of the Proposed Scheme (2024).

13.7.11. Where data is available, Yorkshire and the Humber has in general a higher-than-average availability of construction materials when compared with other UK regions. For example, stocks of concrete block and sales of recycled and secondary aggregate are amongst the highest in the UK. The availability (sales) of sand and gravel are, however, lower than the UK average.

13.7.12. The North Yorkshire Minerals and Waste Joint Plan Interactive Policies Map (NYCC, 2021) identifies that the majority of the Drax Power Station Site and the surrounding area overlie both a brick clay Mineral Safeguarding Area (MSA) and a sand and gravel MSA. However, the mineral resources within the Order Limits are noted to be already constrained by existing infrastructure; this has been taken into account as part of the environmental assessment of the potential for resource sterilisation.

13.7.13. There are no known peat resources (DEFRA, 2021) or active peat extractions (DEFRA, 2009) within or adjacent to the Order Limits.

## SITE ARISINGS

### Site Arisings Currently Generated

13.7.14. The current land use within the Order Limits is expected to generate minimal volumes of site arisings, limited to surplus materials produced during minor repair works on existing power plant infrastructure and access roads; some of these arisings would be expected to be diverted from landfill. Although no data is currently available, it is anticipated (using professional judgement on the scale and nature of the present site) that the existing generation of site arisings at the Drax Power Station Site is minimal.

### Existing Waste Transfer, Recovery and Recycling Management Facilities

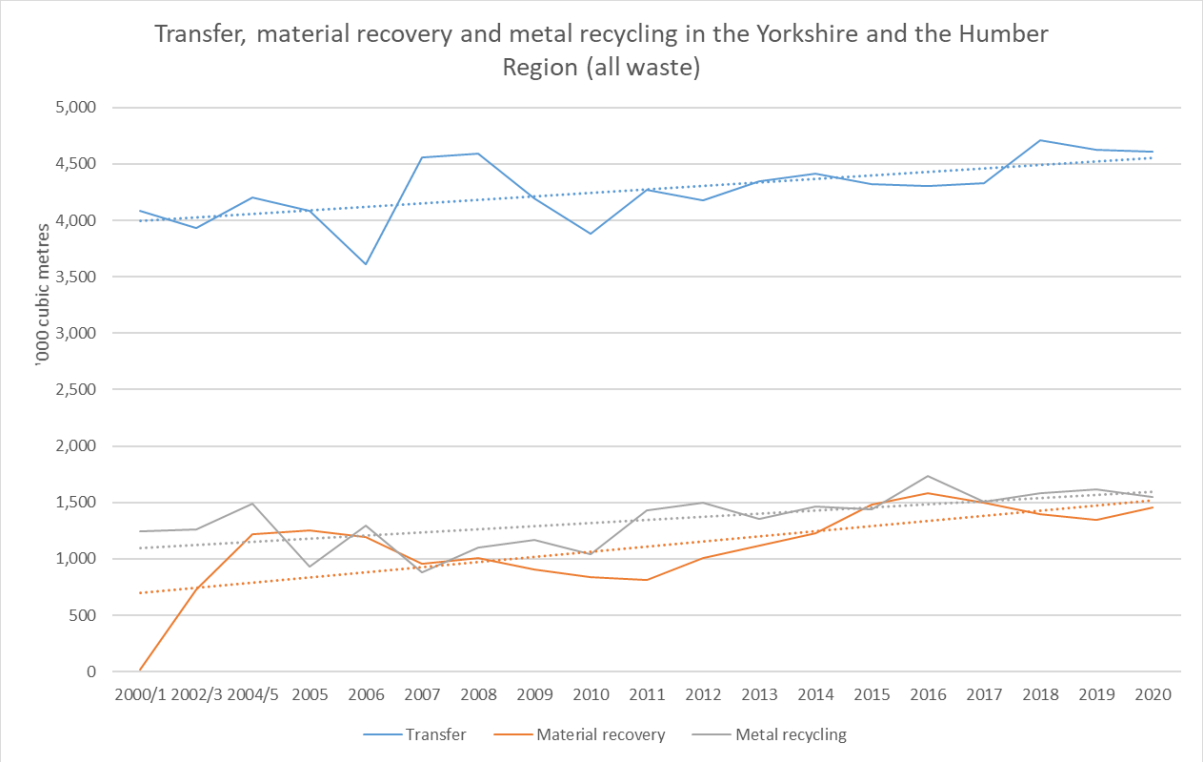
13.7.15. DEFRA data (DEFRA, 2021) reproduced in **Table 13.9** shows that within England, the recovery rate for non-hazardous construction and demolition wastes has remained above 90% since 2010. This exceeds the EU target of 70% (by weight), which the UK was required to meet by 2020. This target excludes naturally occurring materials: specifically, those that fall under category 17 05 04 in the list of waste defined as non-hazardous soils and stones (EU, 2008).

**Table 13.9 - 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% |
| 2017 | 62.2 | 57.9 | 93.1% |
| 2018 | 61.4 | 57.5 | 93.8% |
| Note: DEFRA's 2021 update of the data in this table did not extend the data range beyond 2018 | | | |

13.7.16. Environment Agency data (Environment Agency, 2020) in **Plate 13.1** has been collated to show that trends for waste recovery in the region have risen steadily over the past 20 years. Data is provided for all waste types in Yorkshire and the Humber and hence will include, but are not specific to, construction, demolition and excavation wastes.

### Plate 133.1 - Transfer, Materials Recovery and Metal Recycling in Yorkshire and the Humber Region (2000/1 – 2020)



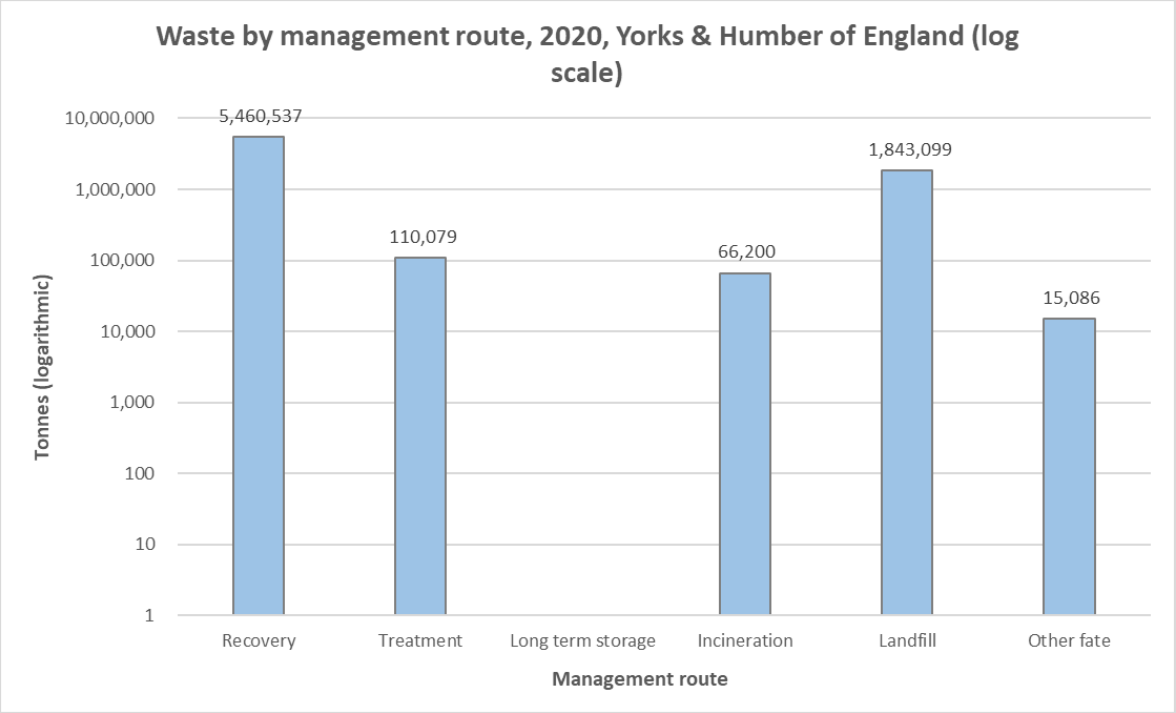

13.7.17. Linear trends (shown as dashed lines on the graph) for transfer, recovery and metal recycling in Yorkshire and the Humber indicate that there is likely to be regional infrastructure and capacity for managing construction, demolition and excavation wastes from the Proposed Scheme. The data in **Table 13.10** reinforces this assertion (Environment Agency, 2020).

### Table 13.10 - Permitted Waste recovery sites in Yorkshire and the Humber Region (2020)

| Waste recovery facility type | Number of sites |
|---|---|
| Incineration | 27 |
| Transfer | 359 |
| Treatment | 357 |
| Metal recovery | 342 |
| Use of waste | 0 |
| Total | **1,085** |

13.7.18. Regional data for construction and demolition waste is presented in **Plate 13.2** based on analysis of publicly available information in the Waste Data Interrogator (Environment Agency, 2020).

### Plate 133.2 - Construction and Demolition Waste Management by Route for the Region




13.7.19. Environment Agency data in **Plate 13.2** shows that the volume of waste recovered, including treatment and incineration, was three times the volume of waste sent to landfill in the region in 2020. This is confirmed by data in **Table 13.11** which shows that in 2020, 75% of waste received in the region was diverted from landfill through waste management and recovery methods. Data includes the total waste received from both within Yorkshire and the Humber and from other regions in the UK.

### Table 13.11 - Waste Management Routes for Waste Received in Yorkshire and the Humber (2020)

| Waste Management Route | Inert and non-hazardous waste (tonnes) | Hazardous waste (tonnes) | Total waste (tonnes) | Percentage |
|---|---|---|---|---|
| Recovery | 5,623,347 | 13,468 | 5,636,815 | 75% |
| Landfill | 1,802,577 | 40,523 | 1,834,099 | 25% |
| Other fate | 15,086 | - | 15,086 | 0% |
| Totals | **7,441,010** | **53,991** | **7,495,001** | **100%** |

13.7.20. The charts and data presented in this section confirm the availability of waste management facilities in the region, that are expected – subject to data provision – to enable suitable recovery of site arisings generated by the Proposed Scheme.

13.7.21. The North Yorkshire Minerals and Waste Joint Plan (herein MWJP) (adopted by NYCC in February 2022) (NYCC, 2022) has identified that construction, demolition and excavation (CDE) arisings currently form a significant proportion of total waste arisings across the North Yorkshire sub-region; projections forecast CDE arisings will reach 920,306 tonnes by 2030.

13.7.22. The MWJP raises the potential of capacity shortfalls at waste recovery facilities in relation to the MWJP timeframe (until 2030), where – if trends cannot be abated – additional waste management facilities will be required for CDE arisings. The MWJP identifies (through the Waste Arisings and Capacity Assessment 2016) an expected capacity gap for recycling of CDE waste of approximately 470,000 tonnes per year by 2030.

13.7.23. The MWJP sets out expectations for waste management practices, with a target of achieving (under a maximised recycling scenario) 5% or less CDE waste to landfill by 2020. Further to this, Policy W05 outlines aims to meet CDE waste capacity requirements, whilst Policy M11 encourages the management of CDE waste with an emphasis on reuse and recycling in accordance with the Waste Hierarchy. Policy W05 states that where this is not achievable, expansions to existing suitable waste recycling and treatment facility sites will be permitted subject to location and development management policies outlined in Policies W10 and W11.

## WASTE

### Waste Currently Generated and Disposed

13.7.24. Information on Commercial and Industrial (C&I) waste generation in England is currently provided in the UK Statistics on Waste report (DEFRA, 2021). Whilst this report does not provide a regional breakdown of C&I arisings, it states that approximately 37.2 million tonnes of C&I waste was generated in England in 2019. C&I waste accounted for 19% of total waste generation in the UK in 2018.

13.7.25. C&I waste is generated by business and industrial activity and will therefore occur relatively widely within the study area, with a particular concentration in more urbanised areas. C&I waste can include a wide range of discarded assets, due to the variety of sources from which it is generated. Certain elements of the C&I waste stream, such as mixed ordinary C&I waste, can be very similar to household waste and can often be dealt with through similar treatment and disposal processes.

13.7.26. The MWJP (NYCC, 2022) states that an important exception to this is the Power and Utilities sector, which comprises a large proportion of total C&I waste in North Yorkshire. Historically, the majority of this waste arose in the form of power station ash from electricity generation. However, since Eggborough power station closed in 2018 and with the Drax Power Station now converted almost entirely to biomass, volumes of power station ash have reduced significantly.

13.7.27. C&I waste can also contain hazardous substances, which require management at specialist facilities. There is currently no dedicated hazardous landfill capacity in North Yorkshire.

13.7.28. The MWJP estimates that 322,872 tonnes of C&I waste were generated in 2014, however, this excludes large volumes of power station ash from the Drax Power Station and Eggborough Power Stations deposited at private disposal facilities at Barlow and Gale Common ash disposal sites.

13.7.29. C&I waste is currently collected within the study area by a large number of private waste companies. Accordingly, there is also a considerable network of waste facilities that are used to bulk, transfer, treat and dispose of C&I waste.

13.7.30. Waste generated for disposal to landfill from activities currently undertaken at Drax Power Station comprises a combination of recoverable and non-recoverable wastes from C&I activities associated with the office and welfare buildings, and routine maintenance of the site plant, and associated infrastructure and assets.

13.7.31. The following baseline data is for the current operational waste from the power generation process. It should be noted that ash from the power generation process has not been included, as the Proposed Scheme will have no effect on the volumes of this waste stream generated. The data in **Table 13.2** is presented in tonnes and shows that current waste generation and disposal is minimal in the context of available regional capacity. This evidence is supported by the fact that the Applicant has existing measures in place for the treatment and disposal of by-products through the current operation of the biomass plant, and a current corporate commitment to a 95% landfill diversion rate.

**Table 13.12 - Current Operational Waste from Power Generation Process (tonnes)**

| Waste Route | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % in 2020 |
|---|---|---|---|---|---|---|---|
| Non-hazardous waste (recycled or composted) | 13,621 | 11,689 | 7,138 | 10,940 | 12,206 | 6,928 | 83.7% |
| Non-hazardous waste (energy recovery) | 661 | 881 | 431 | 484 | 505 | 693 | 8.4% |
| Non-hazardous waste (landfilled) | 189 | 201 | 155 | 117 | 230 | 176 | 2.1% |

| Waste Route | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % in 2020 |
|---|---|---|---|---|---|---|---|
| Hazardous waste (recycled composted) | 192 | 99 | 137 | 153 | 167 | 138 | 1.7% |
| Hazardous waste (energy recovery) | 321 | 674 | 297 | 225 | 101 | 308 | 3.7% |
| Hazardous waste (landfilled) | 677 | 607 | 666 | 15 | 494 | 38 | 0.5% |
| **Total waste** | **15,661** | **14,151** | **8,824** | **11,934** | **13,703** | **8,281** | - |

13.7.32. In 2020, the data shows that of the 8,281 tonnes of operational waste generated, 97.4% was diverted from landfill, with only 2.1% being sent to non-hazardous landfill and 0.5% sent to hazardous landfill. This demonstrates the Applicant's ongoing commitment to achieving a 95% landfill diversion rate.

### Remaining Landfill Capacity – Inert and Non-hazardous Waste

13.7.33. Remaining landfill capacity data (Environment Agency, 2020) confirms that at the end of 2020, 40 landfill sites in Yorkshire and the Humber region had 70.7 $Mm^3$ of remaining capacity for inert and non-hazardous waste; this data is presented in **Table 13.3**, which also shows the change in capacity from 2019 to 2020.

**Table 13.13 - Remaining Landfill Capacity in Yorkshire and the Humber (2019-2020)**

| Landfill type | Capacity in 2019 ($m^3$) | Remaining capacity in 2020 ($m^3$) | 2019 to 2020 change in capacity ($Mm^3$) and percentage |
|---|---|---|---|
| Inert | 25,472,383 | 25,040,150 | -0.4 (-1.7%) |
| Non-hazardous (including stable hazardous waste cells) | 44,567,652 | 43,306,457 | -1.3 (-2.8%) |

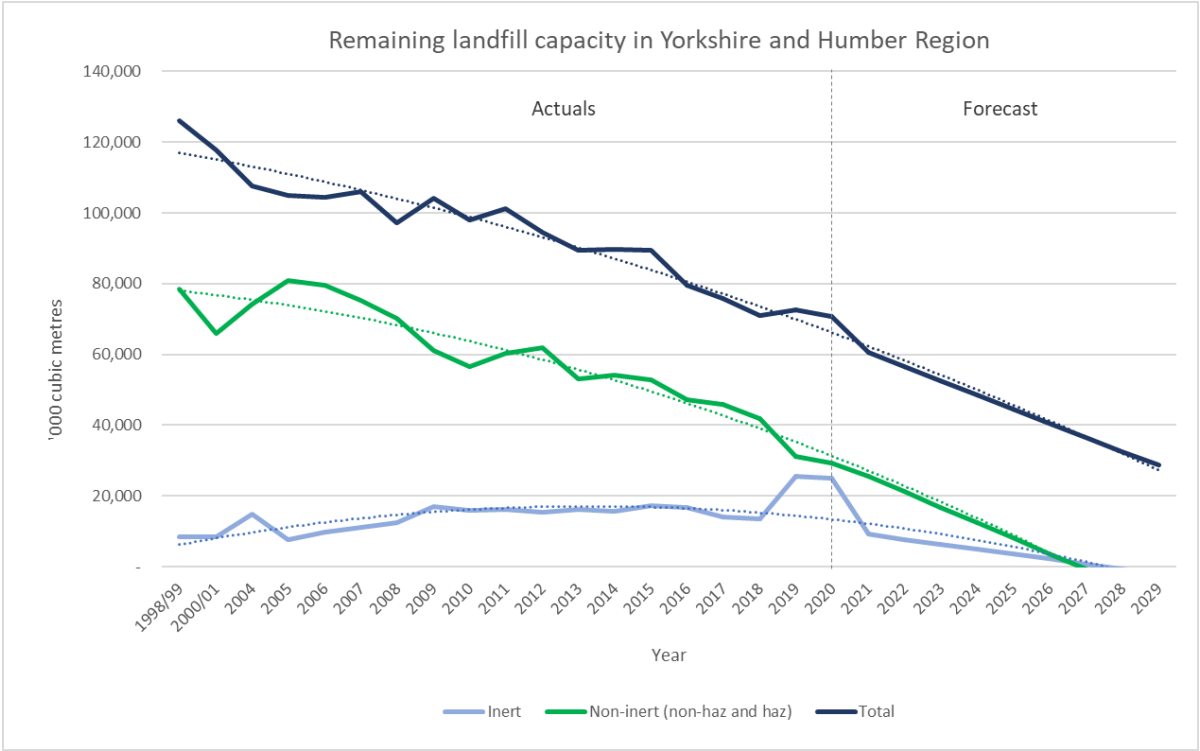
| | | | |
|---|---|---|---|
| **Total** | **72,690,087** | **70,733,221** | **-2.0 (-2.7%)** |

13.7.34. The MWJP has identified a (non-hazardous) landfill capacity shortfall is forecast to occur from 2022, with a maximum capacity deficit of approximately 186,000 tonnes per year by 2030 (the plan timeframe).

13.7.35. The MWJP (Policies W01 and W05) (NYCC, 2022) includes proposals for the development of additional landfill sites under certain criteria. Locations will include, but are not limited to, expansion of existing landfill sites, previously developed land and mineral extraction sites. At the time of publication, no further information on planned expansions to landfill capacity was available for review.

13.7.36. Baseline regional landfill capacity is outlined in **Plate 13.3**. Simple statistical forecasting (using the Microsoft Excel forecasting function) has been used to demonstrate long term void capacity to the year of Proposed Scheme completion (2029) in the absence of future provision.

**Plate 133.3 - Remaining Landfill Capacity in Yorkshire and the Humber Region**




13.7.37. **Plate 13.3** indicates that in the absence of future provision, inert, non-inert and total landfill capacity is likely to become an increasingly sensitive receptor throughout the duration of the construction phase and in operation. **Plate 13.3** shows that in the absence of future provision, waste capacity in Yorkshire and the Humber region is forecast to reduce from 2020 to 2029 by as much as:

**a.** Inert waste - 100% (no capacity after 2028);

**b.** Non-inert waste (non-hazardous and hazardous) - 100% (no capacity after 2027); and

**c.** Total waste - 59% to 28.6 $Mm^3$.

13.7.38. However, it is important to note that inert landfill capacity nearly doubled from 13.5 $Mm^3$ to 25.5 $Mm^3$ in 2019, as indicated by an isolated peak on the relevant (light blue) line on **Plate 13.3**. As the algorithms in the forecasting tool used in this assessment have been applied to a relatively limited and recent dataset, the sharp increase in capacity in 2019 (achieved through additional provision) has resulted in a trendline that should be treated with a level of caution. In particular, whilst the data in **Plate 13.3** indicates that there would be no remaining capacity by the first year of full operation (2029), the collection and analysis of landfill data will remain instrumental in the accuracy of this assertion.

13.7.39. For the purposes of this assessment, however, it is reasonable and proportionate to – as a minimum – assert that landfill in the UK is recognised as a rapidly diminishing management option for resources, and capacity (in the absence of full data certainty) can be considered – in general – a highly sensitive receptor. It should also be noted however, that it is unlikely that - within the given construction timescales (7-8 years) - landfill capacity will be permitted to decline to zero in the region. This scenario is compounded by the information in **paragraphs 13.7.33 and 13.7.34** which describes how the MWJP has identified a future shortfall in capacity in the region and policies include proposals to develop additional non-inert landfill sites to counter this.

13.7.40. Therefore, in order to determine a robust figure for the assessment, professional judgement has been used to assert a decrease of 80% from current capacity for non-inert waste (29.2 $Mm^3$ in 2020) which would equate to a remaining void capacity of 5.8 $Mm^3$. The value of 80% reduction has been selected on the basis of a balance between total waste reduction (forecast trends indicate 59% capacity loss), the local authority's ambition to maintain a level of disposal capacity, and a worst case scenario of 100% reduction.

### Remaining Landfill Capacity - Hazardous Waste

13.7.41. Further to the regional data provided in **Table 13.13**, and to comply with the IEMA Guide, the following data (Environment Agency, 2020) is presented to confirm that at the end of 2020, England had 15.6 $Mm^3$ of remaining capacity for hazardous (merchant) waste.

**Table 13.14 - Remaining Landfill Capacity in England (2020)**

| Landfill type | Remaining capacity in 2019 ($m^3$) |
|---|---|
| Hazardous merchant | 15,571,171 |
| Hazardous restricted* | 809,640 |
| Total hazardous | **16,380,811** |
| **Restricted landfill sites only accept waste from restricted sources and producers, e.g., site operator / managing site.* | |

### FUTURE BASELINE

13.7.42. In the absence of the Proposed Scheme, the current land use within the Order Limits would be expected to remain the same across the future baseline; this is true for both the construction and operation of the Proposed Scheme. This assertion, in combination with the scale of current infrastructure and operations at the Drax Power Station Site, means that the potential for the consumption of materials resources and the recovery of site arisings in the future baseline, remains minimal. Similarly, the potential for waste generation to landfill in the future baseline is also anticipated to remain very limited.

13.7.43. The MWJP estimates that C&I waste quantities will increase from 327,252 tonnes in 2016 to 336,200 tonnes by 2020; 347,759 tonnes by 2025 and 359,736 tonnes by 2030. It also assumes that 10% or less commercial waste and 18% or less industrial waste would be sent to landfill disposal by 2030. Of the remainder, it assumes at least 65% of C&I waste will be sent for recycling and at least 35% will be sent to Energy from Waste (EfW) facilities by 2030.

13.7.44. The possible exception to these cases is that as the existing infrastructure (plant, equipment, buildings, access roads) ages, increased maintenance and repair work may be required, and even (potentially) demolition / deconstruction activities deployed. The generation of such arisings would in most cases be expected to be temporary and hence would not contribute to long-term impacts.

## 13.8. SENSITIVE RECEPTORS

13.8.1. The following sensitive receptors have been assessed:

a. **Material resources** – consumption impacts on materials' immediate and long-term availability, and results in depletion of natural resources; and
b. **Landfill void capacity** – reductions in regional and national infrastructure result in unsustainable use and loss of resources, and temporary or permanent degradation of the natural environment.

## 13.9. PRELIMINARY ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

13.9.1. This section details the preliminary assessment of significant effects taking account of primary and tertiary mitigation, as described in **Chapter 2 (Site and Project Description)** but in the absence of secondary mitigation. Secondary mitigation for the Proposed Scheme is described in **Section 13.10** below.

13.9.2. Receptors identified as experiencing no change, negligible or minor effects (not significant) during the preliminary assessment of likely impacts and effects have been reported in **Appendix 13.1 (Effects that have been determined to be not significant)** of this ES (document reference 6.3.13.1).

### CONSTRUCTION PHASE

13.9.3. **Table 13.15** summarises potential impacts associated with material consumption and waste generation and disposal during construction. The indirect impacts have been

assessed in the following chapters: **Chapter 7 (Noise and Vibration)**; **Chapter 8 (Ecology)**; **Chapter 9 (Landscape and Visual Amenity)**; **Chapter 11 (Ground Conditions)**; **Chapter 14 (Climate Change Resilience)**; and **Chapter 16 (Population, Health and Socio-economics)**.

**Table 13.15 - Potential environmental impacts during construction**

| Element | Direct Impacts | Indirect Impacts |
|---|---|---|
| Materials | Consumption of natural and non-renewable resources. | ~ Release of greenhouse gas emissions (through transportation)<br>~ Water consumption<br>~ Visual impacts, noise, vibration and other nuisance issues<br>~ Human health |
| Waste | Reduction in landfill capacity. | ~ Release of greenhouse gas emissions (through transportation and management)<br>~ Ecological impacts<br>~ Visual impacts, noise vibration and other nuisance issues |

**Materials**

13.9.4. Key construction materials required for the Proposed Scheme are presented in **Table 13.16**, as based on the BoQ data provided by the Applicant available at the time of publication. The information provided in **Table 13.16** describes the material type and estimated quantity, and any available information relating to the use of the material in the construction of the Proposed Scheme. Material quantities reported in this chapter have been rounded up to the nearest 10 tonnes, where applicable.

13.9.5. Construction site arisings which would be recovered on the Proposed Scheme are presented in **Table 13.17.** Construction waste generated by the Proposed Scheme that cannot be diverted from landfill is presented in **Table 13.18**.

**Table 13.16 - Material resources required for construction**

| Material Assets | Quantity (tonnes unless otherwise stated) | Use of Material in the Proposed Scheme |
|---|---|---|
| Aggregate | 80,620 | Comprises granular material for temporary piling platforms and initial access roads. A |

| Material Assets | Quantity (tonnes unless otherwise stated) | Use of Material in the Proposed Scheme |
|---|---|---|
| | | proportion of this material (approximately 55,600 t) is to be retained on site for use in structural backfill. |
| Asphalt (Bituminous mixtures) | 7,070 | For road base and surface course. |
| Concrete | 119,890 | This includes reinforced concrete for structures, foundations, piling and pre-cast concrete for drainage and kerbing materials. |
| Earthworks (imported material) | 210,080 | Used for fill material. |
| Steel | 4,730 | Used in concrete reinforcement, sheet piling and pipe systems / racks, base plates and connections. |
| Plastics (excluding packaging) | 80 | Drainage pipework and cable ducts. |
| Woven geotextile filter fabric | 3 | Used for drainage filtration. |
| Cabling | 59,115 m | Power cables. |

13.9.6. Further to the information and caveats detailed in **paragraphs 13.7.9 and 13.7.10** (which are based on the baseline data concerning the availability of bulk material resources within the Yorkshire and Humber region, and nationally, at the time of writing), it can be asserted there are currently no significant issues regarding material supply and stock.

13.9.7. Information on sustainable features of materials (such as recycled or secondary content), is limited to the reuse of imported aggregate and earthwork arisings on the Proposed Scheme. Using professional judgement to apply the criteria set out in **Table 13.5**, the sensitivity of material resources is therefore considered Low**.**

13.9.8. Where data is available, and as reported in the Baseline (**Section 13.7**), the percentage of natural resources that would be consumed by the Proposed Scheme has been calculated and is presented in **Table 13.17**Error! Reference source not found..

**Table 13.17 - Material resource consumption**

| Material | Production / sales data for the region* (Million tonnes) | Scheme requirements (tonnes) | Percentage of resource consumed by the Proposed Scheme |
|---|---|---|---|
| Primary aggregate | 13.8 | 80,620 | 0.6% |
| Ready-mix concrete | 2.9 | 119,890 | 4% |
| Asphalt | 2.1 | 7,065 | 0.4% |
| Steel* | 7.2* | 4,730 | <0.1%* |
| *Nationally where regional data unavailable | | | |

13.9.9. Based on the criteria set out in **Table 13.6**, using professional judgement, and taking into account the nature and scale of the Proposed Scheme, the magnitude for material resources consumption is therefore considered Minor, due to the expected consumption of ready-mix concrete being between 1-5% by volume of the regional baseline availability.

13.9.10. It is therefore considered that material resource consumption by the Proposed Scheme would have a **slight adverse** (**not significant**) effect.

**Site Arisings**

13.9.11. The quantity of earthworks cut, and the proportion identified for reuse on the Proposed Scheme, obtained from the BoQ, is summarised in **Table 13.18**.

**Table 13.18 - Site arisings generated and reused during construction**

| Arisings | Quantity (tonnes unless otherwise stated) | Comments |
|---|---|---|
| Cut weight | 474,850 | The volume of material anticipated to be excavated to facilitate construction. |
| Earthworks (reused arisings from | 365,850 | Earthworks from excavations are to be reused on the Proposed Scheme, where suitable e.g. recompacting them as backfill for piling, drainage and cabling. |

| Arisings | Quantity (tonnes unless otherwise stated) | Comments |
|---|---|---|
| earthworks cut) | | |
| Aggregate | 55,600 | Comprises granular material initially used for temporary piling platforms and laydown areas. Following removal of the temporary platforms, this material is to be retained and reused on site for use as structural backfill. |

### Waste

13.9.12. Forecasts for construction waste are given in **Table 13.19,** based on data provided in the BoQ by the Applicant. Additional waste types (hazardous waste and general construction waste) have been included in the list as, based on professional judgement, they are expected to be generated.

13.9.13. A range of potential ground contaminants of concern have also been identified in the assessment in **Chapter 11 (Ground Conditions),** including – but not limited to - petroleum hydrocarbons, heavy metals, asbestos, pathogens and pesticides. It is anticipated that contaminants found during the construction phase would be remediated in accordance with applicable legislation and good practice guidance, through implementation of measures defined in the Construction Environmental Management Plan (CEMP).

**Table 13.19 - Forecast waste management during construction**

| Excavated and other materials | Quantity (tonnes unless otherwise stated) | Management process identified |
|---|---|---|
| Aggregate | 25,020 | Surplus granular material imported for temporary piling platforms. This material could be recovered for reuse on other schemes, though this has not yet been confirmed conclusively. For the purposes of the assessment, therefore, a worst-case scenario of 'landfill' has been applied. |
| Earthworks cut | 109,000 | At the time of writing it has not been confirmed whether this volume of earthworks is to be recovered or disposed of to landfill. The exact quantity would depend on tests that would be conducted |

| Excavated and other materials | Quantity (tonnes unless otherwise stated) | Management process identified |
|---|---|---|
| | | on the material once excavated. All material that is identified as suitable would be stockpiled for reuse on the Proposed Scheme or other construction schemes. For the purposes of the assessment, a worst-case scenario of 'landfill' has been applied. |
| Hazardous waste | Quantity unknown | Hazardous waste would be sent for ongoing processing and management, if it was not possible to treat it for reuse on the Proposed Scheme. |
| Contaminated waste | Undefined | Contaminated waste has not (to date) been identified in the data provided, however, it is best practice that any such waste would be disposed of to a licensed hazardous landfill if it was not possible to treat it for reuse on the Proposed Scheme. |
| General construction waste (packaging, surplus materials / off-cuts) | Quantity unknown at this stage | General construction waste will be reused on the Proposed Scheme, where possible, or sent to an off-site recycling facility. Any waste that cannot be recycled or reused would be disposed of to landfill. |

13.9.14. As stated in the baseline section, the availability of remaining landfill capacity (non-hazardous waste) within the Yorkshire and Humber region is expected to reduce considerably (by >10%) prior to construction completion in 2029. Therefore, using the criteria set out in **Table 13.5**, the sensitivity of non-hazardous waste landfill capacity is considered to be Very High.

13.9.15. Waste anticipated to be disposed of to landfill comprises earthwork and aggregate arisings, hazardous wastes and general construction wastes. The quantity of such waste is currently anticipated to comprise a minimum of 109,000 tonnes earthworks and 20,520 tonnes of aggregate (as set out in **Table 13.18**), plus a 'to be defined' quantity of hazardous and general construction wastes.

13.9.16. A shortfall of remaining landfill capacity has been identified in the MWJP and there are commensurate policies to increase capacity and development of additional landfill sites for non-inert waste is proposed. However, at this stage, the volume of any additional (proposed) capacity is not known.

### Waste Generation: Significance of Effect

13.9.17. Based on the information provided from the BoQ, there is not expected to be any inert waste arisings generated during construction of the Proposed Scheme to be disposed to landfill.

13.9.18. Based on the reduced availability of remaining landfill capacity regionally for non-hazardous waste, it is considered, using the criteria in **Table 13.6**, that the disposal of non-hazardous waste generated by the Proposed Scheme (using the worst-case scenario identified in the baseline section of 5.8 $Mm^3$ remaining landfill capacity) that there would be a minor magnitude of impact. This is because it is not expected that waste generated by the Proposed Scheme will reduce regional landfill void capacity by more than 5% of remaining capacity (290,000 $m^3$ / 362,500 tonnes). Based on the above, it is considered that non-hazardous waste generated by the Proposed Scheme would have a **moderate (significant)** effect.

13.9.19. At the end of 2020, England had 15.6 $Mm^3$ of remaining capacity for hazardous (merchant) waste. Although there is no data for anticipated hazardous (including contaminated) waste to be generated during the construction of the Proposed Scheme, using professional judgement on the scale of the Proposed Scheme against the criteria in **Table 13.6**, it is considered this would result in a **slight (not significant)** effect.

## OPERATIONAL PHASE

13.9.20. The likely impacts for waste associated with the operational phase are set out below. Table 13.20 summarises potential impacts for waste during the operational phase.

**Table 13.20 - Potential Environmental impacts during operation - waste**

| Element | Direct Impacts | Indirect Impacts |
|---|---|---|
| **Waste** | Reduction in landfill capacity. | ~ Release of greenhouse gas emissions (through transportation and management)<br>~ Ecological impacts<br>~ Visual impacts, noise vibration and other nuisance issues |

### Operational - Waste

13.9.21. Estimated annual forecasts for operational solid waste from the Proposed Scheme are provided in **Table 13.21**, mainly extracted from daily data provided by the Applicant in confidential and other formats and extrapolated, therein (as described in **Table 13.21**). Additional waste types (i.e. recyclable materials, and general waste) have been included in the list as, based on professional judgement, they are

considered likely to be generated from day-to-day activities undertaken by employees.

13.9.22. Gaseous emissions and wastewater are not included in the table, as these have been assessed within **Chapter 6 (Air Quality)** and **Chapter 12 (Water Environment)** respectively.

**Table 13.17 - Forecast Operational Solid Waste Management**

| Operational waste stream | Quantity (tonnes per annum unless otherwise stated) | Management process |
|---|---|---|
| Recyclable materials (e.g., metals, wood / timber, cardboard, paper, plastics) | 771 | Recyclable materials would be segregated, where possible, before being sent to an off-site recycling facility. Any waste that cannot be recycled would be sent for energy recovery or disposed of to landfill. The Applicant has a current commitment to divert 95% of waste from landfill.<br>Note: The Drax Power Station Site generated an average of 10,025 tonnes per year of non-hazardous waste which was recycled / composted between 2018 and 2020 (**Table 13.12** above). With 650 employees, this equated to 15.4 tonnes per employee per year. The estimated quantity for the Proposed Scheme is based on 50 employees. |
| General waste | 57 | General waste that cannot be recycled or reused would be sent for energy recovery or disposed of to landfill. The Applicant has a current commitment to divert 95% of waste from landfill.<br>Note: The Drax Power Station Site generated an average of 735 tonnes per year of non-hazardous waste which was sent for energy recovery or to landfill between 2018 and 2020 (**Table 13.12** above). With 650 employees, this equated to 1.1 tonnes per employee per year. The estimated quantity for the Proposed Scheme is based on 50 employees. |
| Concentrated sludge from the Quench Column (originating from Flue Gas Condensate) | 1,095 | The effluent from the Quench Column contains condensable species (sulphuric and nitric acids) removed from the untreated flue gas. The effluent would be sent to the steam stripping columns and sludge thickening process within the Carbon Capture Wastewater Treatment Plant where it is treated to produce a water stream of suitable quality to be reused as cooling tower system make-up water.<br>The concentrated sludge waste stream would be collected for off-site disposal.<br>Note: quantity based on three tonnes per day and 50% with wastewater. |
| Effluent from the Carbon Dioxide Processing and Compression Plant | Effluent originates from intermittent draining of compressors but is fed back to Solvent Regeneration System process. There is no specific waste stream to be transported off-site from this; any waste is captured within Reclaimed Wastes quantity (see line below) | Effluent streams / drains from the compressors and driers may contain traces of amine solvent and so cannot be discharged to site drains. The effluent streams / drains would be reused within the Solvent Regeneration System process.<br>Note: quantity not known at this stage, but would be defined at Front-End Engineering and Design (FEED) stage. |
| Reclaimed Wastes from Regeneration System | 3,435 | The Reclaimed Wastes from the Regeneration System originate from the reclaimer drum, which would be used to pull out concentrated waste streams from the Solvent Regeneration System process to maintain a water balance within the system. The waste stream from the reclaimer drum would be collected and removed by vacuum truck.<br>Note: reclaimed wastes from the system would originate from four Regenerator units. Calculations for waste streams have been conducted per cycle (based on 160 tonnes in a 17-day cycle) i.e. approximately 9.4 tonnes on average per day. |
| Amine solvent waste (from the Absorber Column) | 2,102 | The amine solvent concentrator process involves the addition of heat (steam) to produce a clean water stream, which is recycled back into the Absorber Column washing section, and a concentrated amine solvent waste stream which cannot be reused within the process. |

| Operational waste stream | Quantity (tonnes per annum unless otherwise stated) | Management process |
|---|---|---|
| | | The concentrated amine solvent waste stream would be temporarily stored on the Drax Power Station Site in storage tanks with appropriate tank containment bunds and in line with Control of Substances Hazardous to Health (COSHH) regulations, before being treated for reuse or transported off-site to an appropriate waste treatment facility.<br>Note: 0.24 tonnes per hour equates to 5.76 tonnes per day total. |
| Cake from Precoat Filter Unit | 37 | It is best practice that any such waste would be disposed of to a licensed hazardous landfill.<br>Note: 0.6 tonnes per cycle (based on 6-day cycle) i.e. approximately 0.1 tonnes on average per day. |
| Filter Media | 37 pieces per year | The filter media and its management and / or disposal arrangements are not yet fully defined, but would be at FEED stage. Filter media would be managed in accordance with local arrangements once its composition is known. |
| Dehydration Catalyst | 54 | Disposal process currently not specified, but would be defined at FEED stage.<br>Note: total volume of catalyst waste is 200 $m^3$ per three years i.e. 67 $m^3$ per year. The bulk density of catalyst is estimated by the Applicant's supplier to be 800 kg per $m^3$. |
| $O_2$ Removal Catalyst | 5 | Disposal process currently not specified, but would be defined at FEED stage.<br>Note: total volume of catalyst waste is 28 $m^3$ per four years i.e. 7 $m^3$ per year. The bulk density of catalyst estimated is by the Applicant's supplier to be 700 kg per $m^3$. |

13.9.23. The forecast quantity of operational solid waste from the Proposed Scheme is approximately 7,556 tonnes per annum. Of this total, the combined 828 tonnes for recyclable materials and general waste would be expected to be non-hazardous waste and the remaining 6,728 tonnes is forecast as hazardous waste.

13.9.24. For the purposes of this assessment, and as referenced from an average across a range of data sourced from the Environmental Association for Universities and Colleges (Sustainability Exchange - EAUC) a conversion factor of 0.60 tonnes per $m^3$ has been applied to both the non-hazardous and hazardous operational waste quantities, in order to estimate the volume. For context, the conversion factor for rock and stone is 1.2 tonnes per $m^3$, for sewage is 1 tonne per $m^3$ and for general waste is 0.27 tonnes per $m^3$: a conversion factor of 0.6 is therefore considered to be a reasonable and conservative estimate.

13.9.25. The volume of non-hazardous operational waste is therefore estimated to be 1,380 $m^3$ per annum. Therefore, the waste generated by the Proposed Scheme in operation will not reduce regional landfill void by more than 1% of remaining capacity (58,000 m3 / 72,500 tonnes).

13.9.26. Based on the data forecast and analysed, the volume of hazardous operational waste is estimated to be 11,213 $m^3$ per annum. Therefore, hazardous waste generated by the Proposed Scheme will not reduce national landfill void by more than 0.1% of remaining capacity (15,600 $m^3$).[3]

13.9.27. As stated in the baseline section, the availability of remaining landfill capacity (non-hazardous waste) within the Yorkshire and Humber region is expected to reduce considerably (by >10%) prior to construction completion in 2029. Therefore, using the criteria set out in **Table 13.5**, the sensitivity of non-hazardous waste landfill capacity is considered to be Very High.

13.9.28. It is noted in the MWJP that a shortfall of remaining landfill capacity has been identified and development of additional landfill sites is proposed. However, at this stage, the volume of any additional (proposed) capacity is not known.

13.9.29. As the estimated volume of non-hazardous operational waste generated by the Proposed Scheme is not expected to reduce regional landfill void capacity by more than 1% and national hazardous waste landfill void capacity by more than 0.1%; the magnitude of impact is in therefore both cases considered to be Negligible.

13.9.30. The significance of effect for operational waste generation (for both non-hazardous and hazardous waste) is therefore assessed to be **slight adverse (not significant)**.

[3] *In the context of this assessment it is important to note that any hazardous waste suitable for landfill disposal would require pre-treatment; this would likely increase the initial volume. In addition, where certain hazardous waste types are prohibited from landfill, they would need to be transferred to other waste facilities, such as incineration plants. In these instances, the volume of hazardous waste sent to landfill would be reduced. Whilst it has not been possible at the time of publication to model the impact of these scenarios, it is a material consideration going forward*

## 13.10. DESIGN, MITIGATION AND ENHANCEMENT MEASURES

13.10.1. This Section sets out the design, mitigation and enhancement measures which are likely to be required to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment.

### DESIGN

13.10.2. Earthworks arisings generated (cut) will be reused during construction, and are anticipated to comprise approximately 365,850 tonnes of resource. This figure may alter depending on the suitability of the resource for reuse once it has been excavated and chemically / geotechnically tested.

### MITIGATION

#### Construction Phase

13.10.3. No significant effects have been identified for materials during the construction phase of the Proposed Scheme, and as a result no mitigation measures are proposed. As stated in **paragraph 13.10.2**, a proportion of earthworks arisings generated (cut) have been identified which can be reused during construction. Where earthworks cannot be reused on the Proposed Scheme, the materials would be stored temporarily until such a time that it can be usefully deployed. The storage location for these arisings would be determined by the contractor and specified in the CEMP, and in accordance with the to-be-implemented Materials Management Plan (MMP) as outlined below.

13.10.4. Where on-site reuse (or other forms of recovery) cannot be achieved, the arisings would be sent for off-site reuse or to licensed recycling facilities.

13.10.5. The reuse of earthworks represents a reduction in the adverse impacts from waste generation during the construction the Proposed Scheme. The resulting diversion of this potential waste from landfill will (in turn) reduce adverse effects on landfill as a sensitive receptor.

13.10.6. A **Register of Environmental Actions and Commitments (REAC)** (document reference 6.5) has been produced for the Proposed Scheme. The **REAC** collates the mitigation relied upon in the EIA in order to manage the environmental impacts of the Proposed Scheme. The mitigation measures within the **REAC** are proposed to be secured via requirements in the **draft DCO**, or by various management plans or strategies, which are themselves secured via DCO requirements. This would include a requirement for a CEMP to be produced for the Proposed Scheme.

13.10.7. The contractor will develop and implement a SWMP and MMP, to drive performance in the highest tiers of Waste Hierarchy as required by the Site environmental permit, thereby maximising reuse, recycling and recovery. This will include testing site arisings to determine suitability for reuse.

13.10.8. Using design forecasts as a baseline, the SWMP would be used to manage and monitor site waste effectively, with the overall objective to reduce waste and potential harm to the environment during construction, and to ensure:

**a.** Scheme performance objectives and targets are met;

**b.** The types and volumes of waste reused, recycled and landfilled are recorded;

**c.** Where the arisings and waste have been reused, recycled and landfilled, both on and off site are identified;

**d.** Waste recovery and disposal facilities that would be used are identified and the details of their permits / licences / exemptions, both on and off site;

**e.** Waste recovery and disposal contractors that would be used are identified and details of waste carriers licence are collated;

**f.** Any waste exemptions are in place in order to enable waste to be reused; and

**g.** Waste transfer documentation captures all waste movements and is accompanied by information required by law.

13.10.9. The MMP forms part of the Contaminated Land: Applications in Real Environments (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 code of practice provides a framework which allows the reuse of excavated materials on-site or their transfer between sites, without being classified as waste and issued to monitor the maximum reuse of both natural soils and Made Ground (contaminated or otherwise). The MMP requires answers to a series of questions including:

**a.** The parties involved;

**b.** Suitably for use criteria;

**c.** Certainty of use;

**d.** Quantity of use;

**e.** Contingency arrangements;

**f.** Tracking and document control; and

**g.** Verification plan.

13.10.10. Arisings would be suitably stockpiled to maximise reuse. The East Construction Laydown Area has been identified for storage of topsoil from the area and for laydown of plant and materials. The redundant limestone and gypsum storage buildings would be used for covered laydown and fabrication of materials.

13.10.11. Stockpiles will be designed to minimise quality degradation, damage and loss of resource. The following considerations will be taken into account in the CEMP: the stockpile location, the underlying soil type and condition, methods for prevention of erosion and leachate generation, and use of appropriate signage.

### Operational Phase

13.10.12. No significant effects have been identified for materials or waste during the operational phase of the Proposed Scheme, and as a result no mitigation measures are proposed.

### Opportunities for Environmental Enhancement

13.10.13. It is recommended that the following best practice design and construction methods should (outside of the formal DCO planning regime) be pursued and implemented to minimise as far as possible impacts from using construction and other materials:

- **a.** Specify material and products that afford higher sustainability performance than typical industry standards e.g., closed loop plasticised cable ducting; low carbon materials (timber), or technology that is powered through renewable energy sources;
- **b.** Maximise the specification and use of recycled and secondary content in imported materials (such as earthworks, aggregate, concrete and asphalt), and agree % material contributions during detailed design;
- **c.** Capture and communicate actions already undertaken (or planned) within the design for deconstruction and disassembly, to encourage reuse and recycling at the assets' end of life. Quantify the expected benefit of these actions, for future reference; and
- **d.** The project team will engage early with contractors to identify possible enhancement and other opportunities to reduce waste through collaboration and regional synergies.

13.10.14. It is recommended that the following examples of best practice should (outside of the formal DCO planning regime) be pursued and implemented, alongside standard waste permit requirements and existing site waste management practices, as part of operations to minimise as far as possible impacts from operational waste:

- **a.** Install water coolers / fountains that are connected to the main water supply, to prevent the need for disposable cups;
- **b.** Clear signage / guidance for staff and contractors about recycling and segregation of waste;
- **c.** Select plant landscaping that requires low maintenance and produces no or less waste;
- **d.** Undertake periodic waste audits and create action plans to set targets for preventing, reducing, reusing and recycling waste types;
- **e.** Purchase products with less or no packaging. Alternatively, request that deliveries be shipped in returnable containers and return the emptied containers back to the suppliers;
- **f.** Create a paperless working environment – printing should be discouraged; and

**g.** Encourage staff to use their own reusable containers for food and drink, and offer reusable plates, cups and cutlery within the on-site canteen for staff and contractors.

## 13.11. ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

13.11.1. This section details the assessment of significant effects taking account of the secondary mitigation detailed in **Section 13.10** above.

13.11.2. **Table 13.22** summarises the environmental effects associated with the Proposed Scheme. At the time of writing, not all waste data was available as the detailed design will not be finalised until after any DCO development consent order is granted; accordingly, and where data are absent, a worst-case (or other justified) scenario has been adopted. It should also be noted that whilst impacts have the potential to change as the EIA progresses and more data becomes available, it is not expected (based on the findings of the assessment to date) that new or worsened significant effects will transpire.

**Table 13.18 - Assessment of Likely Significant Effects**

| Topic | Potential Impacts | Mitigation within Design | Other Committed Measures | Justification following Mitigation | | Significance of Effect | How Measures would be Implemented, Measured and Monitored |
|---|---|---|---|---|---|---|---|
| | | | | Sensitivity | Magnitude | | |
| Waste (Construction Phase) | Generation and disposal of waste.<br>The total volume of forecast site arisings that have been identified for disposal to landfill is estimated at 134,000 tonnes. | Reuse of site won arisings<br>Reuse of imported materials<br>Diversion of waste from landfill through implementation action in the highest tiers of the Waste Hierarchy (in accordance with the Applicant's current commitment to divert 95% of waste from landfill) | Management of stockpiled arisings.<br>Development and implementation of measures within the REAC and CEMP (incorporating a SWMP and MMP). | **Very High**<br>Overall, the baseline sensitivity for non-hazardous waste landfill capacity is determined to be very high due to an expected reduction of regional landfill void capacity (in the absence of any future provision) of >10%. | **Negligible**<br>It is not expected that waste generated by the Proposed Scheme will reduce regional non-hazardous landfill void capacity by more than 1% of remaining capacity (58,000 $m^3$ / 72,500 tonnes). | **Slight** - **Not Significant** | Implementation of CEMP incorporating a SWMP and CL:AIRE compliant MMP |

## 13.12. CUMULATIVE EFFECTS

13.12.1. A detailed assessment of intra-project combined effects and inter-project cumulative effects for the Proposed Scheme has been carried out and is presented in **Chapter 18 (Cumulative Effects)** (document reference 6.1.18) of this ES and **Appendices 18.1 to 18.5** (document references 6.3.18.1 to 6.3.18.5).

13.12.2. As a result of constructing the Proposed Scheme prior to, during, or after other proposed developments within the region, there is potential for cumulative environmental impacts and effects with regard to the depletion of natural resources and the generation of waste.

13.12.3. The majority of other developments that could be constructed prior to, during or after the Proposed Scheme have not, however, quantified the potential types and volumes of natural resource consumption or waste generation; it is not possible at the time of publication, therefore, to robustly determine the significance of any cumulative effect.

13.12.4. Nevertheless, it is reasonable to assert that as part of its regional planning responsibilities, NYCC - in its role as the local Waste Planning Authority – will continue to plan for effective waste management and to ensure sufficient capacity during the planning period. The increasing number and sufficiency of waste management facilities to enable and encourage transfer, treatment, recovery and recycling of waste in the region, further compound this evidence.

13.12.5. Furthermore, and by comparison with the Proposed Scheme, the scale and nature of other proposed developments within the region (as detailed in **Chapter 18 (Cumulative Effects)**) would not be expected to consume considerable additional volumes of resources, or generate considerable additional volumes of waste, during either the construction or operational phases. This would particularly be the case where good and best practice measures for sustainable resource management, are adopted.

13.12.6. Subject to the effective application of these conditions, the cumulative effects of resource consumption and waste generated from the Proposed Scheme and other proposed developments would not – within a regional context – be expected to result in significant adverse cumulative effects.

13.12.7. Should materials and waste data from other proposed developments become available, the assessment set out in this section may be subject to further testing.

## 13.13. IN-COMBINATION CLIMATE CHANGE IMPACTS

13.13.1. The in-combination Climate Change impact assessment considers the extent to which Climate Change may alter the effects which have already been identified within this chapter.

13.13.2. The in-combination assessment of Climate Change impacts in relation to materials and waste is detailed in **Table 13.23**.

**Table 13.19 - Materials and Waste In-combination Climate Change Impacts**

| Climate hazard | Receptor | Likely impact(s) | Mitigation required |
|---|---|---|---|
| Extreme weather event (e.g., intense downpour / winds) | Stockpiles of material assets and construction waste | Damage to stockpiles | Implementation of stockpile protection measures as set out through the CEMP. |

## 13.14. MONITORING

13.14.1. A **REAC** has been produced in support of the DCO Application. The mitigation measures included in the REAC will be secured by a requirement in the draft DCO (or through various management plans or strategies, which will be secured via DCO requirements) and will include the requirement to consolidate environmental mitigation measures within a CEMP.

13.14.2. The CEMP will be prepared by the main contractor to describe the measures to be implemented to manage potential environmental impacts from arisings generated during construction, with the content updated and monitored at an agreed frequency.

13.14.3. As part of the CEMP, a SWMP will be produced by the main contractor and used to manage and monitor site waste effectively to reduce waste and potential harm to the environment during construction.

13.14.4. An MMP will be produced by the main contractor and used to monitor the maximum reuse of both natural soils and Made Ground (contaminated or otherwise).

## 13.15. RESIDUAL EFFECTS

13.15.1. **Table 13.24** summarises the residual environmental effects associated with the Proposed Scheme.

### Table 13.20 - Summary of Materials and Waste Effects

| Receptor | Potential Effects | Additional Mitigation | Residual Effects |
|---|---|---|---|
| Landfill void capacity | Reductions in regional and national infrastructure, particularly landfill void capacity, result in unsustainable use or loss of resources and temporary or permanent degradation of the natural environment. | Management of stockpiled arisings.<br>Development and implementation of measures within the REAC and CEMP (incorporating a SWMP and MMP). | **slight adverse (not significant)**<br>P / D / LT |

Key to table:

**P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N / A = Not Applicable**

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