Norwich Western Link

Environmental Statement

Chapter 14: Material Assets and Waste

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Glossary of Abbreviations and Defined Terms

Term	Definition
BoQ	Bill of Quantities
CDE	Construction, Demolition and Excavation
CDW	Construction and demolition waste
Circular economy	Maximising the sustainable use and value of resources, eliminating waste from all stages of the resource lifecycle, while benefiting both the economy and the environment.
CL:AIRE	Contaminated Land: Applications in Real Environments
Construction materials	Primary, recycled / secondary and renewable sources of materials required for constructing a project.
Demolition	The action or process of deconstructing, demounting or otherwise bringing down / breaking out of buildings and structures.
Disposal	Any operation which is not recovery, (e.g. discarding waste to landfill). This includes any operation that has as a secondary consequence the reclamation of substances or energy.
DoW	Definition of Waste
Hazardous waste	Any waste that displays one or more of the hazardous properties listed in Annex III of the Waste Directive (2008/98/EC).

Term	Definition
Inert waste	Waste: 1) that does not undergo any significant physical, chemical or biological transformations; 2) that does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter from which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and 3) where its total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater (see Directive 1993/31/EC "The Landfill Directive")
Key construction materials	Construction materials which constitute the majority of material required to deliver the scheme (by weight).
Landfill capacity	The known, forecast or estimated remaining landfill void space, either regionally or nationally, generally measured in cubic metres.
Mineral sites	Operation sites or sites identified within strategic planning documents for the extraction of minerals.
MMP	Materials Management Plan
MSA	Mineral Safeguarding Area
MWJP	Minerals and Waste Joint Plan
Non-hazardous waste	Waste that is neither classified as inert nor hazardous.

Term	Definition
Peat resource	Existing or potential peat extraction sites.
Preparing for reuse	Checking, cleaning or repairing operations, by which products or components of products that have become waste are prepared for reuse without further pre-processing.
Primary materials	Materials that are from a non-renewable source (also referred to as virgin materials).
Recovery	Any operation which results in a waste serving a useful purpose by replacing materials which would otherwise have been used to fulfil that particular function. Recovery also includes waste being prepared or processed to fulfil a particular function.
Recycle	Any recovery operation where waste is reprocessed into products, materials or substances whether for its original or other purposes. Recycling includes the reprocessing of organic material but excludes energy recovery and the reprocessing of waste into materials to be used as fuels or for backfilling operations.
Reuse	Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived; reuse presumes that significant reprocessing is not required.
Secondary (materials)	Useful by-products from manufacturing or industrial processes.
Site arisings	Construction, demolition, excavation and other arisings generated from within a project boundary.

Term	Definition
Site Waste Management Plan	A system or document for implementing, monitoring and reviewing waste prevention measures
Sterilise	Substantially constrain / prevent existing and potential future use and extraction of materials.
SWMP	Site Waste Management Plan
Waste	Any substance or object that is discarded, and that has not been subject to acceptable recovery (including recycling) or disposal.
Waste infrastructure	Facilities that handle, treat / prepare for reuse, recycle and dispose (landfill) of waste.
WRAP	Waste & Resources Action Programme

14 Material assets and waste

14.1 Introduction

14.1.1 This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Scheme from the consumption of material assets and the generation and disposal of waste.

14.1.2 The chapter describes the methodology used for, and the baseline conditions relevant to, the assessment - both of which are integral to the conclusions presented.

14.1.3 A summary of the adverse environmental impacts has been provided. The expected residual effects and any required monitoring after mitigation measures have been implemented are also presented.

14.1.4 This chapter (and its associated figures and plates) is intended to be read as part of the wider ES, with particular reference to **Chapter 7: Noise and Vibration** (Document Reference: 3.07.00), **Chapter 9: Landscape and Visual Effects** (Document Reference: 3.09.00), **Chapter 15: Climate Greenhouse Gases** (Document Reference: 3.15.00) and **Chapter 17: Population and Health** (Document Reference: 3.17.00).

14.2 Legislative framework, Policy and Guidance

Legislative framework

14.2.1 The legislative framework applicable to Material Assets and Waste is summarised as follows.

Waste Framework Directive 2008/98/EC (Ref 14.1)

14.2.2 The Waste Framework Directive provides a comprehensive foundation for the management of waste across the European Community and gives a common definition of waste. While the United Kingdom is no longer a member of the European Union, many of the concepts underpinning the directive remain

relevant to the United Kingdom's domestic law. Article 3 of the Waste Framework Directive defines waste as:

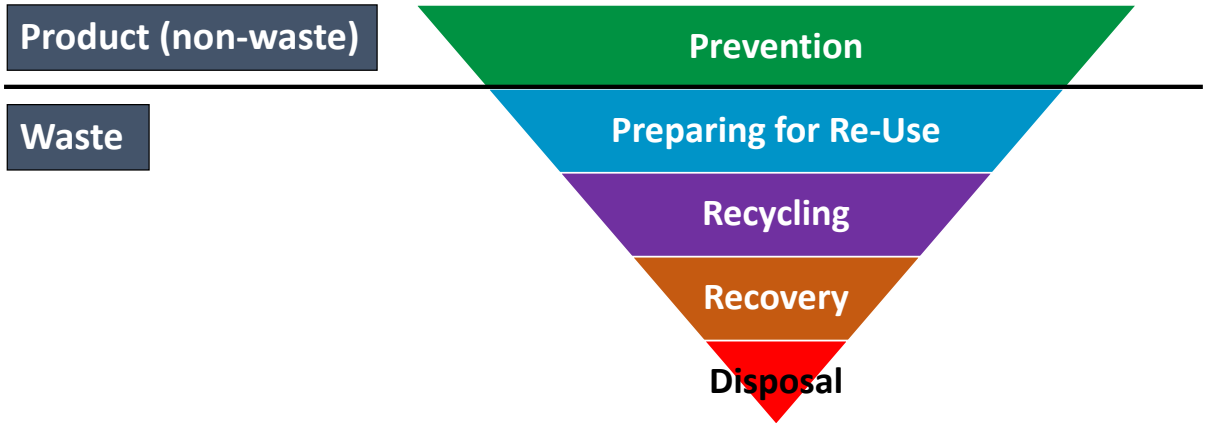
"any substance or object that the holder discards or intends or is required to discard".

14.2.3 It is important to note that the definition of "discard" set out in the Waste Framework Directive includes any substance or object that is discarded for disposal or that has not been subject to acceptable recovery (including recycling).

14.2.4 In accordance with the Waste Framework Directive, Member States are obligated to give due consideration to waste prevention mechanisms and where possible recover, reuse or recycle waste. Specifically, explicit targets are laid out for construction, demolition and excavation wastes; 70% of non-hazardous construction and demolition waste must be recovered, reused or recycled by 2020. This target excludes naturally occurring materials (specifically category 17 05 04 in the List of Wastes, as defined as non-hazardous soils and stones).

14.2.5 The Waste Framework Directive sets out the Waste Hierarchy (**Ref 14.2**) (see **Plate 14-1**) against which action to reduce the production and disposal of waste would be taken.

Plate 14-1 The waste hierarchy



14.2.6 The main principles of the Waste Hierarchy are:

- **Prevention:** using less material in design and manufacture; keeping products for longer; reuse; using less hazardous materials;
- **Preparing for reuse:** checking, cleaning, repairing, refurbishing, whole items or spare parts;
- **Recycling:** turning waste into a new substance or product; includes composting if it meets quality protocols;
- **(Other types of) recovery:** anaerobic digestion; incineration with energy recovery; gasification and pyrolysis which produce energy (fuels, heat and power); recovering materials from waste; some backfilling; and
- **Disposal:** landfill and incineration without energy recovery.

The Controlled Waste (England and Wales) Regulations 2012 (Ref 14.3)

14.2.7 The Regulations provide a definition of controlled waste and classify waste as household, industrial or commercial waste. The Regulations also allow local authorities to implement charges for the collection of waste from non-domestic properties.

The Waste (England and Wales) Regulations 2011 (Ref 14.4)

14.2.8 The legislative requirements of the EU Waste Framework Directive (2008/98/EC) are transposed into UK law via these regulations. They stipulate the requirement for industry and businesses to implement the Waste Hierarchy.

Clean Neighbourhoods and Environment Act 2005 (Ref 14.5)

14.2.9 The Act states that it is the responsibility of construction workers on site to guarantee that waste is disposed of in the appropriate manner. In accordance with this, employees must undertake waste disposal activities as outlined in national law.

Hazardous Waste (England and Wales) Regulations 2005 (Ref 14.6)

14.2.10 The Regulations introduce measures to control the storage, transport and disposal of hazardous waste. They also provide a means to ensure that hazardous waste and any associated risks are appropriately managed.

Waste Minimisation Act 1998 (Ref 14.7)

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

Environmental Protection Act 1990 (Ref 14.8)

14.2.12 The Act outlines the requirements for persons to ensure that waste is handled lawfully without any subsequent harm to the environment.

The Control of Pollution Act 1974 (Ref 14.9)

14.2.13 The Act makes provisions with respect to the prohibition of the unlicensed disposal of waste.

National policy, strategies and plans

National Planning Policy Framework (NPPF) 2023 (Ref 14.10)

14.2.14 The NPPF sets out policies for national construction minerals supply. It aims to facilitate the sustainable use of minerals, which are a finite natural resource, and can only be worked where they are found. As stated in the NPPF at paragraph 216, “Planning policies should:

- Provide for the extraction of mineral resources of local and national importance, but not identify new sites or extensions to existing sites for peat extraction.
- So far as practicable, take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, while aiming to source minerals supplies indigenously.

- Safeguard mineral resources by defining Mineral Safeguarding Areas (MSA) and Mineral Consultation Areas (MCA); and adopt appropriate policies so that known locations of specific mineral resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined would be worked).
- Set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place."

National Planning Policy for Waste, 2014 (Ref 14.11)

14.2.15 The National Planning Policy for Waste outlines the ambition to promote a sustainable approach to resource use and management. It sets out waste planning policies and should be read alongside the recently revised National Planning Policy Framework, the Waste Management Plan for England (**Ref 14.12**) and any relevant successor policies, guidance or documents. Policies from the National Planning Policy for Waste include:

- Delivery of sustainable development and resource efficiency including provision of modern infrastructure; local employment opportunities and wider climate change benefits, by driving waste management up the Waste Hierarchy;
- Ensuring that waste management is considered alongside other spatial planning concerns such as housing and transport, recognising the positive contribution that waste management can make to the development of sustainable communities;
- Helping to secure the reuse, recovery or disposal of waste without endangering human health and without harming the environment; and

- Ensuring the design and layout of new residential and commercial development and other infrastructure (such as safe and reliable transport links) complements sustainable waste management, including the provision of appropriate storage and segregation facilities to facilitate high quality collections of waste.

14.2.16 The *National Planning Policy for Waste* also states that when determining planning applications for non-waste development, local planning authorities should, to the extent appropriate to their responsibilities, ensure that:

- The likely impact of proposed, non-waste related development on existing waste management facilities is acceptable and does not prejudice the implementation of the Waste Hierarchy and / or the efficient operation of such facilities;
- New, non-waste development makes sufficient provisions for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development and, in less developed areas, with the local landscape; and
- The handling of waste arising from the construction and operation of development maximises reuse / recovery opportunities and minimises off-site disposal.

National Policy Statement for Hazardous Waste 2013 (Ref 14.13)

14.2.17 This policy statement outlines the main objectives of Government policy for hazardous waste, including:

- To protect human health and the environment: there are stringent legislative controls in place to control the management of waste with hazardous properties;
- Implementation of the Waste Hierarchy: This aids the production of less hazardous waste, promoting its reuse as a resource (where possible); disposal of waste is noted to be a last resort;

- Self-sufficiency and proximity: This ensures that sufficient disposal facilities are provided across the country to match expected arisings of all hazardous wastes, except those produced in very small quantities, and to enable hazardous waste to be disposed of in one of the nearest appropriate installations; and
- Climate change: To minimise greenhouse gas emissions and maximise opportunities for climate change adaptation and resilience.

14.2.18 The policy additionally outlines the key principles for the management of hazardous waste, as follows:

- **Principle 1:** Hazardous waste should be managed as to provide the best possible environmental outcome. This is expected to be in line with the Waste Hierarchy, with the exception of when life cycle analysis suggests that the best overall environmental option would require a departure from the Hierarchy.
- **Principle 2:** Requires a reduction in reliance upon landfill, with landfill only being used where there is no alternative recovery or disposal option available.
- **Principle 3:** Necessitates that hazardous waste is not mixed with different categories of hazardous waste or with other waste substances or materials (although co-disposal of some wastes in landfill is permitted).
- **Principle 4:** Stipulates that organic hazardous wastes that cannot be reused, recycled or recovered should be subject to destruction using best available techniques, with energy recovery for all appropriate treatments. No hazardous organic waste should be landfilled unless the requirements of the Landfill Directive 1999/31/EC (**Ref 14.14**) are met.

- **Principle 5:** The practice of relying on higher Landfill Directive waste acceptance criteria to enable some hazardous waste to continue to be landfilled must end.

Our Waste, Our Resources: A Waste Strategy for England (Ref 14.15)

14.2.19 Our Waste, Our Resources: A Waste Strategy for England sets out how the Government would preserve the stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. The strategy also outlines the Government's aims to minimise the damage caused to the natural environment by reducing and managing waste safely and carefully, and by tackling waste crime. It combines actions to take now, with firm commitments for the coming years, and gives a clear longer-term policy direction in line with the 25 Year Environment Plan (2018).

25 Year Environment Plan, 2018 (Ref 14.16)

14.2.20 The 25 Year Environment Plan sets out Government actions to improve, regain and retain the natural world. The plan sets out high level goals, which include "using resources form nature more sustainably and efficiently" and "minimising waste" (Our 25-year goals, page 10).

14.2.21 Chapter 4: Increasing resource efficient and reducing pollution and waste seeks to:

- "Make sure that resources are used more efficiently and kept in use for longer to minimise waste and reduce its environmental impacts by promoting reuse, remanufacturing and recycling.
- Work towards eliminating all avoidable waste by 2050 and all avoidable plastic waste by end of 2042." (page 83).

14.2.22 Achievement of the Plan's ambitions requires a "move towards a regenerative, circular economy" through, for example "the wastes or by-products of one [industrial facility or company] become the raw materials of another" (page 84).

14.2.23 In relation to waste elimination, the Plan sets out to "reduce the demand for single use plastic" and "make it easier for people to recycle" (page 88).

14.2.24 The Environmental Improvement Plan (2023) (**Ref 14.36**) is the first of the 5 yearly progress updates of the 25 Year Environment Plan which sets out the Government's actions to improve, regain and retain the natural world.

14.2.25 Goal 5: Maximise our resources, minimise our waste focuses on eliminating avoidable waste by 2050, eliminate avoidable plastic waste by 2042, and halving *"*residual' waste (excluding major mineral waste) produced per person by 2042*"*. Residual waste is defined as waste that is sent to landfill, incinerated (with or without energy recovery), or sent overseas.

14.2.26 Goal 6: Using resource from nature sustainably includes an objective to prevent soil from being sent to landfill, primarily through reuse in construction. A pilot scheme to develop a Soil Reuse and Storage Depot scheme is expected in 2026.

Waste Management Plan for England, 2021 (Ref 14.17)

14.2.27 The Waste Management Plan for England provides a detailed analysis of the present state of waste management at a national level and assesses how the objectives of the Waste Framework Directive (England and Wales) Regulations 2011 would be effectively supported. It states that excavation, construction, and demolition waste is the largest contributor to total waste generation in the UK. The Waste Management Plan for England also outlines the Waste Hierarchy, which gives top priority to waste prevention, followed by preparing for reuse, recycling, other types of recovery and finally disposal (e.g. landfill).

Local policy

The Norfolk Mineral and Waste Local Development Framework (Ref 14.18)

14.2.28 This document is central to Norfolk County Council's (NCC as the County Planning Authority) Development Plan and contains the Minerals and Waste Policies. There is an emerging replacement to this Plan (*Norfolk Minerals and*

Waste Local Plan - Publication version 2022) (**Ref 14.34**) which is outlined in paragraphs 14.2.27 – 14.2.31 below. The purpose of the Minerals and Waste Development Framework is to plan for mineral extraction and associated development and waste management facilities in the most sustainable way i.e. that minimises adverse impacts on amenity and the environment. The principle aims of the Minerals Policy (CS1 and CS2) are to:

- Manage and safeguard mineral resources to meet current and future needs through the development of MSA. This includes protecting minerals of economic importance from unnecessary sterilisation by non-mineral development and considering the feasibility of mineral extraction prior to non-mineral development (subject to certain assessment criteria).
- Assess proposals for non-energy mineral extraction (both individually and cumulatively) in terms of their compliance with national and regional legislation and guidelines.
- Impose high standards of restoration and aftercare to worked land to ensure it is returned to the most appropriate and beneficial use.

14.2.29 The main aims of the Waste Policy (CS3 – CS16) are to encourage action in the highest tiers of the Waste Hierarchy. This would be achieved by:

- Assessing proposals for waste management facilities with regard to location criteria (such as achieving on-site waste management, expansion of existing facilities, co-location of waste facilities situated within employment areas, and using previously developed land).
- Ensuring development would not have an adverse impact on the environment and human health.
- Only permitting development that would result in the loss of a waste management facility where it can be demonstrated that there is no longer a need for that facility, or the capacity can be met elsewhere.

Norfolk Mineral and Waste Local Plan Publication document version 2022 (emerging) (Ref 14.34)

14.2.30 This document is being prepared in order to consolidate and replace the three adopted Development Plan Documents into one Local Plan:

- The Norfolk Core Strategy and Minerals and Waste Development Management Policies DPD 2010-2026 (adopted September 2011);
- The Norfolk Minerals Site Specific Allocations DPD (adopted October 2013); and
- The Norfolk Waste Site Specific Allocation DPD (adopted October 2013).

14.2.31 Consolidation of these documents would ensure that policies remain current and extend the plan period to the end of 2038, in line with other plans being developed by the Local Planning Authorities in Norfolk.

14.2.32 The Plan outlines strategic objectives and policies for minerals and waste management and provides details on allocated sites. Policy W0.2 indicates waste management methods would align with the highest tiers of the Waste Hierarchy. In terms of planning, this means that the emphasis has changed from provision of new landfill sites in former quarries to permanent fixed facilities in employment areas and other suitable locations. In this, the Plan is therefore focused on recycling and other recovery, and (as a last resort) disposal (Policy W0.3).

14.2.33 Specific guidance and procedures are also outlined for minerals safeguarding. MS04 is a Minerals Strategic Objective that seeks to safeguard resources for future use. The objective requires “Avoiding unnecessary sterilisation by encouraging the extraction of minerals prior to other development taking place where practicable and using minerals in construction on the land from which they are extracted”.

14.2.34 Policy MP11 defines MSA and MCA and outlines the aims of safeguarding specific mineral resources. Appendix 10 of the Plan provides detailed guidance on implementation of the policy. These aims are adhered to as part of the assessment in this chapter.

Standards and guidance

14.2.35 The Design Manual for Roads and Bridges (DMRB), Sustainability and Environment Appraisal: LA 110 Material assets and waste (**Ref 14.19**) is the standard against which this chapter has been prepared.

14.3 Consultation, scope, methodology and significance criteria

Consultation undertaken to date

14.3.1 **Table 14-1** provides a summary of the consultation activities undertaken in support of the preparation of this assessment.

Table 14-1 Summary of consultation undertaken

Consultee	Comments provided in scoping response	Response to comments
Breckland Local Planning Authority (LPA)	The submitted documents state that no consultation has been undertaken on this aspect at present. The likely significant effects at 12.5.1 [Scoping Report paragraph] are agreed with.	Noted.
Environment Agency	An appropriate waste exemption or an Environmental Permit from the Environment Agency would be required for any use of waste in the works.	Waste exemption certification and/or permits for waste would be recorded as part of the documentation that accompanies the Proposed Scheme's Site Waste Management Plan (SWMP).
NCC Materials and Waste Policy Advisor	Paragraph 12.1.2 [Scoping Report paragraph] states that upon consultation, Defra confirms that CD&E waste arisings data are only available at national level for England. While this is correct in terms of waste arisings, other relevant information on CD&E waste is available (refer to comments on paragraph 12.3.12 [Scoping Report paragraph] and **Table 12-3**).	Regional information on Construction and Demolition (C&D) waste management and recovery from the Environment Agency's Waste Data Interrogator is provided in the baseline at section 14.4 of this chapter.
NCC Materials and Waste Policy Advisor	Paragraph 12.2.3 [Scoping Report paragraph] lists the Minerals and Waste Planning Authorities in the East of England. But it does not include the unitary authorities. Therefore, the list should be amended to read as follows: Norfolk, Suffolk, Hertfordshire, Cambridgeshire, Essex, Thurrock, Southend-on-Sea Borough, Peterborough City, Luton Borough, Bedford Borough, Central Bedfordshire.	Paragraph 14.3.11 of this chapter now includes a full list of all the unitary authorities.
NCC Materials and Waste Policy Advisor	Paragraph 12.3.6 states *"…however, these deposits extend beyond the study area, and thus the scheme does not sterilise these resources." This is incorrect because any location of safeguarded mineral that is built upon without prior extraction of the underlying mineral will sterilise the underlying mineral as cannot be extracted in the future. Even though there are other locations of that mineral in the county, the quantity of mineral that underlies the development will have been sterilised by the development being located upon it. This paragraph refers both to safeguarded sand and gravel, and silica sand deposits; however, safeguarded silica sand deposits are not found this far east in the county, and only occur close to the western boundary of Norfolk. This paragraph also states that "Further consideration and consultation with Norfolk County Council on the importance of these resources and impact of the Scheme will be reported in the Geology and Soils chapter of the ES*." However, the Geology and Soils section of the report focusses on ground contamination and does not currently refer to mineral resources either in terms of use or safeguarding or use in the Proposed Scheme.	Impacts and effects on mineral safeguarding have been considered and assessed in section 14.5 of this chapter. In accordance with the adjacent comment, the chapter now references the Sand and Gravel MSA only; references to safeguarded silica sand deposits have been removed from the assessment, as they are not present within this part of Norfolk. It should be noted that a proportionate Mineral Resource Assessment (which also confirms the difference between allocated mineral sites, and MSAs) is now included in section 14.5.10, to augment the assessment evidence provided.

Consultee	Comments provided in scoping response	Response to comments
NCC Materials and Waste Policy Advisor	Paragraph 12.3.10 [Scoping Report paragraph] states the sensitivity of materials needed for the scheme is low, but it does not state what the quantity of materials needed for the construction of the scheme would be, or that this would be set out in the ES. Table 12-5 [Scoping Report reference] states that the Environmental Statement would include a Materials Management Plan (MMP); this should include information on the quantity of materials (including minerals) to be used in the Proposed Scheme.	Paragraph 12.3.10 of the Scoping Report describes the baseline position (without the Scheme); articulating the materials required for delivery of the Proposed Scheme has been undertaken as part of the environmental assessment in this chapter (section 14.5). A Materials Management Plan (MMP) would be produced by the Principal Contractor, to manage and monitor site-won arisings from the Proposed Scheme. An Outline MMP is included as an appendix to the Outline Construction Environmental Management Plan (OCEMP) (**Sub Appendix 3-1C Outline Materials Management Plan**) (Document Reference: 3.03.01c).
NCC Materials and Waste Policy Advisor	Paragraph 12.3.13 [Scoping Report paragraph] states that there is not data available for CD&E production or recovery rates in the East of England. While the quantity of arisings is not available and therefore a recovery percentage is not available, it is possible to get figures for the quantities of CD&E waste that have been recovered in the East of England (and in the individual WPA areas) from the Environment Agency's Waste Data Interrogator (WDI). **Table 12-1** [Scoping Report reference] includes all types of waste (hazardous, non-hazardous and inert) arising from all sectors and therefore is not necessarily directly comparable to any trends in CD&E waste recovery. This information should therefore be replaced with data specifically for CD&E waste recovery from the EA's WDI.	Regional C&D waste management and recovery information from the Environment Agency's Waste Data Interrogator, and UK Statistics on Waste are now included in section 14.4 of this chapter.
NCC Materials and Waste Policy Advisor	**Table 12-3** [Scoping Report reference] lists the number of waste management facilities in the East of England. It does not include their capacity or the types of waste that they can accept. This table therefore does not show whether or not there is sufficient waste management capacity available for the CD&E arisings from the construction project. The Environment Agency's Waste Data Interrogator gives figures for the quantities of waste that each site received in that year, which could at least provide a minimum capacity figure for a site. The Environment Agency's WDI gives the permit type for the facility which may provide more information on whether the site could accept CD&E waste from a construction project. Norfolk County Council publishes annual monitoring reports which include data on waste management which may be relevant for the ES.	Only relevant and proportionate information deemed suitable and sufficient to assess the significance of effects for C&D waste management and recovery has been provided in sections 14.4.15-19 of this chapter, including **Table 14-7**.

Consultee	Comments provided in scoping response	Response to comments
NCC Materials and Waste Policy Advisor	No information has been provided in the Scoping Report regarding the quantities of waste that are likely to arise from the Proposed Scheme. In accordance with the information in **Table 12-5** [Scoping Report reference] we advise that the Environmental Statement should include a Site Waste Management Plan (SWMP) detailing the types and quantities of waste arising from the Proposed Scheme, how and where waste would be minimised, reused, recycled, recovered and disposed of.	Information on the volumes and types of waste likely to arise from the Proposed Scheme are included in Section 14.5 of this chapter. A Design Stage SWMP is included in the OCEMP (**Appendix 3-1**) (Document Reference: 3.03.01).
NCC Materials and Waste Policy Advisor	No information has been provided in the Scoping Report regarding the quantity of minerals that are likely to be needed in the Proposed Scheme, or the quantity of minerals that are likely to be extracted as part of the Proposed Scheme. In accordance with the information in **Table 12-5** [Scoping Report reference] we advise that the Environmental Statement should include a Materials Management Plan – Minerals (MMP-M). In terms of minerals safeguarding, this document should consider the extent to which on-site materials which could be extracted during the proposed development would meet specifications for use on-site through testing and assessment. The MMP-M should quantify the amount of material which could be reused on site; and for material extracted which cannot be used on-site its movement, as far as possible by return run, to an aggregate processing plant.	Information on the quantities of minerals (resources) that are required on the Proposed Scheme are now included in Section 14.5 of this chapter. A MMP would be produced by the Principal Contractor to manage and monitor site-won arisings and safeguarded minerals from the Proposed Scheme. An Outline MMP is included in the OCEMP (**Appendix 3-1**) (Document Reference: 3.03.01). Note: in this chapter, we have interpreted “MMP” to be the same as “MMP-M” (referenced in the comment adjacent) as detailed in the CL:AIRE Definition of Waste: Development Industry Code of Practice (**Ref 14.35**).
NCC Materials and Waste Policy Advisor	**Table 12-8** [Scoping Report reference] contains the significance criteria for materials. It states that a large significance would be if the Proposed Scheme sterilises more than 1 mineral safeguarding site and/or peat resource. The Proposed Scheme area is not located on a peat resource. The safeguarded mineral resources in Norfolk are shown as areas on the map; they are not shown as sites unless there is a permitted site for mineral extraction. Therefore, it is not appropriate to measure the impact on mineral safeguarding in terms of sites.	Section 14.4 of this chapter has been updated accordingly.
NCC Materials and Waste Policy Advisor	Paragraph 12.9.1 [Scoping Report paragraph] explains the limitations and assumptions used for CD&E waste generation and recovery rates. Please see our comments about paragraph 12.3.12 [Scoping Report paragraph] and Table 12-3 [Scoping Report reference] above. In summary, we consider that more detailed information is available on the Environment Agency’s WDI and information published by the WPAs which should be used in the ES.	Regional C&D waste management (including recovery) information from the Environment Agency’s Waste Data Interrogator is now included in Section 14.4 of this chapter. Information and data from Local Plan documents are included and referenced where appropriate.

Consultee	Comments provided in scoping response	Response to comments
Norfolk County Council – Planning Authority	The Addendum identifies that the new alignment does not affect scoping for materials and waste as the baseline takes a regional approach to the scheme, meaning that the availability of materials and landfill capacity would be the same for either alignment (original and new). It is also assumed that the material/waste types used for the new alignment would be similar to those in the original design and therefore there would be no effect on scoping. No significant volumes of waste are anticipated from the creation of the habitat areas. Only a small amount of materials would be required for the habitat creation areas and these, the Addendum states, are not likely to result in a significant effect on either the availability of materials or landfill capacity. Where relevant any changes would be included in the Bill of Quantities used to undertake the materials and waste assessment in the ES. The CPA's comments remain essentially unchanged from the original Scoping Opinion.	Noted.

Scope of the assessment

14.3.2 The scope of this assessment has been established and set through the formal scoping process. Further information can be found in **Chapter 5: Approach to EIA** (Document Reference: 3.05.00).

14.3.3 The scope of this chapter follows the industry standard for highways materials and waste assessments: the National Highways' Design Manual for Road and Bridges (DMRB) LA 110 Material Assets and Waste (**Ref 14.19**), referred to as "LA110". As defined in LA110, the scope of the chapter is to assess "environmental effects associated with the consumption / use of material assets, and the disposal and recovery of waste" associated with the Proposed Scheme.

Construction and Operational Phase Assessments

14.3.4 The assessment scope covers the construction phase only of the Proposed Scheme, including any required demolition, site preparation and remediation, and construction activities. Assessing construction only is considered proportionate to the assessment, as the quantity and type of material resources required, and waste generated, during the operational phase (for example routine maintenance and repairs) is considered negligible and is not expected to result in significant adverse effects. This has been determined using professional judgement based on information from other comparable schemes.

Decommissioning / End of Life Assessments

14.3.5 Due to the uncertainties relating to future technologies and infrastructure, it is not possible to proportionately assess impacts during decommissioning or end of life of the Proposed Scheme. It is also considered that the once it has been constructed, the Proposed Scheme would become an integral part of the local highway network and may never be decommissioned.

14.3.6 Currently, there is no methodology set out in the DMRB standard LA110 for the assessment of likely impacts and effects during decommissioning. In addition, there are no Proposed Scheme data on likely materials and waste

that would be expected and the collection of this data is considered disproportionate to the EIA process. Furthermore, due to uncertainties relating to future material reuse and waste management technologies, infrastructure and legislation, it is not possible to proportionally assess potential impacts and effects during decommissioning.

14.3.7 The decommissioning phase of the Proposed Scheme is therefore scoped out of the assessment.

Elements scoped out of the further detailed assessment

14.3.8 The elements of the Proposed Scheme shown in Table 14-2 are not expected to give rise to significant adverse effects and have therefore not been considered further within this assessment.

Table 14-2 Elements scoped out of the further detailed assessment

Element scoped out	**Justification**
Material resource consumption and waste generation and disposal in the **operational phase**	DMRB LA110 states that environmental assessment of materials and waste would include reporting on the construction phase and the first year of operation only. As the type and quantity of material resources required, and waste generated and disposed of, during the operational phase (including the first year of operation) is – as stated in section 12.5.3 and 12.5.5 of the Scoping Report – forecast to be negligible, significant adverse effects are not expected.

Element scoped out	Justification
A lifecycle assessment (LCA) of materials, site arisings and waste (including embodied carbon and water) of materials and site arisings, and waste.	LCAs analyse impacts from a wide range of environmental topics (e.g. water, eutrophication, radiation) as well as carbon. The effort and resources required to undertake a full LCA of all environmental elements is deemed disproportionate to the benefit they would offer the assessment of significance of effects. Furthermore, many of the elements assessed within an LCA are not directly relevant to the goals of this chapter. Embodied carbon (as part of a whole life carbon assessment) is assessed in the ES **Chapter 15: Climate Greenhouse Gases** (Document Reference: 3.15.00).

Elements scoped into the detailed assessment

Construction phase

14.3.9 The following elements shown in **Table 14-3** are considered to have the potential to give rise to likely significant effects during construction of the Proposed Scheme and have therefore been considered within this assessment.

Table 14-3 Elements scoped into the detailed assessment

Element scoped in	Justification
Assessment of materials, site arisings and waste in the Construction phase.	There is potential for direct physical impacts through the consumption of materials (e.g. asphalt, timber and steel) and generation and disposal of inert and non-inert waste, during the preparation for and construction of the Proposed Scheme. These impacts could give rise to significant adverse environmental effects.

Extent of the Study Area

14.3.10 The primary Study Area comprises the extent of the works within the Red Line Boundary.

14.3.11 The secondary Study Area extends to the availability of construction and recovered material resources and the capacity of waste management facilities within the UK and the East of England region (Norfolk, Suffolk, Hertfordshire, Cambridgeshire, Essex, Thurrock, Southend-on-Sea Borough, Peterborough City, Luton Borough, Bedford Borough, Central Bedfordshire).

14.3.12 The Study Areas have been chosen using professional judgement based on experience of similar projects, as they provide a useful and proportionate geographical extent in which the assessment of effects from material and waste can be undertaken.

Site visit and surveys

14.3.13 No site visits or surveys were required for the preparation of the material assets and waste chapter.

Construction phase methodology

Assessment data collection

14.3.14 In accordance with DMRB LA 110, the environmental assessment undertaken is a quantitative exercise with the aim of identifying the following:

Materials:

14.3.15 The assessment of materials has considered (where available):

- Types and quantities of materials required to construct the Proposed Scheme;
- Information on materials that contain secondary / recycled content;
- Information on any known sustainability credentials of materials to be consumed;
- The type and volume of materials that would be recovered from off-site sources for use on the Proposed Scheme;

- The cut and fill balance; and
- Details of on-site storage and stockpiling arrangements, and any supporting logistical details.

14.3.16 An assessment of the likely effects of consuming materials required during the construction phase has been undertaken by considering the origins and sources of materials, including their general availability (production, stock, sales) and the proportion of recovered (reused or recycled) materials they contain (including other sustainability features).

14.3.17 The reuse of excavated and other arisings (that meet waste exemption or other industry-accepted criteria e.g. CL:AIRE Definition of Waste, Code of Practice) has also been evaluated as part of the assessment of materials, to determine whether the impacts (and likely significant adverse effects) associated with the consumption of primary resources can be reduced.

Waste:

14.3.18 The assessment of waste has considered (where available):

- The types and quantities of waste (by weight) that would be recovered (either on site, or off site i.e. for use on other projects) and diverted from landfill, using a typical “excavated arisings” conversion factor of 1.25 tonnes/m^3. This conversion factor has been referenced from Waste and Resources Action Programme (WRAP) Halving Waste to Landfill - Waste recording and reporting;
- Types and quantities of waste arising from the Proposed Scheme (demolition, excavation arisings and remediation) requiring disposal to landfill, using a typical “excavated arisings” conversion factor of 1.25 tonnes/m^3;
- Details of on-site storage and segregation arrangement for waste and any supporting logistical arrangements; and

- Potential for generation and disposal of hazardous waste (by type and quantity).

14.3.19 The assessment considers the type and volume of waste to be generated by the Proposed Scheme and determines the potential impact on remaining landfill capacity in the region; this has been completed for inert and non-inert (non-hazardous and hazardous) waste types, where data are available. Wherever waste is recovered (diverted from landfill) the influence of this action takes is taken into account in the assessment of significance of effect.

14.3.20 The quantitative exercise for the assessment uses material and waste type and quantity data provided by the Principal Contractor for the Proposed Scheme.

14.3.21 As noted in Table 14-4, the temporal scope of the assessment comprises the construction phase only; the operational phase has been scoped out.

Significance criteria

14.3.22 The assessment of effects adopts the significance categories (Table 14-4) and significance of effects criteria (Table 14-5), as originally set out in DMRB LA110 Material Assets and Waste.

14.3.23 Effects that are classified as moderate, large or very large are considered significant. Effects classified as slight or neutral are considered not significant.

Table 14-4 Significance category descriptions

Significance category	Description
Very Large	**Material Assets:** No criteria (use criteria for "large" significance category). **Waste:** >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or Construction of new (permanent) waste infrastructure is required to accommodate waste from a project.
Large	**Material Assets:** Project achieves <70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (CDW) to substitute use of primary materials; and Aggregates required to be imported to site comprise <1% re-used / recycled content; and Project sterilises ≥1 mineral safeguarding site and / or peat resource. **Waste:** 1) >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and 2) >50% of project waste for disposal outside the region.
Moderate	**Material Assets:** Project achieves less than 70% overall mineral recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and Aggregates required to be imported to site comprise re-used / recycled content below the relevant regional percentage target. **Waste:** >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and 1-50% of project waste for disposal outside of the region.
Slight	**Material Assets:** Project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and Aggregates required to be imported to site comprise re-used / recycled content in line with the relevant regional percentage target. **Waste:** ≤1% reduction or alteration in the regional capacity of landfill; and Waste infrastructure has sufficient capacity to accommodate waste from a project without compromising integrity of the receiving infrastructure (design life or capacity) within the region.

Significance category	Description
Neutral	**Material Assets:** Project achieves >99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and Aggregates required to be imported to site comprise >99% reused / recycled content. **Waste:** No reduction or alteration in the capacity of waste infrastructure within the region.

14.4 Baseline conditions

14.4.1 This section of the Material Assets and Waste chapter describes the baseline material consumption and waste disposal for the existing land use (prior to the Proposed Scheme) and provides local and national information and data in the context of which the ES assessment has been undertaken.

14.4.2 Baseline data for Material Assets and Waste requires the collection and review of the following information (published data) to establish the availability of materials for the Proposed Scheme; to assess the infrastructure available to divert waste from landfill; and to identify and forecast remaining landfill capacity:

- The general availability (production, stock, sales) of material resources within the east of England (or nationally, as available);
- The availability of landfill capacity within the east of England; and
- The availability of infrastructure in the east of England to transfer and recover construction, demolition and excavation (CDE) wastes from the Proposed Scheme.

14.4.3 The current land use consists of agricultural fields intersected by small areas of woodland, hedgerows, drainage channels from the River Wensum and single lane carriageways.

Material resources

Materials

Materials currently required

14.4.4 The current land use requires minimal consumption of construction materials for routine repairs and maintenance (for example, asphalt for minor road repairs). Therefore, the current use of resources is deemed negligible. The do-minimum scenario (where the Proposed Scheme is not built) would be unlikely to change this situation.

UK and regional perspective: availability of construction materials

14.4.5 **Table 14-5** (**Ref 14.20**, **Ref 14.21**, **Ref 14.22**, **Ref 14.23**) provides a summary of the availability of the main construction materials in East of England and the UK, as required to deliver typical highways schemes and reflected in the information supplied by the Principal Contractor. The overview provides a context in which the assessment of impacts and significant effects from material consumption from the Proposed Scheme can be undertaken.

Table 14-5 Construction materials availability in the East of England and the UK

Material type	East of England	UK
Sand and gravel *(Ref 14.20)	10.3 million tonnes (Mt)	53.2 million tonnes (Mt) (GB)
Permitted crushed rock *(Ref 14.20)	0.0 Mt (2019)	116.5 million tonnes (Mt) (GB) (2019)
Concrete blocks #(Ref 14.21)	1.1 million square metres (Mm^2) (Midlands)	5.2 Mm^2 (GB)
Primary aggregate *(Ref 14.20)	13.7 Mt (2019)	198.8 Mt (2019)
Recycled and secondary aggregate *(Ref 14.22)	(no data)(Ref 14.22)	71.0 Mt (2018) (GB) (Ref 14.23)
Ready-mix concrete *(Ref 14.20)	1.5 million cubic metres (Mm^3) (2019)	24.7 Mm^3 (2019)
Steel +(Ref 14.23)	(no data)	7.2 Mt (2021)
Asphalt *(Ref 14.20)	2.5 Mt (2019)	27.4 Mt (2019)

stocks + production * sales

Data availability: 2022 unless otherwise stated.

GB: Great Britain (England, Wales and Scotland) figures used where UK figures (including Northern Ireland) are unavailable.

14.4.6 The Norfolk County Council interactive map of MSA (**Ref 14.24**) and the Core Strategy (**Ref 14.25**) indicate that the Proposed Scheme passes through sand

and gravel deposits which are on the edge of a large, safeguarded resource extending across the area, and that is associated with fluvial deposits to the north west of Norwich. Approximately 1km of the Proposed Scheme (at the southern end) and a section approximately 500m long (near the northern end) do not overlie the MSA. The remaining 4.5km of the Proposed Scheme lie just within the MSA. It is noted that the presence of pockets of existing mature woodland, as well as extant infrastructure (in the form of minor roads and overhead power lines) intersecting the Proposed Scheme may have already constrained the MSA for future mineral extraction. In addition, the Proposed Scheme crosses the River Wensum (designated a Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI)) which further constrains the MSA.

14.4.7 According to the Norfolk Minerals and Waste Development Framework Mineral Site-Specific Allocations Development Plan Document (**Ref 14.26**), the nearest allocated safeguarded mineral site for extraction is located approximately 500m to the north of the Proposed Scheme beyond the Red Line Boundary at Keepers Cottage, as described in the Mineral Resources section of **Chapter 13: Geology and Soils** (Document Reference: 3.13.00).

14.4.8 Additionally, to note, there are no known peat resources (**Ref 14.27**) or active peat extractions (**Ref 14.28**) within the primary Study Area.

14.4.9 By comparison with other UK regions, the East of England has – in general – a slightly lower than average availability of some construction materials, in particular, sales of permitted crushed rock, most of which is imported from outside the region.

14.4.10 However, the availability of other construction materials typically required for highways construction schemes in the East of England and across the UK, indicates that stocks, production, or sales remain buoyant.

14.4.11 The East of England is noted to have set a regional recycled content target for aggregate (31%); this target is higher than the average for England (25%) (**Ref 14.29**).

Site arisings

Site arisings currently generated

14.4.12 The current land use within the primary Study Area is expected to generate negligible volumes of site arisings, limited to potential earthworks on agricultural land and minor repairs to roads. The do-minimum scenario (where the Proposed Scheme is not built) would be unlikely to change this situation.

UK and regional perspective: transfer, recovery and recycling

14.4.13 A key consideration of the assessment is to divert from landfill, site arisings generated by the Proposed Scheme i.e. if they are not already used on-site or by another local project. In order to maximise the reuse and recycling value of site arisings, an overview of the availability of materials recovery infrastructure in the East of England, and across England, is presented herein. The following information and data is used to indicate the potential for diversion from landfill.

14.4.14 Defra data (**Table 14-6**) shows that within England, the recovery rate for non-hazardous construction and demolition wastes have remained above 90% since 2010. This exceeds the EU target of 70%, which the UK met by 2020 (**Ref 14.30**).

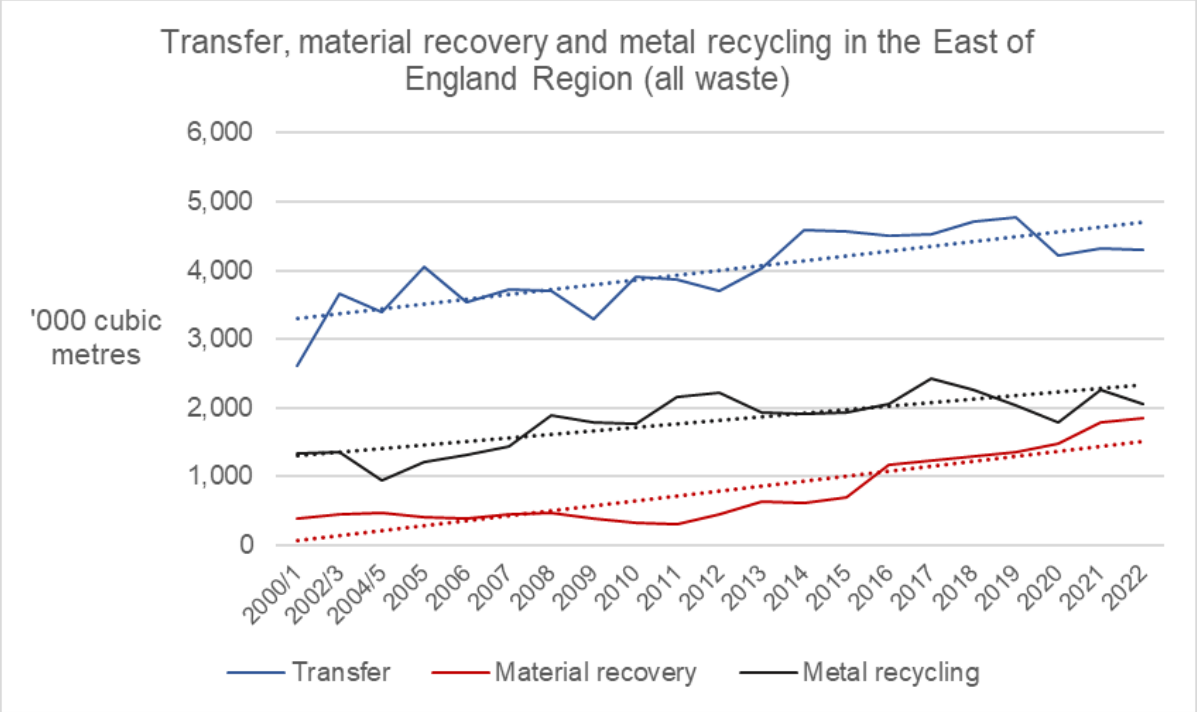
Table 14-6 Non-hazardous construction and demolition waste recovery in England

Year	Generation (Mt)	Recovery (Mt)	Recovery rate (%)
2010	53.6	49.4	92.2%
2011	54.9	50.8	92.5%
2012	50.5	46.4	92.0%
2013	51.7	47.6	92.0%
2014	55.9	51.7	92.4%
2015	57.7	53.3	92.3%
2016	59.6	55.0	92.1%
2017	62.2	57.9	93.1%
2018	61.4	57.5	93.8%
2019	62.3	58.3	93.6%
2020	53.6	50.0	93.2%

Note: Defra's 2023 update of this table does not extend the data range beyond 2020

14.4.15 Data in **Plate 14-2** has been collated to show that rates of waste recovery in the region have risen steadily over the past 20 years (**Ref 14.31**). Metal recycling shows a slight decline in recent years; however, overall the trend is one that is increasing. Data is provided for all waste types in the East of England and therefore would include, but is not specific to, construction, demolition and excavation wastes.

Plate 14-2 Transfer, materials recovery, and metal recycling in the East of England (2000/1 – 2022)



14.4.16 While trends for transfer, recovery and metal recycling in the East of England display different characteristics, data indicates that there is likely to be regional infrastructure and capacity for the transfer and recovery for construction, demolition and excavation wastes from the proposed road scheme. Construction and demolition recovery trends across England (**Plate 14.2**) and data in **Table 14.7** (**Ref 14.31**) confirm this assertion.

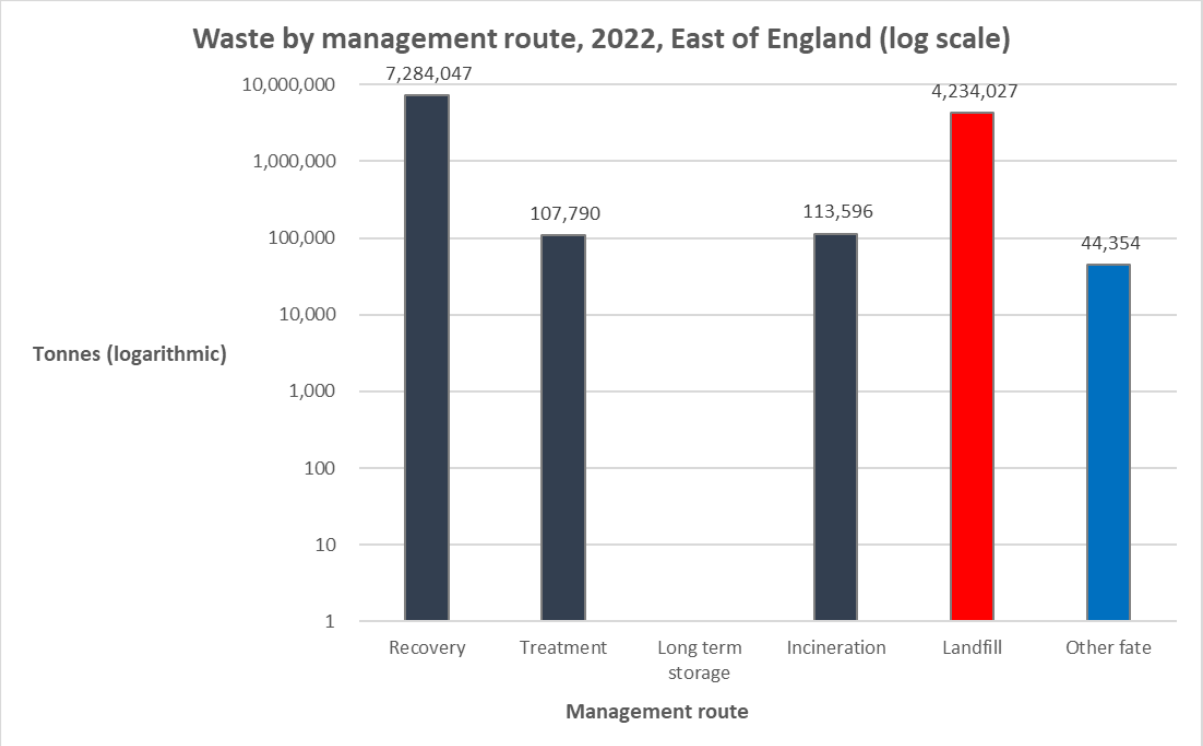
Table 14-7 Permitted waste recovery management sites in East of England (2022)

Waste recovery facility type	Number of sites	Quantity received (tonnes, indicative of facility capacity)
Incineration	21	1,803,000
Transfer	334	4,826,000
Treatment	324	11,402,000
Metal recovery	263	2,346,000
Use of waste	2	1,000

Waste recovery facility type	Number of sites	Quantity received (tonnes, indicative of facility capacity)
Total	**944**	**20,378,002**

14.4.17 Regional data for construction and demolition waste is presented in **Plate 14-3** and is based on analysis of publicly available information in the Waste Data Interrogator (**Ref 14.31**).

Plate 14-3 C&D waste management by route for the region (2022)



14.4.18 Data in **Plate 14-3** show that the volume of waste recovered, including treatment and incineration with energy recovery, was nearly double the volume of waste sent to landfill in the region in 2022. This is confirmed by the data in **Table 14-8** which shows that 64% of waste received in the region was diverted from landfill through waste management and recovery methods. Data includes the total waste received from both within the East of England and from other regions of the UK.

Table 14-8 Waste management routes for waste received in East of England (2022)

Waste management route	Inert and non-hazardous waste (tonnes)	Hazardous waste (tonnes)	Total waste (tonnes)	Percentage
Recovery	7,419,654	85,778	7,505,432	64%
Landfill	4,167,432	66,595	4,234,027	36%
Other	44,354	n/a	44,354	0%
Totals	11,631,440	152,373	11,783,813	100%

14.4.19 The charts and data presented in this section confirm the availability of materials recovery infrastructure in the East of England, and across England, which suggest that there is strong potential to divert from landfill site arisings generated by the Proposed Scheme, if they are not already used on-site or for another local project. The importance (positive value) of this infrastructure indicates there is potential to maximise the reuse / recycling value of site arisings, and therefore also has the potential to materially influence the assessment of materials and waste.

Waste generation and disposal

Waste currently generated and disposed of

14.4.20 The majority of the current land use within the primary Study Area comprises agricultural / arable farmland with small areas of woodland, hedgerows, drainage channels from the River Wensum and single track roads (See **Chapter 2 -The Existing Site** (Document Reference: 3.02.00)). The agricultural land is not expected to generate significant quantities of waste. Small volumes of waste may be generated from road maintenance, such as minor repairs to the pavement, littering, signage replacement, and vegetation from verge clearance. Therefore, the anticipated magnitude of impact

associated with disposing of waste in the baseline situation is deemed negligible in the context of available regional capacity.

14.4.21 The do-minimum option (no scheme pursued) would not be expected to change impacts associated with the generation and disposal of site arisings and waste.

Regional perspective: remaining landfill capacity

14.4.22 Environment Agency data (**Ref 14.32**) confirm that at the end of 2022, 61 landfill sites in the East of England were recorded as having 58 million cubic metres (Mm^3) of remaining capacity for inert and non-hazardous waste; this information is presented in **Table 14-9**, which also shows the change in capacity from 2021 to 2022.

Table 14-9 Remaining landfill capacity in East of England

Landfill type	**Capacity in 2021(m^3)**	**Remaining capacity in 2022 (m^3)**	**2021 to 2022 capacity comparison (Million m^3)**
Hazardous (merchant and restricted)	0	0	0 (0%)
Hazardous (restricted) Note: Restricted landfill sites only accept waste from restricted sources and producers, e.g. site operator / managing site.	0	0	0 (0%)
Inert	24,088,595	31,843,521	7.8 (32.2%)

Landfill type	Capacity in 2021(m^3)	Remaining capacity in 2022 (m^3)	2021 to 2022 capacity comparison (Million m^3)
Non-hazardous (including stable hazardous waste cells)	23,189,639	25,942,277	2.8 (11.9%)
Total	47,278,234	57,785,798	10.5 (22.5%)

Note: Restricted landfill sites only accept waste from restricted sources and producers, e.g. site operator / managing site.

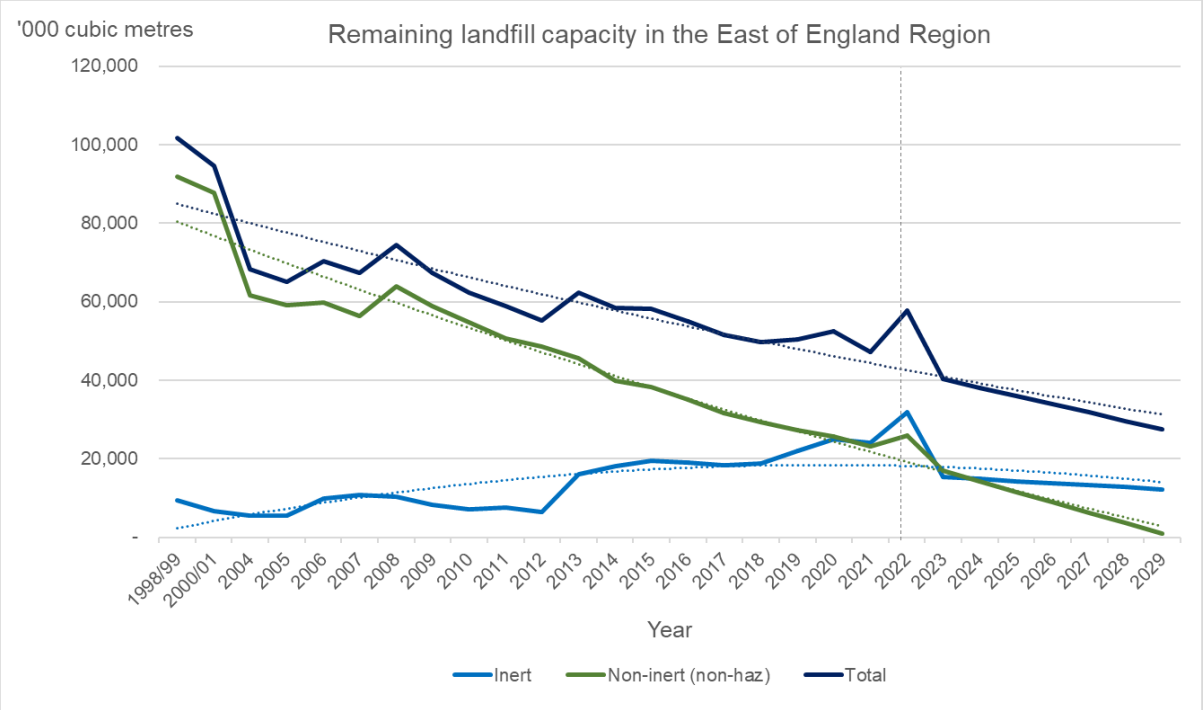
14.4.23 As the data in **Table 14-9** shows, no hazardous waste landfill sites are present within the East of England region. The Norfolk Minerals and Waste Development Framework states that since the ban on co-disposal of hazardous waste with non-hazardous waste to landfill in July 2004, and since much of East of England is hydrogeologically unsuitable for hazardous waste landfill sites, there are no such facilities in the region. The Norfolk Mineral and Waste Local Plan Publication document version 2022 (the emerging plan) confirms this.

14.4.24 Further to this, the Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026 (**Ref 14.33**) specifies that proposals for new inert waste landfill void space would not be acceptable unless there is a clear need for additional void space. Any new proposals would need to demonstrate that they would have advantages for one or more of: amenity, landscape, wildlife or similar. The emerging plan broadly concurs with this and notes the preferred disposal method is for restoration of former mineral workings for biodiversity, landscape and historic environment benefits.

14.4.25 Regional baseline landfill capacity is detailed in **Plate 14-4**. Simple statistical forecasting (using the Microsoft Excel forecasting function) has been used to

demonstrate long-term void capacity to the year of Proposed Scheme's planned completion (2029) in the absence of future provision.

Plate 14-4 Landfill capacity in the East of England



14.4.26 Baseline data indicates that in the absence of future provision, inert, non-inert and total landfill capacity is likely to become an increasingly sensitive receptor throughout the duration of the construction phase and first full year of operation. **Plate 14-4** shows that from 2022 to 2029, in the absence of future provision, waste capacity in the East of England is forecast to reduce by as much as:

- 49% (inert) to 16.2 Mm^3;
- 96% (non-inert – which also comprises non-hazardous waste) to 0.9 Mm^3, and
- 52% (total) to 27.5 Mm^3.

Future baseline

Material Resources

14.4.27 In the future baseline, it is considered that the land use would remain predominantly arable farmland, with small areas of woodland, hedgerows, drainage channels and single track roads. Therefore, the future consumption of construction and other materials (including recovered site arisings) within the proposed primary Study Area is expected to be negligible.

14.4.28 The do-minimum option (no scheme pursued) would be unlikely to change the current consumption of materials.

Waste

14.4.29 In the future baseline, it is considered that the land use would remain predominantly arable farmland, with small areas of woodland, hedgerows, drainage channels and single track roads. Therefore, the future generation and disposal of waste within the primary Study Area is assessed as negligible, as it would likely be limited to small volumes of vegetation, waste from minor road repairs or excavated arisings.

14.4.30 The do-minimum option (no Proposed Scheme pursued) would be unlikely to change the generation and disposal of waste within the primary Study Area.

14.5 Assessment of potential effects, mitigation and residual effects

Potential impacts

Construction phase

14.5.1 The Proposed Scheme would consume materials resources (including those recovered from site arisings) and generate and dispose of waste during the construction phase.

14.5.2 **Table 14-10** summarises the potential impacts associated with material consumption and waste generation and disposal.

Table 14-10 Potential environmental impacts associated with materials and waste

Element	Direct impacts	Indirect impacts
Materials	Consumption of natural and non-renewable resources.	Release of greenhouse gas emissions; Nuisance to communities (visual, noise, vibration); and Health.
Waste	Generation and disposal of waste and reduction of landfill capacity.	Release of greenhouse gas emissions; Nuisance to communities (visual, noise, vibration); and Health.

Note: only direct impacts from materials and waste are assessed within this chapter. Indirect impacts relevant to the Proposed Scheme are addressed within **Chapter 7: Noise and Vibration** (Document Reference: 3.07.00), **Chapter 9: Landscape and Visual Effects** (Document Reference: 3.09.00, **Chapter 15: Climate Greenhouse Gases** (Document Reference: 3.15.00) and **Chapter 17: Population and Health** (Document Reference: 3.17.00).

Materials

14.5.3 **Table 14-11** describes the type and quantities of key materials required to construct the Proposed Scheme as provided by the Principal Contractor. Where available, information on the materials recycled content and sustainability credentials has been provided. All figures have been rounded up to the nearest 10 tonnes, where possible.

Table 14-11 Material types and quantities

Material type	Quantity (tonnes)	Comments
Aggregate	650,400	Aggregate would be used for: **Permanent works:** Sub-base, granular backfill / layer, footway construction, structural backfill, granular bedding on culverts, capping, track pavement, backfill for reinforced earth walls, drainage stones. **Temporary works:** such as working platforms, haul roads and compounds.
Asphalt	95,860	Binder course, surface course, base course, Class 1 bound mixture, bond coat; resources to be consumed for both permanent works, as well as paved temporary works areas.
Concrete	76,630	Pre-cast and in-situ concrete for piling and diaphragm walling, bridge decking, abutment walls / pile caps / foundations / abutment caps, retaining walls, foundations, kerbs, culverts, drainage kerbs, manholes, concrete channel, construction of other structures.
Copper	2	Core cabling.
Geotextile	30	Woven permeable geotextile, separation and protection geotextile, impermeable polyethylene overlay, geotextile protection (Geotech 1000 or similar), scour protection.
HDPE	120	Carrier drain, filter drain and ducting.
Paint	1	Traffic signs and road markings.
Polythene	20	Impermeable polyethylene overlay.
Sand	29,000	Binding sand and sand drains.
Stone	1,330	Scour protection of the viaduct.
Steel	18,920	Reinforcement, piling, fencing, traffic signals and safety barriers, badger proof gate.

Material type	Quantity (tonnes)	Comments
Timber	520	Bird boxes, barn owl boxes, barn owl mounting timber poles, badger artificial sett, fencing, field gate, badger artificial sett, badger sett closure and timber formwork.
UPVC	1	Perforated drainpipe.
Bitumen waterproofing	4	Waterproofing of structures.
Elastomeric material	2	Bridge bearings, expansion joints and sealing of gaps.
Waterproofing membrane	6	Waterproofing of structures.
Total (tonnes)	**872,846**	No data

14.5.4 The cut and fill balance has been estimated as cut of 1,391,369m^3 and a fill requirement of 1,206,547m^3. This equates to a surplus of 184,822m^3 (231,028 tonnes) which the Applicant has committed to recovering and reusing on other (off-site) construction schemes.

14.5.5 **Table 14-12** describes the types and quantities of arisings which would be diverted from landfill during the construction of the Proposed Scheme. It is noted that volumes presented are based on current design information provided by the Principal Contractor. All figures have been rounded up to the nearest 10 tonnes, where possible.

Table 14-12 Arising types and quantities to be diverted from landfill

Material type	Quantity diverted from landfill (tonnes)	Comments
Steel and timber	40	Site clearance - Existing fence / gates to be removed. Arisings would be diverted from landfill through recycling and / or reuse off site.

Material type	Quantity diverted from landfill (tonnes)	Comments
Steel	1	Site clearance - Existing signs to be removed. Arisings would be diverted from landfill through recycling and / or reuse off site.
Tarmac	12,530	Site clearance – tarmac pavement to be scarified and reused on site for temporary roads and platforms, where suitable. On completion of the works, the arisings would be diverted from landfill through recycling and / or reuse off site.
Concrete	20	Existing culvert to be removed. Arisings would be diverted from landfill through recycling and / or reuse off site.
Plastic	20	Existing drainage elements (e.g. carrier and filter drains) to be removed. Arisings would be diverted from landfill through recycling and / or reuse off site.
Earthworks cut	1,739,210	Earthworks from excavations that are suitable are to be reused as fill in embankments and in environmental bunds on the Proposed Scheme.
Excess cut	231,030	The surplus excavated arisings which are not required as fill on the Proposed Scheme would be recovered and stored for reuse off site.
Total	**1,928,851**	**No data**

14.5.6 Provision for stockpiling arisings has been incorporated into the Proposed Scheme; this provision includes site compounds, materials storage areas and delivery marshal zones. These are located along the length of the Proposed Scheme to store materials close to the construction area and minimise transport and handling.

14.5.7 The forecast arisings from the Proposed Scheme achieves more than 70% overall material recovery / recycling (by weight) on non-hazardous CDW to substitute the use of primary materials.

14.5.8 It is confirmed by the Principal Contractor that the reused / recycled content of aggregates to be used on site is 64%, which exceeds the relevant regional percentage target (31%).

14.5.9 In accordance with the criteria and thresholds set out in DMRB LA110, the effects associated with material consumption are assessed to be **slight adverse** and therefore **not significant**.

Mineral Safeguarding

14.5.10 While there are no allocated mineral safeguarded sites identified within the Red Line Boundary; the Proposed Scheme partially overlies a Sand and Gravel Mineral Safeguarding Area (MSA). A mineral safeguarded site is a specific area of land (and the defined mineral resources that underlay it) permitted or allocated for mineral extraction in a Local Minerals Plan, (e.g. a quarry) while a MSA is an area of land where a mineral resource has been identified in a Local Plan, and - based on geological data and maps - has the *potential* for future extraction, where viable. A visual inspection of the NCC Interactive Policy Map shows that the Proposed Scheme would substantially impact (potentially sterilise) less than 1% of the available mineral resource in the region. In accordance with the assessment criteria set out in LA110 (see **Table 14-4**), the Proposed Scheme therefore does not sterilise one or more mineral safeguarding site or peat resource, in its entirety.

14.5.11 As stated in the baseline section, sales of sand and gravel in the East of England were recorded at just over 10Mt during 2022, demonstrating good historical availability and supply in the region. Based on the significant presence of unsterilised deposits of these resources remaining across the East of England, it is reasonable to conclude that the availability and supply of sand and gravel is unlikely to diminish in the short to medium term, and the

percentage sterilised by the Proposed Scheme would not adversely impact future access to supply.

14.5.12 Building on this information, and to proportionately fulfil the requirement for a Mineral Resource Assessment at this stage, the following information has been provided in accordance with Mineral Strategic Objective MS04 and Policy MP11 (in the emerging Norfolk Minerals and Waste Local Plan and the corresponding Appendices):

- A ground investigation has been undertaken to determine the viability of the resource for reuse on the Proposed Scheme. The outcome of the ground investigation is summarised in **Chapter 13: Geology and Soils** (Document Reference: 3.13.00); a brief synopsis of the findings describes superficial deposits comprising a thickness range of 0.5 – 34.9m comprising soil with a high organic content, alluvium and river terrace deposits are encountered across the floodplain; Lowestoft Formations (Glacial Till) are encountered across the site, overlying the chalk. The Sheringham Cliffs Formation (granular glacial deposits) are encountered across the site above the Lowestoft Formation and below the topsoil. No significant contamination of soils was identified during the site investigations undertaken to date.

- Extraction of sand and gravel mineral resources is to be limited to the depth of the Proposed Scheme road construction requirements: it is not deemed economically viable or proportionate to extract resource from below these depths. For example, in some cases, deposits extend more than 30m below ground level, which means that up to 1.35Mm^3 (1.69Mt) of resource would need to be extracted to capture the full value of the sand and gravel presently at site. Any extraction material would need transportation and storage, and any void engineered below the typical road level would need to be backfilled with primary material (which would also require transportation to site). All of these activities, in addition to the impacts on the overall programme, provide a sound

financial and logistical case for not extracting the existing resource at site, beyond the road depth.

- Reuse of excavated arisings on the Proposed Scheme would be maximised to limit the requirement for imported fill. A MMP would be produced to manage the reuse of excavated arisings on site;
- Surplus excavated arisings would be taken off site and diverted from landfill for reuse in high value applications on other schemes.

14.5.13 In accordance with above-bulleted information, the design and assessment teams have applied their professional judgement to conclude that all reasonable and proportionate approaches to minimising impacts on the MSA have been taken, and no further action in this context is required. The effect on the MSA is therefore assessed to be **negligible** and therefore **not significant** and no mitigation measures are required.

Waste

14.5.14 **Table 14-13** provides a summary of the type and estimated quantities of waste generated during the construction phase of the Proposed Scheme, and which are anticipated to be disposed of to landfill. The volumes presented are based on current design information provided by the Principal Contractor.

Table 14-13 Forecast waste types and quantities to be sent to landfill

Waste type	Quantity (tonnes)	Comments
Road planings	1,400	A small quantity of the road planings have been identified as potentially contaminated / hazardous, as they contain coal tar. A worst-case scenario has identified these arisings are likely to be landfilled.
Earthworks cut	1,000	A worst case scenario contingency for hazardous arisings from earthworks cut – the specific quantity unknown.

Earthworks cut (high organic content soil)	69,670	An estimated volume of soils with a high organic content is to be removed from the floodplain, and disposed of as potentially hazardous waste.
Total waste to landfill	72,070	(Based on a worst case scenario)

14.5.15 **Table 14-13** describes that in addition to the contaminated road planings, there is a contingency of 1,000 tonnes of potentially contaminated earthworks arisings, which may not be suitable for reuse on the Proposed Scheme. A worst case contingency of 69,670 tonnes for the disposal of soils with a high organic content has also been used; these excavations are currently expected to be removed from the floodplain and sent to landfill, as they are not geotechnically suitable for reuse and potentially hazardous if dried.

14.5.16 Therefore, the total anticipated quantity of waste likely to require disposal to landfill (as a worst-case scenario) would be 72,070 tonnes.

14.5.17 Based on the forecast reduced availability of total remaining landfill capacity regionally (27.5Mm^3 remaining landfill capacity by 2029), it is considered, using the criteria in **Table 14-4**, that the disposal of waste generated by the Proposed Scheme would reduce regional landfill void capacity by less than 1% of remaining capacity (1% of the remaining landfill void capacity is 275,000m^3 / 343,750 tonnes).

14.5.18 It is therefore considered that waste generated by the Proposed Scheme would have a **slight (not significant) effect**.

Cumulative Impacts

14.5.19 Details of materials and waste impacts in-combination with committed developments are given in **Appendix 14-1** (Document Reference: 3.14.01). All impacts would be negligible and the significance of effect is addressed in **Chapter 20: Cumulative Effects** (Document Reference: 3.20.00).

Mitigation

14.5.20 The following embedded mitigation measures committed to in the design are outlined below and in the OCEMP in **Appendix 3-1** (Document Reference: 3.03.01).

14.5.21 The design incorporates reuse of excavated arisings as fill for the Proposed Scheme, as embankments and in environmental bunds. The cut and fill balance on the scheme produces a surplus of excavated earthworks of approximately 184,822m^3 (231,028t). The client has committed to explore the potential reuse of these excavated arisings either on the Proposed Scheme or on other highways authority developments within the region.

14.5.22 Arisings would be suitably stockpiled to maximise reuse by minimising quality degradation, damage and other loss. Providing a management framework for this approach, the OCEMP would be developed by the Principal Contractor with commitments to, and information on, stockpile location, underlying soil type and condition, methods for prevention of erosion and leachate generation and use of appropriate signage. It is anticipated that the finalised CEMP would be submitted for approval by the Planning Authority prior to the commencement of the Proposed Scheme, in accordance with a planning condition.

14.5.23 As stated in paragraph 14.5.8, the Proposed Scheme would exceed the regional aggregate recycled content target of 31%, in line with the DMRB LA110, Appendix E/1.

Residual effects

Construction phase

Materials

14.5.24 The assessment has established that the significance of effects for materials is not significant, and no further mitigation measures are required.

Waste

14.5.25 The assessment has established that the significance of effects for waste is not significant, and no further mitigation measures are required.

14.6 Monitoring requirements

14.6.1 In addition to the embedded mitigation measures set out, the following monitoring requirements would be adopted by the Principal Contractor to adhere to materials and waste good practice:

- An OCEMP (Document Reference: 3.03.01) has been drafted to accompany the planning application for the Proposed Scheme. The OCEMP incorporates (as an addendum) a Design SWMP; and – in accordance with the *CL:AIRE Definition of Waste: Code of Practice* (**Ref 14.35**) – cross references to an Outline MMP.
- Prior to the start of site works, the Principal Contractor would ensure the measures included in the OCEMP, Draft SWMP (Document Reference: 3.03.01b) and Draft MMP (Document Reference: 3.03.01c) are adopted in live versions of these documents i.e. a CEMP, SWMP and MMP.
- The CEMP would be used to describe the measures to be implemented to manage potential environmental impacts from arisings generated during construction.
- The SWMP would be used to manage, monitor and report site waste effectively to (a) validate the assertions in this assessment and (b) (where possible) maximally reduce associated impacts and potential harm to the environment during construction.
- The MMP would be used to manage, monitor and report on the maximum reuse of both natural soils, Made Ground and other arisings (contaminated or otherwise).

- Based on the framework set out in the OCEMP, the Principal Contractor would monitor and update all these documents at an agreed frequency during the construction phase of the Proposed Scheme.

14.7 Difficulties and uncertainties

14.7.1 Baseline data for material resource availability, landfill capacity and waste recovery is only updated periodically by Defra and the Environment Agency. The most up-to-date sources of available information have been used at the time of writing.

Materials

14.7.2 The assessment of material resources is based upon the validity of the collated information, regarding the materials that are expected to be consumed during the “in scope” lifecycle phases of the Proposed Scheme.

Waste

14.7.3 The assessment of impacts and effects on landfill void capacity is based upon the validity of the collated information, regarding the waste generated and disposed by the Proposed Scheme.

14.7.4 UK landfill operators can claim commercial confidentiality for their data at the time of submission; data for sites with a commercial confidentiality in place are therefore unavailable for the analyses presented in this chapter. It is not anticipated that any lack of data in this context has materially affected the results of the assessment.

14.8 Summary

14.8.1 **Table 14-14** provides a summary of the findings of the assessment.

Key to table:

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

Table 14-14 Summary of effects – Construction Phase only

Receptor	Potential effects	Additional mitigation	Residual effects	Monitoring
Natural and non-renewable resources	**Slight adverse Not Significant**	N/A	N/A	N/A
Landfill void capacity	**Slight Adverse Not Significant**	N/A	N/A	N/A

Operational Phase – SCOPED OUT (N/A)

14.9 References

- **Ref 14.1** European Commission (2008) Waste Framework Directive 2008/98/EC
- **Ref 14.2** Department for Environment, Food & Rural Affairs (Defra) (2011) Guidance on applying the Waste Hierarchy
- **Ref 14.3** HM Government (2012) The Controlled Waste (England and Wales) Regulations 2012
- **Ref 14.4** HM Government (2011) The Waste (England and Wales) Regulations 2011
- **Ref 14.5** HM Government (2005) Clean Neighbourhoods and Environment Act 2005
- **Ref 14.6** HM Government (2005) Hazardous Waste (England and Wales) Regulations 2005
- **Ref 14.7** HM Government (1998) Waste Minimisation Act 1998
- **Ref 14.8** HM Government (1990) Environmental Protection Act 1990
- **Ref 14.9** HM Government (1974) The Control of Pollution Act 1974
- **Ref 14.10** Ministry of Housing, Communities & Local Government (2023) National Planning Policy Framework
- **Ref 14.11** Department for Communities and Local Government (2014) National Planning Policy for Waste
- **Ref 14.12** Defra (2013) Waste Management Plan for England
- **Ref 14.13** Defra (2013) National Policy Statement for Hazardous Waste 2013
- **Ref 14.14** European Commission (1999) Landfill Directive 1999/31/EC

- **Ref 14.15** Defra (2018) Our Waste, Our Resources: A Strategy for England
- **Ref 14.16** Defra (2018) A Green Future: Our 25 Year Plan to Improve the Environment
- **Ref 14.17** Defra (2021) Waste Management Plan for England
- **Ref 14.18** Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026 (adopted September 2011)
- **Ref 14.19** DMRB LA110 Material assets and waste (2019)
- **Ref 14.20** [Mineral Products Association, Profile of the UK Mineral Products Industry, 2020 Edition]
- **Ref 14.21** [Department for Business, Energy and Industrial Strategy (2021) Monthly Bulletin of Building Materials and Components]
- **Ref 14.22** [East of England Aggregates Working Party Annual Monitoring Report (2017)]
- **Ref 14.23** [United Kingdom Steel Production | 1969-2020 Data | 2021-2022 Forecast | Historical]
- **Ref 14.24** [NCC (n. d.) Safeguarded Mineral Resources interactive map]
- **Ref 14.25** [Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026 (adopted September 2011)]
- **Ref 14.26** [Norfolk County Council (October 2013), Norfolk Minerals and Waste Development Framework Mineral Site Specific Allocations Development Plan Document]
- **Ref 14.27** [Natural England (n.d.) MAGIC mapping website]

- **Ref 14.28** Defra (2009) Basis of the UK BAP target for the reduction in use of peat in horticulture – SP0573 (2009)]
- **Ref 14.29** Highways Agency (2019) Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal: LA 110 Material assets and waste Revision 0
- **Ref 14.30** [Defra (2023) UK Statistics on Waste]
- **Ref 14.31** [Environment Agency, Waste Data Interrogator (2023) 2022 Waste Summary Tables for England]
- **Ref 14.32** [Environment Agency (2023), 2022 Remaining landfill capacity, England)]
- **Ref 14.33** [NCC (2010) Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026]
- **Ref 14.34** [NCC (2022) Norfolk Minerals and Waste Local Plan Publication document]
- **Ref 14.35** [CL:AIRE (2011) The Definition of Waste: Development Industry Code of Practice]
- **Ref 14.36** [Department for Environment, Food and Rural Affairs (Defra) (2018). A Green Future: Our 25 Year Plan to Improve the Environment]