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APPENDICES

Appendix 11.1: Construction Waste Estimate

11 Material Assets and Waste

11.1 Introduction

11.1.1 This chapter presents the Preliminary Environmental Information (PEI) in relation to the material assets and waste assessment.

11.1.2 There may be interrelationships related to the potential effects on material assets and waste and other disciplines. Therefore, please also refer to the following chapters:

- Chapter 7: Climate
- Chapter 10: Geology and Soils
- Chapter 15: Road Drainage and the Water Environment.

11.1.3 The methodology used will follow the requirements of *Design Manual for Roads and Bridges (DMRB) LA 110 Material Assets and Waste (DMRB LA 110)* (Highways England, 2019)[1].

11.1.4 At this stage the material assets and waste assessment is at a route wide level. The construction phase planning is currently underway. Where information is available at a scheme by scheme level, this information is provided and utilised in the preliminary assessment presented in this chapter. Given the early stage of planning, the assessment presented in this chapter draws largely from project-wide construction and capex estimates, and therefore the preliminary assessment is reported at a route wide level. In the Environmental Statement (ES) the assessment will be presented at an individual scheme and route wide level.

11.1.5 The construction information used to inform this assessment is drawn from Chapter 2: The Project, section 2.7. There is also a Construction Method Statement[2] available as part of the consultation material, which has been developed to provide an indication to consultees of the likely nature of the construction works proposed. This document was developed after the preliminary assessment was completed, so was not available to inform the assessment to date. It will continue to be developed and will inform the assessment reported in the ES.

11.2 Legislative and Policy Framework

Legislation

11.2.1 The following key legislation is relevant to this assessment:

- Environmental Protection Act 1990 (as amended)
- The Hazardous Waste (England and Wales) Regulations 2005 (as amended)
- The Waste (England and Wales) Regulations 2011 (as amended)
- The Waste Electrical and Electronic Equipment Regulations 2013
- The Environmental Permitting Regulations 2016
- Waste (Circular Economy) (Amendment) Regulations 2020 National Policy
- Waste Framework Directive (WFD) (as amended)

[1] Highways England (2019a) Material assets and waste LA 110, available at: https://www.standardsforhighways.co.uk/dmrb/search/6a19a7d4-2596-490d-b17b-4c9e570339e9 [accessed 23 August 2021]
[2] The Construction Method Statement is available as part of the consultation material at: http://www.highwaysengland.co.uk/A66-NTP

National policy statement for national networks

11.2.2 The primary policy basis for deciding whether or not to grant a Development Consent Order (DCO) is the *National Policy Statement for National Networks (NPSNN)* (Department for Transport, 2014)[3], which sets out policies to guide how DCO applications will be decided and how the effects of national networks infrastructure should be considered by the relevant decision maker. The policies for waste management include statements that:

"Government policy on hazardous and non-hazardous waste is intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Where this is not possible, waste management regulation ensures that waste is disposed of in a way that is least damaging to the environment and to human health." (NPSNN paragraph 5.39)

11.2.3 Table 11-1: Relevant NPSNN policies for the material assets and waste assessment identifies the *NPSNN* policies relevant to the material assets and waste assessment methodology.

Table 11-1: Relevant NPSNN policies for the material assets and waste assessment methodology

Relevant NPSNN paragraph reference	Requirement of the NPSNN (paraphrase)
5.40	Sustainable waste management is implemented through the "waste hierarchy": • prevention; • preparing for reuse; • recycling; • other recovery, including energy recovery; and • disposal
5.42	The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.
5.169	Applicants should safeguard any mineral resources on the proposed site as far as possible.
5.182	Where a proposed development has an impact on a Mineral Safeguarding Area (MSA), the Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to safeguard mineral resources

[3] Department for Transport (2014) National Policy Statement for National Networks, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf accessed 06/09/21 [accessed 23 August 2021]

National planning policy framework (NPPF)

11.2.4 The *NPPF* (Ministry of Housing, Communities & Local Government, 2021)[4] originally published in March 2012 and most recently updated in July 2021, sets out the government's planning policies for England and provides a framework within which locally prepared plans can be produced. The *NPPF* is *"an important and relevant matter to be considered in decision making for NSIP"*.

Local planning policy

11.2.5 The following local planning policies are relevant to the assessment:

- *Minerals and Waste Local Plan* (Cumbria County Council, 2017)[5]
- *Joint Local Aggregates Assessment 2019* (Cumbria County Council and the Lake District National Park, 2019a)[6]
- *Joint Cumbria Waste Needs Assessment (*Cumbria County Council and the Lake District National Park, 2019b)[7]
- *County Durham Plan* (Durham County Council, 2020)[8]
- *Joint Local Aggregates Assessment for County Durham, Northumberland and Tyne and Wear 2018* (Durham County Council, 2018)[9]
- *Minerals and Waste Joint Plan* (North Yorkshire County Council, 2016)[10]
- *Local Aggregates Assessment for the North Yorkshire Sub-region 2017* (North Yorkshire County Council, 2017)[11]

[4] Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [accessed 23 August 2021]
[5] Cumbria County Council (2017) Minerals and Waste Local Plan, available at: https://cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/4298491253.PDF [accessed 23 August 2021]
[6] Cumbria County Council and the Lake District National Park (2019a) Cumbria County Council Joint Local Aggregates Assessment 2019, available at: https://www.cumbria.gov.uk/eLibrary/Content/Internet/538/755/1929/4378110518.pdf [accessed 23 August 2021]
[7] Cumbria County Council and Lake District National Park (2019b) Joint Cumbria Waste Needs Assessment, available at: https://cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/4379018810.PDF [accessed 23 August 2021]
[8] Durham County Council (2020) The County Durham Plan Adopted 2020, available at: https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-/pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637424969331400000 [accessed 23 August 2021]
[9] Durham County Council (2018) Joint Local Aggregates Assessment for County Durham, Northumberland and Tyne and Wear, available at: https://www.northumberland.gov.uk/NorthumberlandCountyCouncil/media/Planning-and-Building/planning%20policy/Studies%20and%20Evidence%20Reports/Minerals%20Waste%20Studies/3.%20LAA/Joint-Local-Aggregate-Assessment-April-2018.pdf [accessed 23 August 2021]
[10] North Yorkshire County Council (2016) Minerals and Waste Joint Plan Publication Draft, available at:https://www.northyorks.gov.uk/sites/default/files/fileroot/Planning%20and%20development/Minerals%20and%20waste%20planning/MWJP_addendum_of_proposed_changes_to_publication_draft_July_2017.pdf [accessed 23 August 2021]
[11] North Yorkshire County Council (2017) Local Aggregates Assessment for the North Yorkshire Sub-region 2017

Standards and guidance

11.2.6 In addition to compliance with the *NPSNN* and *NPPF*, this assessment has been compiled in accordance with professional standards and guidance. The standards and guidance which relate to the assessment are:

- European Commission Circular Economy (CE) Package[12]
- Waste strategy (H.M. Government, 2018)[13]
- National planning policy for waste 2014 (Department for communities and local government, 2014)[14]
- National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2021)[15]
- *DMRB LA 110*
- *National and regional guidelines for aggregates provision in England 2005-2020*[16]
- *DMRB GG 103 Introduction and general requirements for sustainable development and design (DMRB GG 103)* (Highways England, 2019b)[17]

11.3 Assessment Methodology

11.3.1 An assessment of materials assets and waste will be undertaken in accordance with *DMRB LA 110* Section 1.4 and shall include:

"1) The consumption of materials and products (from primary, recycled or secondary, and renewable sources), the use of materials offering sustainability benefits and the use of excavated and other arisings that fall within the scope of waste exemption criteria; and

2) The production and disposal of waste."

11.3.2 These impacts will be assessed in the context of relevant policies, standards and guidance relating to materials and waste management at the project, local, regional and national level.

11.3.3 The effects associated with the transportation of materials (Greenhous gas (GHG) emissions, air quality, noise etc) are not covered within this methodology and will be addressed in the relevant environmental topics of the ES.

11.3.4 Mitigation measures to reduce the impacts of material assets and waste impacts from the project will follow the principles of sustainable resource and waste management

[12] European Union: European Commission, Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee Of The Regions *A new Circular Economy Action Plan for a cleaner and more competitive Europe* COM/2020/98 final, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN [accessed 23 August 2021]
[13] H.M. Government (2018) Our Waste, Our resource: A Strategy for England
[14] Department for Communities and Local Government (2014) National Planning Policy for Waste
[15] Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework (NPPF), available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 [accessed 23 August 2021]
[16] Ministry of Housing, Communities & Local Government (2009) Communities and Local Government. ISBN 978-1-4098-1589-1, 'National and regional guidelines for aggregates provision in England 2005-2020
[17] Highways England (2019b) Design Manual for Roads and Bridges GG 103 Introduction and general requirements for sustainable development and design, available at: https://www.standardsforhighways.co.uk/prod/attachments/89d10ef2-7833-44df-9140-df85cd6382b9?inline=true [accessed 23 August 2021]

in accordance with the waste hierarchy as described *in DMRB LA 110* (see Image 11-4: Waste heirarchy).

11.3.5 The assessment considers the impact on the environment as a result of the generation and management of waste. Where information is available to inform the assessment in this PEI Report it is presented, and potential measures to minimise waste are identified. Further quantitative information will be provided in the ES:

- Demolition waste – although much of the area surrounding the existing A66 is undeveloped land, there are buildings and existing infrastructure, including services, roads, and drains which will need to be removed prior to construction. These are likely to consist of hard and inert materials, soils, rock and stones, wood (including vegetation), asphalt, brick, concrete, and miscellaneous metals.
- Construction and excavation waste – material waste will arise from the construction and excavation phases which will consist of hard and inert materials, soils and stones, wood, plastics, packaging (wooden and plastic), insulation material, miscellaneous metals, canteen and office waste.

11.3.6 For the PEI Report, data in relation to the quantities of demolition waste generated by the project is not yet available. Therefore the estimated quantities of demolition waste have not been included in the construction waste forecast in Table 11-17. However an assumption has been made based on professional judgement that the quantities of surplus excavation waste and construction waste identified in the PEI Report will be higher than the quantities of demolition waste arising from the project. Therefore, demolition waste are unlikely to represent a significant source of waste and the absence of the demolition waste quantities in the PEI Report is unlikely to impact the assessment of likely significant effects. The quantities of demolition waste will be available to inform the assessment presented in the ES.

11.3.7 *DMRB LA 110 Section 2.3* identifies that the application of the waste hierarchy can require specific waste streams to depart from the hierarchy where it is suitably justified by lifecycle thinking and delivers the best overall environmental outcome.

11.3.8 Following the requirements of *DMRB LA 110,* the confirmed a material assets and waste assessment would be necessary for the project. *DMRB LA 110* requires that the following information on material assets and waste will be identified:

- Types and quantity of material use associated with operation of the existing road/site.
- Types and quantities of waste associated with operation of the existing road/site.
- Information on availability of key construction materials required for the project.
- Types and quantities of materials required to construct the project.
- Information on materials that contain secondary aggregate or recycled content.
- Information on any known sustainability credentials of materials to be consumed.
- The type and volume of materials that will be recovered from off-site sources for use on the project.
- The cut and fill balance.
- Details of onsite storage and stockpiling arrangements, and any supporting logistical details.

11.3.9 In addition *DMRB LA 110* requires information regarding the current and likely future state (in the absence of the project) of the following:

- Regional (or other relevant geographic scale) presence and capacity of landfill facilities to be utilised by the project.
- Regional (or other relevant geographic scale) presence and capacity of material recovery/recycling facilities to be utilised by the project.

- The location of mineral sites and peat resources (this is defined as commercial peat extraction) in relation to the project.

11.3.10 For waste *DMRB LA 110* requires the assessment to identify the following:

- The amount of waste (by weight) that will be recovered and diverted from landfill either onsite or offsite (i.e. for use on other projects).
- Types and quantities of waste arising from the project (demolition, excavation, construction arisings and remediation) requiring disposal to landfill.
- Details of onsite storage and segregation arrangements for waste and any supporting logistical arrangements.
- Potential for generation of hazardous waste (type and quantity).

11.3.11 As the project progresses any assumptions and limitations on data gaps will be reported.

11.3.12 To minimise the effects from material assets usage and waste production the assessment will identify the location of sensitive receptors (e.g. designated sites identified in other environmental topics).

11.3.13 *Table 3.13* in *DMRB LA 110* describes the significance category descriptions for material assets and waste. The significance of effects on material assets and waste will be reported in accordance with the significance criteria taken from *Table 3.14* in *DMRB LA 110*.

Targets and Key Performance Indicators

11.3.14 There are two material assets and waste targets included in *DMRB LA 110* for the project.

- The Ministry of Housing, Communities and Local Government Communities and Local Government guidance identifies construction materials will have recycled content target of 31%.
- At least 70% (by weight) of Construction and Demolition Waste (CDW) will be subjected to material recovery in accordance with the Waste Directive.

11.3.15 In addition, the project will aim to achieve at least 90% (by weight) material recovery of non-hazardous CDW.

11.4 Assessment Assumptions and Limitations

11.4.1 This material assets and waste assessment is based on preliminary information available at the time of writing. Some information required for a detailed assessment is not available to inform the PEI Report. The data not available at this stage in the material assets and waste assessment are summarised in Table 11-2.

11.4.2 The environmental impacts associated with the extraction of raw materials and the manufacture of products are excluded from the scope of the assessment. These impacts occur offsite and may occur outside the UK. They include the depletion of non-renewable resources and the production of waste at the point of extraction and during manufacturing. This is considered of being a reasonable approach and was outlined in the *ESR* and confirmed through the *Scoping Opinion*.

11.4.3 The information not available at this stage to inform the material assets and waste assessment are summarised in Table 11-2 below. It is expected that this information will be available to inform the ES, or that reasonable assumptions will be agreed (where dependant on constrction methodologies to be confirmed during the construction stage for example), as described in the table.

Table 11-2: The Information not currently available in the material assets and waste assessment

Current Gaps	Information available for PEI/reason for gap at PEI stage	Information that will be available for the ES
Material use - Categories and quantities of materials consumed by the project, including the volume of materials that will be required from offsite sources	Construction phase planning is at a very early stage, with only high level phasing and earthworks information available	An indicative Bill of Quantities for the project is expected to be reported in the ES. In addition, the type and volume of materials that will be required from offsite sources for use on the project will also be reported in the ES
Material sources – details of the sources of materials and potential suppliers	Specific materials required not yet confirmed due to early stage of construction planning	Indicative Bill of Quantities, setting out volumes required, and an indication of potential sources (distance from project) will be reported in the ES
Mineral Safeguarding Sites and Peat Resources – confirmation of locations	Information presented in the PEI Report is preliminary, based on the current draft DCO boundary	The sterilisation of Mineral Safeguarding Sites and Peat Resources will be updated for ES based on final DCO boundary
Sustainability credentials	Quantification and specification of materials required for the project not yet available. Sustainability credentials of materials, including secondary aggregate and recycled content of materials considered at high level	Materials required by the project and approximate quantities will be available for ES, allowing a more detailed review of sustainability credentials.
Demolition	No data yet available in relation to the quantities of demolition waste generated by the project. The general types of demolition waste and the approach to manage these materials are considered in the PEI Report, in the context of construction waste volumes and are not expected to be significant.	The quantities of demolition waste will be available in the ES.
Earthworks estimates	A preliminary earthworks estimate is reported in the PEI Report	Further detailed earthworks estimates will be available in the ES.
Contaminated materials	Chemical analysis from Ground Investigation not yet available, therefore consideration of existing contamination is based on historic uses of the land, and	Detailed contamination assessment will be undertaken for the ES, and used to inform the waste assessment. An Environmental Management Plan (EMP) will be developed

Current Gaps	Information available for PEI/reason for gap at PEI stage	Information that will be available for the ES
	the assessment presented in Chapter 9: Geology and Soils.	which will set out the commitments of a Site Waste Management Plan (SWMP) (see Appendix 4.1: Outline of Environmental Management Plan). A Materials Management Plan (MMP) will be developed at a later stage in the development of the project, the objectives of which will be detailed in the EMP. A SWMP is used to plan, implement, monitor and review waste minimisation and management on construction sites.
Construction waste forecast	The construction waste forecast reported in the PEI Report is based on the projected cost of construction	More detailed waste generation estimates are expected to be available for the ES.
Construction and Demolition Waste (CDW) diversion	The estimated mass of CDW that will be recovered and diverted from landfill either onsite or offsite for the project is based on a diversion rate for the PEI Report. For the PEI Report there is an absence of data in relation to the quantities of demolition waste generated by the project	The CDW diversion rate will be updated in the ES, including updated figures relating to demolition waste.
Construction Demolition & Excavation (CD&E) Waste	The estimated types and quantities of CD&E waste that will be disposed to landfill. For the PEI Report there is an absence of data in relation to the quantities of demolition waste generated by the project, this will be reported in the ES. However, an assumption has been made based on professional judgement that the quantities of surplus excavation waste and construction waste identified in the PEI Report will be higher than quantities of demolition waste arising from the project. The absence of the demolition	The CD&E waste that will be disposed of to landfill will be updated in the ES, including demolition waste estimates.

Current Gaps	Information available for PEI/reason for gap at PEI stage	Information that will be available for the ES
	waste quantities in the PEI Report are unlikely to impact the assessment of likely significant effects.	
Hazardous waste	The potential for the generation of hazardous waste from the project is estimated for the PEI Report.	The details of any hazardous waste from the project will be updated in the ES.
Onsite storage and stockpiling arrangements	Areas for material management are included in the engineering boundary, and principles for storage and stockpiling are outlined in the PEI Report.	More detail on the onsite storage and stockpiling arrangements and any logistical information will be provided for consideration in the preparation of the ES and will also be included in the EMP.
Operational materials consumption	Categories of materials consumed by the operation of the project are considered in the PEI Report.	There will be more detailed information on the quantities of operational materials in the ES.
Operational waste generation	Categories of waste arising from the operation of the project are considered in the PEI Report.	There will be more detailed information on the quantities of operational waste in the ES.

11.5 Study Area

11.5.1 Two interrelated study areas have been identified and defined as per *DMRB LA 110*.

- Study area 1 is the area within the draft DCO boundary as within these areas construction materials will be consumed (used, re-used and recycled) and will include any temporary storage and compound areas.
- Study area 2 is related to the area where the main construction materials will be sourced and construction waste will be treated or disposed and comprises waste infrastructure in the regions of the North East (consisting of the local authority areas set out in Table 11-4), the North West (consisting of the local authority areas set out in Table 11-6) and Yorkshire and The Humber (consisting of the local authority areas set out in Table 11-8) likely to be suitable to accept waste arisings generated by the project. In addition, the location of Mineral Safeguarding Sites and peat resources will be required in the second study area. These three regions have been selected following *DMRB LA 110* as the project is located within these areas.

11.5.2 The project comprises eight individual schemes that will be delivered in four packages, at different times and across a large geographic area. Each scheme will have a cut/fill balance resulting in materials and waste generation. The cut and fill assessment will be at package, scheme and route wide levels. As set out above, the preliminary assessment reported in this chapter is assessed at route wide level due to the current status of construction planning. The EIA will be undertaken at route wide and scheme level. The design will seek to achieve a balance of cut and fill at an individual scheme, package and project level, taking into account the complexity of the phasing of delivery. The *Scoping Opinion* highlighted the importance of the re-

use of material within the scheme, through achieving a cut and fill balance. This remains a focus of the design, and the extent to which it can be achieved, and the effects that would be expected to arise from the earthworks strategy will be fully reported in the ES.

11.5.3 The preliminary earthworks estimates for the project at this stage are presented in Table 11-14.

11.6 Baseline Conditions

Existing baseline

11.6.1 *DMRB LA 110* requires the assessment to describe the current and future baseline for:

- The types of materials use associate ed with the operation of the existing road (Study area 1).
- The types and quantities of waste produced associated with the operation of the existing road (Study area 1).
- Information on the availability of key construction materials required for the project (to be sourced from within and outside study areas 1 and 2).

11.6.2 The materials consumed by the existing road will be associated with routine maintenance of the highway, highway infrastructure and road-side technology, such as surfacing asphalt, replacement fencing and barriers and replacement electronic equipment. Waste arisings from operation of the existing road may include waste asphalt from re-surfacing activities, verge clearance waste and Waste Electrical and Electronic Equipment (WEEE) from replacing lighting and other equipment. Quantities and further detail regarding the types of materials consumed and waste generated by the existing road will be presented in the ES.

Material assets required for construction

11.6.3 Material assets used during construction of the project in study area 1 will include primary raw materials, such as aggregates and minerals, and manufactured construction products which include recycled and secondary aggregates. The term 'aggregate' is an umbrella descriptor for bulk raw materials used in large development and infrastructure construction projects. These materials can be further defined as primary, secondary or recycled aggregate as follows:

- Primary aggregate - is the term used for aggregate produced from naturally occurring mineral deposits which are used for the first time.
- Secondary aggregates - as defined by the Waste and Resources Action Programme (WRAP) *Aggregain Programme* (Waste and Resources Action Programme, 2008)[18] - are derived from a very wide range of materials that may be used as aggregates.
- Recycled aggregates - as defined by Aggregain - can be sourced from a variety of materials arising from construction and demolition (concrete, bricks, and tiles), highway maintenance (asphalt planings), excavation and utility operations.

11.6.4 Most of the material resources required for construction of the project, such as metals, aggregate, pavement, concrete and soils, will originate offsite purchased as construction products. Some, such as excavated soils, will originate onsite. The project will seek to utilise as much soil sourced from within study area 1 (the draft DCO boundary) as possible.

[18] Waste and Resources Action Programme (2008) Aggregain Programme

11.6.5 The project will consume large quantities of materials increasing demand on the existing UK supply chain. It is noted the majority of new materials would be sourced from within and outside study areas 1 and 2, but this is reported within study area 1 as that is the location that the materials are consumed. The volumes of key material products used by the project will be identified in the ES meeting the requirements of *DMRB LA110,* and will be contextualised with the volumes of aggregate reserves available within study area 2.

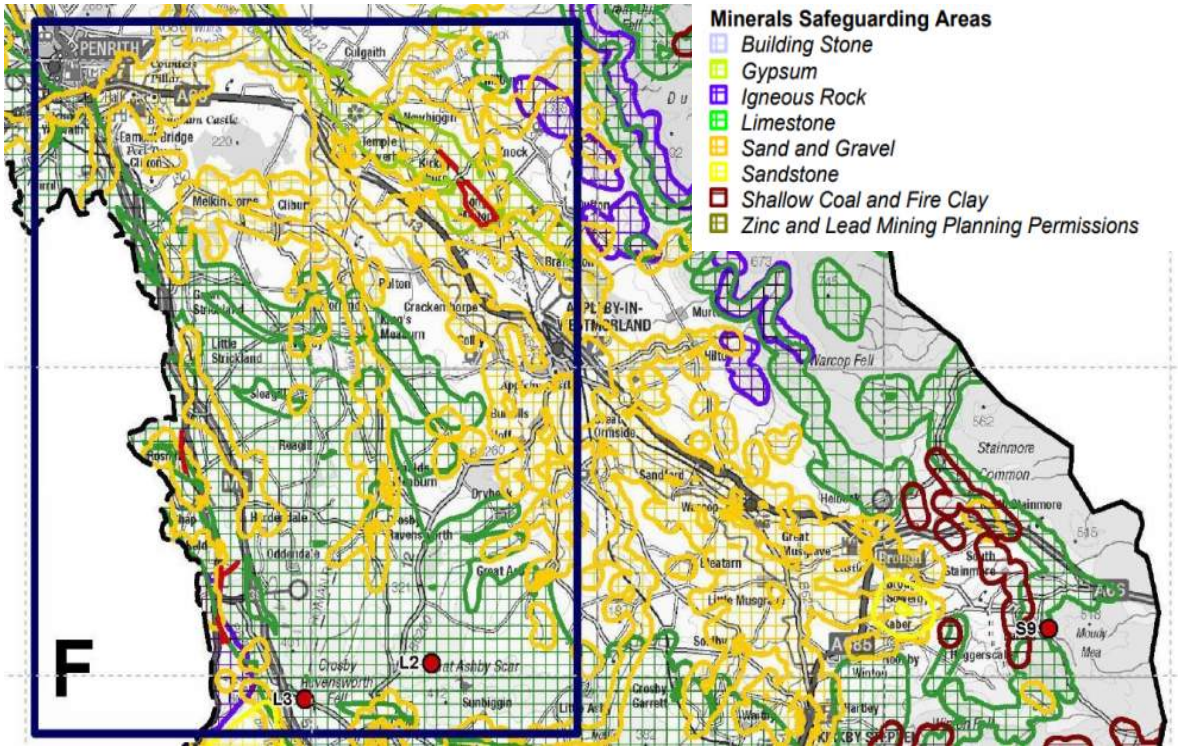

Image 11-1: Mineral safeguarded areas within Cumbria County Council (Cumbria County Council Minerals and waste local plan, Policy map part 2 – Mineral safeguarding areas, 2016

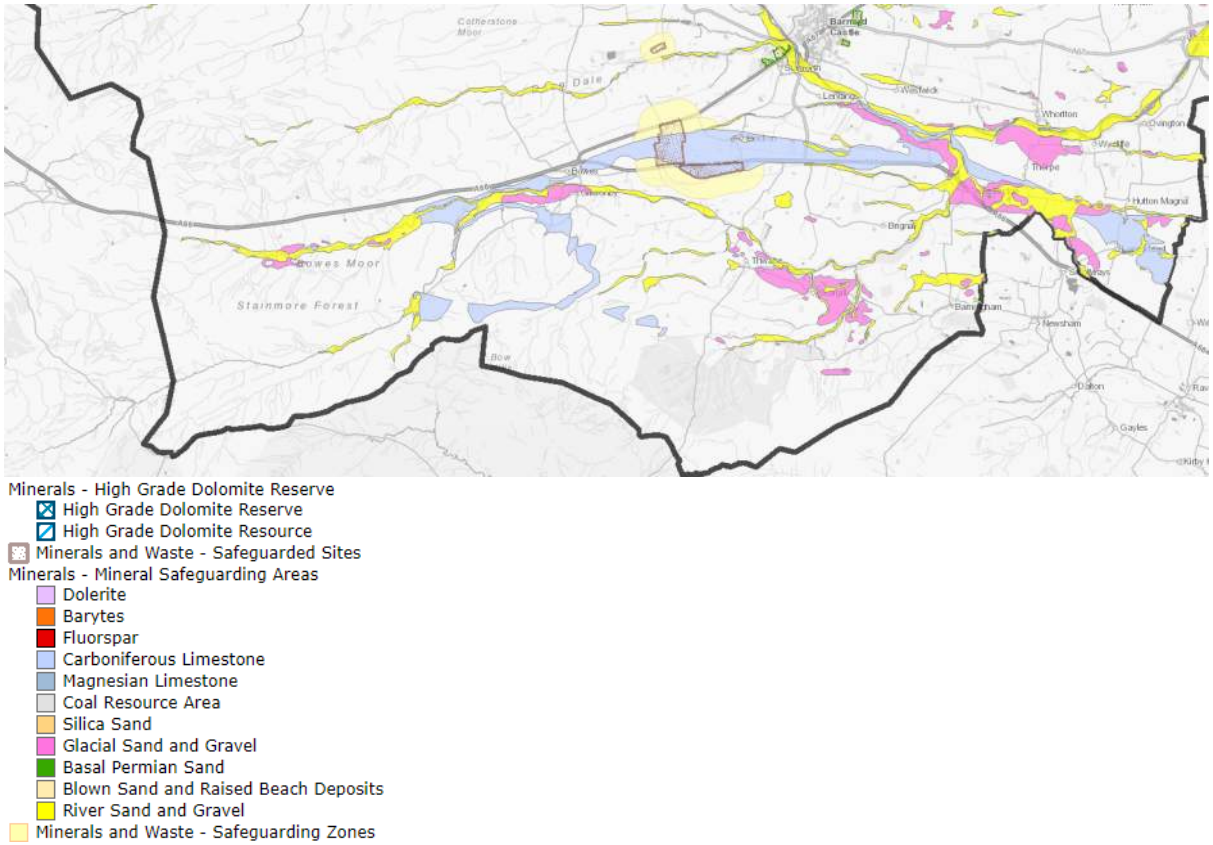

Image 11-2: Mineral safeguarded areas within Durham County Council

11.6.6 The location of Mineral Safeguarding Sites are required for study area 2. The Cumbria County Council *Minerals and Waste Local Plan 2015-2030* shows that there are several Mineral Safeguarding Areas (MSA) for sand and gravel extraction in the vicinity of and crossing the A66 as shown in Image 11-1: Mineral safeguarded areas within Cumbria County Council. MSAs are areas of mineral resources that are of economic value to protect. MSAs are also a planning designation which are required to be identified in Local Plans to be protected from non-mineral development. There is also an MSA for gypsum deposits in the Long Marton/Kirkby Thore area where British Gypsum operates an existing mine and plasterboard factory.

11.6.7 Durham County Council has established an MSA for carboniferous limestone around the A66 near Bowes which includes two existing quarries: Hulands Quarry operated by Aggregate Industries and Kilmond Wood Quarry operated by Kearton Farms Ltd. There are also proposals for the working of carboniferous limestone from land to the east of Hulands Quarry. The carboniferous limestone MSA follows the A66 from east of Bowes to Lane Head. Durham County Council has also identified an MSA for both glacial and river sands and gravel close to the A66. However there are no working sites in the area. The Durham County Council MSAs in proximity to the A66 are demonstrated in Image 11-1: Mineral safeguarded areas within Cumbria County Council (Cumbria County Council Minerals and waste local plan, Policy map part 2 – Mineral safeguarding areas, 2016.

11.6.8 North Yorkshire County Council has limestone, building stone as well as sand and gravel MSAs established at the eastern extent of the project around Scotch Corner near Darlington. The Stephen Bank to Carkin Moor scheme lies within the limestone MSA area as does the A1 (M) Junction 53 Scotch Corner scheme. The former Green Bank Quarry (GR 413738 509300) lies to the north-west of Ravensworth

approximately 210m from the existing route of the A66. A small area in the vicinity of Fox Well (GR 414859 509040) to the north-east of Ravensworth lies within the sand and gravel MSA. These areas are illustrated in Image 11-3: Mineral safeguarded areas within North Yorkshire County Council

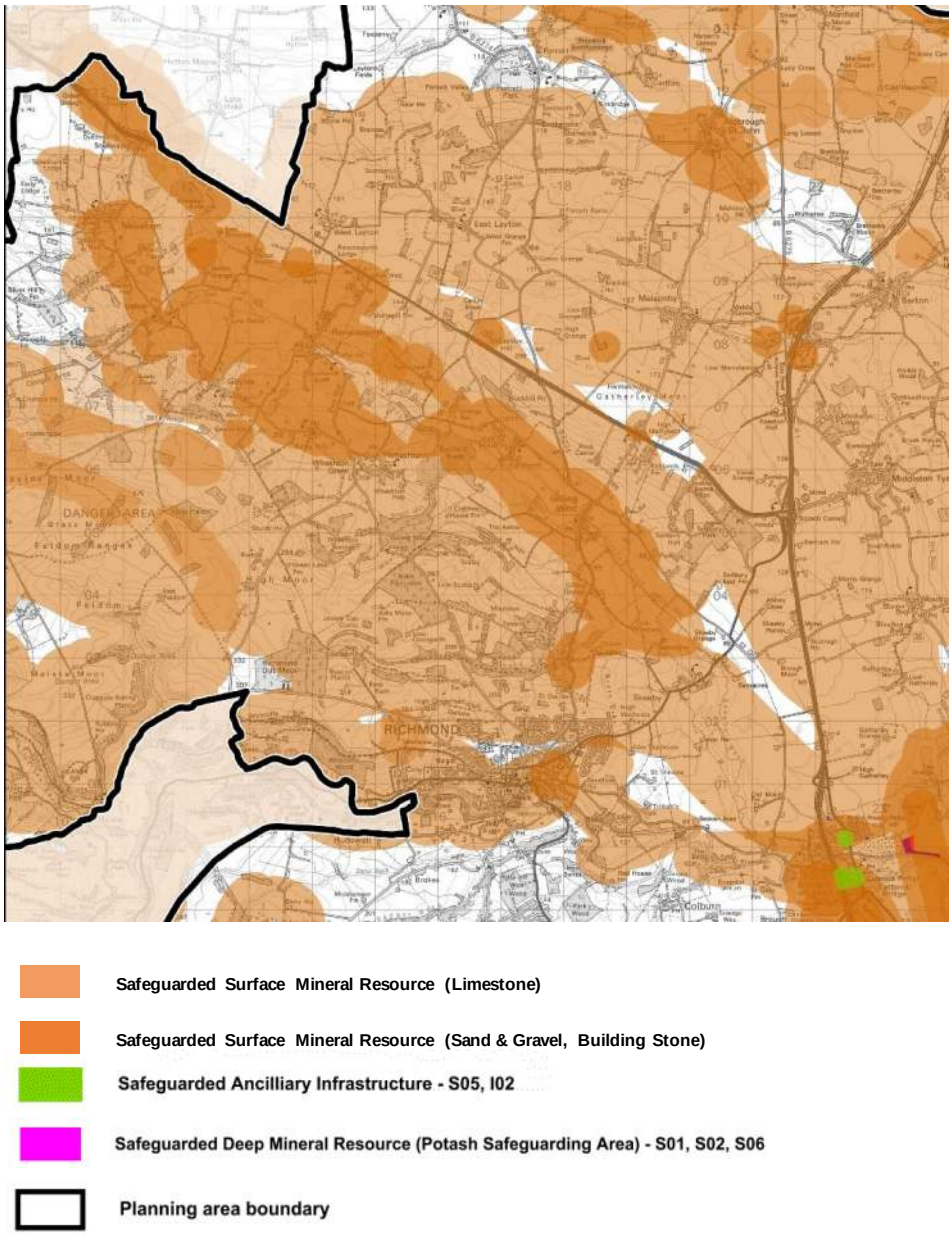

Image 11-3: Mineral safeguarded areas within North Yorkshire County Council

11.6.9 The potential impacts of the sterilisation of existing or future peat resources for commercial extraction has been assessed in this PEI Report and will be assessed further in the in the ES in line with *DMRB LA 110*. Consultation with Cumbria County Council, Durham County Council and North Yorkshire County Council identifies there are no existing peat resources sites (commercial peat extraction) within study area 1. The extent of peat within study area 1 will be identified in Chapter 9: Geology and Soils using desk-based information supplemented by intrusive ground investigations along the route. The greenhouse gas (GHG) emissions associated with the removal of peat will be identified in Chapter 7: Climate.

11.6.10 DMRB *LA 110* regional recycled aggregate targets provided in Table 11-3 will be used in the EIA process. Where a project is located in more than one region, the highest regional target is adopted (in this case a target of 31% recycled content, reflecting the target set by the Yorkshire and The Humber region). There is a total aggregate provision of 193 million tonnes in the North East, 392 million tonnes in the North West and 431 million tonnes in Yorkshire and The Humber. The project has therefore adopted the target of minimum 31% recycled content, and this is reflected in the preliminary assessment within this PEI Report.

Table 11-3: Highways England DMRB LA 110 recycled aggregate targets for England

Region	Recycled content target	Total aggregate provision (million tonnes)
Yorkshire and The Humber	31%	431
North East	26%	193
England Average	25%	3,908

11.6.11 The targets outlined in Table 11-3: Highways England DMRB LA 110 recycled aggregate targets for England are applicable from 2005 until 2020, and updated targets are not currently available. Therefore if these targets were updated by Highways England, as a result of the expiry of their validity period, the project may be required to increase the recycled content target accordingly.

Waste

Construction, demolition and excavation (CD&E) waste arisings

11.6.12 The project will result in the production of waste arising from Construction, Demolition and Excavation (CD&E) activities. The project will generate large quantities of CD&E waste increasing the demand on the existing waste infrastructure. The data on CD&E waste generated by the project has been assessed in this PEI Report and will be assessed further in the ES.

11.6.13 The UK had a commitment to recovering (e.g. diverting from disposal) at least 70% of non-hazardous construction waste by 2020 as required by the EU *Directive on Waste* (European Commission, 2008)[19]. This target has not yet been reported against or amended for future years, and was reiterated in the Waste Management Plan for England, published by Defra in 2020. The project will exceed this target as *DMRB LA 110* identifies the project will aim to achieve at least 90% recovery of non-hazardous construction waste. The last published data from 2016 indicated that England was achieving a recovery rate of 92.1% (Department for Environment, Food and Rural Affairs, 2020)[20]. Therefore meeting the *DMRB LA 110* target to achieve at least 90% recovery of non-hazardous construction waste appears to be achievable for the project.

[19] European Commission (2008) EU Waste Framework Directive, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705 [accessed 23 August 2021]
[20] Department for Environment, Food & Rural Affairs (2020) UK Statistics on Waste, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf [accessed 23 August 2021]

Waste capacity

11.6.14 Information from the Environment Agency has been used to inform the baseline with respect to waste infrastructure capacity in the North East (Environment Agency, 2020a[21]), North West (Environment Agency, 2020b[22]), and Yorkshire and The Humber (Environment Agency, 2020c[23]), former planning regions. In addition the landfill capacity has also been identified for England.

11.6.15 The Environment Agency provides landfill capacity data in volume (cubic metres) and has therefore been converted to mass (tonnes) using the following conversion factors identified in the High Speed Rail ES (High Speed Rail London to West Midlands, 2015)[24]:

- 1.5 tonnes per cubic metre for hazardous waste landfill.
- 0.83 tonnes per cubic metre for non-hazardous waste landfill.
- 1.5 tonnes per cubic metre for inert waste landfill.

11.6.16 These conversion factors have been applied as they are considered robust and originate from the Environment Agency. The approach to using these conversion factors was outlined in the *ESR*, and confirmed through the *Scoping Opinion*.

11.6.17 Table 11-4 provides a summary of the transfer, treatment and metal recycling capacity within the North East in 2019.

[21] Environment Agency (2020a) Waste Management Information 2019 Former North East Planning Region
[24] Environment Agency (2020b) Waste Management Information 2019 Former North West Planning Region
[23] Environment Agency (2020c) Waste Management Information 2019 Former Yorkshire and Humber Planning Region
[24] High Speed Rail London to West Midlands (2015) Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement Volume 5

Table 11-4: Transfer, treatment and metal recycling site input for the North East in 2019

Facility type	County Durham (tonnes)	Northumberland (tonnes)	Tees Valley Unitary (tonnes)	Tyne and Wear (tonnes)	North East Capacity (tonnes)
Waste transfer	410,000	456,000	570,000	1,308,000	2,744,000
Waste treatment	337,000	368,000	2,079,000	963,000	3,747,000
Metal recycling	56,000	4,000	386,000	254,000	700,000
Total treatment and waste transfer	803,000	828,000	3,035,000	2,525,000	7,191,000

11.6.18 Table 11-5: Landfill capacity in the North East in 2019 below provides a summary of the landfill capacity in the North East in 2019.

Table 11-5: Landfill capacity in the North East in 2019

Facility type	County Durham (tonnes)	Northumberland (tonnes)	Tees Valley Unitary (tonnes)	Tyne and Wear (tonnes)	North East Capacity (tonnes)
Inert waste landfill	12,028,500	238,500	0	1,804,500	14,071,500
Non-hazardous landfill	2,948,990	918,810	3,012,900	495,510	7,376,210
Hazardous landfill	0	0	10,278,000	0	10,278,000

11.6.19 Table 11-6: Transfer, treatment and metal recycling site input in the North West in 2019 below provides a summary of the transfer, treatment and metal recycling capacity in the North West in 2019.

Table 11-6: Transfer, treatment and metal recycling site input in the North West in 2019

Facility type	Cheshire (tonnes)	Cumbria (tonnes)	Greater Manchester (tonnes)	Lancashire (tonnes)	Merseyside (tonnes)	North West (tonnes)
Waste transfer	423,000	395,000	2,301,000	1,196,000	1,870,000	6,185,000

Facility type	Cheshire (tonnes)	Cumbria (tonnes)	Greater Manchester (tonnes)	Lancashire (tonnes)	Merseyside (tonnes)	North West (tonnes)
Waste treatment	1,880,000	1,161,000	7,210,000	3,090,000	4,172,000	17,513,000
Metal recycling	50,000	50,000	709,000	243,000	1,708,000	2,760,000
Total treatment and waste transfer	2,353,000	1,606,000	10,220,000	4,529,000	7,750,000	26,458,000

11.6.20 Table 11-7 below provides a summary of the landfill capacity in the North West in 2019.

Table 11-7: Landfill capacity North West in 2019

Facility type	Cheshire (tonnes)	Cumbria (tonnes)	Greater Manchester (tonnes)	Lancashire (tonnes)	Merseyside (tonnes)	North West (tonnes)
Inert waste landfill	1,140,000	1,576,500	2,088,000	2,670,000	771,000	8,245,500
Non-hazardous landfill	6,325,430	2,548,930	4,795,740	6,795,210	0	20,465,310
Hazardous landfill	6,433,500	0	0	2,791,500	0	9,225,000

11.6.21 Table 11-8: Transfer, treatment and metal recycling site input Yorkshire and The Humber in 2019 provides a summary of the transfer, treatment and metal recycling capacity in Yorkshire and The Humber in 2019.

Table 11-8: Transfer, treatment and metal recycling site input Yorkshire and The Humber in 2019

Facility type	Former Humberside (tonnes)	North Yorkshire (tonnes)	South Yorkshire (tonnes)	West Yorkshire (tonnes)	Yorkshire and The Humber (tonnes)
Waste transfer	1,602,000	548,000	1,620,000	1,319,000	5,089,000
Waste treatment	3,628,000	940,000	2,188,000	5,114,000	11,870,000
Metal recycling	514,000	53,000	786,000	439,000	1,792,000
Total treatment and waste	5,744,000	1,541,000	4,594,000	6,872,000	18,751,000

11.6.22 Table 11-9: Landfill capacity Yorkshire and The Humber in 2019 below provides a summary of the landfill capacity within Yorkshire and The Humber in 2019 for the disposal of CDW arising from the project.

Table 11-9: Landfill capacity Yorkshire and The Humber in 2019

Facility type	Former Humberside (tonnes)	North Yorkshire (tonnes)	South Yorkshire (tonnes)	West Yorkshire (tonnes)	Yorkshire and The Humber (tonnes)
Inert waste landfill	23,010,000	1,887,000	8,616,000	4,696,500	38,209,500
Non-hazardous landfill	20,334,170	14,193,830	1,423,450	1,039,160	36,990,610
Hazardous landfill	1,252,500	0	0	2,722,500	3,975,000

11.6.23 The objective for the project will be to minimise the volume of waste that is sent to landfill, and for the waste that has to be disposed of via this route, to send to a landfill site as close as possible to study area 1. If sufficient capacity is not available within study area 2, there may then be a requirement for waste to be sent further afield. Table 11-10: Landfill Capacity in England in 2019 below provides a summary of the wider landfill capacity within England in 2019.

Table 11-10: Landfill Capacity in England in 2019

Facility type	England (tonnes)
Inert waste landfill	177,666,000
Non-hazardous landfill	189,298,930
Hazardous landfill	28,110,000

11.6.24 A non-exhaustive list of permitted landfill sites that could potentially accept CD&E waste generated during the construction phase of the project is presented in Table 11-11: Non-exhaustive list of landfill sites that could potentially accept CD&E waste arisings in 2018

Table 11-11: Non-exhaustive list of landfill sites that could potentially accept CD&E waste arisings in 2018

Facility Name	Facility Type*	Permit Number	Post code	Remaining capacity (tonnes)
Augean North Limited Approximate distance: 33km	L01 - Hazardous Merchant Landfill	BV1399IT	TS2 1UE	7,406,880
Whitemoss Landfill Ltd Approximate distance: 146km	L01 - Hazardous Merchant Landfill	DP3639LM	WN8 8BW	2,230,500
Bostock Landfill Approximate distance: 185km	L01 - Hazardous Merchant Landfill	AP3238GH	CW10 9JQ	2,230,500
Flusco Pike Landfill Approximate distance: 5km	L02 Non-hazardous stable non-reactive waste (SNRHW) landfill	EA/EPR/FP3 393ZK/V002	CA11 0JA	733,721
Aycliffe Quarry East Approximate distance: 23km	L02 Non-hazardous stable non-reactive waste (SNRHW) landfill	EA/EPR/BP3 890ZK/A001	DL5 6NB	1,563,223

Facility Name	Facility Type*	Permit Number	Post code	Remaining capacity (tonnes)
Lillyhall Landfill Stage 3 Approximate distance: 63km	L02 Non-hazardous stable non-reactive waste (SNRHW) landfill	EA/EPR/EP3 693ZZ/A001	CA14 4JP	739,563
Allerton Park Approximate distance: 51km	L04 Non-hazardous	EA/EPR/SP3 390ZE/A001	HG5 0SD	1,794,022
Hespin Wood Approximate distance: 51km	L04 Non-hazardous	EA/EPR/HP3 193ZX/S011	CA6 4HB	1,036,545
Harewood Whin Landfill Approximate distance: 69km	L04 Non-hazardous	EA/EPR/CB3 430DW/A001	YO23 3RR	498,000
Bennet Bank Landfill Approximate distance: 80km	L04 Non-hazardous	EA/EPR/XP3 993ZN/V002	LA14 4QH	109,958
Bishop Middleham Quarry 2 Approximate distance: 35km	L05 Inert	EA/EPR/RP3 496ZM/A001	DL17 9EB	6,473,339
Old Quarrington Quarry Landfill Approximate distance: 39km	L05 Inert	EA/EPR/BB3 007CA/V005	DH6 5NN	2,291,871
Asenby Quarry Ltd Approximate distance: 43km	L05 Inert	EA/EPR/QP3 139XR/A001	YO7 3RB	486,239
Crime Rigg Quarry Landfill Approximate distance: 44km	L05 Inert	EA/EPR/FB3 602TW/T001	DH6 1LA	2,670,000

Facility Name	Facility Type*	Permit Number	Post code	Remaining capacity (tonnes)
Roan Edge Landfill Approximate distance: 44km	L05 Inert	EA/EPR/MP3 034SJ/	LA10 5EW	272,150
Goldmire Quarry Approximate distance: 101km	L05 Inert	EA/EPR/CB3 705TJ/V002	LA15 8BG	1,265,621
Wilberfoss Quarry Landfill Approximate distance: 107km	L05 Inert	EA/EPR/VP3 634LC/A001	YO41 4DB	878,106

Future baseline

11.6.25 The latest available information on material assets and waste infrastructure capacity has been used to inform the future baseline. Where information on likely trends is available, this is utilised to define the potential future baseline.

Materials

11.6.26 An increased demand on material assets in the UK is anticipated as a result of a number of compounding factors: Covid-19 has affected materials supplies; supply chains have been impacted due to global demand shocks, container shortages and port delays; and construction demand has increased due to new infrastructure projects *(The possible impacts of materials shortages in the UK)* (Royal Institution of Chartered Surveyors, 2021)[25].

11.6.27 In the UK, the Construction Products Association reported construction activity is anticipated to increase 13.7 % in 2021, year on year, and by 6.3 per cent in 2022, in part due to efforts to stimulate an economic recovery from Covid-19 (*Construction Industry Forecasts - Summer 2021)* (Construction Products Association, 2021)[26].

11.6.28 The project will consume large quantities of key materials such as aggregates, concrete, asphalt and mortar, increasing the demand on the existing UK supply chain. The data on key material products used by the project will be identified in the ES.

Waste

11.6.29 The Durham County Council, Cumbria County Council, and North Yorkshire County Local Plans present the future expected waste arisings. Table 11-12: Projected CD&E waste arisings below provides a summary of the projected CD&E waste arisings within Durham County Council, Cumbria County Council, and North Yorkshire County Council.

Table 11-12: Projected CD&E waste arisings

Sub-region	Projected CD&E Annual Waste Arisings (tonnes)		
Durham County Council	623,300	623,300	623,300
Cumbria County Council	940,833	1,176,275	1,070,626
North Yorkshire County Council	871,196	897,639	920,306
Total	**2,435,029**	**2,697,214**	**2,614,532**

Future landfill capacity

11.6.30 It is anticipated that different types of waste infrastructure capacity will continue to be available during the construction and operation of the project. Landfill will experience some use of available capacity as void space is taken. Government policy measures are also likely to divert waste from landfill.

[25] Royal Institution of Chartered Surveyors (2021), The possible impacts of materials shortages in the UK, available at: https://www.rics.org/uk/products/data-products/insights/the-possible-impacts-of-materials-shortages-in-the-uk/ [accessed 23 August 2021]
[26] Construction Products Association (2021), Construction Industry Forecasts - Summer 2021, available at: https://www.constructionproducts.org.uk/publications/economics/construction-industry-forecasts/construction-industry-forecasts-summer-2021/ [accessed 23 August 2021]

11.6.31 Permitted capacity data published by the Environment Agency has been used to estimate the projected landfill capacity for study area 2 (the North East, the North West and Yorkshire and The Humber) for the future baseline. This relates to the total capacity of inert, non-hazardous and hazardous waste landfill that will be available within all of the regional areas in study area 2 through which route the project will pass.

11.6.32 The future landfill capacity is displayed in Table 11-13: Future Landfill Capacity in study area 2 (the North East, North West and Yorkshire and The Humber) and is based on the average percentage change in permitted landfill capacity for the years 2015 to 2019 reported by the Environment Agency. The average percentage change has then been applied to the 2015 permitted landfill capacity and projected forward to 2026. This method assumes that the average percentage change in permitted capacity for each class of landfill remains constant. The use of an average value taken from historical data provides an allowance for potential future increases or decreases in permitted capacity for each class of landfill.

11.6.33 The Environment Agency provides landfill capacity data in volume (cubic metres) and has therefore been converted to mass (tonnes) using the following conversion factors that were identified previously in paragraph 11.6.15:

- 1.5 tonnes per cubic metre for hazardous waste landfill.
- 0.83 tonnes per cubic metre for non-hazardous waste landfill.
- 1.5 tonnes per cubic metre for inert waste landfill.

11.6.34 The data identifies there is likely to be adequate future inert, non-hazardous and hazardous landfill capacity across study area 2 (the North East, the North West and Yorkshire and The Humber) for the disposal of CDW arising from the project.

Table 11-13: Future Landfill Capacity in study area 2 (the North East, North West and Yorkshire and The Humber)

	Estimated Capacity (tonnes) 2020	Estimated Capacity (tonnes) 2021	Estimated Capacity (tonnes) 2022	Estimated Capacity (tonnes) 2023	Estimated Capacity (tonnes) 2024	Estimated Capacity (tonnes) 2025	Estimated Capacity (tonnes) 2026
Inert waste landfill	66,227,178	73,001,504	81,024,027	90,498,405	101,662,242	114,792,720	130,213,171
Non-hazardous waste landfill	60,315,427	53,728,680	47,877,772	42,678,214	38,055,529	33,944,020	30,285,705
Hazardous waste landfill	23,504,475	23,533,465	23,565,018	23,599,185	23,636,017	23,675,568	23,717,891

11.7 Potential Impacts

Construction

Material assets

11.7.1 With respect to material assets, impacts relate to the extraction of primary raw materials and the production of construction materials. In addition the project has the potential to constrain existing or future use and extraction of materials.

11.7.2 The potential construction impacts on material assets included in the assessment, as identified in *DMRB LA 110*, are:

- The sterilisation of mineral safeguarding sites and/or peat resources.
- The consumption of virgin materials.

11.7.3 In addition by virtue of the project's scale a balance between earthwork excavations (cut) and material placement (fill) may not be achieved. As a result, extraction of material from borrow pits in proximity to the project is likely to be required.

Demolition estimates

11.7.4 Demolition waste will be generated through the clearance of buildings and existing infrastructure, including services, roads, and drains which will need to be removed prior to construction. These are likely to consist of hard and inert materials, soils, rock and stones, wood (including vegetation), asphalt, brick, concrete, and miscellaneous metals. For the PEI Report there is an absence of data in relation to the quantities of demolition waste generated by the project. Therefore the quantities of demolition waste have not been included in the construction waste forecast in Table 11-17. However an assumption has been made based on professional judgement that the quantities of surplus excavation waste and construction waste identified in the PEI Report will be higher than the quantities of demolition waste arising from the project. Therefore, demolition waste is unlikely to represent a significant source of waste and the absence of the demolition waste quantities in the PEI Report are unlikely to impact the assessment of likely significant effects. The quantities of demolition waste will be available in the ES.

Earthworks estimates

11.7.5 The design is still being finalised for the earthworks estimations and will be updated and made available as part of the ES. Preliminary earthworks estimations are set out in Table 11-14: Preliminary earthworks estimations. Earthworks estimates have been provided in volume (cubic metres) and have therefore been converted to mass (tonnes) using the Environment Agency conversion factor of 1.5 tonnes per cubic metre used for inert materials.

11.7.6 The aim of the design is to achieve a cut and fill balance within the scheme, if possible. Where this is not possible due to the nature of the scheme the excess materials will be utilised within other schemes, with the aim of achieving an overall balance, where possible. This will depend on the scheduling and timing of the construction of each scheme and the nature of the materials available. Overall, it is expected there will be a net import of materials required.

11.7.7 The lack of re-usable materials available on the Temple Sowerby to Appleby, Appleby to Brough and the Cross Lane to Rokeby schemes are likely to increase the requirement for fill materials from offsite. This is also likely to increase transportation of these materials.

11.7.8 The M6 Junction 40 to Kemplay Bank and Bowes Bypass schemes are likely to generate excess cut materials which will be required to be removed from each scheme.

11.7.9 A number of schemes are undergoing further alignment and where information is available they are considered in the PEI Report. For the earthworks estimates the outline impacts of the alternative alignments are evaluated based on the preliminary data.

11.7.10 The Temple Sowerby to Appleby scheme is undergoing further alternative alignment therefore only the basic earthworks estimates are provided for the Blue, Orange and Red alternatives. In terms of the earthworks estimates the Orange alternative route alignment would have a requirement for fill materials. The Blue and Red alternative alignments are likely to generate excess cut materials which will be required to be removed.

11.7.11 The Appleby to Brough and Cross Lane to Rokeby schemes are also undergoing further alternative alignment. It should be noted that the earthworks calculations for the alternatives associated with the two schemes are not currently available. The Blue alternative for the central section of the Appleby to Brough scheme could result in an overall reduction of the deficit for that scheme by approximately 200,000m^3. For the Cross Lane to Rokeby scheme, the alternative Cross Lanes junction (the Blue (Cross Lanes) alternative) is expected to lead to surplus materials of approximately 40,000m^3. The assessment of impact of these alternatives in relation to earthworks is therefore qualitative, and based on the indicative differences set out here.

11.7.12 For the Appleby to Brough scheme, depending on the timing of the construction of schemes and which alternatives are selected, there is the potential for there to be a deficit of fill materials, therefore a provisional borrow pit for around 500,000m^3 has been identified north of the A66 dual carriageway to east of Café 66. It is anticipated that the site will be restored by regrading the hill and returning it to agricultural use. A second potential borrow pit has been identified south of the existing A66 alignment at Eamont Bridge (M6 Junction 40 to Kemplay Bank scheme), which has the potential to generate up to 60,000m3 of general fill material for the project, if required. Again, the site would be regraded and restored following use. The nature and design of the borrow pit(s), if required, will inform the materials and waste assessment undertaken for the ES as it is developed and refined.

11.7.13 The earthworks required for the new road and bridges will involve cutting into existing topography. Further assessment is ongoing and will be documented within the ES to identify the suitability of the won material for re-use.

Table 11-14: Preliminary earthworks estimations

Scheme	Cut (m^3)	Usable Cut (m^3)	Fill (m^3)	Scheme Balance (m^3)	Package Balance (m^3)	Cut (tonnes)	Usable Cut (tonnes)	Fill (tonnes)	Scheme Balance (tonnes)	Package Balance (tonnes)
M6 Junction 40 to Kemplay Bank	247,549	219,502	37,204	186,798	145,528	371,324	329,253	55,805	280,197	218,292
Penrith to Temple Sowerby	224,434	207,602	248,872	-41,270		336,651	311,402	373,307	-61,905	
Temple Sowerby to Appleby – Orange	331,837	N/A	594,699	-262,862	N/A	497,756	N/A	892,049	-394,293	N/A
Temple Sowerby to Appleby – Red	1,333,432	N/A	496,776	836,656	N/A	2,000,148	N/A	745,164	1,254,984	N/A
Temple Sowerby to Appleby – Blue	1,392,462	N/A	494,709	897,753	N/A	2,088,693	N/A	742,064	1,346,630	N/A
Appleby to Brough	457,500	393,588	945,500	-513,625	N/A	686,250	590,382	1,418,250	-770,437	N/A
Bowes Bypass	110,478	102,192	92,378	9,814	-191,491	165,717	153,288	138,567	14,722	-287,237
Cross Lane to Rokeby	89,764	83,032	284,337	-201,305		134,646	124,548	426,505	-301,957	
Stephen Bank to Carkin Moor	361,490	334,378	351,137	-16,759	-16,759	542,235	501,567	526,705	-25,138	-25,138
A1(M) Junction 53 Scotch Corner	0	0	0	0	0	0	0	0	0	

Waste

11.7.14 In terms of waste, potential environmental impacts are primarily related to the production, movement, transport, processing and disposal of waste from the project.

11.7.15 The potential construction impacts on waste included in the assessment, as identified in *DMRB LA 110*, are:

- The reduction in regional landfill capacity.
- The reduction in national landfill capacity.

11.7.16 The project has the potential to generate large amounts of CD&E waste which could potentially affect the capacity of waste management infrastructure in study area 2 (the North East, the North West and Yorkshire and The Humber regions).

11.7.17 Potential impacts could include the temporary use of waste management facilities capacity (during treatment) and a permanent decrease in landfill capacity (disposal). Landfill is a finite resource and the ongoing disposal of waste puts pressure on the existing facilities or requires new sites to be developed. Similarly, waste management and waste treatment facilities have limits on processing capacity, therefore there is the potential for the project to utilise a proportion of the remaining available capacity temporarily for the duration of construction.

11.7.18 Although much of the area surrounding the existing A66 is undeveloped land, there are buildings and existing infrastructure (e.g. services, roads, drains) which will need to be demolished prior to construction.

11.7.19 As this is a large-scale project with eight schemes, the quantities of waste and material resources associated with the earthworks mean that a balance between excavation (cut) and material placement (fill) may not be achieved. If there is more cut material than is required for fill, the material will be removed for re-use offsite. Therefore onsite generated material resources and waste arisings may have an effect on the existing landfill capacity. Similarly, if a net import is required, material may need to be obtained from nearby sources as set out in paragraph 11.7.3 (for example the potential borrow pit identified for Appleby to Brough).

11.7.20 The potential waste types that could arise during the construction phase are summarised in Table 11-15: Potential waste sources during the construction phase.

Table 11-15: Potential waste sources during the construction phase

Construction phase	Potential wastes produced	Classification of waste	Potential impacts
Construction	Construction materials, such as concrete, bricks, plastics, metals, plasterboard, timber, paint, etc.	Inert; and/or, Non-hazardous; and/or, Hazardous.	The reduction in regional inert, non-hazardous and hazardous landfill capacity.
	Made ground, soil and sub-soils.	Non-hazardous, and Hazardous if it contains sufficiently high levels of heavy metals.	The reduction in national landfill capacity.
	Waste products arising from the presence of construction staff onsite	Inert; Non-hazardous and	The reduction in regional non-hazardous and

Construction phase	Potential wastes produced	Classification of waste	Potential impacts
	e.g. effluent from portable toilets, food waste and packaging, as well as waste from surplus materials and spillages.	potentially Hazardous.	hazardous landfill capacity.
Demolition	Building materials, such as concrete, bricks, plastics, metals, plasterboard, timber, paint, etc. Made ground, soil and sub-soils Asphalt and bituminous products.	Inert; and/or, Non-hazardous; and/or, Hazardous. Non-hazardous, and Hazardous if it contains sufficiently high levels of heavy metals or if asphalt contains coal tar.	The reduction in national landfill capacity.
Excavation	Made ground, soil and sub-soils.	Inert; and/or, Non-hazardous; and/or, potentially Hazardous if it contains sufficiently high levels of heavy metals.	The reduction in regional inert, non-hazardous and hazardous landfill capacity.

11.7.21 The types of CD&E waste arisings generated by the project are displayed in Table 11-16: Types of CD&E waste arisings generated by the project.

Table 11-16: Types of CD&E waste arisings generated by the project

Activity	Waste arisings	Quantities	Additional information
Site preparation and earthworks	Vegetation strip and tree removal. Existing highways infrastructure such as kerbs, lighting, highways signs, safety barriers, etc.	Only the preliminary earthworks estimates are available.	Re-use onsite. Recycling offsite in local projects. Local recycling facilities. Disposal at an inert/non-hazardous or hazardous landfill site.
Demolition	Existing infrastructure such as farmhouse and road demolition including supports, rails, voids.	Limited qualitative information available regarding properties and structures for demolition. Quantities not currently available, though not expected to be significant given relatively small scale demolition required.	Some material may be suitable for re-use or recycled onsite. Local recycling facilities. Disposal at an inert/non-hazardous or hazardous landfill site.

Activity	Waste arisings	Quantities	Additional information
Construction	Surface planings.	The construction waste forecast is available.	Some material may be suitable for re-use or recycled onsite. Local recycling facilities. Disposal at an inert or non-hazardous site.
	Site won material (hazardous).	Not currently available.	Any hazardous material will be taken to a permitted waste management facility.

Construction waste estimate

11.7.22 Construction waste has been estimated using information provided by the project team and Waste Benchmarking Data developed by Building Research Establishment (BRE) on behalf of the Waste Resources Action Programme (Waste Resources Action Programmeand the Building Research Establishment, 2012)[27] for the project.

11.7.23 Using this method, the project is forecast to generate 26,146 tonnes of construction waste during the construction period. The quantity of construction waste that will be diverted from landfill via re-use, recycling and recovery is based on a landfill diversion rate of 90%. This rate has been selected based on a review of industry landfill diversion rates (92%) and also the target identified in *DMRB LA110* to divert at least 90% (by weight) material recovery of non-hazardous Construction and Demolition Waste (CDW). Therefore as a worst-case scenario it has been assumed that the remaining 10% of construction waste arising will be disposed of off-site to landfill.

11.7.24 The quantity of construction waste that will require off-site disposal to landfill is estimated to be 2,614 tonnes.

11.7.25 The assumptions used to estimate the construction waste are available in Appendix 11.1: Construction Waste Estimate. The construction waste generated by the project will be estimated again in the ES as new information will be available.

Impact on future baseline

11.7.26 A summary of waste quantities estimated to be generated by excavation activities and construction of the project are displayed in Table 11-17.

11.7.27 For the PEI Report there is an absence of data in relation to the quantities of demolition waste generated by the project. However an assumption has been made based on professional judgement that the quantities of surplus excavation waste and construction waste identified in the PEI Report will be higher than quantities of demolition waste arising from the project. The quantities of demolition waste will be available in the ES.

11.7.28 For the excavation waste estimates, in order to identify a worse-case scenario the total surplus materials identified in the preliminary earthworks estimates (see Table 11-14: Preliminary earthworks estimations) have been used. The estimated route wide excavation waste is likely to be much lower as schemes are likely to share surplus materials for fill materials. Also, in order to identify a worse-case scenario for

[27] Waste Resources Action Programmeand the Building Research Establishment (2012) SMARTWaste Data and Reporting

the alignment options for Temple Sowerby to Appleby, the Blue alternative has been used as it has the highest surplus materials.

11.7.29 The quantity of excavation and construction waste that will be diverted from landfill via re-use, recycling and recovery is based on a landfill diversion rate of 90%. This rate has been selected based on a review of industry landfill diversion rates (92%). Therefore as a worst-case scenario it has been assumed that the remaining 10% of excavation and construction waste arising will be disposed of off-site to landfill.

Table 11-17: A summary of waste quantities estimated to be generated by excavation and construction of the project

Activity	Total quantity (tonnes)	Quantity diverted (tonnes)	Quantity for offsite disposal (tonnes)
Excavation waste	1,663,669	1,497,302	166,367
Construction waste	26,146	23,532	2,615
Total waste	1,689,815	1,520,834	168,982
Proportion	100%	90%	10%

11.7.30 Table 11-17 identifies that the project will generate 1,689,815 tonnes of excavation and construction waste with 90% (1,520,834 tonnes) of this waste diverted from landfill via re-use, recycling and recovery.

Operation

11.7.31 An assessment is included for the first year of operation, to address any remaining materials from the construction phase (i.e. remaining stockpiles or waste generated from handover activities). Where available, information is also presented to provide an indication of material use and waste generation likely to occur during the operational phase. It is anticipated that during operation, the material consumption and waste generation will be substantially lower than during the construction phase, therefore an assessment of future operational years is not included, as per *DMRB LA 110*.

11.7.32 Table 11-18: Potential waste arisings during the first year of operation below summarises the types of waste arisings that may potentially be generated during the first year of operation of the project. The operational waste streams generated by the project are likely to be similar to the wastes generated from the existing A66. Therefore, operational waste generated by the project is not likely to be difficult to manage or dispose.

Table 11-18: Potential waste arisings during the first year of operation

Project Activity	Activities generating waste	Classification of waste	Potential Impacts
Operation and maintenance	Routine maintenance of infrastructure and technology, including surfacing asphalt and servicing of electronic equipment.	Waste arisings during the operational phase are expected to be minimal however there is likely to be hazardous waste such Waste Electrical and	Operational waste generated by the project is not likely to result in any potential impacts due to minimal amounts even

Project Activity	Activities generating waste	Classification of waste	Potential Impacts
		Electronic Equipment (WEEE) from replacing lighting and other equipment. Other minimal hazardous waste could include contaminated surfacing following a diesel or oil spill as well as the emptying of any interceptors/pollution control systems. Non-hazardous waste will arise from re-surfacing and other activities.	considering maintenance waste and WEEE.

11.8 Design, mitigation and enhancement measures

11.8.1 The design of the project is ongoing along with the development of mitigation measures relating to material assets and waste. However initial measures have been developed using a series of principles to drive the mitigation of materials use and waste generation, treatment and disposal, and will be included in the EMP. The measures required to implement good practice and sustainable resource and waste management will be developed further through the EIA process and will be secured within the EMP as part of the DCO process.

Design

11.8.2 By considering materials at the earliest opportunity in the design process there are likely to be far more opportunities for resource efficiency. *DMRB LA 110* Section 3.18 identifies that the ES shall include evidence of the adoption of design and mitigation measures (Designing out Waste) for material assets and waste, including aspects such as designing for re-use and recovery, materials optimisation, offsite construction, future (deconstruction and flexibility), and waste efficient procurement. The current examples of Designing out Waste on the project are listed below.

Design for re-use and recovery

11.8.3 Prior to demolition of each structure or building, a pre-demolition audit would be carried out to quantify materials and investigate opportunities for re-use and recycling.

11.8.4 The paving of large sections of the existing A66 highway will be re-used saving materials and reducing waste.

Design for materials optimisation

11.8.5 The project team will investigate design for materials optimisation by simplifying layout and form to minimise material use, balancing cut and fill, maximising the use of renewable materials and materials with recycled content. The project team will also investigate the opportunity to introduce the standardisation of selected materials to ensure waste inherent in the design is reduced. Standardisation will be applied to pre-cast concrete components such as pavers, kerbs, and blocks, and drainage such as gullies, pipes and chambers.

Design for offsite construction

11.8.6 The project team will investigate the potential for offsite construction of certain elements of the project. Offsite construction can drive improvements in the products or processes employed in construction, ranging from innovative products such as asphalt surfaces on a 'carpet roll' to be used onsite through to precast components manufactured offsite. At this stage it would be envisaged to manufacture offsite bridge beams, prefabricated concrete units (headwalls and drainage rings) and steel segments (if selected to be used).

Design for the future (deconstruction and flexibility)

11.8.7 The project team will investigate and identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be maximised at end of first life.

Design for waste efficient procurement

11.8.8 The project team will identify and specify materials that can be acquired responsibility, in accordance with a recognised industry standard.

Engineering plan configurations and layouts

11.8.9 In addition the project team will provide engineering plan configurations and layouts that demonstrate how the most effective use of materials and arisings can be achieved.

11.8.10 The project team will also engage with the appointed contractor during design to identify possible mitigation and enhancement measures, and to identify opportunities to reduce waste.

Mitigation

Material assets

11.8.11 The depletion of finite material resources will occur through extraction of primary aggregates (e.g. sands and gravels). Structures, drainage and signage products will be procured with consideration of the environmental impacts associated with their manufacture, as well as other considerations such as structural design, carbon footprint (PAS 2050), energy consumption, long-life performance, visual impacts, durability and cost. The procurement of sustainable materials will be secured through the EMP.

11.8.12 With the growing demand for construction products and the ever-increasing pressure to reduce the environmental impacts of depleting natural resources, there is a significant percentage of construction materials that are produced from recycled material. The project team are committed to achieve a recycled content target of at least 31% for aggregates. In the case of concrete, it is common for 20% of the material by volume to be secondary sourced material, which can be increased beyond 40% depending on the mix, workability and strength gain requirements.

11.8.13 In addition the project team are committed to sourcing other construction materials with a high recycled content. In the case of steel, most of the steel sourced for bridge beams or ground support solutions is made from over 90% recycled steel. In relation to drainage products, there are now many drainage products on the market that incorporate over 60% recycled content, most notably with plastic drainage products and kerbs.

11.8.14 Site levels and grading of the project will be designed to achieve a cut and fill balance where practicable in order to help minimise excavation quantities.

11.8.15 The approach to earthworks will enable materials excavated onsite to be re-used at areas of the site where materials are required as far as practicable. This will minimise the amount of material required from offsite. In addition it may also be possible to identify other construction projects located in study area 2 that can re-use the materials. The approach to earthworks will, however, be influenced by the construction phasing and there may be limitations on how materials can be re-used between schemes. The approach to earthworks will be set out in the ES and EMP.

11.8.16 The Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste Code of Practice (Contaminated Land: Applications in Real Environments, 2011)[28] would be applied to optimise the amount of excavated materials that can be re-used and recycled across the project. The requirement to comply with the CL:AIRE Definition of Waste Code of Practice will be set out in the MMP.

11.8.17 The Environment Agency *Quality protocols* (Environment Agency, 2020d)[29] will be used to identify when a waste-derived material can be regarded as a non-waste product and no longer subject to waste controls. The Quality protocols could potentially be applied to optimise the amount of demolition materials that can be re-used across the project, and the requirement to comply with these protocols will be set out in the EMP.

Waste

11.8.18 The project design will take into consideration the upper tiers of the waste hierarchy as required by *DMRB LA 110* in Image 11-4: Waste hierarchy with a view to minimising the overall volume of waste arisings via designing out waste and maximising efficient use of materials, ultimately to prevent and minimise waste sent to landfill.

[28] Contaminated Land: Applications in Real Environments (2011) The Definition of Waste: Development Industry Code of Practice

[29] Environment Agency (2020d) Quality protocols: converting waste into non-waste products, available at: https://www.gov.uk/government/collections/quality-protocols-end-of-waste-frameworks-for-waste-derived-products [accessed 23 August 2021]

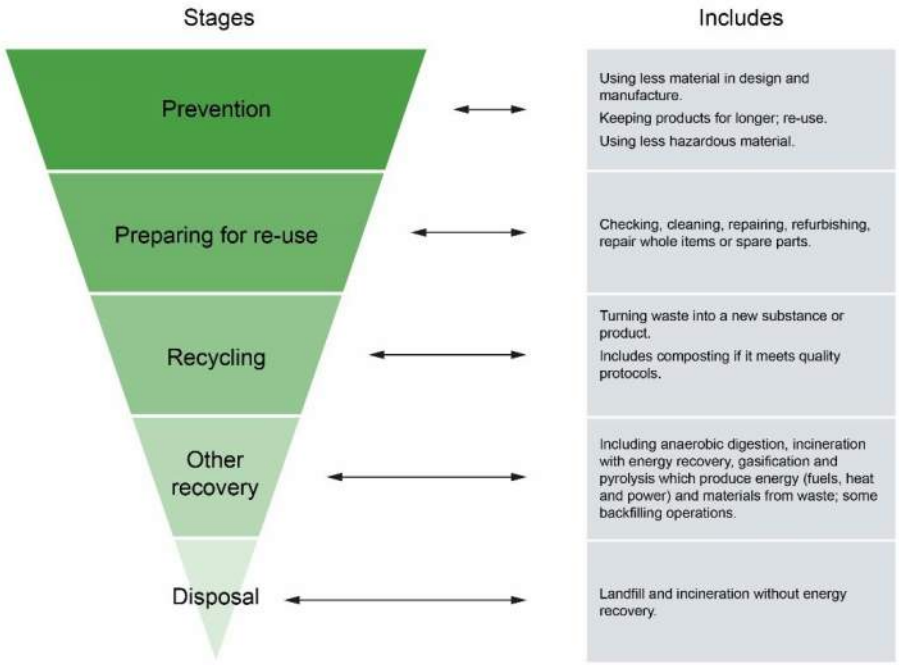

Image 11-4: Waste hierarchy

11.8.19 The project will generate material from demolition and the project team will investigate how demolition materials can be integrated with a future works programme, or be considered for use in other construction projects, to minimise their classification as waste as far as practicable. The project will consider the *Demolition Protocol* (Institute of Civil Engineers, 2008[30]), a resource efficiency model that shows how the production of demolition material can be linked to its specification as a high-value material both onsite and in other construction projects.

11.8.20 The project team will investigate the opportunities to re-use existing foundations, structures, pavements, floor slabs and services onsite. Where this is not appropriate the appointed contractor will consider crushing demolition materials for recycling as aggregates onsite. If onsite recycling is not feasible the appointed contractor will identify opportunities for recycling the demolition materials offsite in any Highways England or other suitable local projects, through a recycling contractor or in other external projects.

11.8.21 In addition to these embedded mitigation measures, other materials and waste measures that will be considered as part of the EIA process include:

- Specifying the use of materials with a high percentage of recycled content.
- Local sources for aggregate supplies should be considered whenever possible.
- Re-using packaging by returning it to the supplier or manufacturer or using it for other purposes (e.g. non-treated timber packaging pallets can be chipped and used for landscaping top mulch).
- Ensuring arisings generated are handled, stored, managed and re-used or recycled as close as possible to the point of origin.

[30] Institute of Civil Engineers (2008) Demolition Protocol, available at: https://uk.practicallaw.thomsonreuters.com/3-383-9202?transitionType=Default&contextData=(sc.Default)&firstPage=true [accessed 23 August 2021]

- Identifying areas for stockpiling and storing arisings that will minimise degradation, damage and loss.

11.8.22 All the mitigation measures will be included as requirements within the MMP and SWMP, the objectives of which will be set out in the EMP prepared as part of the ES (an outline of what will be included in the EMP is found at Appendix 4.1: Outline of Environmental Management Plan) Other relevant good practice controls during the construction phase (for example segregated materials storage and re-use of inert materials for grading) will also be included in these documents.

11.8.23 While reduction of waste should remain the highest priority, where feasible waste produced shall be segregated for recycling. This will allow materials to be recycled and ultimately reduce the amount of waste that has to be finally disposed of. The appointed contractor will establish waste storage and recycling areas, for each scheme or package, for the safe storage and processing of recovered materials to ensure that opportunities for re-use are maximised. The project will strive to implement industry best practice with regard to the segregation of waste by adopting the Considerate Constructors Scheme (CCS)[31] colour coding system on waste skips. The colour coding scheme is a simple system which colour labels waste skips indicating the types of waste that can be placed in them. Where no other waste management option is found to be feasible, wastes shall be sent to an appropriately permitted landfill site in accordance with UK legislation and any Highways England requirements.

11.8.24 For any waste taken off site or brought onto site, the *Waste duty of care: code of practice* (Department for Environment, Food & Rural Affairs, 2018)[32] must be complied with through the use of registered waste carriers and appropriately permitted sites.

11.8.25 Hazardous waste shall be correctly labelled and should not be mixed with non-hazardous waste. It should be securely contained and disposed of at an appropriately permitted facility via a registered waste carrier.

11.8.26 Onsite investigation is also required to determine the levels of contaminated land, identify the appropriate remediation options and agree the preferred approach with the regulatory authorities. Any contaminated excavated material will have to be carefully segregated and stored to minimise cross contamination of clean materials.

Environmental management plan (EMP)

11.8.27 The EMP for the project will include materials and waste commitments, including those that will need to be delivered through the SWMP. The EMP will capture information and data on site arisings recovered or diverted from landfill and waste and specify management requirements for construction materials, site arisings and waste. The EMP will be reviewed and monitored to meet the requirements of Section 4 of *DMRB LA 110*.

Materials management plan (MMP)

11.8.28 The MMP will be prepared by the appointed contractor pre-construction and will include the proposals for the handling of waste material following the protocols within

[31] Considerate Constructors Scheme (2017) Colour Coded Waste Skips, available at: https://ccsbestpractice.org.uk/entries/colour-coding-waste-skips/ [accessed 23 August 2021]
[32] Department for Environment Food & Rural Affairs (2018) Waste duty of care: code of practice, available at: https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice/waste-duty-of-care-code-of-practice [accessed 23 August 2021]

the *CL:AIRE Definition of Waste*. The EMP will set out the objectives that need to be met by the MMP.

Site Waste Management Plan (SWMP)

11.8.29 A SWMP is used to plan, implement, monitor and review waste minimisation and management on construction sites. The SWMP is also used to record how waste is prevented, minimised, re-used, recycled and disposed of on a construction site. The SWMP will be a live document, reviewed and updated regularly during the course of the project.

11.8.30 Table 11-19: Summary of mitigation and monitoring measures displays a summary of the mitigation measures associated with the project.

Table 11-19: Summary of mitigation and monitoring measures

Activity	Impact	Mitigation	Monitoring
Site clearance and demolition	Disposal of demolition waste	Re-use of materials onsite where feasible. Recycle materials onsite. Recycling and recovery of materials offsite at recycling facilities.	The EMP will set out how the SWMP will manage and monitor waste arisings, and the objectives to be met by the MMP.
Earthworks	Consumption of primary resources Disposal of excavation waste	Design to maximise the earthworks balance. Re-use of excavated materials onsite where feasible. Re-use of excavated materials offsite in other local projects where feasible.	The EMP will set out the objectives that would need to be delivered by the SWMP and the MMP for the project.
Construction waste	Disposal of construction waste	Re-use as pavement planings sub-base in footpaths. Re-use existing planings in pavement construction.	The EMP will include the requirements of the SWMP to monitor waste arisings.

11.9 Assessment of the Likely Significant Effects

Construction

11.9.1 At this stage of the assessment the potential significant effects have been identified by reference to Tables 3.13 and 3.14 in *DMRB LA 110* for material assets and waste. Whilst mitigation is a key focus there remains the potential for residual effects.

Potential significant effects

11.9.2 The likely effects listed below represent a significant effect as set out in *DMRB LA 110*[33]:

Material assets

- The sterilisation of ≥1 mineral safeguarding site and/or peat resources; and
- Aggregates required to be imported to site to comprise re-used/recycled content below the relevant regional percentage target (less than 31%); and
- A low recycling and recovery rate (less than 70%) of non-hazardous CDW.

Waste

- Disposal of >50% of project waste outside study area 2 (the North East, the North West and Yorkshire & The Humber region); and
- >1% reduction or alteration in the capacity of landfill capacity in study area 2 as a result of accommodating waste from the project.

Material assets

Sterilisation of mineral safeguarding sites and peat resources

11.9.3 Due to the number of MSAs and mineral sites crossing and close to the project there is potential to substantially constrain or prevent existing and potential future extraction of materials. Therefore, based on this preliminary worst-case scenario a large likely significant effect has been identified. The sterilisation of mineral sites will be assessed further in the ES following the requirements of *DMRB LA 110*.

11.9.4 The consultation with Cumbria County Council, Durham County Council and North Yorkshire County Council confirmed there are no existing peat resource sites (commercial peat extraction) within study area 2. Therefore the project will not sterilise any peat resources and no further assessment is required regarding peat as a resource. Chapter 7: Climate and Chapter 9: Geology and Soils set out the consideration of peat in the context of soils and carbon emissions.

Importation of importation of excess virgin aggregates

11.9.5 The importation of secondary aggregates with low recycled content will be assessed in the ES following the requirements of *DMRB LA 110*. The project aims to achieve that construction materials will have recycled content target of at least 31%.

Recycling and recovery rate of construction and demolition waste (CDW)

11.9.6 Based on preliminary data the recycling and recovery of CDW across the project will not generate a likely significant effect (less than 70%). The project is likely to achieve a recycling rate in excess of 70% and aims to achieve at least 90% (by weight) material recovery of non-hazardous CDW. The current construction industry recovery rate is 92%. In addition the control measures will be implemented through:

- The EMP
- The SWMP
- The MMP
- Best practice construction waste segregation as identified by the CCS

[33] The Potential Likely Significant Effects have been listed replicating DMRB LA 110. However, there is recognition that the criteria for which to determine significance of effects for material assets and waste in DMRB LA 110 is under review. Therefore, a divergence from the standard and a worst-case approach is applied to this PEI Report that considers this list to be 'or' not 'and'.

Waste infrastructure capacity in study area 2

11.9.7 The following waste infrastructure capacity in study area 2 (the North East, the North West and Yorkshire and The Humber) has been assessed following the requirements of *DMRB LA 110*:

- Inert landfills
- Non-hazardous landfills
- Hazardous landfills.

Inert landfill capacity

11.9.8 Inert waste arising from the project that cannot be re-used, recycled or recovered will need to be disposed to inert landfill. In order to model the worst-case scenario, the total waste identified for offsite disposal arising from the construction of the project has been compared to the total future inert landfill capacity in study area 2 (the North East, the North West and Yorkshire and The Humber) in 2024. The results are shown in Table 11-20: Inert landfill capacity in study area 2 which displays the maximum amount of inert waste that could potentially be sent to landfill in 2024.

Table 11-20: Inert landfill capacity in study area 2

Year	Maximum Project Inert Waste (tonnes)	Total Inert landfill capacity (tonnes)	% Inert waste disposal capacity
2024	168,982	101,662,242	0.2

11.9.9 The estimated tonnage of excavation and construction waste which may potentially be sent for inert landfill disposal generated from the project is 0.2% of the total inert landfill capacity in study area 2 (the North East, the North West and Yorkshire and The Humber). This represents a slight effect and would not produce a likely significant effect.

Non-hazardous landfill capacity

11.9.10 Non-hazardous waste arising from the project that cannot be re-used, recycled or recovered will need to be disposed to non-hazardous landfill. In order to model the worst-case scenario, the total waste identified for offsite disposal arising from the construction of the project has been compared to the total future non-hazardous landfill capacity in study area 2 (the North East, the North West and Yorkshire and The Humber) in 2024. The results are shown in Table 11-21: Non-hazardous landfill capacity in study area 2 which displays the maximum amount of non-hazardous waste that could potentially be sent to landfill in 2024.

Table 11-21: Non-hazardous landfill capacity in study area 2

Year	Maximum Project Non-hazardous Waste (tonnes)	Maximum Project Non-hazardous Waste (tonnes)	Total Non-hazardous landfill capacity (tonnes)
2024	2,615	38,055,529	0.01

11.9.11 The estimated tonnage construction waste which may potentially be sent for non-hazardous landfill disposal generated from the project is 0.01% of the total non-hazardous landfill capacity in study area 2 (the North East, the North West and

Yorkshire and The Humber). This represents a slight effect and would not produce a likely significant effect.

Hazardous landfill capacity

11.9.12 Hazardous waste arising from the project that cannot be treated or recovered will need to be disposed to hazardous landfill. There is no information currently available to indicate the proportion of waste that might be classified as hazardous. In order to model the worst-case scenario, therefore, the total waste identified for offsite disposal arising from the construction of the project has been compared to the total future hazardous landfill capacity in study area 2 (the North East, the North West and Yorkshire and The Humber) in 2024. The results are shown in Table 11-22 Hazardous landfill capacity in study area 2 which displays the maximum amount of hazardous waste that could potentially be sent to landfill in 2024.

Table 11-22 Hazardous landfill capacity in study area 2

Year	Maximum Project Hazardous Waste (tonnes)	Total Hazardous landfill capacity (tonnes)	% Hazardous waste disposal capacity
2024	2,615	23,636,017	0.01

11.9.13 The estimated tonnage of construction waste which may potentially be sent for hazardous landfill disposal generated from the project is 0.01% of the total hazardous landfill capacity in study area 2 (the North East, the North West and Yorkshire and The Humber). This represents a slight effect and would not produce a likely significant effect.

11.9.14 It should be noted that this assessment does not include materials that are extracted from the ground that are tested and classified as hazardous. Given the context of the surrounding area and limited industrial development, it is not expected that the project will encounter large areas of contamination. A Ground Investigation has been completed, and chemical analysis is ongoing, therefore an estimate of potential volumes of material that could be classified as hazardous arising from excavation will be reported in the ES.

11.9.15 Based on preliminary data, the assessment of future inert, non-hazardous and hazardous landfill capacity in 2024 has identified a slight and non-significant effect across the waste management infrastructure in study area 2 (the North East, the North West and Yorkshire and The Humber). The waste management infrastructure will be assessed further in the ES following the requirements of *DMRB LA 110*.

Disposal of CDW outside study area 2

11.9.16 The assessment of waste management infrastructure identifies there is sufficient inert, non-hazardous and hazardous landfill capacity across study area 2 (the North East, the North West and Yorkshire and The Humber). Therefore it is unlikely CDW will need to be disposed outside study area 2. Therefore, based on preliminary data, it has been identified the project would not produce a likely significant effect in relation to the disposal of CDW outside study area 2. The disposal of CDW outside study area 2 will be assessed further in the ES following the requirements of *DMRB LA 110*.

Operation

Material assets

11.9.17 During operation of the project, materials use is expected to be limited. Therefore, only the first year of operation is included in the assessment in order to capture any effects arising from materials remaining from construction (such as stockpiles) and assess any potential for effects arising from operational activities.

11.9.18 The materials consumed by the project will be associated with routine maintenance of the highway, highway infrastructure and road-side technology, such as surfacing asphalt, replacement fencing and barriers and replacement electronic equipment. It is anticipated that during operation, the material consumption will be substantially lower than during the construction phase. Therefore based on preliminary data the project would not produce a likely significant effect in relation to material assets during operation. The operational material assets will be assessed further in the ES.

Waste

11.9.19 During operation of the project, waste arisings are expected to be limited. Therefore, only the first year of operation is included in the assessment in order to capture any effects arising from waste generated from the final phases of construction and handover, and assess any potential for effects arising from operational activities.

11.9.20 The waste arisings from the operation of the project may include waste asphalt from re-surfacing activities, verge clearance waste and Waste Electrical and Electronic Equipment (WEEE) from replacing lighting and other equipment. It is anticipated that during operation, the waste generated will be substantially lower than during the construction phase. Therefore based on preliminary data the project would not produce a likely significant effect in relation to waste during operation. The operational waste will be assessed further in the ES.

Summary

11.9.21 A summary of the preliminary route wide likely significant effects on material assets and waste receptors, possible design mitigation and enhancement measures and remaining significant effects is provided in Table 11-23: Route wide - likely significant effects (Materials and Waste).

Table 11-23: Route wide - likely significant effects (Materials and Waste)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely significant effect following mitigation (Yes/No/Uncertain)
Mineral Safeguarding Sites and/or peat resources	Sterilisation of Mineral Safeguarding Sites and/or peat resources	None	Avoidance of Mineral Safeguarding Sites and/or peat resources.	Yes (Construction) – Based on the preliminary information available the sterilisation of Mineral Safeguarding Sites cannot be avoided across the project.
Aggregates imported to site	Ability to meet Highways England Regional target for percentage of recycled content	None	The project aims to achieve that aggregates imported to site will have recycled content target of at least 31%.	Yes (Construction) LSE cannot be ruled out at this stage, based on the preliminary information available. The potential for importation of aggregates with low recycled content will be assessed in the ES following the requirements of DMRB LA 110, having regard to the information available at ES.
Material resources	Recycling and recovery rate of Construction and Demolition Waste (CDW)	None	The project aims to achieve at least 90% (by weight) material recovery of non-hazardous CDW.	No (construction and operation) – based on the preliminary data the project is likely to achieve a recycling rate in excess of the 70%.
Waste management infrastructure outside of study area 2	Disposal of CDW outside study area 2	None	The project aims to achieve at least 90% (by weight) material recovery of non-hazardous CDW.	No (construction and operation) - the assessment of waste management infrastructure identifies there is sufficient inert, non-hazardous and hazardous landfill capacity across study area 2. Therefore, it is unlikely

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely significant effect following mitigation (Yes/No/Uncertain)
				CDW will need to be disposed outside study area 2.
Waste management infrastructure in study area 2	Inert landfills; non-hazardous landfills and hazardous landfill capacity in study area 2.	None	The project aims to achieve at least 90% (by weight) material recovery of non-hazardous CDW.	No (construction and operation) - the assessment of waste management infrastructure identifies there is sufficient inert, non-hazardous and hazardous landfill capacity across study area 2 (the North East, the North West and Yorkshire and The Humber).

11.10 Monitoring

Route wide

11.10.1 It is anticipated that the construction phase will be undertaken by Highways England's existing Delivery Integration Partners. They are contracted to support the preliminary preparation for construction and will develop procedures during construction to control the use of materials and further reduce the impact. This will be documented in the EMP which will include the commitments of the SWMP such as the estimated quantities of waste material and the opportunities for re-use, recycling, recovery or disposal. A draft of the EMP will be submittd with the DCO, and will evolve through the DCO process and pre-construciton ohase. The EMP will be a legally secured document through the DCO process, and will remain as a live document throughout construciton, handover and operation. An outline of what will be included in the EMP can be found at Appendix 4.1: Outline of Environment Management Plan.

11.10.2 The EMP and as appropriate SWMP and MMP shall be reviewed and updated as the project progresses to report on monitoring of:

1) construction monitoring data for on-site arisings and waste generated and assumptions on-site arisings and waste forecast used in the assessment;

2) equivalent data for comparison with the assessment forecast during the first year of operation; and

3) recording/reporting to ensure all legal documentation (waste carrier registration, environmental permit, waste transfer documentation) associated with the management of construction and operational materials, site arisings and waste is available and retained.

11.10.3 The monitoring measures to be implemented are summarised in Table 11-19: Summary of mitigation and monitoring measures.