

M20 Junction 10a

TR010006

Environmental Statement

Chapter 10 Materials

APFP Regulation 5(2)(q)

Revision A

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and
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10 Materials

10.1 Introduction

- 10.1.1 This chapter assesses the potential impact on material resources of the proposed Main and Alternative Schemes. It describes the potential effects that are anticipated from preliminary studies in relation to the Main and Alternative Schemes and outlines proposed design and other measures to help mitigate these potential effects.
- 10.1.2 The assessment is undertaken in accordance with the guidance provided by Highways England in the Interim Advice Note (IAN) 153/11 Guidance on the Environmental Assessment of Materials Resources¹ and the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 2, Part 5 Assessment and Management of Environmental Effects (HD 205/08)².
- 10.1.3 With respect to materials use for the Main Scheme, the following is currently known:
- A new junction 10a would be constructed over the M20 comprising a gyratory roundabout approximately 700m east of the existing junction 10, 2 bridges over the motorway each carrying 3 traffic lanes and 4 new slip roads to cater for all movements to and from the motorway;
 - A new A2070 link road would also be constructed between the new junction 10a and the existing A2070.
 - A roundabout would be provided at the junction of the existing A2070 and the new A2070 link road.
 - The existing east facing slip roads at junction 10 would be removed.
 - A new pedestrian / cyclist bridge would be constructed over the M20 from Kingsford Street to the A20.
 - Three properties (Beauchamp Clerk Nurseries - disused), Willesborough Garden Centre and Highfield Cottage) would be demolished.
 - A sewage pumping station on Highfield Lane would be demolished and relocated to land adjacent to Kingsford Street. Diversion of the sewer pipeline would also be required.

¹ Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources available online at <http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian153.pdf> , accessed 31/03/16

² Highways Agency (2008) Design Manual for Roads and Bridges (DMRB), Volume 11, Section 2, Part 5 Assessment and Management of Environmental Effects (HD 205/08) available online at <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section2/ha20508.pdf>, accessed 31/05/16

- The existing Highfield Lane bridge would be demolished, with Non-Motorised Users (NMUs) rerouted to the new footbridge adjacent to Kingsford Street.
 - The Church Road footbridge would be replaced with a new bridge that meets the requirements of the Equality Act 2010 and is suitable for cyclists.
- 10.1.4 The Alternative Scheme would be as above, with the addition of a roundabout access from the new A2070 link road to the Stour Park development site, which will be assessed quantitatively.
- 10.1.5 The works identified above would involve the management of excavated and other waste materials. The treatment and / or disposal of these materials would typically cause environmental impacts, such as the contribution to landfill and the perceived environmental risks, damage to local hydrological systems resulting from disposal, and the emissions associated with the transport required to the point of disposal. In addition, the procurement of new materials would also have a potential impact for both the Main and Alternative Schemes and these have been discussed further in this chapter.

10.2 Legislative and Policy Framework

National Policy and Regulation

- 10.2.1 A wide range of legislation, policies and guidance that regulate the control and management of waste have been considered. The key legislation and policies relevant to the project include the following:
- The National Policy Statement for National Networks 2014³
 - The Waste (England and Wales) Regulations 2014, as amended.
 - Environmental Permitting Regulations 2010⁵, as amended.
 - Environmental Protection Act 1990⁶
 - Waste Management Plan for England, 2013⁷
 - National Planning Policy Framework, 2012⁸
 - National Planning Policy for Waste, 2014⁹

³ Department for Transport (2014) National Policy Statement for National Networks Presented to Parliament pursuant to Section 9(8) and Section 5(4) of the Planning Act 2008, available on line at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf, accessed 26/05/16

⁴ Statutory Instrument (2011) The Waste (England and Wales) Regulations. No.988.

⁵ Statutory Instrument (2010) Environmental Permitting Regulations. No.675.

⁶ Parliament of the United Kingdom (1990) Environmental Protection Act 1990.

⁷ Department for Environment, Food and Rural Affairs (2013) Waste Management Plan for England available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/265810/pb14100-waste-management-plan-20131213.pdf, accessed 31/03/16

⁸ Department for Communities and Local Government, (2012) National Planning Policy Framework available at <http://planningguidance.communities.gov.uk/>, accessed 31/03/2016

- The Waste Prevention Programme for England, 2013¹⁰
- Clean Neighbourhoods and Environment Act 2005¹¹
- Hazardous Waste (England and Wales) Regulations 2005 (as amended)¹²
- List of Waste Regulations 2005¹³
- The Landfill (England and Wales) Regulations 2002, as amended¹⁴
- Site Waste Management Plans – Guidance for Construction Contractors and Clients. Voluntary Code of Practice, 2004¹⁵
- Waste Framework Directive 2008/98/EC¹⁶.

10.2.2 The Landfill Regulations 2002, as amended, require that disposal sites are classified into 1 of 3 categories, dependent on the chemical composition of the material. These are hazardous, non-hazardous and inert. Prior to disposal, all waste must be pre-treated. If excavated materials are in accordance with Waste Acceptance Criteria (WAC) testing and Soil Guideline Values (SGVs), then a number of re-use and recycling opportunities exist.

The Waste Framework Directive 2008 and the Waste (England and Wales) Regulations 2011

10.2.3 The revised Waste Framework Directive has set out a 5-step waste hierarchy to how waste should be managed as an important requirement which applies to anyone who produces or manages waste.

10.2.4 The waste hierarchy ensures that waste is dealt with in the following order of priority:

- 1) Prevention
- 2) Preparing for re-use
- 3) Recycling
- 4) Other recovery (for example energy recovery)
- 5) Disposal, only as a last resort.

⁹ Department for Communities and Local Government (2014) National Planning Policy for Waste. Available online: <https://www.gov.uk/government/publications/national-planning-policy-for-waste> accessed 08/04/2016

¹⁰ Department for Environment, Food and Rural Affairs (2013) Waste Prevention Programme for England Available online: <https://www.gov.uk/government/publications/waste-prevention-programme-for-england> accessed 08/04/2016

¹¹ Parliament of the United Kingdom (2005) Clean Neighbourhoods and Environment Act 2005, Chapter 16.

¹² Statutory Instrument (2005) Hazardous Waste (England and Wales) Regulations.No.507.

¹³ Statutory Instrument (2005).The List of Wastes (England) Regulations. No.895.

¹⁴ Statutory Instrument (2002).The Landfill (England and Wales) Regulations. No.1559

¹⁵ Department of Trade and Industry (2004) Site Waste Management Plans – Guidance for Construction Contractors and Clients. Available online at http://www.ccinw.com/images/Publications/site_waste_management.pdf accessed

31/03/16

¹⁶ European Union (2008) Waste Framework Directive 2008/98/EC

- 10.2.5 The following considerations must be taken into account:
- The general environmental protection principles of precaution and sustainability
 - Technical feasibility and economic viability
 - Protection of resources
 - The overall environmental, human health, economic and social impacts.
- 10.2.6 The Waste (England and Wales) Regulations 2011, implements parts of the revised Waste Framework Directive.
- 10.2.7 Site Waste Management Plans (SWMPs) are no longer mandatory for projects commencing after 1 December 2013. They are, however, recommended, and the principles behind the Regulations remain best practice. A SWMP will be adopted and will include details of the amount and types of waste that would be produced on site and how it would then be reduced, re-used and disposed of, by whom and where. The Contractor will develop the SWMP and adopt the waste hierarchy for the disposal of waste.

The National Policy Statement for National Networks 2014

- 10.2.8 The National Networks National Policy Statement (NN NPS) provides planning guidance for promoters of nationally significant infrastructure projects (NSIPs). In the guidance for waste management it states that the applicant should set out the arrangements that are proposed for managing any waste produced. All waste generated by the development should include information on the proposed waste recovery and disposal system. Waste produced should be minimised as should the volume of waste sent for disposal, unless it can be demonstrated that the alternative is the best overall environmental outcome.

The Waste Prevention Programme for England 2013

- 10.2.9 The development of a Waste Prevention Programme is a requirement of the revised Waste Framework Directive (2008/98/EC) and takes forward a commitment in the Government Review of Waste Policy in England 2011¹⁷. The programme sets a number of objectives to help people and organisations make the most of opportunities to save money by reducing waste.

National Planning Policy for Waste, 2014

- 10.2.10 This replaces 'Planning Policy Statement 10: Planning for Sustainable Waste Management' (PPS 10) and sets out detailed waste planning policies. It should be read in conjunction with other national planning policies for England - such as in the National Planning Policy Framework (NPPF) (2012), Defra's

¹⁷ Department for Environment, Food and Rural Affairs (2011) Government Review of Waste Policy in England available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69401/pb13540-waste-policy-review110614.pdf accessed 31/03/16.

Waste Management Plan for England (2013) and the National Policy Statements for Waste Water¹⁸ and Hazardous Waste¹⁹ (2012 and 2013 respectively).

The Waste Management Plan for England, 2013

10.2.11 The Waste Management Plan for England sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management. Positive planning plays a pivotal role in delivering England's waste ambitions through ensuring the re-use, recovery or disposal of waste is undertaken without endangering human health or harming the environment and delivering sustainable development and resource efficiency through all schemes.

Local Policy

Kent Mineral and Waste Local Plan 2013-2030

10.2.12 The Kent Mineral and Waste Local Plan 2013-2030²⁰ sets out the vision and strategy for mineral provision and waste management in Kent and contains a number of development management policies for evaluating minerals and waste planning applications. It plans to the year 2030 and considers strategic site provision for all minerals and waste management facilities.

The Joint Municipal Waste Management Strategy 2006-2026

10.2.13 In addition to the Kent Mineral and Waste Local Plan there is the Kent Joint Municipal Waste Management Strategy²¹, authored by the Kent Waste Partnership (KWP). The partnership includes the 13 Borough, District, City and Unitary Authorities in Kent as well as the County Council.

10.2.14 The key activities of the KWP are:

- To ensure delivery of the Kent Joint Municipal Waste Management Strategy.
- Provide a platform for co-operative and joint working to improve services.
- Act as a single voice for strategic waste issues for Kent local authorities.
- Increase awareness of waste as a resource, promote waste minimisation and achieve an economically, environmentally and socially sustainable waste strategy.

¹⁸ Department for Environment, Food and Rural Affairs (2012) National Policy for waste water available online at <https://www.gov.uk/government/publications/national-policy-statement-for-waste-water> , accessed on 31/03/16

¹⁹ Department for Environment, Food and Rural Affairs (2013) Hazardous Waste National Policy Statement available online at <https://www.gov.uk/government/publications/hazardous-waste-national-policy-statement> access on 31/03/16

²⁰ Kent County Council (2015) Kent Mineral and Waste Local Plan 2013-2030

²¹ Kent Waste Partnership (2007) Kent Joint Municipal Waste Management Strategy available online at <http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/waste-strategies> , accessed 31/03/16

- Work with stakeholders who are developing, supporting and influencing the future direction of sustainable waste/ resource management.

Growing the Garden of England: A strategy for environment and economy in Kent, 2011

- 10.2.15 The Kent Environment Strategy²² supports the delivery of Kent's Community Strategy, the Vision for Kent. It is one of 8 strategies setting out the Vision for Kent's objective 'to be a better place for people to live, work and visit'.
- 10.2.16 The Vision for Kent is currently under review. The Kent Environment Strategy, delivered through the Kent Forum, will ensure that a future sustainable community strategy helps to achieve a high quality Kent environment that is low carbon, resilient to climate change, and that has a thriving green economy at its heart.

Highways England Policy

Highways England Procurement Strategy 2009²³

- 10.2.17 The Highways Agency Procurement Strategy outlines the following recycling targets:
- 25% (minimum) of products used in construction projects to be from schemes recognised for responsible (sustainable) sources by 2012;
 - 50% reduction of waste to landfill from construction and demolition activities by 2012.
 - By 2020, the recovery of non-hazardous construction and demolition waste shall be increased to a minimum of 70% by weight.

Highways England Environment Strategy 2012²⁴

- 10.2.18 The Highways England Environment Strategy states that they are committed to ensuring that a legal and responsible approach to materials and waste management is adopted in all their activities. They will work towards meeting the national waste strategy target of halving waste to landfill by 2012.

10.3 Method of Assessment

- 10.3.1 All aspects of both the Main and Alternative Schemes have the potential to require materials and generate wastes.

²² Kent County Council (2011) Growing the Garden of England: a key strategy for environment and economy in Kent available online at http://www.kent.gov.uk/_data/assets/pdf_file/0020/10676/Kent-Environment-Strategy.pdf, accessed 31/03/16

²³ Highways Agency (2009) Procurement Strategy 2009

²⁴ Highways Agency (2012) Highways Agency Environmental Strategy available online at <https://www.gov.uk/government/publications/highways-agency-environment-strategy> accessed 02/06/16

- 10.3.2 The Scheme Environmental Scoping Report²⁵ concluded that a Detailed Assessment would be necessary to ascertain the potential effects of material generation. A Detailed Assessment, undertaken in accordance with IAN153/11, takes into account the following:
- The types and quantities of materials required for the project.
 - Details of the source / origin of materials, site-won materials to replace virgin materials, materials from secondary / recycled sources or virgin / non-renewable sources.
 - The cut and fill balance.
 - The types and quantities of forecast waste arisings from the project, including the identification of any forecast hazardous wastes.
 - Surplus materials and waste falling under regulatory controls.
 - Waste that requires storage on site prior to re-use, recycling and disposal.
 - Waste to be pre-treated on site for re-use within the project.
 - Wastes requiring treatment and / or disposal off site.
 - The impacts that will arise from the issues identified in relation to materials and waste.
 - A conclusion about the magnitude and nature of the impacts and whether they are permanent / temporary and direct / indirect.
 - The identification of measures to mitigate the identified impacts.
- 10.3.3 In addition, as part of the assessment the quantification of the carbon impacts of the construction of the Main and Alternative Schemes has been carried out using Highways England's Carbon Tool²⁶.

Scope of Assessment

- 10.3.4 The Scoping Report identified the materials to be used and wastes generated by the Main Scheme that have the potential to generate significant environmental effects. This assessment expands on the findings of that report, including an additional assessment for the Alternative Scheme which was not included in the Scoping Report. This assessment has been carried out in accordance with the Design Manual for Roads and Bridges (DMRB) Materials Resource guidance provided in IAN153/11.
- 10.3.5 Significant environmental effects are likely to arise from those materials or waste which:

²⁵ Highways Agency (2015) M20 Junction 10a Environmental Scoping Report (41755-90-140-RE-02 RevD)

²⁶ Highways England (2015) Highways England Carbon Tool Guidance available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/453177/Task_446_Guidance_Document.pdf accessed 26/04/16

- Arise in the largest quantities.
 - Have hazardous properties.
 - Comprise a large proportion of the value of the Main and Alternative Schemes.
- 10.3.6 The following waste-generating activities have been considered:
- Excavation of material (including vegetation clearance and soil removal).
 - Demolition.
 - Construction.
 - Treatment of contaminated materials.
 - On-site (or off-site) reuse and recycling / recovery where appropriate.
- 10.3.7 Where possible, all re-usable material would be re-used on site. However, the construction of some elements of both the Main and Alternative Schemes are likely to require the use of natural resources. This assessment also considers the sustainability of the sources of materials used and specifies relevant environmental best practice when selecting products, suppliers and Contractors for the works.
- 10.3.8 The consideration of waste and residual materials has not addressed potential environmental effects that are more logically dealt with in other Chapters of this Environmental Statement (ES). This includes dust from construction activities and the vehicle movements associated with the removal of demolition materials which is considered in Chapter 5 Air Quality, and contaminated waste and soils which is considered in Chapter 9 Geology and Soils.
- 10.3.9 Sources of contamination were also identified in the Scoping Report and consideration has been given to the disposal of hazardous waste and quantities of contaminated material in this assessment for both the Main and the Alternative Schemes.
- 10.3.10 This assessment takes into consideration the site remediation / preparation phase and the construction phase of both the Main and Alternative Schemes only. The operational and decommissioning phases of the Main and Alternative Schemes have not been assessed, as the materials and waste arisings associated with the annual maintenance regime are expected to be on average minimal.

Study Area

- 10.3.11 The study area is determined by the influence of the Main and Alternative Schemes as noted above in Section 10.1, rather than through a set geographical area. It encompasses the use of materials and waste arisings that will occur within the DCO boundary including associated compound sites (see Figures 2.1 and 2.2, Volume 6.2 for the DCO red line boundary for the Main and Alternative Schemes). In addition, the assessment also takes into

account the closest waste facilities (within 60km) to the Main and Alternative Schemes.

Significance Criteria

- 10.3.12 No standard criteria exists, and IAN153 / 11 Guidance on the Environmental Assessment of Materials Resources does not provide any for assessing the significance of the potential effects that may arise from the use of material resources and the generation of wastes.
- 10.3.13 Professional judgement has therefore been used to provide an assessment of impacts / effects of the Main and Alternative Schemes, based on several factors, including:
- The ‘treatability’ of the waste generated by the Main and Alternative Schemes, which is determined by its physical and chemical characteristics (i.e. whether the waste can be treated with minimal residual waste, such as recycled waste; whether the waste requires a specialised treatment with potentially hazardous residual waste; or other).
 - The availability of suitable facilities within close proximity to Ashford, Kent to treat the waste generated.
 - Compatibility of the Best Practicable Environmental Option (BPEO) for the waste within the context of the waste hierarchy, i.e. whether generation of the waste can be minimised, the waste can be recycled, landfilled etc.
 - Potential environmental health effects or human health risks associated with the waste e.g. hazardous waste.
- 10.3.14 The significance of effect has been determined through the use of a matrix, with the sensitivity of the affected receptor on one axis and the magnitude of the impact on the other axis, presented below in Table 10.1, conforming to the matrix presented as Table 2.4 in HA 205/08²⁷.

Table 10.1 Matrix for the Assessment of Significance of Effects

Value/ Sensitivity	Magnitude of impact				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Large or Very Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large

²⁷ Highways England 2008, available <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/index.htm> accessed 23/03/16

Value/ Sensitivity	Magnitude of impact				
	No change	Negligible	Minor	Moderate	Major
Medium	Neutral	Neutral or Slight	Slight	Slight or Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Source: Highways Agency (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5 Assessment and Management of Environmental Effects (HA 205/08)

10.3.15 For the purpose of this assessment, the sensitivity is considered high if the resource is only available locally in limited amounts and the magnitude is considered major if a large quantity of material is required. In this scenario, the likely significance would be considered as Large or Very Large. Conversely, the sensitivity is considered low if the resource primarily consists of recovered / recycled materials and only limited volumes are required. The significance would therefore be Neutral.

10.3.16 The most significant potential effects would be Large or Very Large, followed by Moderate or Large and would be considered as significant for the purposes of this assessment. Categories that are considered as Neutral or Slight would not have significant effects.

10.3.17 The receptors for this assessment are defined as:

- Highways England, local, regional and national policy on the sourcing of materials.
- The waste management infrastructure in the local area and policy set out in Section 10.2.

Embodied carbon content of materials

10.3.18 Quantification of the carbon impacts of different materials has been carried out using Highways England Carbon Tool (version release 3 February 2016). The scale of magnitude in Table 10.2 has been used to assess the magnitude of change associated with the scheme's materials requirements. The scale in Table 10.2 is based on benchmark data from previous road projects²⁸ where the magnitude of change as a result of materials use has been quantified.

²⁸ A14 Cambridge to Huntingdon Improvement Scheme Environmental Statement, December 2014 - source

Table 10.2 Matrix for the Assessment of Significance of Effects

Scale of impact magnitude	Total of CO ₂ e of materials (tonnes)
No change	< 1,000
Negligible	1,000 – 5,000
Minor	5,000 – 20,000
Moderate	20,000 – 40,000
Major	40,000

Source: A14 Cambridge to Huntingdon Improvement Scheme Environmental Statement, December 2014

10.4 Consultation

10.4.1 With the exception of the consultation undertaken for the general purposes of the EIA, no external consultation on either the Main Scheme or the Alternative Scheme has been carried out specifically for the purposes of the materials assessment.

10.5 Assumptions and Limitations

10.5.1 This assessment has been limited to the footprint of the Main and Alternative Schemes and considers only site remediation / preparation, and construction, demolition and excavation. No assessment has been made on the operation, maintenance or decommissioning phases as the materials and waste arisings associated with these phases are expected to be on average minimal.

10.5.2 Given the early stage of design, there are only initial estimates available relating to the quantity of construction materials that are anticipated to be required during the construction of the Main Scheme and the Alternative Scheme.

10.5.3 The IAN 153/11 Guidance on the Environmental Assessment of Materials Resources states that it is not possible to provide detailed guidance on some aspects of the assessment process, namely significance of effect. It recognises that permanent impacts are likely to be significant in terms of their effect and so projects should, as a minimum, aim to identify these. Similarly, estimates of quantities of materials to be used and of wastes that are expected to be produced can be made. These provide the basis for assessment of magnitude of change.

10.5.4 This chapter does not provide detailed information on how to manage and dispose of any waste generated during the site remediation / preparation and construction phases of the Main Scheme or the Alternative Scheme. However, a SWMP would be produced by the Principal Contractor which would detail this information taking account of any changes in design as the project progresses. The SWMP is a key part of the CEMP and would be a live document based on construction operations as they occur.

10.5.5 Whilst the carbon assessment has considered the amount of embodied carbon of the proposed materials for the construction of the Main and

Alternative Schemes, the detailed assessment of materials has only considered the impacts on material use associated with the construction of the Main and Alternative Scheme. For example, it has not considered the environmental impacts associated with off-site extraction of materials and the processing of materials.

- 10.5.6 The assessment has not considered the impacts of contaminated waste and soils as this has been considered within Chapter 9 Geology and Soils.
- 10.5.7 A Minerals Assessment has been undertaken for the Main and Alternative Schemes and is presented in Chapter 9 Geology and Soils. It has concluded that there would be no site won mineral materials as the resource within the Main and Alternative Schemes is of low value and there would be limited benefit in extracting any mineral resources. Therefore, when reference is made to site-won materials within this assessment, it excludes mineral materials.
- 10.5.8 Where materials are required for the Main and Alternative Schemes the assessment has made the assumption that locally sourced recycled materials would be used where possible.
- 10.5.9 Cut and fill volumes for the Main Scheme and Alternative Scheme have been estimated based on the latest design information available (March 2016), and are therefore, likely to change as detailed design evolves. The estimated volumes are intended only for the purpose of the current assessment and should be reviewed on completion of the detailed design. The development of a SWMP would support the changes made in the design as well as providing details of the amount and types of waste that would be produced on site and how it would then be reduced, re-used and disposed of, by whom and where.
- 10.5.10 A Materials Management Plan (MMP), as recommended in the Geology and Soils Chapter 9 and the CEMP, would be developed by the Principal Contractor for the earthworks.

10.6 Baseline Information

- 10.6.1 Current waste arisings in Kent and the wider area and waste management facilities and disposal arrangements have been determined through a desk-top study, using a number of readily available resources, in particular the Environment Agency and Defra websites.

Volume of Construction Waste

- 10.6.2 For the purpose of this assessment, 3 main data sources have been used to determine the volume of construction waste and are outlined below:
- Data produced as part of the outline design and assessment process for the proposed Main and Alternative Schemes.
 - Data from the Government body, Constructing Excellence, in conjunction with Movement for Innovation (M4I). These institutions publish a number

of Environmental Performance Indicators (EPI) for use by the construction industry in benchmarking (and therefore improving) performance.

- Data from the Building Research Establishment's (BRE) SMART waste system. This uses the same EPI as above.
- 10.6.3 M4I EPI report 2012 'EPI for Sustainable Construction' is the most applicable for use in this assessment and measures construction waste in volume (m³) per 100m² or m³ waste per £100K of project value that is sent for disposal (i.e. not for recycling or reuse).
- 10.6.4 All the benchmarking data reviewed is based on a completed new build construction project and based on the construction phase only. It does not include demolition, excavation or groundwork waste. In addition, the majority of data is for buildings rather than civil engineering projects. Although BRE Waste Benchmarking Data issued in June 2011 shows waste data for civil engineering projects, it does not include published information on the types of civil engineering projects.

Waste Generation in Kent and the South East

- 10.6.5 Information relating to current waste generation in Kent and the South East region has been gathered to provide the baseline for this assessment, and is described below. The latest data from the Environment Agency indicated that England produced over 187 million tonnes of waste in 2014, which was managed in nearly 6,300 permitted waste facilities²⁹. The South East region produced over 29.9 million tonnes, with Kent producing over 5.5 million tonnes of waste, as shown in Table 10.3.

Table 10.3 Waste breakdown by site type

Site Type/ Method	South East/ tonnes	Kent/ tonnes	England/ tonnes
Landfill	7,910,000	1,778,000	41,288,000
Transfer	7,833,000	1,789,000	46,717,000
Treatment	8,969,000	1,523,000	57,392,000
Incinerated	2,000,000	529,000	8,592,000
Total	25,712,000	5,619,000	153,989,000*
Use of waste			
In construction	310,000	5,000	1,229,000
In reclamation	190,000	35,000	1,000,000

²⁹Environment Agency (2015) Waste Management 2014 – England available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/382066/Waste_Management_2013_in_England_-_Summary.pdf, accessed 26/04/16

Site Type/ Method	South East/ tonnes	Kent/ tonnes	England/ tonnes
Deposited in landfill for recovery/benefit	2,709,000	799,000	16,848,000
Hazardous Waste			
Managed	577,257	170,812	4,203,220
Deposited	485,589	163,456	4,581,780

Source: Waste_Management_2014_in_South_East_Data_Tables.xlsx from
<https://www.gov.uk/government/statistics/waste-management-for-england-2014>

*Some exclusions apply that are not relevant to this assessment.

Construction and demolition waste in Kent and the South East

10.6.6 In 2012, the UK produced 100 million tonnes of construction and demolition waste. A total of 4.709 million tonnes of construction and demolition waste was produced in the South East in 2014, and the Environment Agency recorded that nearly 2.4 million tonnes of inert construction and demolition waste was deposited in landfill in the South East region with 1.2 million tonnes landfilled in Kent.

10.6.7 There are no figures available showing how much was recovered or recycled or how much was contaminated soil. However, the Environment Agency recorded that 501,000 tonnes of waste was used in construction or reclamation (under permits) within the South East and 40,000 tonnes from Kent, in 2014. A further 2.7 million tonnes of waste was deposited in landfill for recovery / land benefit with 799,000 tonnes in Kent³⁰.

Hazardous Waste in Kent and the South East

10.6.8 In 2012 / 2013, nearly 6 million tonnes of hazardous waste was produced in the UK with 1,057 million tonnes produced by the construction sector of which 881,000 tonnes was produced in England³¹.

10.6.9 Of all the hazardous waste generated, 577,000 tonnes was transferred for recovery, treatment or disposal in 1 form or another in the South East (195,448 tonnes in Kent). There are no figures showing how much was recovered or recycled or how much was contaminated soil.³²

Disposal and Restoration Opportunities in Kent and the South East

10.6.10 In general the methods used to dispose of construction and demolition waste in the South East of England reflects that of the rest of England. The available

³⁰ Environment Agency (2015) Waste Management for England 2014 available online

<https://www.gov.uk/government/statistics/waste-management-for-england-2014> accessed 09/05/16

³¹ Department for Environment, Food and Rural Affairs (updated 2015) ENV23 – UK statistics on waste available online

<https://www.gov.uk/government/statistical-data-sets/env23-uk-waste-data-and-management>, accessed 26/04/16

³² Environment Agency (2014) Waste Management 2013 in South East and England Data tables available online
<https://www.gov.uk/government/statistics/waste-management-for-england-2013>, accessed 26/04/16

data does not identify the amount of contaminated soil or material included in construction and demolition waste.

- 10.6.11 Local Authorities are not responsible for disposing of construction and demolition wastes. There are over 100 private companies who specialise in the recycling and disposal of mixed construction, demolition and excavated wastes that operate within Kent and the South East.

Local Environment

- 10.6.12 To identify potential sources of contamination, an initial review of the landfill sites, both active and historic, in the area was undertaken. This identified 6 active landfill sites located between 23km to 39km from the Main and Alternative Schemes, with 16 sites able to accept inert waste and with 3 sites able to accept hazardous waste within 60km (refer to Table 10.4 for a summary).
- 10.6.13 The review also identified 2 historic landfill sites (Hunter Close – 2.1km and Mersham Quarry – 0.25km) within 3km of the Main and Alternative Scheme. Only 1, Mersham Quarry, is located within 500m. It is anticipated that the works would require some excavation of this landfill site. In addition, there would be historic contamination associated with use of the existing highway itself. The potential contamination is likely to be confined to the existing highway boundary and is only likely to result in minimal quantities of hazardous waste needing to be considered. Potential sources of contamination that are greater than 500m in distance away from the study area have not been taken into account, as these are considered unlikely to affect the Main and Alternative Schemes.
- 10.6.14 There are no active landfills within 500m of the Main Scheme and Alternative Scheme extents. However, Table 10.4 lists the nearest active landfill sites able to accept inert and hazardous waste, and Table 10.5 lists the nearest material recovery facilities. It should be noted that where treatment facilities or landfill sites are used, haulage routes would need to be agreed between the operator and the Contractor.

Table 10.4 Nearest sites able to accept inert and hazardous waste locally to the Main and Alternative Schemes

Site name	Site address	Type*	Status	Distance (km)**
Marley Landfill Facility	Marley Landfill Facility, Sandway Road, Harrietsham, Kent, ME17 1HT	A2 – Accepts hazardous waste	Transferred	19.2
Ham Farm	Ham Farm, Ham Road, Oare, Faversham, Kent, ME13 7EU	A5 – Accepts non-biodegradable waste, may accept inert waste.	Issued	26.8
Shelford Landfill Site	Broad Oak Road, Canterbury, Kent, CT2 0PR	A4 – Accepts industrial waste may accept inert waste	To PPC	27.3

Site name	Site address	Type*	Status	Distance (km)**
Bramling Lime Works	Holly Bush Corner, Bramling Road, Bekesbourne, Canterbury, Kent, CT3 1NA	A5 – Accepts non-biodegradable waste, may accept inert waste.	Transferred	34.9
Allington Landfill	Land / Premises At, A20 London Road, Allington, Maidstone, Kent, ME16 0LE	A5 – Accepts non-biodegradable waste, may accept inert waste.	Modified	38.3
D-shaped Field, Allington Landfill	Land / Premises At, A20 London Road, Allington, Maidstone, Kent, ME16 0LE	A5 – Accepts non-biodegradable waste, may accept inert waste.	Modified	38.3
Hermitage Quarry	Hermitage Lane, Barming, Maidstone, Kent	A5 – Accepts non-biodegradable waste, may accept inert waste.	To PPC	39.2
Factory Farm	Factory Farm, Wouldham Road, Borstal, Rochester, Kent, ME1 3TL	A1 – Accepts hazardous and non-hazardous waste, may accept inert waste.	Modified	39.7
Pebsham Landfill Site	Pedsham Landfill Site, Bexhill Road, Freshfields, St Leonards On Sea, East Sussex, TN38 8AY	A1 – Accepts hazardous waste.	Modified	40.8
Margetts Pit Landfill	Margetts Pit Landfill, Margetts Lane, Burham, Rochester, Kent, ME1 3XU	L04 – Inert waste.	Modified	41.7
Austins Land	Land / Premises At, Elms Vale Road, , Dover, Kent, CT15 7AS	A5 – Accepts non-biodegradable waste, may accept inert waste.	Issued	45.4
Hammill Clay Quarry	Hammill Clay Quarry, Hammil, Eastry, Kent, CT13 0EQ	A5 – Accepts non-biodegradable waste, may accept inert waste.	Modified	45.9
Offham Landfill	White Ladies, Teston Road, Offham, West Malling, Kent, ME19 5PF	A4 – Accepts industrial waste may accept inert waste.	Modified	46.1
Richborough Landfill	Rear Of Richborough Civic Amenity Site, Ramsgate Road, Richborough, Sandwich, Kent, CT13 9NW	A4 – Accepts industrial waste may accept inert waste.	Issued	50.6
Lower Twydall Chalk Pit	Lower Rainham Road, Rainham, Kent	A5 – Accepts non-biodegradable waste, may accept inert waste.	Issued	53.3

Site name	Site address	Type*	Status	Distance (km)**
Norwood Farm Landfill (west)	Lower Road, Brambledown, Isle Of Sheppey, Kent, ME12 3AJ	A4 – Accepts industrial waste may accept inert waste.	Modified	55.8
Stonecastle Farm Extension	Stonecastle Farm, Whetsted, Tonbridge, Kent, TN12 6SD	A4 – Accepts industrial waste may accept inert waste.	Issued	58.4
Lappel Bank Foreshore	Lappel Bank Foreshore, Sheerness Docks, South Of Sheerness, Kent	A5 – Accepts non-biodegradable waste, may accept inert waste.	Issued	59.3

*These categories are based upon Environment Agency definitions. Any site may accept inert waste, and it would be left to the Contractor to identify appropriately permitted sites for treatment and disposal of waste materials. Consideration should be given to the waste hierarchy with the reuse and recycling of waste before material is sent to landfill sites.

** Distance based on postcode from Wyevale Garden Centre (TN24 0NE).

Table 10.5 Nearest material recovery facilities to the Main and Alternative Schemes

Site name	Site address	Distance (km)
East Kent Waste Recovery Facility (Augean Integrated Services)	East Kent Waste Recovery Facility, Discovery Park, River Road, Sandwich, Kent, CT13 9FN	34.8km
RTA Waste Management / Crossways Recycling Ltd.	RTA Waste Management / Crossways Recycling Ltd., Plot 15 Manor Way Business Park, Manor Way, Swanscombe, Kent, DA10 0PP	54.5km

Primary and recycled aggregates

10.6.15 The aggregate sales in Kent during 2013 from all sources amounted to approximately 4,900,000 tonnes. Construction, demolition (C&D) and excavation wastes can be used as an alternative to primary aggregates and the capacity for C&D Recycling and Aggregate Recycling in Kent was 2,546,195 tonnes in 2013/2014³³. Table 10.6 provides details on the locations of secondary and recycled aggregate and recycling facilities for construction, demolition and excavation waste.

³³ 10th Annual Mineral and Waste monitoring report, February 2015 available online http://www.kent.gov.uk/data/assets/pdf_file/0004/28516/Minerals-and-waste-annual-monitoring-report-2013-14.pdf, accessed 27/05/16

Table 10.6 Secondary and recycled aggregate sites

Site name	Site address	Capacity of the site (tonnes)	Distance (km)**
Conningbrook Recycling Centre	Willesborough Lane Ashford Kent TN24 9QP	750,000 ^C 40,000 ^D	4
Hothfeild	Watery Lane, Westwell Ashford, Kent, TN25 4JJ	10,000 ^D	10
Shelford Landfill	Viridor Waste Management Canterbury, Shelford Landfill Shalloak Road, Canterbury, Kent, CT2 0PU	490 ^A 25,000 ^D	27
Pinden Quarry	Pinden Quarry, Green Street Green Road, Dartford, Longfield, Kent, DA2 8EB	770,000 ^D	61
Hermitage Quarry	Hermitage Quarry, Hermitage Lane, Maidstone, Kent ME16 9NT	585,000 ^C 530,000 ^D	40
Borough Green Landfill	Wrotham Road, Borough Green, Kent, TN15 8DG	Not available	51
East Peckham Quarry	Arnolds Lodge Farm, Hale Street East, Peckham, Tonbridge, Kent, TN12 5HN	Not available	50
Ham Hill Quarry	Snodland Quarry, Hays Road Snodland, Kent, ME6 5TQ	Not available	43
Favesham Quarry	Oare Road, Faversham, Kent, ME13 7TS	9,600 ^D 0.175,000 ^{B+C}	25
Ridham Dock	Brett Aggregates Ltd, Ridham Dock, Iwade, Kent, ME9 8SR	10,000 ^B 60,000 ^D	52

Sources:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/448468/140905_SOUTH_EAST_ANNUAL_REPORT_2013.pdf; http://www.kent.gov.uk/__data/assets/pdf_file/0004/28516/Minerals-and-waste-annual-monitoring-report-2013-14.pdf; http://www.kent.gov.uk/__data/assets/pdf_file/0005/28517/Minerals-and-waste-Local-Aggregate-Assessment.pdf

Notes: ^A – Daily production, ^B – Annual production, ^C – Environment Agency Licence, ^D - Recommended Annual Production 2012

** Distance based on postcode from Wyevale Garden Centre (TN24 0NE)

10.7 Mitigation and Compensation Measures

Main and Alternative Schemes - Construction

- 10.7.1 A consistent potential impact associated with the disposal of the materials identified is the eventual contribution to landfill and subsequent perceived environmental risks, such as damage to local hydrological systems, and emissions associated with material and waste transport.
- 10.7.2 Where material must be taken to a recycling / disposal site, these sites must have the appropriate permits to ensure environmental risks are reduced. Preference would be for these sites to be located as close to the works as possible. The closest and relevant treatment and disposal sites would be identified by the appointed Contractor.
- 10.7.3 When considering the requirement for the supply of materials for use on site, local suppliers would be identified, where possible, to reduce fuel requirements and cost of delivery.
- 10.7.4 The appointed Contractor would produce a CEMP based on the outline CEMP in Appendix 17.1, Volume 6.3. The CEMP would reference the SWMP, MMP, Soil Handling and Management Plan (SHMP) and the Traffic and Transport Plan which would detail specific mitigation measures to be adhered to. This would reduce impacts associated with the construction phase of the proposed Main and Alternative Schemes.
- 10.7.5 A SWMP would be prepared and implemented by the Contractor prior to the start of construction to ensure that all generated wastes are evaluated against the waste management hierarchy of prevention, reuse, recycling, recovery and disposal. This evaluation would be used to derive management options that would achieve the highest practical performance levels within the hierarchy. Where waste needs to be taken off-site for reuse, recycling, recovery or disposal the SWMP would detail information on the waste carriers and the waste management facilities that would be used. The SWMP would also identify waste to landfill targets to work towards the aim of recovering at least 70% by weight of non-hazardous construction and demolition waste in order to reflect Highways England's aspirations and current government policy in addition to the other strategic targets identified in Section 10.2.
- 10.7.6 The earthworks would be carried out under a MMP implemented by the Contractor, this would ensure that site won and imported materials comply with an earthworks specification ensuring that the geotechnical and chemical composition is acceptable before being used on-site during construction. The MMP will also contain information on the cut and fill balance.
- 10.7.7 A SHMP would be prepared and implemented by the Contractor and contain guidance regarding the correct procedure for storage, handling and disposal of contaminated soils, and appropriate best practice measures to protect the soil structure and quality.

- 10.7.8 The preparation and implementation of a Traffic and Transport Plan would be the responsibility of the Contractor. The Traffic and Transport Plan would outline the haulage routes to be used to transport materials and waste on and off-site. The plan would detail the shortest routes in order to reduce the impact on traffic and emissions.
- 10.7.9 The preparation of the CEMP, SWMP, MMP, SHMP, and Traffic and Transport Plan would ensure that any adverse impacts associated with material use, waste generated and required transport are minimised. If developed and used appropriately, it is feasible that, through the implementation and use of these plans, any potentially adverse effects as a result of construction and excavation wastes could be minimised.
- 10.7.10 Chapter 9 Geology and Soils recommends that a site investigation of any land which is believed to be subject to contamination should be undertaken to establish the contaminants present and identify the method of treatment, if necessary, and any particular handling measures required.
- 10.7.11 Through eliminating the resources required to complete the Main and Alternative Schemes and reusing and recycling as much site-won materials onsite, there would be a reduction in the impacts from the materials required and wastes produced. In addition, all concrete and metal to be used in the both the Main and Alternative Schemes would, where design constraints allow, contain high proportions of recycled content. Existing infrastructure such as ducts and cabinets would be reused where possible, reducing the need for new construction. All surplus waste materials to be removed from site would be sent for reuse off-site which would reduce the use of primary materials, sourcing new materials and landfill use. Waste materials that cannot be reused off-site would be sent for recycling therefore also reducing the amount of waste going to landfill and reducing the impact on the environment.
- 10.7.12 The Main and Alternative Scheme would make the use of non-landfill waste management facilities which would result in lowering the requirement of landfill and utilise the available waste management capacity of the non-landfill waste management facilities.

Mitigation Measures Reporting Matrix

- 10.7.13 Table 10.7 identifies the potential impacts associated with material resource use and generation of waste for the Main Scheme and Alternative Scheme. It also describes the mitigation measures to reduce the perceived impacts.

Table 10.7 Mitigation Measures Reporting Matrix for both the Main and Alternative Schemes

Scheme Activity	Proposed works	Potential impacts associated with material resource use	Description of mitigation measures	How the measures would be implemented, measured and monitored
<p>Site clearance, demolition and excavation – Main and Alternative Schemes</p>	<p>Demolition of 3 properties (Clarks Nursery (disused), Wyevale Garden Centre and Highfield Cottage).</p> <p>Demolition of the sewage pumping station on Highfield Lane and relocation to Kingsford St, along with diversion of sewer pipeline.</p> <p>Demolition of the existing Highfield Lane bridge, with NMUs re-routed to the new footbridge adjacent to Kingsford Street.</p> <p>Demolition and replacement of the Church Road footbridge with a new bridge.</p> <p>Demolition of the existing Highfield Road Bridge (once diversion of the services within the bridge structure are complete and construct new access).</p>	<p>Demolition of structures and buildings has the potential to produce significant quantities of waste materials. These materials have the potential to be reused on site in other areas of the construction and this should be considered a priority.</p> <p>Some materials from the demolition would not be able to be reused e.g. M&E services from buildings, and need to be removed from site and the waste hierarchy must be taken into account when identifying suitable facilities.</p> <p>Materials and waste would be transported by road, using the existing highway network and / or agreed transportation routes.</p> <p>Removal of fencing materials and safety barrier, depending on material and quality, can either be reused in the Main and Alternative Schemes or be recycled off-site.</p>	<p>Consideration of reuse for waste materials generated during demolition should be given priority.</p> <p>Opportunities for reduction, reuse and recycling would be identified.</p> <p>Methods to minimise waste would be incorporated into the SWMP including the provision of facilities to separate out recyclable wastes such as metals, plastics, oils, green wastes and surplus / rejected aggregates etc. for export to the appropriate local recycling / treatment facilities.</p> <p>If landfill is required then the landfills used would be prioritised on the basis of suitability to take the specific waste and distance to minimise transport.</p>	<p>Design workshop and implementation of ideas into the detailed design of this element of the works would ensure that the reuse of materials generated during demolition is made a priority.</p> <p>A SWMP, MMP, SHMP and Traffic and Transport Plan would be implemented across the site. This would ensure that material reuse is promoted, monitored and recorded resulting in the reduction of material usage and wastage.</p>

Scheme Activity	Proposed works	Potential impacts associated with material resource use	Description of mitigation measures	How the measures would be implemented, measured and monitored
<p>Construction – Main and Alternative Schemes</p>	<p>A2070 Link Road Construction of a new single carriageway road linking the new junction 10a to the existing A2070. To include access to the new attenuation ponds.</p>	<p>Primary sourced materials, concrete and stone, as well as metals would be required for the construction of the new A2070 link road. Materials for the construction would contain recycled content. Where possible recycled materials would be won from within the site from other works activities, therefore reducing the impacts of transporting materials to site</p>	<p>The design of any new road would incorporate recycled content materials where standards allow. All earthworks associated with the new road construction would make use of existing material or material excavated or demolished from other areas of the site. Opportunities for reduction, reuse and recycling would be identified. Fill material that is required (where excavated soil cannot be re-used on site) would be sourced locally. Where the importation of materials is required, the methods of this would be explored with the contractor, and the transport routes for road haulage shall be identified and discussed with the highways authority (Ashford Borough Council).</p>	<p>Design workshop and implementation of ideas into the detailed design of this element of the works would ensure that the reuse of materials generated is made a priority. A SWMP and MMP would be implemented across the site. This would ensure that material reuse is promoted, monitored and recorded resulting in the reduction of material wastage.</p>

Scheme Activity	Proposed works	Potential impacts associated with material resource use	Description of mitigation measures	How the measures would be implemented, measured and monitored
Construction– Main and Alternative Schemes	<p>Junctions New junction 10a Include a gyratory roundabout 2 bridges over the motorway each carrying 3 traffic lanes and 4 new slip roads</p> <p>A2070 Junction Construction of a roundabout at the junction of the new A2070 link road and the existing A2070.</p> <p>Barrey Road Junction Slight amendments, although it would remain right-turn restricted.</p>	<p>Primary sourced materials, concrete and stone, as well as metals would be required for the construction of any replacement bridges, slip roads and roundabouts with off-site construction and on-site assembly to reduce waste.</p> <p>Materials for the construction of the new bridges, roundabouts and slip roads would contain recycled content. Where possible recycled materials would be won from within the site from other works activities, therefore reducing the impacts of transporting materials to site.</p>	<p>The design of any replacement bridges, slip roads and roundabouts would incorporate recycled content materials where possible.</p> <p>All earthworks associated with the bridges, roundabout and slip roads would make use of existing material or material excavated or demolished from other areas of the site. Opportunities for reduction, reuse and recycling will be identified.</p> <p>Fill material that is required (where excavated soil cannot be re-used on site) would be sourced locally. Where the importation of materials is required, the methods of this would be explored with the contractor, and the transport routes for road haulage shall be identified and discussed with the highways authority (Ashford Borough Council).</p>	<p>Design workshop and implementation of ideas into the detailed design of this element of the works would ensure that the reuse of materials generated is made a priority.</p> <p>A SWMP and MMP would be implemented across the site. This would ensure that material reuse is promoted, monitored and recorded resulting in the reduction of material wastage.</p> <p>In addition, Carbon monitoring and management would enable low carbon design and minimise material use and waste arisings.</p>
Construction - Alternative Scheme only	<p>Stour Park Access A 3-arm roundabout providing access to the Stour Park development from the A2070 link road.</p>			
Construction – Main and Alternative Schemes	<p>Structures New Junction 10a interchange bridges Two continuous spans with a built-in</p>	<p>Primary sourced materials, concrete and stone, as well as metals would be required for the construction of any replacement bridges.</p>	<p>The design of any replacement bridges, slip roads and roundabouts would incorporate recycled content materials where</p>	<p>Design workshop and implementation of ideas into the detailed design of this element of the works would ensure that the</p>

Scheme Activity	Proposed works	Potential impacts associated with material resource use	Description of mitigation measures	How the measures would be implemented, measured and monitored
	<p>pier. The decks formed from precast pre-tensioned concrete beams and 1 or both bridges. Services require diversion from the demolished Highfield Road bridge.</p> <p>New Junction 10a slip road bridges Two single span structures with new supports constructed 1 on either side of the existing Lacton Farm Culvert to carry the new west facing slip roads over the Aylesford Stream.</p> <p>Partial demolition of the headwall of the Lacton Farm Culvert to enable the new slip road construction.</p> <p>New Kingsford Street footbridge A new cycle / footbridge would span the M20 opposite Bockham Lane. This would be a pre-fabricated steel bridge 3.5m wide, with approach ramps with a 1-in-20 gradient.</p> <p>Existing Lacton Farm Culvert No major changes to this structure are proposed, although a mammal ledge would be installed.</p> <p>Existing A20 Swatfield Bridge Install a new structure over and around the existing structure to remove traffic loading from the existing bridge.</p> <p>New A2070 Church Road Footbridge A new cycle / footbridge would span</p>	<p>Decks and pre-fabricated beams to be pre-cast off-site and assembled on site, requiring transport. However, overall wastage rates on site would remain low.</p> <p>Materials for the construction of the new bridges and slip roads would contain recycled content. Where possible recycled materials would be won from within the site from other works activities, therefore reducing the impacts of transporting materials to site.</p>	<p>possible.</p> <p>All earthworks associated with the bridges, roundabout and slip roads would make use of existing material or material excavated or demolished from other areas of the site, as detailed in the MMP.</p> <p>Opportunities for reduction, reuse and recycling would be identified.</p> <p>Fill material that is required (where excavated soil cannot be re-used on site) would be sourced locally.</p> <p>Where the importation of materials is required, the methods of this would be explored with the contractor, and the transport routes for road haulage shall be identified and discussed with the highways authority (Ashford Borough Council).</p> <p>If landfill is required for waste arisings then the landfills would be located within close proximity of the Main and Alternative Schemes to reduce the transport distance of waste.</p>	<p>reuse of materials generated is made a priority.</p> <p>A SWMP and MMP would be implemented across the site. This would ensure that material reuse is promoted, monitored and recorded resulting in the reduction of material wastage.</p> <p>In addition, Carbon monitoring and management would enable low carbon design and minimise material use and waste arisings.</p>

Scheme Activity	Proposed works	Potential impacts associated with material resource use	Description of mitigation measures	How the measures would be implemented, measured and monitored
	<p>the A2070. A pre-fabricated steel bridge, with approach ramps with a 1-in-20 gradient.</p> <p>Provision for non-motorised users</p> <p>Replace steps connecting existing PRoW AU101 into junction 10 with a ramp. A new footbridge adjacent to Kingsford Street would be provided. The Church Road footbridge would be replaced.</p>			
<p>Construction – Main and Alternative Schemes</p>	<p>Lighting</p> <p>Lighting would be provided for all new junctions.</p> <p>The lighting design assumes that 12m lighting columns in the verge and junction splitter islands, whilst supporting LED lanterns for greater light control and longer life burning.</p> <p>Electrical works would include feeder pillars and outgoing circuit cabling runs directly buried in the verge and through ducting beneath carriageway.</p>	<p>Metal for above ground infrastructure, wires and cabling would be required. Rigid plastics, made with recycled material, would be used for new ducts and traffic sign components. Concrete foundations are required for new chambers and cross carriageway ducts.</p> <p>Metal with a high recycled content can be used for new and replacement cabinets and columns. Plastic piping for new ducts can be from recycled sources. Concrete can contain up to 50% recycled content depending on its specification and use.</p>	<p>Where design standards allow, infrastructure with a high recycled content would be used.</p> <p>Opportunities for reduction, reuse and recycling would be identified.</p> <p>Where the importation of materials is required, the methods of this would be explored with the contractor, and the transport routes for road haulage shall be identified and discussed with the highways authority (Ashford Borough Council).</p>	<p>Design workshop and implementation of ideas into the detailed design of this element of the works would ensure that the reuse of materials generated is made a priority.</p> <p>A SWMP would be implemented across the site. This would ensure that material reuse is promoted, monitored and recorded and would result in the reduction of material wastage.</p> <p>In addition, Carbon monitoring and management would enable low carbon design and minimise material use and waste arisings.</p>
<p>Construction –</p>	<p>Drainage</p>	<p>Primary sourced materials, concrete</p>	<p>The design of any water</p>	<p>Design workshop and</p>

Scheme Activity	Proposed works	Potential impacts associated with material resource use	Description of mitigation measures	How the measures would be implemented, measured and monitored
Main and Alternative Schemes	<p>Retain the existing drainage systems where unaffected by works and use the existing outfalls where possible. Modify and up-size existing drainage.</p> <p>Retain existing attenuation pond EXP1 to the west of the proposed junction 10a.</p> <p>Construct dry pond 1 (to south of junction 10a).</p> <p>Construct pond 2 (to be located north of the junction of the A2070 and the new A2070 link road).</p> <p>Construct pond 3 (to be located between junction 10a and the A20).</p> <p>Install Penstocks upstream and downstream of each pond to allow isolation in case of a spillage within the catchment.</p> <p>Install bypass oil interceptors upstream of the ponds.</p>	<p>and stone, may be required for the construction of any replacement drainage systems and attenuation ponds. However, it is likely to contain recycled content and where possible, recycled materials would be won from within the site from other works activities, therefore reducing the impacts of transporting materials to site.</p>	<p>attenuation ponds, interceptors and drainage systems would incorporate recycled content and material reuse / alternatives where possible.</p> <p>All earthworks associated with the construction of the attenuation ponds and interceptors would produce material which can be used for landscaping purposes or in other areas of the site, as detailed in the MMP.</p> <p>Opportunities for reduction, reuse and recycling will be identified.</p> <p>Fill material that is required (where excavated soil cannot be re-used on site) would be sourced locally.</p> <p>Where the importation of materials is required, the methods of this would be explored with the contractor, and the transport routes for road haulage shall be identified and discussed with the highways authority (Ashford Borough Council).</p>	<p>implementation of ideas into the detailed design of this element of the works would ensure that the reuse of materials generated is made a priority.</p> <p>A SWMP and MMP would be implemented across the site. This would ensure that material reuse is promoted, monitored and recorded resulting in the reduction of material wastage.</p> <p>In addition, Carbon monitoring and management would enable low carbon design and minimise material use and waste arisings.</p>

Source: Based on Table D in Annex 3 of Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources

Operation – Main and Alternative Schemes

- 10.7.14 No assessment of the operational phase has been undertaken for either the Main Scheme or the Alternative Scheme, as the materials and waste arisings associated with the annual maintenance regime are expected to be on average minimal. Therefore no operational mitigation measures are required or have been identified.

10.8 Predicted Effects on Materials

Main Scheme - Construction

- 10.8.1 During site remediation and earthworks preparation, there is the potential for impacts associated with the transportation of materials and the unnecessary imports of primary aggregates and / or fill material together with exports of surplus waste material.
- 10.8.2 With the demolition of existing structures there would be impacts associated with the transportation of construction material and the disposal of waste associated with the removal of existing material. In addition, the realignment of carriageways may result in waste arising from activities such as carriageway planings from the re-surfacing of the existing carriageway, replacement of trenched cables with ducting and bridge replacement and tying in at junctions.
- 10.8.3 The construction of a new highway and associated structures, including a roundabout, slip roads, bridges and a retaining wall would require a substantial amount of materials, which have the potential to generate significant effects. These would be quantified as part in the SWMP, and the MMP would address the earthworks for the Scheme.
- 10.8.4 Table 10.8 summarises the material resources and quantities required for the Main Scheme activities and Table 10.9 summarises the waste arisings.
- 10.8.5 Where the import of materials is required for the construction of the Main Scheme consideration would be given to the use of locally sourced recycled materials or the potential co-ordination of materials available from other nearby schemes. Although all the specific quantities of materials and waste arisings have not been finally quantified at this stage of design development, the estimates provided in Table 10.8 and Table 10.9 have been based on the latest design information available (March 2016). If properly managed, the construction phase has the potential to produce minimal wastage, over and above that mentioned in Table 10.9. Some surplus waste may be generated, if material cannot be reused within the Scheme due to contamination etc.
- 10.8.6 The estimated quantities for the earthworks indicate that the cut and required fill volumes for the Main Scheme are:
- Cut = 195,826 m³
 - Fill = 89,090 m³.

- 10.8.7 Table 10.10 contains the results from the detailed assessment for the Main Scheme. It contains information on the nature and magnitude of the impact, the sensitivity of the resource and subsequently the significance of residual effects following implementation of mitigation measures.

Table 10.8 Summary of data required for the Simple Assessment of material resource use for the Main Scheme

Main Scheme Activity	Material resources required for the project	Quantities of materials resources required	Additional information on material
Site remediation / preparation / earthworks	<p>Primary aggregate for minor widening, construction and foundations.</p> <p>There is likely to be a small net surplus of suitable site-won material. Cutting material is unlikely to be geo-technically suitable and as such aggregate would need to be sourced off-site.</p>	<p>6.13ha of area would be cleared, however, specific quantities of materials for this activity have not been quantified at this stage.</p>	<p>Primary materials would be sourced locally where possible. Materials would be transported by road, using the existing highway network. Excavated material would be re-used on site wherever possible.</p>
Demolition and excavation	<p>Material use is not expected to be significant during demolition or excavation.</p> <p>Imported material is unlikely to be required for use in excavations within the site, although all the specific quantities of materials have not been finally quantified at this stage.</p>	<p>Specific quantities of materials for this activity have not been quantified at this stage.</p>	<p>Primary materials would be sourced locally, where possible. Materials would be transported by road, using the existing highway network. Excavated material would be re-used on site wherever possible and any surplus material would be landscaped onto the existing junction 10 slips when they are closed and where possible on the rest of the Scheme.</p>
Construction	<p>The installation of infrastructure would require material use including bituminous strip; wooden posts and railings, concrete and steel, other metals, drainage and lighting etc.</p> <p>Bridge replacements</p> <p>A large volume of concrete and steel would be required for the construction of any bridge replacements over the M20. There is the potential that these materials could be sourced from recycled sources, therefore reducing the need for virgin materials. In addition soils would be recycled from the earthworks.</p> <p>New road construction</p> <p>Surfacing materials can consist of reclaimed asphalts and secondary aggregates in the base,</p>	<p>The construction phase would require substantial quantities of material use as outlined below:</p> <p>Fencing – wooden post and 3 rail fencing ~5,241m.</p> <p>Road restraint systems – concrete safety barrier ~1,489m, steel safety barrier ~1,241m.</p> <p>Drainage and service ducts -</p> <p>UPVC drain (ranging 150-900mm dia.) – 6,086m (total).</p> <p>Pre-cast concrete chamber (ranging 1,200-2,100mm dia.) – ~143No (total).</p> <p>Gully trap – ~196No.</p>	<p>Primary materials would be sourced locally where possible. Materials would be transported by road, using the existing highway network. Construction, demolition and excavation (C, D and E) material would be re-used on site, wherever possible.</p>

Main Scheme Activity	Material resources required for the project	Quantities of materials resources required	Additional information on material
	<p>binder and surface course.</p> <p>Construction of new gantries Where possible, steel and concrete for the new gantries would be sourced from recycled material, therefore reducing the need for virgin materials.</p> <p>Installation of new signs, lighting and signalling Metals and concrete would be required for new signs, lighting and signalling requirements. Primary materials may be used for these features.</p> <p>Installation of communications infrastructure including cross carriageway ducts Plastics and metals would be required for any new infrastructure cables and ducting. Where possible existing ducts and cabinets would be reused, reducing the need for new construction. All cross carriageway ducts would be new construction. Primary materials may be used for these elements.</p> <p>Installation of new / upgrading of existing drainage systems, attenuation ponds and interceptors Plastic piping, concrete and bedding stone would be used for the construction of new drainage systems and for the upgrading of existing pipes. Where possible, these materials would be sourced from recycled materials.</p>	<p>Kerb inlets – ~2580m. Hydrobrakes, oil interceptors, penstocks - ~13 (total). Pavement – Sub-base - ~20,519m³ Base, binder and surface course – ~48,220 tonnes (total). Kerbs, footways and paved areas – Footway - ~6,556m² (total). Kerb (half and full) - ~10,417m (total). Concrete edgings - ~4,850m. Access to ponds - ~5,248m². Traffic signs and road markings – Signs - ~82No. (total). Road markings - ~26,672m (total). Lighting (ranging 16LED – 128LED) - ~155No. (total). Duct route - ~4,275m. Road crossing and feeder pillar - ~19 No.(total). Special structure – concrete piled retaining wall (ranging 3.8-6.1m high) - ~599m³. Structures – Concrete volume for new bridges / footbridges, 4No. MS4 and 18No. CCTV camera based - ~1,834m³ Steel for footbridges 120 tonnes No volumes of material needed for landscaping available.</p>	

Source: Based on Table A in Annex 1 of Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources

Table 10.9 Summary of data required for the Simple Assessment of waste arisings for the Main Scheme

Main Scheme Activity	Waste arisings for the project	Quantities of waste arising	Additional information on material
Site remediation / preparation / earthworks	There is potential for substantial quantities of waste to be generated.	6.13ha of area would be cleared. Site clearance - ~6,766m of fencing assumed to be wood and 1,460m of safety barrier assumed to be metal.	Waste arisings are anticipated during this stage of the works, which would be managed by the Contractor as part of a SWMP and MMP.
Demolition and excavation	There is potential for substantial quantities of waste to be generated during the demolition and excavation phases from the demolition of 3 properties, a sewage pumping station and a footbridge. Excavation of ground for the attenuation ponds would produce waste material although this can be reused within the Scheme or for landscaping purposes. The demolition and removal of any existing bridges would result in the generation of concrete and steel waste. Although this would not be reused onsite it would be recycled offsite.	Demolition – Three structures would be demolished along with 3 properties. Excavated materials ~195,826 m ³ (total).	Waste arisings are anticipated during this stage of the works, which would be managed by the Contractor as part of a SWMP and the MMP. Soil arisings would be recycled for use onsite, as outlined in the MMP and therefore a reduced amount of soils would need to be removed from site. Brick, tiles and concrete would be crushed, screened and reused on site or sent off site for recycling.
Construction	Bridge replacements All uncontaminated soil arisings from excavations for the replacement bridges would be reused onsite. New road construction All uncontaminated soil arisings from excavations would be reused onsite. As the roads are new construction no other waste arisings are anticipated. Construction of new gantries Any uncontaminated soils excavated for the new gantries would be reused onsite. As the gantries are new construction no other waste arisings are anticipated.	Specific quantities of waste arisings for this activity have not been quantified at this stage.	Any waste arisings anticipated and generated during this stage of the works, would be managed by the Contractor as part of a SWMP.

Main Scheme Activity	Waste arisings for the project	Quantities of waste arising	Additional information on material
	<p>Installation of new signs, lighting and signalling Any uncontaminated soil arisings from excavations for the sign posts would be reused onsite. As the signs are new construction no other waste arisings are anticipated.</p> <p>Installation of communications infrastructure including cross carriageway ducts Plastic and metal waste from the removal of old infrastructure would occur. Any uncontaminated soil arisings from excavations for the ducts would be reused onsite.</p> <p>Installation of new / upgrading of existing drainage systems, attenuation ponds and interceptors Where possible bedding stone would be reused onsite. All old plastic piping and concrete would be recycled offsite. Uncontaminated soil arisings from excavations for the new drainage features would be reused within the Scheme.</p>		

Source: Based on Table B in Annex 1 of Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resource

Table 10.10 Detailed Assessment Reporting Matrix for the Main and Alternative Schemes

Main & Alternative Scheme Activity	Potential impacts associated with material resources/waste arisings	Sensitivity of Resource	Description of the impacts and mitigation	Significance of residual effect
Site remediation / preparation / earthworks	Vegetation clearance resulting in waste arising	Low	Minor, permanent and direct. Small volumes of vegetation waste produced which can be composted / chipped on or off-site. If composted / chipped on site it can be reused for the landscaping. Magnitude of impact would remain as Minor.	Neutral/ Slight adverse
	Soil waste arisings from site clearance	Medium	Moderate, permanent and direct. Reasonable volumes of soils would be generated. Suitable soils would be stored and reused on the scheme for engineering fill. Other soils would be reused elsewhere on the scheme for landscaping or taken off-site for reuse or recycling. Potential that substantial volumes would be exported so potential to cause transport effects. Magnitude of impact would remain as Moderate due to excess materials from the earthworks that would need to be removed from site.	Moderate adverse
	Inert waste arisings	Low	Minor, permanent and direct. Small to reasonable volumes of inert materials would be generated which would be unsuitable for on-site use. Inert waste generated through site clearance that are unable to be reused on-site would either be taken off-site for recycling. Small volumes exported so unlikely to involve significant transport effects. Magnitude of impact would remain as Minor.	Slight adverse
Demolition and excavation	Storage of waste on-site for on-site reuse or off-site treatment resulting in lowering the requirement for landfill.	Low	Minor, temporary and direct. Relatively small volumes of waste and materials would be produced that may be stored on-site potentially resulting in issues such as contaminated silty runoff. Appropriate segregation and storage of waste and materials on site, and appropriate best practice construction measures would be implemented. Magnitude of impact would remain at Minor.	Neutral /slight adverse

Main & Alternative Scheme Activity	Potential impacts associated with material resources/waste arisings	Sensitivity of Resource	Description of the impacts and mitigation	Significance of residual effect
	Landfill waste resulting in a reduction in the remaining available landfill capacity and not reducing, reusing or recycling the waste.	Low	Minor, temporary (degradable) / permanent (nondegradable) and indirect. Minor impact given the relatively small volumes of material and that as much waste as practicable would be reused on or offsite. If landfill is required then the landfills would be prioritised on the basis of suitability to take the specific waste and distance to minimise transport. Small volumes exported unlikely to involve significant transport effects. Magnitude of impact would remain as Minor.	Neutral / slight adverse
	Use of imported aggregates from quarries resulting in the depletion of finite resources (note: primary aggregate would only be used if site won materials are not suitable).	High	Moderate, permanent and direct. Small to reasonable volumes of primary aggregate resources won off-site could be used depending on what can be won and / or recovered on-site. Volumes imported could contribute to impacts associated with traffic movements. Off-site quarry materials would only be used as a backup if site won materials are not suitable. Therefore effective use of site excavated materials is essential. Additional methods to reduce the use of and impacts of external primary materials would be considered throughout the development of the Scheme. This would include reuse of on-site materials and use of secondary / recycled materials locally and responsibly sourced. Magnitude of impact would reduce to Minor.	Slight / moderate adverse
Construction	Use of imported materials (e.g. blacktop, sub base, steel, concrete).	Medium	Major, permanent and direct. Substantial volumes of materials that would need to be sourced off-site would be used. The use of imported primary materials would contribute to the depletion of finite natural resources. Methods to reduce the use of and impacts of external primary materials would be considered throughout the development of the Scheme. This would include reuse of on-site materials and use of secondary / recycled materials locally and responsibly sourced. The design of	Slight / moderate adverse

Main & Alternative Scheme Activity	Potential impacts associated with material resources/waste arisings	Sensitivity of Resource	Description of the impacts and mitigation	Significance of residual effect
			replacement bridges, slip roads and roundabouts would incorporate recycled content materials where possible. Potential impacts associated with transporting imported materials, however, where importation of materials is required, the methods of this would be explored with the contractor and transport routes for road haulage shall be identified and discussed with the highways authority. Magnitude of impact would reduce to Moderate.	
	Storage of potential waste on-site for on-site reuse or off-site treatment resulting in lowering the requirement for landfill.	Low	Moderate, temporary and direct. Relatively substantial volumes of waste and materials would be stored on-site potentially resulting in issues such as contamination, silty runoff and dust. Appropriate segregation and storage on-site via dedicated storage areas for specific waste and appropriate best practice construction measures would be implemented. Magnitude of impact would reduce to Minor.	Neutral / slight adverse
	Sending the waste to landfill results in a reduction in the remaining available landfill capacity and not reusing or recycling the waste.	Low	Moderate, temporary (degradable) /permanent (non-degradable) and indirect. Moderate impact given that as much waste as practicable would be re-used on or offsite, however, the anticipated excess material from earthworks would be sent to landfill. Volumes exported could contribute to impacts associated with traffic, however, if landfill is required then the landfills used would be located within close proximity to the Scheme to reduce transport distance of wastes. Magnitude of impact would remain as Moderate.	Slight adverse

Source: Based on Table C in Annex 2 of Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources

Carbon Calculations for the Main Scheme

- 10.8.8 Materials, fuel and energy use, waste arisings and transportation during construction, all produce greenhouse gas emissions either directly, as in the case of transportation, or indirectly as embodied carbon of the materials used.
- 10.8.9 A carbon assessment of construction for the Main Scheme has been undertaken using Highways England's Carbon Tool (February 2015)³⁴.
- 10.8.10 This estimated the amount of carbon emissions in terms of carbon dioxide equivalent (CO₂e) for proposed material use and waste arisings, based on the latest design information available (March 2016). The results indicate that approximately 7,365 tonnes of CO₂e would be produced as a result of the Main Scheme, as shown in Table 10.11 below (for carbon assessment calculations refer to Appendix 10.1, Volume 6.3). Energy use and transport has been specifically excluded from the calculations as there is no reliable data currently available. According to Table 10.2 the magnitude of the impact would be Minor, and therefore, effects are not considered to be significant.
- 10.8.11 To put this in context, in 2014, UK emissions of the 7 greenhouse gases covered by the Kyoto Protocol were estimated to be 514.4 million tonnes carbon dioxide equivalent (MtCO₂e), with 23% of this attributable to transport³⁵.
- 10.8.12 Highways England's calculation of its own carbon emission in 2013³⁶ indicated that construction based emissions were at 330,000 tonnes of CO₂e. The report also projects that the carbon emissions from construction will rise to 1,200,000 tonnes of CO₂e by 2020. The Main Scheme calculated carbon emission of 7,819 tonnes of CO₂e which would account for 2% of calculated 2013 construction carbon emissions and 0.007% of the 2020 projected construction carbon emissions. The Main Scheme's impact on UK wide emissions is therefore not significant, as the emissions for the UK's infrastructure for 2013³⁷ were 338,000,000 tonnes of CO₂e.

³⁴ Highways England Carbon Tool available online at <https://www.gov.uk/government/publications/carbon-tool>, accessed 26/04/16

³⁵ Department of Energy and Climate Change (2014) 2014 UK Greenhouse Gas Emissions, Final Figures available online https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/496942/2014_Final_Emissions_Statistics_Release.pdf, accessed 26/04/2016

³⁶ Highways Agency (2014) Highways Agency Carbon Routemap, available online http://assets.highways.gov.uk/specialist-information/knowledge-compendium/2013-2014-knowledge-programme/HACR_Opportunities%20for%20a%20national%20low%20carbon%20transport%20system.pdf, accessed 26/04/2016

³⁷ Highways Agency (2014) Highways Agency Carbon Routemap, available online http://assets.highways.gov.uk/specialist-information/knowledge-compendium/2013-2014-knowledge-programme/HACR_Opportunities%20for%20a%20national%20low%20carbon%20transport%20system.pdf, accessed 26/04/2016

Table 10.11 Estimated carbon emissions of the Main Scheme in terms of CO₂e for proposed material use and waste arisings

Material / Waste arisings	CO ₂ e / tonnes
Bulk Materials	3,933
Earthworks	717
Fencing, Barriers and Road Restraint Systems	428
Drainage	303
Road Pavements	349
Street Furniture and Electrical Equipment	596
Civils Structures and Retaining Walls	864
Waste arisings	569
Total	7,819

Alternative Scheme - Construction

10.8.13 Table 10.12 and

10.8.14 Table 10.13 provide a summary of the additional Alternative Scheme activities with the potential to generate significant effects on materials and waste arisings (in addition to those presented in Table 10.8 and Table 10.9 for the Main Scheme).

10.8.15 Where material is required for the construction of the Alternative Scheme consideration would be given to the use of locally sourced recycled materials or the potential co-ordination of materials available from other nearby schemes. Although all the specific quantities of materials and waste arisings have not been finally quantified at this stage of design development, the estimates provided in Table 10.12 and

10.8.16 Table 10.13 have been based on the latest design information available (March 2016). If properly managed, the construction phase has the potential to produce minimal wastage, over and above that mentioned in

10.8.17 Table 10.13. Some surplus waste may be generated, if material cannot be reused within the Scheme due to contamination etc.

10.8.18 The estimated quantities for the earthworks indicate that the cut and required fill volumes for the Alternative Scheme are:

- Cut = 203,822 m³.
- Fill = 97309 m³.

10.8.19 The significance of the residual effects of the Alternative Scheme on materials and waste arisings following the implementation of mitigation would be as per the Main Scheme which is detailed in Table 10.10 above.

Table 10.12 Summary of additional data required for the Simple Assessment of materials resource use for the Alternative Scheme

Alternative Scheme Activity	Material resources required for the project	Quantities of materials resources required	Additional information on material
Site remediation / preparation / earthworks	Primary aggregate for minor widening, construction and foundations. There is likely to be a small net surplus of suitable site-won material. Cutting material is unlikely to be geo-technically suitable and as such aggregate would need to be sourced off-site.	No additional area is required to be cleared for the Alternative Scheme, therefore 6.13ha would be cleared as per the Main Scheme. However, specific quantities of materials for this activity have not been quantified at this stage.	Primary materials would be sourced locally where possible. Materials would be transported by road, using the existing highway network. Excavated material would be re-used on site wherever possible.
Demolition and excavation	Material use is not expected to be significant during demolition or excavation. Imported material is unlikely to be required for use in excavations within the site.	Specific quantities of materials have not been quantified at this stage for the Alternative Scheme.	Primary materials, if required, would be sourced locally, where possible. Materials would be transported by road, using the existing highway network. Excavated material would be re-used on site wherever possible.
Construction	The installation of infrastructure would require material use including bituminous strip; wooden posts and railings, concrete and steel, other metals, drainage and lighting etc. New roundabout and road construction Surfacing materials can consist of reclaimed asphalts and secondary aggregates in the base, binder and surface course. If implemented, the use of recycled materials means that significant effects are not anticipated. Installation of new lighting Metals and concrete would be required for new signs, lighting and signalling requirements. Primary materials may be used for these features and therefore there is the potential for	The construction phase would require additional quantities of material use as outlined below: Drainage and service ducts – UPVC drain (ranging 150-450 mm dia.) – 216m (total). Pre-cast concrete chamber (ranging 1,200-2,100mm dia.) – ~7No (total). Gully trap – ~18no. Kerb inlets – ~141m less Pavement – Sub-base - ~1,539m ³ Base, binder and surface course – ~2,873 tonnes (total). Kerbs, footways and paved areas – Footway - ~123m ² (total). Concrete edgings - ~4,292 m less. Road markings - ~178m (total) less. Lighting (80LED) - ~15No. (total).	Primary materials would be sourced locally where possible. Materials would be transported by road, using the existing highway network. Construction, demolition and excavation (C, D and E) material would be re-used on site, wherever possible.

Alternative Scheme Activity	Material resources required for the project	Quantities of materials resources required	Additional information on material
	significant effects.	Road crossing - ~6 No volumes of material needed for landscaping available.	

Source: Based on Table A in Annex 1 of Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources

Table 10.13 Summary of additional data required for the Simple Assessment of waste arisings for the Alternative Scheme

Alternative Scheme Activity	Waste arisings for the project	Quantities of waste arising	Additional information on material
Site remediation / preparation / earthworks	There is potential for substantial quantities of waste to be generated.	Specific quantities of waste have not been finally quantified at this stage. No additional site clearance is anticipated with the Alternative Scheme, therefore 6.13ha would be cleared as per the Main Scheme.	Waste arisings are anticipated during this stage of the works, which would be managed by the Contractor as part of a SWMP and MMP.
Demolition and excavation	There is potential for substantial quantities of waste to be generated.	The construction phase would result in additional quantities of waste arisings as outlined below: Excavated materials ~7,996 m ³	Waste arisings are anticipated during this stage of the works, which would be managed by the Contractor as part of a SWMP and MMP. Soil arisings would be recycled for use onsite, and so would not need to be removed from site
Construction	New roundabout and road construction All uncontaminated soil arisings from excavations would be reused onsite. As the roads are new construction no other waste arisings are anticipated. Installation of lighting Any uncontaminated soil arisings from excavations for the lighting columns would be reused onsite. As	Specific quantities of waste arisings for this activity have not been quantified this stage	Any waste arisings anticipated and generated during this stage of the works, would be managed by the Contractor as part of a SWMP and it is anticipated that all waste arisings would be recycled.

Alternative Scheme Activity	Waste arisings for the project	Quantities of waste arising	Additional information on material
	the columns are new construction no other waste arisings are anticipated.		

Source: Based on Table B in Annex 1 of Highways Agency (2011) Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resource

Carbon calculations – Alternative Scheme

10.8.20 High level carbon calculations were undertaken for the Alternative Scheme using the Highways England’s Carbon Tool (February 2015)³⁸. This estimated the amount of carbon emissions in terms of CO₂e for proposed material use and waste arisings, based on the latest design information available (March 2016). The results indicate that approximately 8,068 tonnes of CO₂e would be produced as a result of the Alternative Scheme, as shown in Table 10.14 below (for carbon assessment calculations refer to Appendix 10.1, Volume 6.3). Energy use and transport has been specifically excluded from the calculations as there is no reliable data currently available. According to Table 10.2 the magnitude of the impact would be Minor, and therefore, effects are not considered to be significant.

Table 10.14 Estimate of the amount of carbon emissions of the Alternative Scheme and in terms of CO₂e for proposed material use and waste arisings

Material / Waste arisings	CO ₂ e / tonnes
Bulk Materials	4228
Earthworks	764
Fencing, Barriers and Road Restraint Systems	428
Drainage	311
Road Pavements	279
Street Furniture and Electrical Equipment	626
Civils Structures and Retaining Walls	874
Waste arisings	569
Total	8,068

10.9 Conclusions

10.9.1 The detailed assessment within this chapter has identified that the majority of potential impacts are likely to arise during the demolition and excavation phases with the potential for impacts during the construction phase if materials and waste are not properly managed. A summary of the potential impacts after mitigation associated with material use and waste arisings as a result of the construction of the Main and Alternative Schemes can be seen in Table 10.10. With careful management and storage of materials on site, very little waste would be anticipated during the construction phase. However, any waste that is produced during this phase would be reused where possible as part of the construction.

10.9.2 All identified impacts would be managed through standard mitigation measures identified in Table 10.7 and through adherence to measures which

³⁸ Highways England Carbon Tool available online at <https://www.gov.uk/government/publications/carbon-tool>, accessed 26/04/16

would be outlined within the CEMP, SWMP, MMP, SHML and Traffic and Transport Plan. Therefore, following the implementation of these mitigation measures it is anticipated that overall there would be no significant effects as a result of material usage and waste arisings during the construction of the Main Scheme and the Alternative Scheme. However, there would be a Moderate adverse effect due to soil waste arisings, which mitigation would seek to reduce.

- 10.9.3 In addition, a carbon assessment has been carried out using Highways England's Carbon Tool, which estimated that approximately 7,819 tonnes CO₂e would result from material use and waste arising's associated with the construction of the Main Scheme and 8,068 tonnes CO₂e for the Alternative Scheme. The magnitude of this impact has been assessed as Minor which is not considered to be significant.