M25 junction 28 improvement scheme
TR010029
10.8 Environmental Statement
Chapter 12: Materials and waste
Changes 1-4

Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applicaitons: Prescribed Forms and Procedure) Regulations2009

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The M25 junction 28 scheme
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10.8 ENVIRONMENTAL STATEMENT
CHAPTER 12: MATERIALS AND WASTE CHANGES 1-4

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Executive summary

This chapter reports the assessed impacts of materials and waste associated with the Scheme during its construction, demolition and excavation (CD&E) phases. This chapter has been written in accordance with LA 110 Material assets and waste (formerly IAN 153/11), the Design Manual for Roads and Bridges (DMRB) which sets out the requirements for assessing and reporting the effects on material assets and waste from the delivery of motorway and all-purpose trunk road projects.

The operational phase of the Scheme was scoped out of the assessment at the scoping stage, because it is unlikely that the operational phase will result in significant effects with respect to material assets and waste.

The estimated quantities of materials consumed during the construction phase have been assessed against a regional or national material sales baseline. The estimated quantities of waste generated during the construction phase have been assessed against a local waste infrastructure capacity baseline.

The CD&E waste generated by the Scheme, will be primarily non-hazardous and inert. However, there is likely to be some hazardous waste mainly from excavation due to the proximity of the Scheme to historic landfills and other sources of contamination.

The assessment finds that the Scheme's significance of effect of material consumption and CD&E waste is slight. ~~The Scheme's significance of effect regarding CD&E waste arising from the Scheme is moderate, assuming a worst-case scenario of all excavated material being disposed of to landfill.~~

With regards to cumulative effects, the Scheme's significance of effect regarding material consumption has been assessed as neutral or slight.

Mitigation and enhancement measures associated with the materials and waste have been provided in line with Waste Framework Directive (2008/98/EC) waste hierarchy: prevention, reuse, recycle, recover, and disposal. These have been provided for the design phase, as well as the construction phase of the Scheme.

The assessment is based on the findings of the preliminary ground investigation and main ground investigation that was undertaken for the Scheme, as well as buildability information provided by the contractor in their earthworks strategy, and proposed materials re-use environmental enhancement measures (environmental bund Work No.18).

12. Materials and waste

12.1 Introduction

12.1.1 This chapter reports the assessed impacts of materials and waste associated with the Scheme during its CD&E phases. This chapter has been written in accordance with LA 110 Material assets and waste (formerly IAN 153/11), the Design Manual for Roads and Bridges (DMRB) which sets out the requirements for assessing and reporting the effects on material assets and waste from the delivery of motorway and all-purpose trunk road projects.

12.1.2 The operational phase of the Scheme was scoped out of the assessment at the scoping stage, because it is unlikely that the operational phase will result in significant effects with respect to materials and waste, as outlined in section 12.5.

12.1.3 Materials are defined, as per LA 110, as “the materials and construction products required for the construction, improvement and maintenance of the trunk road network. Materials include primary raw materials such as aggregates and minerals, and manufactured construction products. Many materials will originate off-site, purchased as construction products, and some will arise on-site such as excavated soils or recycled road planings”.

12.1.4 Waste is defined in line with the Waste Framework Directive (2008/98/EC) as “any substance or object which the holder discards or intends or is required to discard”.

12.2 Competent expert evidence

12.2.1 This materials and waste chapter has been drafted by individuals who have used their knowledge and professional judgement to undertake this assessment. The following competent persons hold the professional qualifications as described:

- A chartered Environmentalist who holds full professional membership with the Institute of Environmental Management and Assessment with over 15 years of experience in materials and waste assessment, including Materials Management Plans and Environmental Permitting.
- A chartered Environmental Scientist who holds a full professional membership with the Institution of Environmental Sciences. They are a specialist in Land Condition who holds a full professional membership with SiLC. They have 15 years of experience in environmental assessment, including soil, materials and waste assessment, including Materials Management Plans and Environmental Permitting. They also hold a BSc in Ecology and Environment Management, an MSc in Environmental Diagnostics and Assessment, and is a Qualified Person under National Quality Mark Scheme.

12.3 Legislative and policy framework

12.3.1 Table 12.1 summarises the legislation, regulatory and policy framework applicable to materials and waste on this Scheme.

12.3.2 Many of the relevant UK acts and regulations relating to waste implement European Union (EU) legislation into UK Law. These include:

- EU Revised Waste Framework Directive (2008/98/EC)
- EU Landfill Directive (1993/31/EC), as amended by the EU Directive (2003/33/EC)
- EU Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures (including revisions)
- EU Directive 91/689/EEC on hazardous waste

Table 12.1: Legislation, regulatory and policy framework

Legislation, regulatory and policy framework	Summary of requirements
The Environmental Protection Act 1990[1] (c.43) as amended in 1996 and 1999	The EPA implements integrated pollution control for the disposal of waste to air, land and water, including solid waste disposal. As part of this, under Section 34, the Act imposes a duty of care on anyone who produces, imports, keeps, stores, transports, treats or disposes of waste. This will mean that Highways England and its supply chain must take all reasonably practical steps to ensure that: • Waste is consigned only to a registered waste carrier, licensed waste contractor, local authority waste collector or person dealing with waste in ways that are exempt from licensing; • Waste that is disposed of is accompanied by a detailed written description of the waste to ensure its safe handling, treatment and disposal (waste transfer notes are to be kept for a minimum of two years and hazardous waste consignment notes are to be kept for a minimum of three years); • Waste is securely contained to prevent it escaping to the environment; • Appropriate measures are taken to ensure that others involved in the handling and disposal of waste do so in accordance with the all applicable Regulations; • Copies of registration certificates should be obtained for all waste contractors and waste carriers used as part of the Scheme and it should be ensured that they are on the Environment Agency's 'Public Register of Waste Carriers, Brokers and Dealers'; and • Checks should be made on the final destination of each waste, ensuring that each waste disposal facility is licensed to accept the waste. Duty of Care audits of carriers and waste disposal facilities are advisable. The generation of waste from the Scheme shall be managed in accordance with all applicable legislation and policy and in accordance with good practice.
Clean Neighbourhoods and Environment Act 2005[2] (c. 16)	Chapter 16 of the Act prescribes the correct transportation, collection, disposal and management of waste and prohibits fly tipping.

[1] Environmental Protection Act, 1990, Chapter 43
[2] Clean Neighbourhoods and Environment Act 2005, Chapter 16

Legislation, regulatory and policy framework	Summary of requirements
Waste (England and Wales) Regulations 2011[3] (SI 2011/988)	The Regulations transpose the Revised EU Waste Framework Directive (2008/98/EC) into English law and require organisations to manage waste in alignment with the waste hierarchy to prevent waste going to landfill. Waste management contractors working on the Scheme will be required to provide evidence that the waste hierarchy has been applied. This evidence can be in the form of waste transfer notes and hazardous waste consignment notes, which themselves must be kept for two and three years respectively.
The Hazardous Waste (England and Wales) Regulations 2005[4] (SI 2005/894) (as amended in 2016)	The Regulations apply to all wastes listed as hazardous in the European Waste Catalogue (2000/532/EC) and the CLP (Classification, Labelling and Packaging) Regulation (EC 1272/2008). Hazardous waste will be produced throughout all lifecycle stages of the Scheme. Hazardous waste should be disposed of in accordance with the Regulations, including the need to produce a hazardous waste consignment note.
Waste Electrical and Electronic Equipment (WEEE) Regulations 2013[5] (SI 2013/3113)	The Regulations revoke the 2006 WEEE Regulations and have a key objective to reduce the amount of WEEE that goes to landfill. This is to be achieved by making producers responsible for the collection, treatment and recovery of WEEE, including the associated costs. For the Scheme being considered, all WEEE produced in the construction, demolition and excavation (CD&E) and operational phases must be segregated and managed separately from other wastes, with relevant paperwork provided as described above.
The Waste Batteries and Accumulators Regulations 2009[6] (SI 2009/890)	The main requirements of the Regulations are that producers of batteries and accumulators must either take back waste batteries and accumulators or fund the collection and recycling of them. The 2015 amendment removed several additional requirements, inclusive of the provision of operational plans and independent audit reports. For the Scheme being considered, all batteries produced in the CD&E and operational phases must be segregated and managed separately from other wastes.
The CLP (Classification, Labelling and Packaging) Regulation[7] (EC 1272/2008)	The CLP Regulation was introduced in a staggered manner between 1999 and 2015. It should be noted that within the UK and EU, the CLP Regulation has replaced the Dangerous Substances Directive (67/548/EEC) and the Dangerous Preparations Directive (1999/45/EC). To summarise, the Regulation provides guidance on the application of the CLP criteria for hazards (physical, health and environmental). With specific reference to the Scheme, the Regulation should be used to support the classification of both waste and materials. All waste should be classified by a six-digit code, which must be recorded on all waste transfer notes and hazardous waste consignment notes for the movement of waste from the CD&E and operational phases of the Scheme.
Environmental Protection (Disposal of Polychlorinated	The Regulations require the safe disposal or decontamination of all equipment that contains polychlorinated biphenyls (PCBs).

[3] Statutory Instruments, 2011 No. 988, Environmental Protection, England And Wales, The Waste (England and Wales) Regulations 2011
[4] Statutory Instruments 2005 No. 894, Environmental Protection, England And Wales, The Hazardous Waste (England and Wales) Regulations 2005
[5] Statutory Instruments 2013 No. 3113, Environmental Protection, The Waste Electrical and Electronic Equipment Regulations 2013
[6] Statutory Instruments 2009 No. 890, Environmental Protection, The Waste Batteries and Accumulators Regulations 2009
[7] Statutory Instruments 2015 No. 21, Health and Safety, The Classification, Labelling and Packaging of Chemicals (Amendments to Secondary Legislation) Regulations 2015

Legislation, regulatory and policy framework	Summary of requirements
Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000[8] (SI 2000/1043)	Equipment containing 5 litres or more of PCB substance or mixture is also covered by the Regulations. PCBs can be present in old electrical equipment which may be removed as part of the Scheme.
The Environmental Permitting (England and Wales) Regulations 2016[9] (SI 2016/1154) (as amended 2018) (SI 2018/110)	The Regulations put in place requirements to ensure that operators on certain sites that produce certain materials and undertake certain activities (such as the storage, use or treatment of waste) have a permit or exemption from the regulator (i.e. the Environment Agency, local planning authority). Permit or exemption details of all sites that manage waste from the Scheme will be checked to ensure waste is being managed legally.
Environmental Damage (Prevention and Remediation) Regulations 2015[10] (SI 2015/810)	The Regulations developed obligations (introduced by the original regulation in 2009) to ensure the polluter pays for any environmental damage it has caused. The Regulations apply to all economic activities and therefore cover businesses. The Regulations require caution to be taken when managing sites to prevent damage to water, land and biodiversity. Such damage could be caused by poor waste management practices and, as such, the generation of waste from the Scheme must be managed in accordance with all applicable legislation and policies and in accordance with good practice.
The Control of Asbestos Regulations 2012[11] (SI 2012/632)	The Regulations require notification to the appropriate authority of: all notifiable asbestos works (as specified in the Regulations), the medical surveillance (from April 2015) and health records for employers dealing with asbestos, the provision of the correct equipment and training for working with asbestos; and the documentation of the method, storage and disposal of asbestos waste. Any waste containing asbestos (e.g. insulation or lagging) must be stored and disposed of, in suitable packaging to prevent fibre release, in line with the Regulations. All asbestos must be removed by a licensed contractor who has undergone the appropriate training for the removal of asbestos and must wear the appropriate personal protective equipment. Written records must be kept of the workers and the likely level of exposure. The asbestos must only be disposed of at an appropriately permitted disposal site. These regulations will be adhered to during the construction of the Scheme to minimise harm to human health due to asbestos exposure. Information relating to asbestos contaminated soils (ACS) is provided in Chapter 10 Soils and Geology.
Our Waste, Our Resources: A Strategy for England 2018[12]	The strategy sets out how to preserve the stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. The strategy sets out key areas the government wants to focus on with support from the waste industry, but also wider industry and the public.

[8] Statutory Instruments 2000 No. 1043, Environmental Protection, England and Wales, The Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000
[9] Statutory Instruments 2016 No. 1154, Environmental Protection, England And Wales, The Environmental Permitting (England and Wales) Regulations 2016
[10] Statutory Instruments 2015 No. 810, Environmental Protection, England The Environmental Damage (Prevention and Remediation) (England) Regulations 2015
[11] Statutory Instruments 2012 No. 632, Health and Safety, The Control of Asbestos Regulations 2012
[12] HM Government, Our Waste, Our resources: A Strategy for England, 2018

Legislation, regulatory and policy framework	Summary of requirements
	The strategy is based on two overarching objectives: to maximise the value of resources used; and to minimise waste and its impact on the environment. Strong focus is on sustainable production such as setting 30% limits for recycled content in plastic packaging, banning some plastics, increasing municipal recycling and reducing food waste across the supply chain and in homes. Chapter 3 covers resource recovery and waste management. The strategy aims to, among others: address information barriers to the use of secondary materials; and encourage waste producers and managers to implement the waste hierarchy in respect to hazardous waste. The strategy also sets out to tackle waste crime, including by improving the transport, management and description of waste by reforming existing regulations. Designs for the Scheme should ensure the use of plastics are strictly necessary and where they are used that high recycled content is specified. The Principal Contractor should ensure they fulfil all requirements of the waste duty of care i.e. selecting permitted facilities to manage their waste and producing waste transfer notes, which helps reduce waste crime.
National Policy Statement for National Networks (NPS NN) (2014)[13]	The NPS NN outlines the importance of managing resources and wastes to prevent and minimise environmental impacts. The resource and waste management measures outlined in the 'Waste Management' chapter should be adhered to and considered throughout all stages of the Scheme. Management measures are inclusive of but not limited to, the implementation of the waste hierarchy (see Figure 12-1), the correct management of waste both on-site and off-site and ensuring the appropriate waste infrastructure for waste treatment and disposal.
National Planning Policy Framework (NPPF) 2018[14]	As part of the 2018 revision (and amended 2019), the NPPF's goal of supporting sustainable development identifies the importance of using natural resources prudently and minimising waste. It identifies that strategic policies should make provision for minerals and waste management. Section 17 focuses on "Facilitating the sustainable use of minerals", and states planning policies should include consideration of the following points: • provide for the extraction of mineral resources of local and national importance, except for peat; • take account of the contribution that recycled materials and minerals waste can make to supply; and • safeguard mineral resources by defining Mineral Safeguarding Areas. The NPPF does not contain any specific waste policies since national waste planning policy is published as part of the Waste Management Plan for England 2013 (paragraph 5 of the introduction to the NPPF). However, in Section 2 'Achieving sustainable development' NPPF sets out an environmental objective in which 'using natural resourcing prudently, minimising waste and pollution' are core tenets.

[13] National Policy Statement for National Networks, Department for Transport, December 2014
[14] Department for Communities and Local Government (2019) National Planning Policy Framework. London: DCLG

Legislation, regulatory and policy framework	Summary of requirements
National Planning Policy for Waste 2014[15]	The National Planning Policy for Waste is the formal replacement for Planning Policy Statement 10 (PPS10). It follows the principles set out in PPS10 which states that waste should be managed in line with the principles of the waste hierarchy. It is important to ensure that, where possible, waste production is minimised to reduce environmental impacts and to ensure an assessment is made of the local waste infrastructure type and capacities, to include, but not be limited to, an assessment of the local policies.
Waste Planning Practice Guidance 2015[16]	The Planning Practice Guidance website details how to adhere to the National Planning Policy for Waste 2014. The guidance should be followed to satisfy the local planning authority that impacts introduced by a proposed development on the existing waste management facilities are acceptable and do not prejudice the implementation of the waste hierarchy (see Figure 12.1).
Road Investment Strategy (RIS) and Strategic Business Plan 2015[17]	This strategy does not refer to waste directly, however the strategy highlights Highway England's commitment to improving and sustaining the environment. Waste management plays a role in environmental sustainability, and the commitments set out under the strategy should be adopted as part of the Scheme.
Road Investment Strategy (RIS2) 2020 – 2025[18]	As outlined above, the RIS2 strategy does not refer to waste directly, however the strategy highlights Highway England's commitment to improving and sustaining the environment.
Highways England Sustainable Development Strategy 2017[19]	The Strategy sets a vision for responsible sourcing of materials. This includes ensuring that the responsible resourcing of materials takes into consideration the impact that resources production can have on human and social health, climate and the environment. The strategy also seeks to increase the well-being of those who supply materials and resources to HE.

12.4 Study area

12.4.1 For materials and waste, the study area extends outside of the Scheme Development Consent Order (DCO) boundary and has been defined using professional judgement.

12.4.2 For materials, the study areas are the regions of Eastern England and Greater London. Mineral Safeguarding Areas (MSAs) have been assessed within the DCO boundary of the Scheme.

12.4.3 For non-hazardous waste, the study area for CD&E infrastructure capacity is the county of Essex.

12.4.4 For hazardous waste, the study area for CD&E infrastructure capacity is England.

[15] Department for Communities and Local Government, National Planning Policy for Waste, October 2014
[16] Ministry of Housing, Communities & Local Government, Waste Planning Practice Guidance, October 2015
[17] Road Investment Strategy: 2015 to 2020, Department for Transport and the former Highways Agency, December 2014
[18] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872252/road-investment-strategy-2-2020-2025.pdf
[19] Highways England, Sustainable Development Strategy, Our approach, 2017

12.4.5 The details of these study areas are further explained in section 12.6.

12.5 Assessment methodology

Level and scope of assessment

12.5.1 An environmental assessment, as defined in LA 110, was carried out to assess the impacts of materials and waste from the Scheme during its CD&E phases.

12.5.2 LA110 is a new environmental assessment technical guidance, part of the updated Highways England Design Manual for Roads and Bridges (DMRB), published in August 2019. The updated guidance series requires that the standards are implemented as soon as they are published, with limited exceptions (such as, if the project has reached a stage that would result in significant additional expense or delay).

12.5.3 The general methodology described below was applied:

- Review and application of relevant waste legislation, national, regional and local planning policies and guidance.
- Review of the proposed construction materials types and quantities and estimate the quantities and types of wastes to be generated from the Scheme during the CD&E phases.
- Review the proposed route and evaluate the impacts on any MSAs within the DCO boundary.
- Identify and evaluate the impacts of the Scheme against the materials and waste baselines.
- Identify opportunities to reduce, re-use, recover and/or recycle materials and wastes through a review of the proposed development (including proposed materials, construction methods and design, where available) and in accordance with industry best practice.

Assessment methodology

12.5.4 The significance of impacts from the anticipated materials and waste during the construction phase of the Scheme has been determined by assessing the Bill of Quantities (dated January 2020) information related to the removal of excavated materials, and materials/equipment to be installed. The Bill of Quantities provides earthworks volumes for the materials to be excavated from site, volumes of site excavated materials which will be reused, volumes to be removed, and volumes of materials to be imported into the site as part of the Scheme development. The volumes were calculated based on the design model as at August 2019.

12.5.5 In order to determine the significance of the impact, the volumes from the Bill of Quantities were compared to the baseline conditions for materials and waste (see section 12.6) and assessed against the assessment criteria presented in Table 12.2 and Table 12.3.

12.5.6 Information provided by the Principal Contractor regarding re-use or recycling of materials was also taken into consideration as part of the assessment.

12.5.7 The results of the assessment are presented in section 12.10. Additional details

on waste types will be provided in the Site Waste Management Plan (SWMP) produced by the Principal Contractor.

12.5.8 The operational phase of the Scheme has been scoped out of the assessment as it is envisaged that there will be minimal material use and waste generation.

Assessment criteria

12.5.9 Table 12.2 summarises the 'significance categories' adopted in the assessment of effects on materials and wastes. The table originates from the DMRB LA110 manual (as detailed in section 12.1.1). It should be noted that in certain circumstances the sensitivity of materials (i.e. generating capacity) cannot be assessed due to a lack of publicly available data; this decision has been made through the exercise of professional judgement.

Table 12.2: Criteria for classifying environmental effects

Significance category	Description
Very Large	**Material assets** No criteria: use criteria for large categories. **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 the 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% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and • >50% of project waste for disposal outside of the region.
Moderate	**Material assets** • Project achieves less than 70% 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 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**

Significance category	Description
	• ≤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.
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% re-used / recycled content. **Waste** • No reduction or alteration in the capacity of waste infrastructure within the region.

Table Source: LA 110 revision 0

12.5.10 The assessment of significance on material assets and waste has been reported in accordance with Table 12.3. The table originates from the DMRB LA110 manual (as detailed in section 12.1.1).

Table 12.3: Significance criteria

Significance category	Description
Significant (one or more criteria met)	Material assets • Category description met for moderate or large effect. Waste • Category description met for moderate, large or very large effect.
Not significant	Material assets • Category description met for neutral or slight effect. Waste • Category description met for neutral or slight effect.

Table Source: LA 110 revision 0 Assumptions and limitations

Assumptions

- The assessment is based on material and waste quantities provided in the Bill of Quantities (dated January 2020), ~~and~~ the buildability information) (December 2020) provided by the Principal Contractor, and the proposed environmental bund (Work No. 18) ~~(December 2020)~~.
- The findings of the preliminary ground investigation as reported in the Preliminary geo-environmental assessment report (APP-075) have been used to support the Waste Recovery Plan for the re-use of controlled wastes within the scheme.
- The findings of the ground investigation report for the entire scheme, including the anticipated geological make up of the excavated materials within the Scheme, as reported in the Ground Investigation Report (REP1-023 to REP1-025) have been used to develop the proposals for materials re-use within the environmental bund (Work No. 18).

- In the absence of a detailed construction programme being available, it was assumed that materials use, and waste generation will be spread equally across the construction period.
- All material quantities have been converted into tonnes using industry standard conversion rates.
- All materials and waste streams have been grouped according to main materials and waste types.

Limitations

12.5.11 The assessment is based on material and waste quantities from the Bill of Quantities as at January 2020, ~~and~~ estimates made by the Principal Contractor as part of their buildability report, and proposed environmental bund (Work No. 18). The buildability report provides the Principal Contractor's commitments and proposals for the Scheme construction, including proposals for re-use of materials.

12.5.12 The assessment draws upon further engagement (held between September and December 2020) with the buildability contractor to understand the earthworks strategy and inform the preparation of the Waste Recovery Plan required for the Scheme. The assessment of effects has been based on the proposed earthwork strategy within this time period.

~~12.5.11~~12.5.13 The construction of an environmental bund will enhance environmental mitigation measures such as landscape and noise screening from the Scheme. The assessment of effect and mitigation has been based on the proposed design of materials to be re-used within the environmental bund (Work No. 18).~~Further to this, as the details of materials re-use outside the Scheme were not available at the time of this assessment, a worst-case scenario has been assumed that all materials excavated from the Scheme will be disposed to landfill~~.

12.6 Baseline conditions

12.6.1 Desk based information has been collated to identify the existing baselines of the receptors.

Materials baseline

12.6.2 The Scheme is situated on the borders of London and East of England regions. The two regions have been selected to produce the baseline in line with the proximity principle.

12.6.3 The regional baseline data for material sales has been sourced from the Mineral Products Association Profile of the UK Mineral Products Industry 2018 report[20].

12.6.4 The material data detailed in Table 12.4 is based on the main construction materials as identified from previous road improvement schemes. Note, that the number, type and size of construction developments vary from year to year and the demands for construction materials may also fluctuate. The data should

[20] Mineral Products Association, The Trade Association for the Aggregates, Asphalt, Cement, Concrete, Dimension Stone, Lime, Mortar and Silica Sand Industries. Profile of the UK Mineral Products Industry, 2018 Edition

therefore be considered as representative.

Table 12.4: Regional material sales baseline

Construction material	Regional baseline
	Tonnes per annum (tpa)
Aggregates	18,300,000*
Concrete	12,050,000**
Asphalt	5,100,000
* Combined figure including; crushed rock, sand and gravel. **Converted from m3 using a 1m^3 to 2.41 tonnes, source: https://www.traditionaloven.com/building/masonry/concrete/convert-cubic-metre-m3-concrete-to-tonne-metric-t-concrete.html.	

Table Source: Mineral Products Association Profile of the UK Mineral Products Industry 2018

Mineral Safeguarding Areas

12.6.5 The DCO boundary of the Scheme falls within Essex County Council and the London Borough of Havering.

12.6.6 The Essex Minerals Local Plan (adopted 2014), and The London Borough of Havering Local Aggregate Assessment (2014), both show that there are no MSAs that would be impacted by the Scheme.

Waste arisings baseline

12.6.7 The CD&E waste generated by the Scheme, will be primarily non-hazardous and inert. However, there is likely to be some hazardous waste mainly from excavation due to the proximity of the Scheme to historic landfills and other sources of contamination as detailed in the Geology and Soils chapter (Chapter 10).

12.6.8 Further to the above, it has been identified that potentially unpermitted recently deposited waste lies within the DCO boundary of the Scheme.

12.6.9 A preliminary ground investigation has been undertaken in the area of the recently deposited waste and historic landfill area (former Brook Street landfill). The preliminary waste classification based on the site data collected indicates that the top 0.4 m of the material deposited (Made Ground) would be classified as non-hazardous waste with <0.1% asbestos. The preliminary ground investigation also indicates that the Made Ground would be classified as non-hazardous, and the natural ground is classed as inert waste.

12.6.10 The baseline for non-hazardous CD&E waste arisings has been calculated using the Environment Agency Waste Data Integrator 2018 (filtered by CD&E waste for Essex) and Essex County Council & Southend-on-Sea Waste Local Plan (2017), as shown in Table 12.5. The figure from 2018 has been extrapolated to year 2022 (the construction phase start date) using the mean annual growth estimated in the Local Plan. The future waste management capacity requirements of the Plan area (Essex County Council and Southend-on Sea) have been calculated through the Waste Capacity Topic Paper 2015[21], which in

[21] Essex and Southend-on-Sea Waste Local Plan Adopted July 2017

turn builds on the analysis originally presented in the Capacity Gap Report 2014. The reports model future waste arisings alongside existing operational waste capacity to identify future waste treatment and disposal requirements in the Plan area 2032.

12.6.11 The baseline for hazardous CD&E arisings has been calculated using the hazardous CD&E arisings of Essex in 2016. The data is taken from the Environment Agency Hazardous Waste Data Integrator (2017)[22] filtered by hazardous construction waste.

12.6.12 The total CD&E waste arisings for Essex will fluctuate year on year based on the number, type and size of construction schemes underway. This in turn is heavily influenced by factors such as the economic situation, investment levels and legislative and policy variations. This data should therefore be considered representative.

Table 12.5: Waste arisings baseline

Waste stream	Tonnes per annum (tpa)	Baseline year
Non-Hazardous CD&E (regional)	8,677,432	2021
Hazardous CD&E (regional)	6,365	2017

Table Source: Environment Agency Waste Data Integrator 2017, Essex County Council & Southend-on-Sea Waste Local Plan (2017) and Environment Agency Hazardous Waste Data Integrator 2017

Waste infrastructure capacity baseline

12.6.13 The regional non-hazardous CD&E waste infrastructure capacity has been calculated using the Environment Agency Waste Data Interrogator 2017 and Essex County Council & Southend-on-Sea Waste Local Plan (2017), using the same extrapolation method described above.

12.6.14 Within the Essex and Southend-on-Sea Waste Local Plan 2017, it is stated that 'Hazardous waste is not subject to net self-sufficiency within this Plan due to the specialist nature of the facility type and the relatively small quantities generated within the Plan area.' Hazardous waste treatment is specialised, therefore a proportion of any hazardous CD&E generated by the Scheme is likely to be treated outside Essex.

12.6.15 As result of the above, the baseline for infrastructure capacity for hazardous waste is England. The data is taken from the Environment Agency Hazardous Waste Data Integrator (2017) filtered by hazardous construction waste.

Table 12.6: Waste infrastructure baseline

Waste stream	Tonnes per annum (tpa)	Baseline year
Non-Hazardous CD&E (regional)	6,662,718	2021
Hazardous (national)	982,308	2016

Table Source: Environment Agency Waste Data Integrator 2017, Essex County Council & Southend-on-Sea Waste Local Plan (2017) and Environment Agency Hazardous Waste Data Integrator 2017

[22] https://data.gov.uk/dataset/d6819c00-9c98-42fe-84d1-397fc93d76f6/hazardous-waste-interrogator-2018

12.7 Potential impacts

Construction

12.7.1 Receptors which have the potential to be impacted by materials and waste, are defined as:

- The market for materials such as aggregate, asphalt and concrete. Smaller quantities of materials may also include metal and wood etc.
- Mineral Safeguarding Areas.
- The capacity of waste infrastructure both regionally (non-hazardous and inert) and nationally (hazardous).

Operation

12.7.2 Minimal impact is envisaged during the operational stage of the Scheme due to limited material use (mostly associated with planned/ unplanned maintenance) and waste generation. Most of the wastes would likely be non-hazardous e.g. litter and non-hazardous/inert and hazardous wastes from planned/unplanned maintenance (concrete, bituminous materials, waste electrical and electronic equipment (WEEE), oils, etc).

12.7.3 Due to the minimal impact anticipated materials and waste have been scoped out from the assessment.

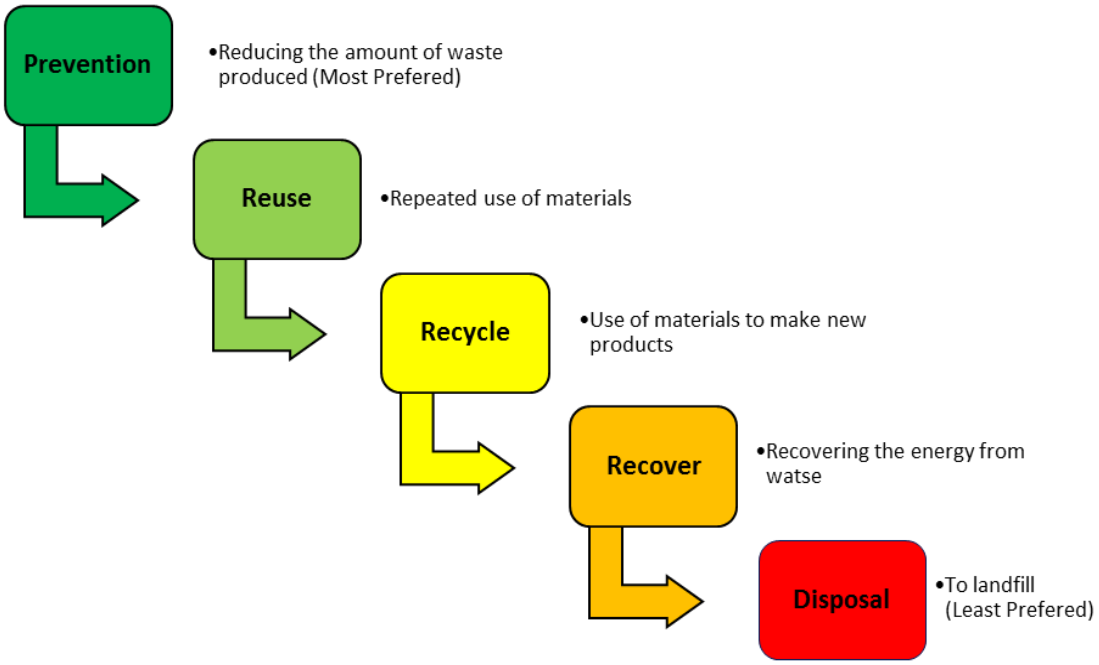
12.8 Design, mitigation and enhancement measures

12.8.1 Throughout the design process, mitigation measures associated with materials and waste will be identified. This process will be further refined as the design progresses and the Principal Contractor's buildability assessment is updated based on the encountered ground conditions.

12.8.2 Although every effort will be made (through the design process) to maximise resource efficiency, it is inevitable that materials will be used and waste will be generated during Scheme.

12.8.3 The Scheme will prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill as per the internationally recognised Waste Framework Directive (2008/98/EC) waste hierarchy, shown in Figure 12.1.

Figure 12.1: Waste hierarchy



12.8.4 Mitigation measures are necessary to reduce the environmental effects of both the CD&E and operational phases of the Scheme. The following sections detail the mitigation measures that should be implemented. Many of the measures outlined for waste in both the CD&E and operational sections are also mitigation measures for materials. Although the operational stage has been scoped out, the proposed measures are good practice that can be adopted (as applicable) throughout the Scheme's lifecycle.

Construction

Designing out waste

12.8.5 Decisions taken during the design phase to reduce material use and waste generation are an example of embedded mitigation measures.

12.8.6 The following measures are proposed to be implemented to reduce material use and waste generation as a minimum:

- Reduce embankment surcharging (adding fill materials on the ground surface to reduce the differential settlement due to soft Alluvium soils) by remediating the ground through Alluvium removal in embankments areas (estimated 1.5 – 2m deep) and replacement.
- Re-use of excavated Alluvium for landscaping within the Scheme.
- Re-use of London Clay for replacement of excavated Alluvium.
- Re-use of road planings (asphalt) as base layer for track and haul roads during the construction phase of the Scheme.
- Building of haul roads predominantly on line, so that haul roads are not completely sacrificial and lower layers are retained and incorporated into the final works.

- Sourcing locally recycled capping and sub-base aggregates for road box construction.
- Stripping of topsoil and re-use within the Scheme.

12.8.7 During detailed design, opportunities for further re-use of materials will be explored.

On-site management of CD&E waste

12.8.8 Best practice waste management and embedded mitigation measures should be applied to the Scheme as below and are set out in the Outline Construction Environment Management Plan (CEMP) (application document TR010029/APP/7.2) and Register of Environmental Actions and Commitments (REAC) (application document TR010029/APP/7.3):

- Setting targets for waste recovery and recycling and communicating these to those working on the Scheme with a clear understanding of what is expected.
- Preparation and maintenance of a Materials Management Plan (MMP), Site Waste Management Plan (SWMP) (if applicable) and CEMP so that waste generation and management can be logged and audited.
- Using components that can be prepared off-site to minimise waste generation on-site.
- Using recycled materials wherever practicable such as recycled aggregates.
- Not over ordering materials and using materials brought to site as efficiently as possible.
- Organising deliveries so materials arrive on-site as they are needed to reduce the possibility of damage and wastage occurring.
- Having clearly defined and separated skips on-site and a clearly demarked waste area(s).
- Training staff to understand how they should sort any waste and providing regular reminders and updates.
- Locally source materials, where practicable.

12.8.9 Best practice waste management not only reduces the environmental effects of a scheme through reducing waste to landfill or incineration, but also offers cost benefits, as the cost of disposal to landfill or incineration is not needed.

Treatment and disposal

12.8.10 Highways England are committed in their Sustainable Development Strategy (see Table 12.1) to achieving high recycling and recovery rates, as part of further embedded mitigation measures within the Scheme. This can be achieved by arranging for source segregation of recyclable materials and the provision of appropriate recycling facilities. Achieving a high recycling rate would minimise the environmental burden in terms of pollution, energy consumption, the carbon impact and the emission of large quantities of carbon dioxide equivalent associated with the production of products from virgin material.

12.8.11 Data from the recent ground investigation (once available in full) will be used to

provide a preliminary waste classification of soils within the Scheme, and where needed, any additional testing will be undertaken to determine waste classification. Once testing has shown the waste to be hazardous, non-hazardous or inert it will be managed accordingly via permitted waste facilities. If hazardous waste (such as contaminated soil) is encountered, this should be quarantined and segregated. This will be carried out through detail design by the Principal Contractor.

12.8.12 The Principal Contractor must select waste contractor(s) who are registered with the Environment Agency as a waste carrier for all waste to be transported off site, including hazardous waste, as part of their legal duty of care. The waste contractor should be able to undertake daily collections which may be required during the CD&E phases. Completed waste transfer notes and/or hazardous waste consignment notes must, as a legal requirement, be provided by the waste contractor. These must be kept, as a legal requirement, for a minimum of two and three years respectively. Any site that waste is transferred to must also have either a permit or exemption that allows it to receive and manage the waste being transferred. Following these legal requirements of the waste management duty of care, as highlighted above, is part of the further construction phase embedded mitigation measures.

12.8.13 As part of their construction assessment, the Principal Contractor has included the option of using local waste management facilities for waste management, in line with the proximity principle, which is to manage waste as close to the point of generation as possible, so as to reduce the carbon footprint of managing waste from the Scheme.

~~12.8.13~~12.8.14 In addition, to enhance the Scheme's sustainability, the excavated controlled wastes from the recently deposited material from Grove Farm and the Brook Street historical landfill, will be re-used on-site for the construction of the loop road in a clearly defined area of the Scheme. The controlled wastes will be re-used through a Waste Recovery for Deposit Permit which will be obtained by the Principal Contractor from the Environment Agency.

Operation

~~12.8.14~~12.8.15 Although the operational phase is not being assessed, there is still an opportunity for mitigation measures to be considered, such as:

- Any materials required for planned/unplanned maintenance should be managed in accordance with the best practice procedures outlined in the above sections.
- Recyclable waste should be source segregated. This can be achieved through the provision of clearly marked and/or colour-coded bins to enable easy identification of where waste should be placed during planned/unplanned maintenance.
- Hazardous waste should also be source segregated. Hazardous waste such as WEEE may arise during planned/unplanned maintenance and should be stored and collected separately. This is due to these wastes not being suitable for storage in standard waste receptacles due to human and environmental hazards and risks. Therefore, an area should be set aside, at maintenance depots, for hazardous waste storage which should include

appropriate containers, for example WEEE cages.

- Regular training should be provided for staff and/or sub-contractors. The training should focus on the practices necessary to minimise waste and to facilitate good practice whilst undertaking litter picking and planned/unplanned maintenance.

12.9 Assessment of effects

Materials

12.9.1 The materials use associated with the Scheme is presented in Table 12.7. The quantities have been sourced from current design and information provided by the Principal Contractor.

Table 12.7: Materials use associated with the Scheme

Materials~~Waste~~ stream/type	Total waste arisings (tonnes)
Aggregate (imported granular fill 6 type)	106,648
Concrete	8,483
Asphalt	6,900
Note: numbers may not add up due to rounding (rounded to the nearest tonne). Asphalt quantities not provided by Principal Contractor.	

12.9.2 Based on the figures above, the Scheme materials use would be 0.046% of the national material sales baseline (247,000,000 tpa – for aggregate, representing the largest amount of material) and 0.58% of the regional baseline.

Waste

12.9.3 The summary of waste arising from the Scheme is provided in Table 12.8.

~~12.9.3~~12.9.4 Wastes at the site are primarily anticipated to comprise excavated soil and stones. A detailed description of the geological units encountered at the site based on the ground investigation data is provided in the Ground Investigation Report (GIR) (REP1-023 to REP1-025). The GIR also provides a preliminary waste classification based on the ground investigation data, with the soil and stones wastes comprising non-hazardous wastes (primarily associated with the Made Ground) and inert wastes (generally associated with the natural geological units).

~~12.9.4~~12.9.5 Excavation quantities were provided by the design team, (included in the Bill of Quantities, as at January 2020) which informed the design of environmental bund (Work No. 18). A density conversion from the Highways England Carbon Tool (see Climate Chapter 14 for description of this tool) of 1.7 tonnes/m^3 has been used.

~~12.9.5~~12.9.6 Asphalt estimated quantities have been provided by the Principal Contractor, as detailed in Table 12.8 below.

Table 12.8: Estimated construction waste arisings

Waste stream/type	Total waste arisings (tonnes)
Aggregate	62,475~~125,173~~
Asphalt	6,426
Total	69,901~~131,599~~
Note: numbers may not add up due to rounding (rounded to the nearest tonne).	

~~12.9.6~~12.9.7 Based on the figures above, this would be 0.8~~1.5~~% of the regional CD&E arisings baseline (8,677,432 tpa).

Significance of effects

~~12.9.7~~12.9.8 Based on the estimated quantities of materials to be re-used and considering the Principal Contractor's strategy for importing recycled material, the effect of material use is slight (not significant).

~~12.9.8~~12.9.9 Based on the estimated quantities of waste to be generated there would be a slight~~moderate~~ effect (not significant) on the regional capacity~~, assuming the worst-case scenario that the waste will all require landfill disposal~~, accounting for the Scheme's target of maximising site-won materials re-use on-site.~~.~~

Residual effects

~~12.9.9~~12.9.10 The use of materials and the generation of waste is an inevitable consequence of all forms of development and as such there will be some unavoidable environmental effects.

~~12.9.10~~12.9.11 The environmental effects of the Scheme can be reduced using mitigation measures. However, it is not possible to quantify the reduction in material use or waste generation of the proposed mitigation measures at this stage, as these would depend on the feasibility of adopting and implementing the mitigation measures by the Principal Contractor during the construction phase. Therefore, the environmental effects have been assumed as those presented above.

12.10 Cumulative effects

12.10.1 Several relevant planned developments within Essex County Council, Brentwood Borough Council and the London Borough of Havering were reviewed as outlined in the Assessment of Cumulative Effects chapter (Chapter 15). From the applications reviewed, none included sufficient information related to materials and waste to enable assessment for cumulative effects.

12.10.2 One of the proposed developments includes the Lower Thames Crossing, an infrastructure project providing a new motorway and tunnel under the River Thames. Although it is likely that the materials and waste impact from this project may be significant, the start of construction is forecasted for the end of works on the Scheme. Therefore, it has been assumed the cumulative effects could be neutral or slight negative.

12.10.3 However, using professional judgement on material use and waste generation, it

is considered that the proposed developments would generate a low quantity of waste in relation to the baseline capacity. Also, materials used in the construction of these developments (mostly residential and commercial buildings) will be "released" when buildings/structures and other built environment are demolished (and therefore any effects and impacts would not be permanent). Therefore, it is estimated that there could be a neutral or slight long-term negative effect (not significant).

12.11 NPS NN compliance

12.11.1 The NPS NN outlines the importance of managing resources and wastes to prevent and minimise environmental impacts (paragraphs 5.39 to 5.66). Mitigation measures should be adopted and considered throughout all stages of the Scheme. Mitigation measures are inclusive of, but not limited to, the implementation of the waste hierarchy, the correct management of waste both on-site and off-site and identifying the appropriate waste infrastructure for waste treatment and disposal. Compliance with NPS NN has been demonstrated through the description of such mitigation measures, as described above.

12.12 Monitoring

12.12.1 Monitoring of waste generation during the CD&E phase would be carried out via the SWMP which is to be included within the CEMP by the Principal Contractor.

12.12.2 The focus of the SWMP will be monitoring the quantities and types of waste generated, as well as the duty of care information for the contractors transferring the waste and the sites the waste is taken to for management.

12.12.3 The CEMP will provide more detailed information on the duty of care documents that will be needed, such as the waste transfer notes and consignment notes, as well as strategies to be implemented to minimise waste generation and increase re-use and recycle.

12.12.4 The MMP (if required) will monitor and track the movement, storage and placement of excavated materials within the Scheme or outside the Scheme in accordance with CL:AIRE protocol[23].

~~12.12.4~~12.12.5 As part of the Waste Recovery Permit, the location and volumes of controlled wastes re-used within the Scheme will be recorded through the SWMP.

12.13 Summary

12.13.1 A material and waste assessment has been undertaken for the Scheme in accordance with LA 110.

12.13.2 During construction, the amount of material to be used is estimated to have a slight effect (not significant).

12.13.3 The effect of the waste is estimated to be slight~~moderate~~ (not significant) on the

[23] Contaminated Land: Applications in Real Environments. The Definition of Waste: Development Industry Code of Practice, Version 2, March 2011.

regional baseline capacity, ~~assuming a worst-case scenario of disposal to landfill~~taking into account the proposals to maximise site-won materials re-use (including the creation on of an environmental bund (Work No. 18) and re-use of controlled wastes as part of the loop road in a clearly defined area of the Scheme).

12.13.4 Mitigation measures have been recommended to be adopted during the construction phase, to further minimise the effects of the wastes generated.

12.13.5 Impact assessment for the operational stage is considered to be negligible and has been scoped out.

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