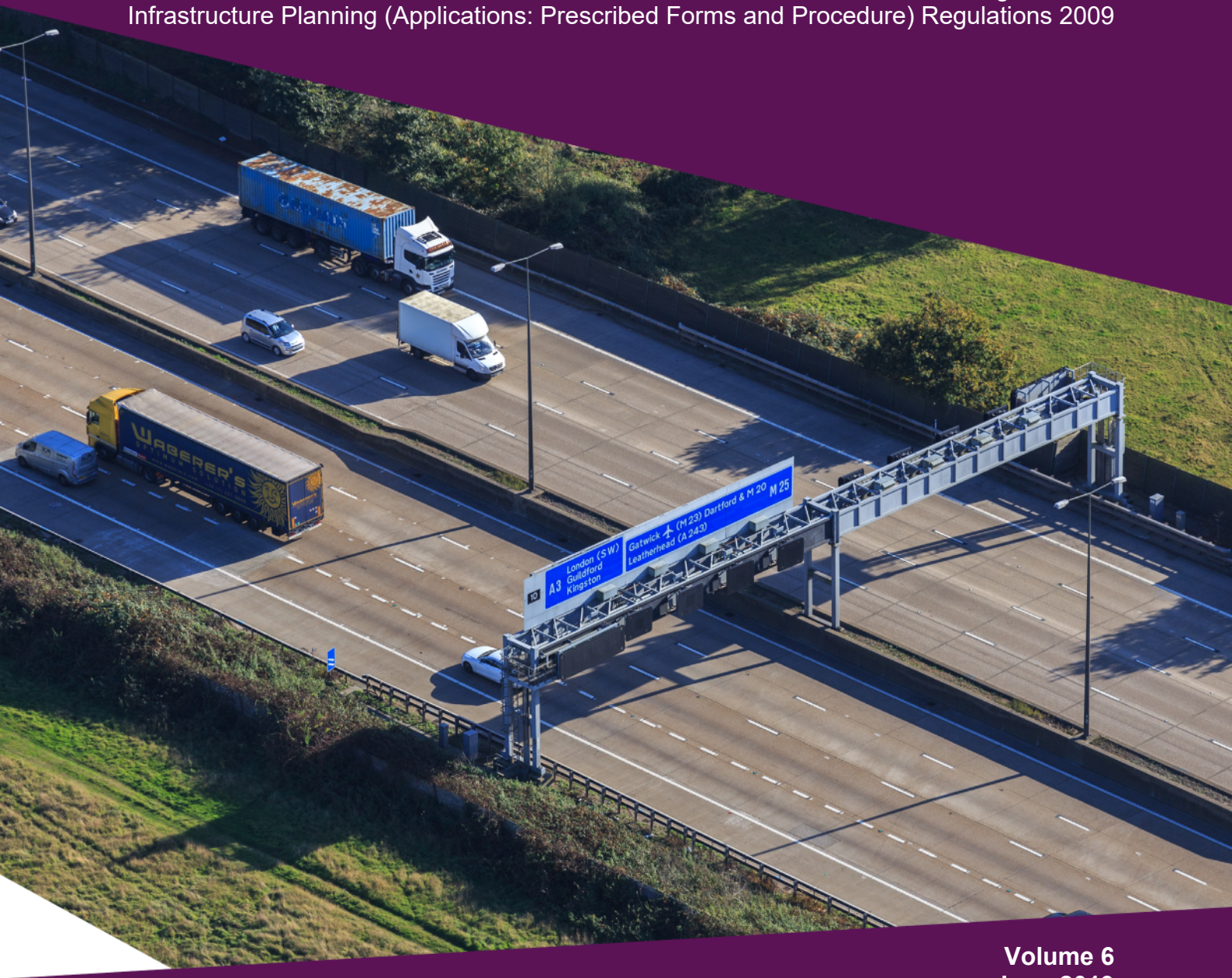
M25 junction 10/A3 Wisley interchange TR010030
6.3 Environmental Statement Chapter 12: Materials and waste

Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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M25 junction 10/A3 Wisley interchange

The M25 junction 10/A3 Wisley interchange Development Consent Order 202[x]

6.3 ENVIRONMENTAL STATEMENT CHAPTER 12: MATERIALS AND WASTE

Regulation Number:	Regulation 5(2)(a)
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Author:	M25 junction 10/A3 Wisley interchange project team, Highways England

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Rev 0	June 2019	Development Consent Order application

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12. Materials and Waste

Executive summary

This chapter provides an assessment of the Scheme's environmental effects regarding construction material consumption and waste generation during the construction phase. The operational phase of the Scheme was scoped out by the Environmental Scoping Report, as minimal resource use and waste generation is envisaged, and therefore it has not been assessed. 1st

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 arisings baseline and waste infrastructure capacity baseline. The study areas are defined through professional judgement due to a lack of industry guidance.

The chapter finds that the Scheme's significance of effect regarding material consumption is neutral or slight. In addition, the significance of effect of construction, demolition and excavation waste arising from the Scheme is neutral or slight and the significance of effect of hazardous waste arising from the Scheme is neutral. Therefore, the overall significance of effect of the Scheme is determined to be neutral or slight, i.e. not significant, for materials and waste.

A full breakdown of the results of the assessment is presented in Table 12.12.

To minimise environmental impacts and the overall effect of the Scheme, several mitigation measures have been identified.

These include, but are not limited to:

- The Scheme has a net requirement for fill material. Where possible this should be sourced from a sustainable and local supply, this may be another Scheme with an excess material or by using recycled aggregate in preference to primary aggregate.
- Waste prevention by designing waste out wherever possible. Examples of where waste has been designed out of the Scheme have been provided. These include retaining existing safety barriers and lighting columns in the central reservation.
- Opportunities to use waste as a resource will be sought, where practicable. This will include reuse of clean excavated material within the Scheme and the development of a timber reuse strategy to identify the most appropriate management route for the types and quality of timber and wood waste arising from thinning and felling.
- Where waste reuse, recycling and recovery are not possible, waste will be disposed of in a way that is least damaging to the environment and to human health (i.e. in accordance with the waste hierarchy, as set out in the Waste Framework Directive).

12.1 Introduction

12.1.1 This chapter provides an assessment of the effects of material use and waste generation associated with construction, demolition and excavation (CD&E) works as part of the Scheme. Based on the findings of the assessment, appropriate mitigation measures have been proposed to minimise the environmental effect on material use and waste generation. The operational phase of the Scheme has not been assessed, as detailed in the Environmental Scoping Report.

12.1.2 The assessment was undertaken in May 2019 in compliance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and in accordance with Highways England's Design Manual for Roads and Bridges (DMRB) Volume 11 and Interim Advice Note (IAN) 153/11. The assessment is based on the estimates provided for the current design of the Scheme and the latest publicly available information.

12.2 Competent expert evidence

12.2.1 This Chapter was undertaken by the following individuals who have used their knowledge and professional judgement to undertake this assessment:

- a Waste Management Consultant (MSci (Hons) Geology), with over 5 years of experience in environmental and waste management relating to infrastructure projects;
- a Senior Waste Management Consultant (BSc (Hons) Environmental Science), with over 12 years of knowledge and experience in environmental and waste management, and holds professional membership as a Chartered Waste Manager with the Chartered Institute of Waste Management; and
- a Principal Waste Management Consultant (MSc Environmental Diagnostics, BSc (Hons) Biology), with over 13 years of experience in waste audits, site waste management plans and the reuse of materials, and holds professional memberships as Chartered Environmentalist with the Institute of Environmental Management and Assessment.

12.3 Legislative and policy framework

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

Table 12.1: Legislative, regulatory and policy framework for materials and waste

Legislation / Regulation	Summary of Requirements
National	
National Networks National Policy Statement (NPSNN)	The NPSNN 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	The NPPF does not contain 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, as part of the 2018 revision, the NPPF 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.
Road Investment Strategy (RIS) and Strategic Business Plan 2015	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.
Highways England Sustainable Development Strategy 2017	The strategy sets out Highways England's ambitions regarding human, natural, social and manufactured capital. The strategy states that the responsible sourcing of materials is essential to reducing local, national and global impacts associated with resources. It also states Highways England's 'circular' approach to resource management: minimising demand for primary resources and maximising reuse of materials within the existing road network.
The Environmental Protection Act 1990 (c.43)	The Environmental Protection Act 1990 (c. 43), as amended in 1996 and 1999, 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 Duty of Care on anyone who produces, imports, keeps, stores, transports, treats or disposes of waste. This will mean that Highways England and all contractors 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

Legislation / Regulation	Summary of Requirements
	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 (c. 16)	Chapter 16 of the Clean Neighbourhoods and Environment Act 2005 (c. 16) prescribes the correct transportation, collection, disposal and management of waste and prohibits fly tipping. Waste generated by the Scheme will need to be stored and managed under the correct exemption or environmental permit. Transportation of waste will need to be undertaken by a registered waste carrier.
Waste (England and Wales) Regulations 2011 (SI 2011/988)	The Regulations 2011 (SI 2011/988), as amended in 2012 (SI 2012/1889) and in 2014 (SI 2014/656), 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 (SI 2005/894)	The Regulations, as amended in 2009 (SI 2009/507), 2015 (SI 2015/1360) and 2016 (SI 2016/336), applies 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 may be produced throughout all lifecycle stages of the Scheme. Hazardous waste should be disposed of in accordance with the Regulations. including a hazardous waste consignment note and only transferred to a facility holding an appropriate permit.
Waste Electrical and Electronic Equipment (WEEE) Regulations 2013 (SI 2013/3113)	The Regulations revoke the previous WEEE Regulations (2006 (SI 2006/3289), 2007 (SI 2007/3454), 2009 (SI 2009/2957) and 2010 (SI 2010/1155)) 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 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 (SI 2009/890)	The Regulations, as amended in 2015 (SI 2015/1935), main requirements 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,

Legislation / Regulation	Summary of Requirements
	inclusive of the provision of operational plans and independent audit reports. For the Scheme being considered, all batteries produced in the construction and operational phases must be segregated and managed separately from other wastes.
The CLP (Classification, Labelling and Packaging) Regulation (EC 1272/2008)	The CLP Regulation (within the UK and EU) 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 construction and operational phases of the Scheme.
Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000 (SI 2000/1043)	The Regulations, as amended in 2000 (SI 2000/3359), require the safe disposal or decontamination of all equipment that contains polychlorinated biphenyls (PCBs). 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 (SI 2016/1154)	The Environmental Permitting Regulations 2016 (SI 2016/1154) replace the 2010 Regulations (SI 2010/675) (as amended in 2011 (SI 2011/2043), 2012 (SI 2012/630) and 2014 (SI 2014/255)). The Regulations put in place requirements to ensure that 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). Permit or exemption details of all sites that manage waste from the Scheme will be checked to ensure waste is being managed legally. A permit or exemption may be required to store and manage wastes within the Scheme.
Environmental Damage (Prevention and Remediation) Regulations 2015 (SI 2015/810)	The Environmental Damage Regulations further developed obligations (introduced by the original regulation in 2009) to ensure the polluter pays for any environmental damage caused. The Regulations are applicable 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 (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 PPE. Written records

Legislation / Regulation	Summary of Requirements
	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 is provided in Chapter 10 Soils and Geology.
Resources and Waste Strategy for England 2018	The strategy sets out national policy for minimising waste, promoting resource efficiency and moving towards a circular economy. The strategy continues to focus on the importance of driving waste management up the waste hierarchy and states the importance of considering the Government's ambition of achieving zero avoidable waste. The Plan puts a strong emphasis on waste prevention through making products using fewer natural resources. The strategy references the UK statistics on waste which show that over 90% of non-hazardous construction and demolition waste was recovered in 2016. The Waste Framework Directive target of recovering 70% of non-hazardous construction and demolition waste is also referenced and this should be considered a minimum requirement of the Scheme.
National Planning Policy for Waste 2014	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	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).
Local	
Surrey Minerals Plan Core Strategy Development Plan 2011	The Plan aims to meet the need for minerals while being prudent in the use of natural resources and addressing other mineral development issues. It promotes the safeguarding of existing or potential mineral resources and the efficient use of mineral resources, including the use of substitute or recycled materials.
Surrey Waste Local Plan (Draft) December 2017	As the Waste Planning Authority (WPA), Surrey County Council have produced a Waste Local Plan with additional supporting documents for the period from 2018 to 2033. The Plan aims to forecast waste types and arisings and determine the gap in waste management capacity. Sites suitable for new waste infrastructure have then been identified to meet the gap in capacity.
Surrey Waste Needs Assessment 2017	As part of the Surrey Waste Local Plan, an assessment of the forecast waste arisings and forecast waste infrastructure has been made to determine the gap in waste management capacity. This assessment specifically considered construction and demolition waste and hazardous waste. Where applicable, the figures stated in the Waste Needs Assessment have been used as a baseline for the Scheme's materials and waste assessment.

Source: Atkins analysis.

12.4 Study area

12.4.1 With regards to materials and waste, the study area extends outside of the DCO boundary. As there is currently no industry standard, the study area for the two receptors have been chosen based on Atkins' prior experience and professional judgement.

12.4.2 The study areas are described below:

- For materials, the study area covers sales at a regional or national level. Effects may occur outside the national study area; however, this is considered outside of the assessment scope in accordance with IAN 153/11 (DMRB Volume 11).
- For waste (arisings and infrastructure capacity), the study area is local and covers the county of Surrey.

12.5 Assessment methodology

12.5.1 An assessment methodology was proposed in Section 12.7 of the Environmental Scoping Report. The methodology is outlined below. Note that due to the relatively small quantities of material used and waste generated during the operational phase it was removed from the assessment, as detailed in the Environmental Scoping Report.

12.5.2 Due to its scale, a 'detailed assessment' as defined in IAN 153/11, is considered necessary to assess the environmental effects of material use and waste arisings from the Scheme. The detailed assessment allows for a quantitative approach (a simple assessment takes a qualitative approach).

12.5.3 For the purposes of the assessment, materials are defined as per IAN 153/11 as:

> *'the materials and construction products required for the construction, improvement and maintenance of the trunk road network. Material resources include primary raw materials such as aggregates and minerals, and manufactured construction products. Many material resources will originate off-site, purchased as construction products, and some will arise on-site such as excavated soils or recycled road planings.'*

12.5.4 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.' The term 'holder' is defined as the 'producer of the waste or the person who is in possession of it.'*

12.5.5 The following tasks were undertaken to determine the effect of materials and waste from the Scheme:

- Review of the relevant waste legislation and guidance, and national, regional and local planning policies (as summarised in Table 12.1);
- A review of the proposed construction material types and quantities, and estimates of the quantities and types of waste to be generated during the construction phase;

- Identification and evaluation of the impacts of the Scheme against the regional/national sales of materials and the local waste arisings and infrastructure capacity; and
- Identification of opportunities to reduce, re-use, recover and/or recycle materials and wastes through a review of the Scheme (including proposed design, materials and construction methods, where available) and in accordance with industry best practice.

12.5.6 The receptors have been assessed for the Scheme based on sensitivity of receptors (waste infrastructure capacity) and magnitude of impact (sales of materials and waste arisings).Table 12.2 and Table 12.3 summarise how magnitude and sensitivity respectively have been defined with regards to materials and waste. The criteria are based on Atkins' prior experience and professional judgement, given there is no specific industry assessment standard.

12.5.7 The sensitivity of receptors cannot be assessed for materials as it is not possible to determine the true quantity of materials available on the market internationally. As this the receptor is outside of the study area the sensitivity has not been assessed in accordance with IAN 153/11.

Table 12.2: Criteria for classifying the magnitude of impact

Level	Magnitude of impact (degree of change)
Major	The Scheme meets one of more of the following criteria: • Significant volumes of materials required such that it has a high impact on current sales, greater than 10% of the Materials Baseline (for any one material); • Generation of large volumes of CD&E waste, greater than 10% of the local Waste Arisings Baseline; and • Generation of large volumes of hazardous waste, greater than 5% of the local Waste Arisings Baseline.
Moderate	The Scheme meets one of more of the following criteria: • Moderate volumes of materials required such that it has a moderate impact on current sales, greater than or equal to 5% but less than 10% of the Materials Baseline (for any one material); • Generation of medium volumes of CD&E waste, greater than or equal to 5% but less than 10% of the local Waste Arisings Baseline; and • Generation of moderate volumes of hazardous waste, greater than or equal to 2.5% but less than 5% of the local Waste Arisings Baseline.
Minor	The Scheme meets one of more of the following criteria: • Low amounts of materials required such that it has a moderate impact on current sales, greater than or equal to 1% but less than 5% of the Materials Baseline (for any one material); • Generation of low volumes of CD&E waste, greater than or equal to 1% but less than 5% of the local Waste Arisings Baseline; and • Generation of low volumes of hazardous waste, greater than or equal to 0.5% but less than 2.5% of the local Waste Arisings Baseline.
Negligible	The Scheme meets one of more of the following criteria: • Negligible amounts of materials required such that it has a negligible impact on current sales, less than 1% of the Materials Baseline (for any one material); • Generation of negligible volumes of CD&E waste, less than 1% of the local Waste Arisings Baseline; and • Generation of negligible volumes of hazardous waste, less than 0.5% of the local Waste Arisings Baseline.
No change	The Scheme meets one of more of the following criteria: • No materials are required, or waste generated either due to design, construction technique or 100% utilisation of site won materials; and • No generation of hazardous waste.

Source: Atkins analysis.

Table 12.3: Criteria for classifying the sensitivity of receptors

Level	Environmental value (sensitivity)
Very high	The Scheme meets one of more of the following criteria: • Very high volumes of waste generated such that it may have a very high impact on CD&E waste infrastructure within the local study area (greater than 100% of the local capacity baseline); and • Very high volumes of hazardous waste generated such that it may have a very high impact on estimated hazardous waste infrastructure within the local study area (greater than 25% of the local capacity baseline).
High	The Scheme meets one of more of the following criteria: • High volumes of waste generated such that it may have a high impact on estimated CD&E waste infrastructure within the local study area (between 10% and 100% of the local capacity baseline); and • High volumes of hazardous waste generated such that it may have a high impact on estimated hazardous waste infrastructure within the local study area (between 5% and 25% of the local capacity baseline).
Medium	The Scheme meets one of more of the following criteria: • Moderate volumes of waste generated such that it may have a moderate impact on estimated CD&E waste infrastructure within the local study area (greater than or equal to 5% but less than 10% of the local capacity baseline); and • Moderate volumes of hazardous waste generated such that it may have a moderate impact on estimated hazardous waste infrastructure within the local study area (greater than or equal to 2.5% but less than 5% of the local capacity baseline).
Low	The Scheme meets one of more of the following criteria: • Low volumes of waste generated such that it may have a low impact on estimated CD&E waste infrastructure within the local study area (greater than or equal to 1% but less than 5% of the local capacity baseline); and • Low volumes of hazardous waste generated such that it may have a low impact on estimated hazardous waste infrastructure within the local study area (greater than or equal to 0.5% but less than 2.5% of the local capacity baseline).
Negligible	The Scheme meets one of more of the following criteria: • Negligible volumes of waste generated such that it may have a negligible impact on estimated CD&E waste infrastructure within the local study area (less than 1% of the local capacity baseline); and • Negligible volumes of hazardous waste generated such that it may have a negligible impact on estimated hazardous waste infrastructure within the local study area (less than 0.5% of the local capacity baseline).

Source: Atkins analysis.

Table 12.4: Significance of effects

Environmental Value (Sensitivity)	Magnitude of Impact (degree of change)				
	Major	Moderate	Minor	Negligible	No Change
Very high	Very large	Large or very large	Moderate or large	Slight	Neutral
High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

Source: Atkins analysis.

12.5.8 The significance of environmental effects has been estimated by combining the magnitude and sensitivity to determine whether the effect is very large, large, moderate, slight or neutral, as shown in Table 12.4. Very large to moderate effects are considered to have the potential to be significant, while slight and neutral effects are not considered significant.

12.5.9 The results of the significance assessment are presented in Table 12.12.

12.6 Assumptions and limitations

12.6.1 There are several assumptions and limitations that are applicable to the assessment which are listed below:

- It has been assumed that material consumption and waste generation will be distributed equally across the Scheme's construction period;
- All material quantities have been converted into tonnes using industry standard conversion rates;
- All materials have been grouped according to main types, as shown in Table 12.5;
- An additional 1% has been added to the total waste arisings (excluding soil, aggregate and granular fill) to account for packaging waste, based on experience from previous schemes;
- An additional 0.01% has been added to the hazardous waste arisings to account for packaging waste associated with sealants, paints and solvents; and
- Hazardous waste arisings include oils, sealants, paints, solvents, asbestos and contaminated soil. Contaminated land is considered in Chapter 10 - Geology and Soils.

12.7 Baseline conditions

12.7.1 Desk based information has been gathered to identify the existing baseline that may be affected through material consumption and waste generation associated with the Scheme.

12.7.2 With regards to materials, sales of relevant construction materials have been collated from a regional or national level depending on the publicly available data.

12.7.3 With regards to CD&E waste, this will primarily be inert and non-hazardous, with small quantities of hazardous waste (e.g. associated with sealants, paints, solvents and contaminated soil). The waste arisings baseline and waste infrastructure baseline have been extracted from the Surrey Local Plan – Waste Needs Assessment.

12.7.4 The hazardous waste arisings baseline has been extracted from the Surrey Waste Needs Assessment. Hazardous waste infrastructure capacity is not estimated in the Surrey Waste Needs Assessment and therefore it has been estimated from a three-year average of hazardous waste managed in Surrey from 2015 to 2017.

12.7.5 Fewer impacts are envisaged during the operational stage of the Scheme due to minimal material consumption, associated with maintenance, and waste generation, through littering and maintenance. Most of these wastes would likely be non-hazardous municipal type wastes (e.g. litter - paper, food, packaging etc.) and inert, non-hazardous and hazardous wastes from maintenance (concrete, bituminous materials, Waste Electrical and Electronic Equipment (WEEE), oils, etc.).

Materials Baseline

12.7.6 The regional or national sales of construction materials relevant to the Scheme are presented in Table 12.5.

12.7.7 The Materials Baseline has been sourced from data published by the Mineral Products Association (regional data), UK Steel (national data) and the Forestry Commission (national data). The data presented is for 2017, excluding timber which is for 2014.

12.7.8 Note, given that the number, type and size of construction developments varies from year to year, the consumption of construction materials also fluctuates. As such, this data should be considered representative.

Table 12.5: Materials baseline

Material	Regional Sales in Tonnes per Annum (tpa)	National Sales in Tonnes Per Annum (tpa)
Aggregate*	13,000,000	Not applicable.
Asphalt	1,600,000	Not applicable.
Concrete†	6,250,000	Not applicable.
Steel	Data not available.	10,800,000
Timber‡	Data not available.	9,490,000

Sources: Mineral Products Association – Profile of UK Mineral Products Industry 2018, UK Steel - Key Statistics 2017 and Forestry Commission - Timber Utilisation Statistics 2015. Note: Regional sales refers to sales in southeast England, excluding London, in 2017. Figures are rounded to nearest hundred. * Primary aggregate consisting of crushed rock, sand and gravel. † Ready-mixed concrete converted to tonnes using 2.5 t/m^3. ‡ Based on sawn softwood sales converted to tonnes using 0.34 t m^{-3}.

Waste Arisings Baseline

12.7.9 CD&E waste arisings will fluctuate year on year based on the number, type and size of construction projects underway. This in turn is heavily influenced by factors such as the economy, investment levels and legislative or policy variations. There are several significant construction projects in or near Surrey which may or may not come forward during the Scheme's construction phase. These include housing developments and major infrastructure projects such as HS2, River Thames Scheme, Heathrow Expansion and Crossrail 2.

12.7.10 The forecast CD&E and hazardous waste arisings for Surrey are shown in the Surrey Waste Needs Assessment. The representative baselines for CD&E and hazardous waste arisings during the Scheme's construction phase (2020 to 2023) are presented in Table 12.6.

Table 12.6: Waste Arisings Baseline

Waste Stream	Arisings in Tonnes per Annum (tpa)
CD&E*	1,972,000
Hazardous†	47,000

Source: Surrey Waste Local Plan – Waste Needs Assessment 2017. Note: Figures are rounded to nearest hundred tonnes. Professional judgement has been used to determine the most applicable baseline. * Forecast annual CD&E waste arisings for the period 2018 to 2033. † Forecast annual hazardous waste arisings for 2023.

12.7.11 The forecast CD&E waste assumes zero-growth over the 2018 to 2033 planning period. A small annual increase in hazardous waste arisings is forecast during the planning period. The forecast hazardous waste arisings for 2023 falls within the Scheme's construction period and has therefore been selected for the purpose of this assessment.

Waste Infrastructure Capacity Baseline

12.7.12 The representative Waste Infrastructure Capacity Baseline for CD&E waste for the Scheme's construction period (2020 to 2023) has been chosen as 2023. This is based on professional judgement as it is the most relevant year from data presented in the Surrey Waste Local Plan: Waste Needs Assessment.

12.7.13 Hazardous waste infrastructure capacity is not estimated in the Surrey Waste Needs Assessment and therefore it has been estimated from a three-year average of hazardous waste managed in Surrey from 2015 to 2017. This data was extracted from the Environment Agency's Hazardous Waste Interrogator for each respective year.

12.7.14 Both sets of data are presented in Table 12.7.

Table 12.7: Waste Infrastructure Capacity Baseline

Waste Stream	Capacity in Tonnes per Annum (tpa)
CD&E*	2,132,700
Hazardous†	75,200

Source: Surrey Waste Local Plan – Waste Needs Assessment 2017 and Hazardous Waste Data Interrogator. Note: Figures are rounded to the nearest hundred tonnes. * Combined capacity of C&D Recycling, Recovery to Land and Non-inert Landfill forecast for 2023. † Hazardous capacity has been interpreted from a three-year average of hazardous waste managed in Surrey between 2015 and 2017. This only includes hazardous wastes with EWC code beginning "17".

12.8 Potential effects

Construction phase

12.8.1 The Scheme is likely to have two primary environmental effects as a result of construction activities, these are:

- The consumption of construction materials, including large quantities of aggregate, asphalt and concrete. Smaller quantities of materials will include steel and timber, although this list is not exhaustive; and
- The generation of waste, including vegetation, wood, soil, aggregate, asphalt and concrete. Smaller quantities of waste that will be generated include metal, municipal wastes and septic tank waste from the workforce. Where waste is not suitable for reuse on site it is required to be taken off-site for potential reuse, recycling, recovery or disposal. This would result in an impact on the capacity of local waste facilities.

12.8.2 The effects of transport relating to import of materials and export of waste are considered as part of the traffic modelling. The impacts of transport are reflected in Chapter 5 - Air Quality and Chapter 6 - Noise and Vibration of the Environmental Statement.

12.8.3 The effects relating to contaminated land are detailed in Chapter 10 - Geology and Soils.

Operation phase

12.8.4 Minimal environmental effects are 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 municipal type wastes (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.).

12.8.5 Due to the minimal effect, anticipated material use and waste generation during operation was scoped out of the assessment.

12.9 Design, mitigation and enhancement measures

12.9.1 Following public consultation and value engineering several measures have been developed through design progression, which when implemented, will reduce material use and waste generation.

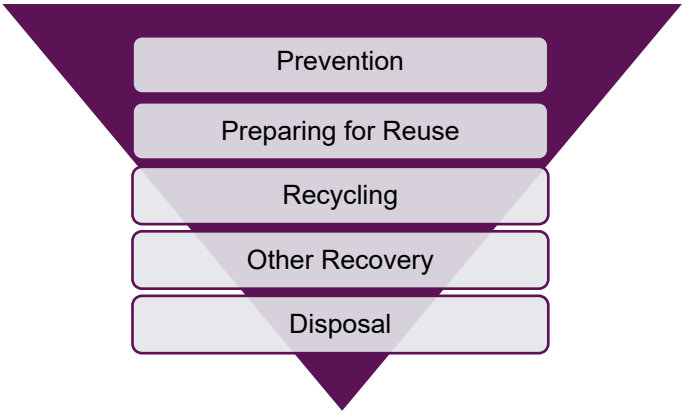
12.9.2 The measures include:

- Gas main diversion which has been amended to follow the NMU route which has reduced the need for a retaining wall and land take to replace the lake at Bolder Mere;
- NMU route alignment which has been amended to follow existing tracks, where feasible, which has led to a reduction in earthworks;

- NMU links have been put on temporary slip roads, where possible, which has led to a reduction in earthworks;
- In several areas Local Access Roads (LAR) and NMU routes have either been merged or provided separately to reduce track width, earthworks and/or land take and material use;
- Reduction in the number of laybys (following a survey which confirmed that adequate layby facilities are available);
- Existing safety barriers and lighting columns in the central reserve are to be retained rather than replaced; and
- In several places throughout the Scheme the number of lanes has been reduced, where it is safe to do so.

12.9.3 Further to the design measures above the Scheme will prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill in accordance with the internationally recognised waste hierarchy, shown in Figure 12.1.

Figure 12.1: Waste hierarchy



Source: Article 4 (1) of Directive 2008/98/EC on waste.

12.9.4 The following sections detail the mitigation measures that shall be implemented, further to the design measures shown above.

12.9.5 Many of the measures outlined for waste are also mitigation measures for materials, as such there is not a separate section.

On-site management of CD&E waste

12.9.6 Best practice mitigation measures, which shall be applied to the Scheme, and specific actions to implement them are presented in Table 12.8.

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

Table 12.8: Proposed Mitigation Measures

Proposed Mitigation Measure	
Setting targets for waste recovery and recycling.	The construction contractor should use its prior experience to determine sensible targets for waste

	recovery and disposal. These should be communicated to those working on the Scheme with a clear understanding of what is expected.
Recording waste management and waste arisings and setting targets for waste recovery and recycling.	Preparation and maintenance of a Materials Management Plan (MMP) (if applicable), CEMP and a Site Waste Management Plan (SWMP) so that waste generation and management can be logged and audited.
Using pre-prepared materials to minimise waste generation on-site.	Pre-cast concrete and other materials that can be prepared off-site without the need for processing and waste generation.
Ensuring only materials needed are ordered wherever possible.	Quantities of materials ordered for the Scheme should be based on the latest requirements for the Scheme from the Bill of Quantities or equivalent estimate.
Effective segregation of waste.	Having clearly defined and separated waste storage areas or containers, depending on the waste type and applicable reuse, recovery or disposal option (in accordance with the waste hierarchy).
Ensuring that all staff have a basic understanding of waste management as a minimum.	Training staff to understand that they should sort any waste material and providing regular reminders and updates.

Source: Atkins analysis.

12.9.8 High recycling and recovery rates will be achieved by arranging for the source segregation of materials and the utilisation of appropriate waste management facilities. Achieving a high recycling rate will 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.

Management of timber and wood waste

12.9.9 Timber and lower grade wood arising from thinning and felling of trees, as part of the Special Protection Area (SPA) enhancements and as required in other areas of the Scheme, is anticipated to form a significant waste stream. The SPA enhancement is expected to be phased over two winter periods during the construction phase and this will allow for time to manage the arisings effectively. The total volume of timber and wood is expected to be approximately 20,240 m^3.

12.9.10 A timber reuse strategy will need to be developed to mitigate the environmental impacts of the required woodland clearance. This should first consider processing of saw logs for reuse as timber in the Scheme or by a third party, i.e. as construction or fencing materials, where practicable. Where timber is not suitable for construction due to its type, quality or the market conditions at the time alternative options will need to be considered. This may include processing to produce pulp, or chip for use as wood fuel at a Combined Heat and Power (CHP) station. The strategy will need to identify suitable sites for processing saw logs whilst considering the proximity principle.

12.9.11 These measures are likely to require temporary storage and processing of the timber either on-site or off-site facility. Temporary storage of saw logs at a compound within the Scheme may be required and procedures will need to be implemented to prevent deterioration of the product during storage.

Management of SPA enhancement material

12.9.12 In addition to tree clearance, the SPA enhancements include removal of the top 0.15 m of organic material, expected to consist of plant litter and topsoil. The 25 Ha SPA enhancement area is estimated to generate 37,500 m^3 of material requiring management. Where possible, this material should be reused or transferred to an appropriate facility for composting.

Management of excavated material

12.9.13 During the construction phase excavated material will be segregated. Contaminated or potentially contaminated material will be quarantined and undergo further testing, as required. Where testing has shown the waste to be hazardous, it will be managed accordingly via permitted waste facilities.

12.9.14 To reduce volumes of waste for disposal, uncontaminated soil from excavations will be reused within the Scheme, where appropriate. To enable reuse with the Scheme, an appropriate consent will be required. It is likely that a Materials Management Plan (MMP) will need to be developed in accordance with CL:AIRE Definition of Waste: Development Industry Code of Practice. This will be based on human health and environmental risk assessments to ensure reuse of the material does not cause harm to human health or the environment.

12.9.15 If it is not possible to reuse soil within the Scheme, other nearby schemes or third parties with a net requirement for fill material should be identified and the feasibility of reusing the material determined. CL:AIRE maintains a “Register of Materials Sites” which lists donor and receiver sites, however this is not exhaustive and other known development schemes should be approached to determine if they have a requirement for fill material.

Other considerations

12.9.16 This assessment has identified vegetation as a high-volume waste stream. This is expected to include grass and shrubs. Potentially interested third parties, e.g. Surrey Wildlife Trust and the Forestry Commission, should be approached to determine if they have a use for vegetation waste. If this is not possible, suitable composting facilities should be used to manage the waste.

12.9.17 The principal contractor must select waste contractor(s) who are registered with the Environment Agency as a waste carrier for all CD&E waste to be transported, including hazardous waste. Completed waste transfer notes or hazardous waste consignment notes must be provided by the contractor. These shall be kept for a minimum of two and three years, respectively. In addition, any site that waste is transferred to must have either a permit or exemption that allows it to receive and manage the waste being transferred.

Operational Phase

12.9.18 As described previously, it is likely only small quantities of materials will be used and waste generated in the operational phase of the Scheme; therefore, operational mitigation measures have not been considered separately. CD&E mitigation measures are considered applicable to the operational phase.

12.10 Assessment of effects

Materials

12.10.1 Material consumption during the construction phase have been estimated for the Scheme based on current design information.

12.10.2 Table 12.9 presents the estimated consumption of key construction materials and the annual consumption based on a construction period of 30 months. For this assessment, it has been assumed that material consumption will be distributed equally across the construction phase. Where necessary estimates have been converted from cubic metres to tonnes for comparison with the baseline.

Table 12.9: Construction Material Consumption for the Scheme

Material	Total Material Use (Tonnes)	Material Use per Annum (Tonnes)
Aggregate/fill*	442,650	177,060
Asphalt	145,270	58,110
Concrete*	31,020	12,410
Steel	1,060	420
Timber*	1,900	760

Source: material estimates provided by Faithful+Gould. Note: Figures are rounded to nearest ten tonnes. The material use per annum assumes material use is spread equally across the construction phase, which is expected to be 30 months. * The fill required for the Scheme has been assumed to be aggregate. Concrete has been converted to tonnes using a bulk density of 2.50 t/m^3. Timber has been converted to tonnes using a bulk density of 0.34 t/m^3.

12.10.3 Based on the figures above, the worst-case material use for the Scheme in terms of percentage use is asphalt. The estimated asphalt consumption of the Scheme is 3.6% of the Materials Baseline (1,600,000 tpa) presented in Table 12.5. Therefore, the magnitude of impact when assessed against the Materials Baseline is determined to be minor.

Construction, demolition and excavation waste

12.10.4 Waste quantities arising during the construction phase have been estimated for the Scheme based on current design information. Table 12.10 presents the estimated CD&E waste as total arisings and the annual arisings based on a construction period of 30 months. For this assessment, it has been assumed that CD&E waste generation will arise equally across the construction phase. Where necessary estimates have been converted from cubic metres to tonnes for comparison with the baseline.

Table 12.10: CD&E Waste Arisings for the Scheme

Waste Type	Total Waste Arisings (Tonnes)	Waste Arisings in Tonnes per Annum (tpa)
Construction excavation*	21,730	8,690
SPA enhancement excavation*	18,750	7,500
Timber and wood*	13,150	5,260

Waste Type	Total Waste Arisings (Tonnes)	Waste Arisings in Tonnes per Annum (tpa)
Vegetation*	13,050	5,220
Concrete	3,130	1,250
Metal	150	60
Packaging	290	120
Total	**70,250**	**28,100**

Source: Construction, vegetation, concrete and metal estimates provided by Faithful+Gould. SPA enhancement material has been estimated based on the 25 Ha area to be cleared. Packaging waste has been estimated based on an additional 1% of total waste excluding excavated material. Note: Figures are rounded to nearest ten tonnes. The waste arisings per annum assumes waste will arise equally across the construction phase, which is expected to be 30 months. * Excavated material has been converted to tonnes using a bulk density of 1.25 t/m^3. SPA enhancement excavation and vegetation has been converted to tonnes using a bulk density of 0.30 t/m^3.

12.10.5 Based on the figures above, the CD&E waste arising from the Scheme represents 1.4% of the Waste Arisings Baseline (1,972,000 tpa) and 1.3% of the Waste Infrastructure Baseline (2,132,700 tpa).

12.10.6 Therefore, the magnitude of impact when assessed against the Waste Arisings Baseline is determined to be minor.

12.10.7 The sensitivity of the receptor when assessed against the Waste Infrastructure Capacity Baseline is determined to be low.

Hazardous Waste

12.10.8 The hazardous waste associated with the Scheme is presented in Table 12.11. It is estimated that approximately 10 % of demolition waste arising from overbridges and footbridges is hazardous.

Table 12.11: Hazardous Waste Arisings for the Scheme

Waste Type	Total Waste Arisings (Tonnes)	Waste Arisings in Tonnes per Annum (tpa)
Hazardous CD&E waste	290	120
Hazardous packaging	2	1
Total	290	120

Source: Hazardous waste arising estimates provided by Faithful+Gould. Hazardous packaging waste has been estimated based on an additional 0.01% of total waste excluding excavated material. Note: Figures are rounded to nearest ten tonnes. The waste arisings per annum assumes waste will arise equally across the construction phase, which is expected to be 30 months.

12.10.9 Based on the figures above, this would be 0.3 % of the local hazardous waste arisings baseline (47,000 tpa) and 0.2 % of the local hazardous waste capacity baseline (75,200 tpa). There would therefore be a negligible impact on waste arisings and a negligible impact on waste capacity.

Operational waste arisings and material use

12.10.10 As described previously, it is likely only small quantities of materials will be used and waste generated in the operational phase of the Scheme. Therefore, it is unlikely to have a significant impact and as such operational effects have not been assessed.

Significance of effects

12.10.11 The table below summarises the significance of effects derived from comparing baseline material and waste data with estimated material and waste data from the current design of the Scheme.

12.10.12 The significance of the environmental effect of the Scheme is assessed to be neutral or slight.

Table 12.12: Materials and Waste Significance of Effects

Receptor	Magnitude	Sensitivity	Significance
Material sales	Minor	N/A	Neutral or slight
CD&E waste	Minor	Low	Neutral or slight
Hazardous waste	Negligible	Negligible	Neutral

Residual effects

12.10.13 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.

12.10.14 The environmental effect 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, therefore the environmental effect is the same as those presented in Table 12.12.

12.11 Cumulative effects

12.11.1 Several relevant planning applications were reviewed for this Chapter, however none of these provided sufficient materials and waste information to be able to assess the cumulative effects against the Scheme.

12.12 NPSNN compliance

12.12.1 Section 4 of the NPSNN outlines principles for assessing national network infrastructure. The Scheme complies with the NPSNN through outlining the potential benefits and potential adverse impacts of material use and waste generation associated with the Scheme along with appropriate mitigation measures.

12.12.2 Specific requirements for waste management are stated in Section 5 of NPSNN. The Scheme's mitigation measures are inclusive of but not limited to, efficient use of natural resources, the implementation of the waste hierarchy (Figure 12.1), the correct management of waste both on-site and off-site and identifying the appropriate waste infrastructure for waste treatment and disposal.

12.13 Monitoring

12.13.1 Monitoring of waste generation during the construction phase will be carried out via implementation of a Site Waste Management Plan (SWMP). This will need to be produced by the principal contractor prior to construction work commencing and updated during construction works.

12.13.2 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 receptor sites.

12.13.3 The Construction Environmental Management Plan (CEMP) will provide more detailed information on the required Duty of Care documents including Waste Transfer Notes (WTN) and Hazardous Waste Consignment Notes (HWCN). Appendix G of the Outline Construction Environmental Management Plan (OCEMP) provides the minimum requirements for Duty of Care.

12.14 Summary

12.14.1 A materials and waste assessment has been undertaken for the Scheme in accordance with Highways England's DMRB and IAN 153/11.

12.14.2 A review of Material Baseline conditions found that regional sales of asphalt, the material impacted most by the Scheme, to be 1,600,000 tonnes per annum (tpa). During the construction phase, the Scheme is expected to use 58,110 tpa of asphalt. This represents 3.6% of the baseline.

12.14.3 Therefore, material use is assessed to have a minor impact. The sensitivity of the receptor for materials was considered to be outside of the study area and therefore has not been assessed.

12.14.4 Within Surrey, 1,972,000 tpa of non-hazardous CD&E waste and 47,000 tpa of hazardous construction waste is generated and there is capacity to manage 2,132,700 tpa of non-hazardous construction waste and 75,200 tpa of hazardous construction waste. During the construction phase, the Scheme is expected to generate 28,100 tpa of CD&E waste and 120 tpa of hazardous construction waste.

12.14.5 Therefore, CD&E waste generation is assessed to have a minor impact on the Waste Arisings Baseline and a low impact on the Waste Infrastructure Capacity Baseline. Hazardous waste generation is assessed to have a negligible impact on the Waste Arisings Baseline and a negligible impact on the Waste Infrastructure Capacity Baseline.

12.14.6 The significance of the effect of material use and waste generation during the construction phase of the Scheme, on their respective baselines, is estimated to be neutral or slight (not significant).

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