HIGHWAYS AGENCY

M1 Junction 19 Improvement

Environmental Statement

Volume 2

Chapter 5 – Materials

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5.1 INTRODUCTION

5.1.1 This chapter provides an assessment of the potential impacts of the M1 Junction 19 Improvement in respect to materials. It is one of nine chapters dealing with environmental topics as set out in the Design Manual for Roads and Bridges (DMRB) Volume 11, Environmental Assessment[1]. The term 'Materials' was introduced by the August 2008 amendment to Section 1 of the DMRB Volume 11. Materials are assessed in terms of four distinct topics which shall be used within each section, these are namely; Geology, Made Ground Contaminated Land, Soils and Construction Materials. This approach was set out in the M1 Junction 19 Improvement Comparative Environmental Assessment Scoping Report[2] and has been subject co consultation with statutory environmental bodies including the Environment Agency (EA). The scope of the Materials section shall include assessment of the potential effects of the use of materials, effects of waste materials arising from the scheme and effects on soils and geology, both during the construction phase and the long-term operational phase of the site. A full glossary of terms used in this Chapter is given in Appendix A.

5.1.2 Soils and geology and are an important factor in determining the character and quality of a given geographical area. Underlying rocks are a key determinant of the landform, while the physical and chemical properties of the rocks and the overlying soils influence the type and variety of the vegetation that will grow, agricultural quality, flood risk and water storage capacity. In some cases, historic land uses have resulted in changes to the soils and geology, for instance by changing the original ground levels to create 'Made Ground' potentially associated with contaminants, by replacing rocks with waste (landfill). In mining areas the creation of voids can cause subsidence and the potential for groundwater and ground gas hazards. In areas which have been engineered for highways various other materials such as aggregate (sub-base) and tarmac will also have been introduced which may have the potential to impact upon the environment. Waste materials may also be produced during construction works, for example during excavation for proposed highways.

5.1.3 There are several ways in which development may potentially impact upon geological resources. Excavating or masking exposures of rocks or superficial geological deposits of specific scientific interest can represent a serious impact if the features of interest are not reproduced or replicated elsewhere in the area. Similarly, removal or modification of landform features can affect their scientific value or the local landscape. Impacts can also affect the existing or potential future commercial exploitation of resources.

5.1.4 Development in the immediate vicinity of watercourses may have potential impacts on underlying groundwater aquifers, especially during construction. For example, construction activities requiring earthworks can lead to changes in groundwater flow due to interception of natural seepage pathways, particularly in cuttings. There may also be a risk of spillage or leakage of fuels or oils from storage tanks or construction plant. Without suitable mitigation measures these pollutants may have the potential to impact upon underlying aquifers.

5.1.5 In common with other Chapters the Materials assessment recognises that the Catthorpe Viaduct, which carries the M6 to M1 Southbound link over the M1, is being replaced as a maintenance project. The scope of this work includes the replacement of the bridge on a new alignment immediately to the south west of the existing. It also requires the creation of new approach embankments either side of the M1. The work is programmed to begin in June 2010, for completion in November 2011.

5.1.6 The bridge and earthworks either side of the M1 would be retained in the proposed layout for the M1 Junction 19 Improvement, as would the alignment of the M6 to M1 Southbound link east of the M1. To the west of M1 this link would have to be amended to accommodate the proposed M6 to A14 link.

5.1.7 A separate environmental assessment has been carried out for the bridge replacement as a standalone maintenance project.

5.1.8 This EIA for the M1 Junction 19 Improvement takes into account the new bridge both:-

- As part of the existing junction assuming the M1 Junction 19 Improvement is not built, the 'do-minimum' scenario.
- As part of the completed M1 Junction 19 Improvement, the 'do-something' scenario.

5.1.9 In terms of materials one implication for the assessment is that the bridge replacement would require a net import of materials for earthworks, which in turn affects the earthworks balance for the junction improvement.

5.1.10 These issues are dealt with in Section 5.6 Environmental Impacts.

Objectives

5.1.11 The objectives of the Materials assessment are as follows:-

- To make the most efficient use of the materials present on site by reduction, reuse and recycling, setting quantitative targets where possible.
- To minimise disposal of waste to landfill, with a particular target to avoid the export offsite of bulk earthworks materials.
- To minimise adverse impacts on sites designated for their scientific value.
- To prevent the mobilisation or remobilisation of contamination which may potentially be present in soils.
- To safeguard the quality of soil for reuse.

Study Area

5.1.12 The study area directly affected by the M1 Junction 19 Improvement will consist of:-

- the construction area for M1 Junction 19, including land required for mitigation
- any areas required temporarily for the site compound, storage of materials or haul roads
- any areas considered for the supply of bulk materials, or for the deposition of waste.

5.1.13 The project is illustrated by a series of plans bound into a separate Appendix 1 to Volume 1 of the ES. Figure B, the Environmental Master Plan shows the proposals including mitigation measures. It also identifies the Catthorpe Viaduct and sections of the M6 – M1 Southbound link constructed as a maintenance project. Figure G shows the areas required during construction.

Materials Topics

5.1.14 The term 'Materials' was introduced by the August 2008 amendment to Section 1 of the DMRB Volume 11[1] . Although no detailed guidance is available in Section 3 of Volume 11 for the assessment of Materials, in the context of this EIA is it considered to include assessment of all materials, soils (potentially contaminated) and wastes which may be associated with the scheme. The following sub-sections will be included within the assessment.:-

- Geology
- Made Ground and contaminated land
- Soils (i.e. growing mediums) which will deal with agricultural restoration and substrates required for habitat creation
- Construction materials

Interactions

5.1.15 There are interactions between this chapter and several other chapters as follows:-

- Chapter 3 Ecology and Nature Conservation outlines proposals for habitat creation which would require special soil treatment.
- Chapter 8 Community and Private Assets deals with the permanent loss of agricultural soils and the restoration of these agricultural soils on areas required temporarily during construction.
- Chapter 9 deals with impacts in relation to Road Drainage and the Water Environment.

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5.2 METHODOLOGY

5.2.1 This assessment has been carried out in accordance with the requirements of the DMRB, Volume 11[1] . Guidance on the assessment of Geology, Soils and Contaminated Land is included in Volume 11, Section 3[2], Part 11, Geology and Soils. Bulk materials for construction are dealt with in Volume 11, Section 3[2], Part 3 Disruption Due to Construction. Currently there is no detailed guidance in the DMRB on other materials and their reduction, reuse and recycling. The assessment here is based on current best practice as described below.

5.2.2 In terms of assessing the significance of effects, wherever possible the approach set out in DMRB Volume 11, Section 2[3], Part 5 (HA205/08) has been used. This allows for the identification of:-

- the environmental value or sensitivity of resources
- the likely magnitude of impact upon the resource
- the likely significance of effect.

5.2.3 The DMRB sets out typical criteria to define sensitivity, impact and effect and these have been adapted for this Materials chapter as set out in Tables 5.1, 5.2, 5.3 and 5.4 under the heading Geology below.

5.2.4 The basic principle is that significance is determined as a product of the sensitivity of the receiving environment and the likely magnitude of the impact. The two are brought together in the matrix at Table 5.4.

5.2.5 This approach has been used when effects on specific environmental assets / receptors can be identified, i.e. for:-

- Geology
- Made Ground and contaminated land
- Soils

5.2.6 Implications arising from the use of construction materials, including the use of existing materials or the importation of primary materials requires a different approach. Here, the proposed use of materials has been compared with appropriate industry benchmarks for minimising waste.

5.2.7 Potential impacts have been assessed for both the construction and operational phases of this project. It is anticipated that most impacts for materials are likely to arise during construction, though longer term residual impacts could occur post construction during the operational phase of the project such as the disposal of materials arising from routine maintenance operations.

5.2.8 The approach for each part of the materials assessment is set out below.

Geology

5.2.9 For the purposes of this assessment, the sensitivity of receptors to geological (geotechnical and earthworks) impacts within the study area has been defined according to the criteria summarised in Table 5.1. Note that further information on sensitivity of environmental receptors relating to groundwater and surface water can be found in Chapter 9 Road Drainage and the Water Environment.

Table 5.1: Environmental Value or Sensitivity Criteria and Typical Descriptors

Sensitivity	Description	Examples of Receptors
Very High	Very high sensitivity receptors, including areas of high population density, major aquifers and designated areas considered to be of international interest. Limited potential for substitution.	Significant residential / industrial development. Strategic sites e.g. hospital, park. Public water supply abstractions. Surface Water: EC Designated Salmonid/Cyprinid fishery RQO River Ecosystem Class RE1. Site protected under EU or UK wildlife legislation (SAC, SPA, SSSI, Ramsar site). Groundwater: Major aquifer providing a regionally important resource or supporting site protected under wildlife legislation. SPZ I
High	High sensitivity receptors, including areas of high population density, major aquifers and designated areas considered to be of national interest. Limited potential for substitution.	Sites of Special Scientific Interest (SSSIs). Significant transport links e.g. railway, airport. Significant utilities. Surface Water: RQO River Ecosystem Class RE2. Major Cyprinid fishery. Species protected under EU or UK wildlife legislation. Groundwater: Major aquifer providing a locally important resource or supporting river ecosystem. SPZ II. High quality agricultural land.
Medium	Medium sensitivity receptors, including areas of moderate population density, major aquifers and designated areas considered to be of regional interest. Limited potential for substitution.	Regionally Important Geological Sites (RIGS). Surface Water: RQO River Ecosystem Class RE3 or RE4. Groundwater: Aquifer providing water for agricultural or industrial use with limited connection to surface water. SPZ III. High to Medium quality agricultural land.
Low	Receptors not currently protected but that may require specific protection in the future.	Minor residential / industrial development. Surface Water: RQO River Ecosystem Class RE5. Groundwater: Non-aquifer. Low quality agricultural land.
Negligible	Receptors not currently protected and unlikely to require specific protection in the future.	No residential / industrial development. Low quality agricultural land.

5.2.10 The magnitude of predicted impacts on geology has been assessed on a five-point scale, in accordance with the definitions summarised in Table 5.2.

Table 5.2: Magnitude Criteria in terms of Geology

Magnitude	Description
Major	Where there would be partial (greater than 50%) or total loss of a receptor, or where there would be complete severance of a site such as to affect the value of the site, e.g. where 50% of the site, mineral or sensitive/rare geological feature would be lost.

Magnitude	Description
Moderate	Where there would be loss of part (between approximately 15% to 50%) of a receptor, major severance, major effects to the setting, or disturbance such that the value of the receptor would be affected, but not to a major degree, e.g. where 15% to 50% of the site, mineral or sensitive/rare geological feature would be lost.
Minor	Where there would be a minimal effect on a receptor (up to 15%) or a medium effect on it's setting, or where there would be a minor severance or disturbance such that the value of the receptor would not be affected, e.g. where up to 15% or less of the site, mineral or sensitive/rare geological feature would be lost.
Negligible	Very slight change from baseline condition.
No Change	Change hardly discernible, approximating to a 'no change' conditions.

5.2.11 Potential impacts in terms of Geology are:-

- disturbance of groundwater flow paths
- soil deterioration
- soil consolidation
- earthworks balance
- mineral extraction or sterilisation
- land slips
- disturbance of groundwater flow paths.

5.2.12 Assessment of risk associated with the M1 Junction 19 Improvement in terms of geology, geotechnics and earthworks will be addressed by the geotechnical reporting, investigation, assessment and certification procedures which will be carried out in accordance with the DMRB Volume 4[4] Section 1, Part 2 (HD22/08). The risk assessments will generally determine relevant aspects of the engineering design. In most cases, these engineering design solutions will represent the relevant mitigation measures (e.g. requirements for treatment of contaminated land or treatment of voiding caused by mineral extraction). Should it be appropriate, further work may be identified, so that the site is suitable for the intended use subject to mitigation as required. Should further intrusive investigation or risk assessment work be required this will be identified in the assessment, and guidance will be provided on the required scope.

5.2.13 Following the assessment of the magnitude of an impact, taking account of any appropriate risk assessment as discussed above, the significance of effects are determined by use of a matrix (Table 5.4), with the magnitude of impact on one axis and the sensitivity of the receptor on the other. Table 5.3 also provides some useful descriptors to define significance.

Table 5.3: Descriptors of Significance of Effects

Significance Category	Typical Descriptors of Effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of district importance may also enter this category.

Significance Category	Typical Descriptors of Effect
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 5.4: Significance of Impacts in terms of Geology

Sensitivity	Magnitude				
	No Change	Negligible	Minor	Moderate	Major
Very High	neutral	slight	moderate or large	large or very large	very large
High	neutral	slight	slight or moderate	moderate or large	large or very large
Medium	neutral	neutral or slight	slight	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

Made Ground and Contaminated Land

5.2.14 Impacts as a result of Made Ground or contaminated land are not certain to occur. Such impacts can therefore be identified through a risk assessment process, which defines their likelihood of occurrence.

5.2.15 For the purposes of this assessment, the sensitivity of receptors to potential contamination impacts within the study area has also been defined according to the criteria summarised in Table 5.1 set out under the heading Geology above.

5.2.16 The magnitude of predicted impacts with respect to Made Ground and Contaminated Land has been assessed on the same five-point scale as Geology, in accordance with the definitions summarised in Table 5.5.

Table 5.5: Magnitude Criteria in terms of Made Ground and Contaminated Land

Magnitude	Description
Major	Where there would be partial (greater than 50%) or total loss of a receptor, or where there would be complete severance of a site such as to affect the value of the site, e.g. where contamination would be spread across 50% or greater of the site, or where a significant proportion of contaminated material would be remediated / removed.

Magnitude	Description
Moderate	Where there would be loss of part (between approximately 15% to 50%) of a receptor, major severance, major effects to the setting, or disturbance such that the value of the receptor would be affected, but not to a major degree, e.g. where contamination would be spread across 15% to 50% of the site, or where a moderate proportion of contaminated material would be remediated / removed.
Minor	Where there would be a minimal effect on a receptor (up to 15%) or a medium effect on it's setting, or where there would be a minor severance or disturbance such that the value of the receptor would not be affected, e.g. where contamination would be spread across up to 15% or less of the site or where a minor proportion of contaminated material would be remediated / removed.
Negligible	Very slight change from baseline condition.
No Change	Change hardly discernible, approximating to a 'no change' conditions.

5.2.17 Potential impacts in terms of Made Ground and Contaminated Land are:-

- disturbance of potentially contaminated land
- remobilisation of residual pollutants
- creation of new pollution pathways
- creation of dust and airborne contaminants
- spillages
- contamination from road run off
- siltation of watercourses.

5.2.18 Potentially contaminated material which may be present in various areas as described in Section 5.4 may have the potential to impact upon receptors as a result of the M1 Junction 19 Improvement construction works and its operational stages. Contaminated material may have the potential to leach into surrounding areas, pathways may be created linking contamination sources and sensitive receptors and underlying aquifers particularly during drilling or piling works. Contaminated materials may also become airborne as dust particles. The magnitude of potential impacts are outlined in Table 5.5. There may be overlap in terms of potentially contaminated land with other disciplines such as Chapter 1 Air Quality, and Chapter 9 Road Drainage and Water Environment.

5.2.19 Assessment of risk in relation to Made Ground and Contaminated Land will be addressed by the environmental risk assessments, reporting, investigation, assessment in line with the EA's Model Procedures for the Management of Land Contamination (CLR11)[5]. In most cases relevant mitigation measures (e.g. requirements for treatment of contaminated land) will be recommended in these assessments. Should it be appropriate, further work may be identified, so that the site is suitable for the intended use subject to mitigation as required. Should further intrusive work be required this will be identified in the assessment, and guidance will be provided on the required scope.

5.2.20 Following the assessment of the magnitude of an impact, taking account of any appropriate risk assessment and mitigation measures as discussed above, the significance of effects are determined by use of the same matrix and descriptors of significance as for Geology as set out in Table 5.4 and Table 5.3 respectively.

Soils

5.2.21 In terms of soils there is considerable overlap between this section and Chapter 8 Community and Private Assets which deals with agricultural issues. Chapter 8 deals with soil as an agricultural resource. It defines the contribution made by soils to agricultural land quality in terms of the Agricultural Land Classification[6]. It outlines the survey work carried out to identify soil quality and assesses the implications for agriculture in terms of the permanent loss of land and its temporary use during the construction period and subsequent restoration to agricultural use.

5.2.22 To avoid double counting impacts on soils for agriculture are not re-assessed for this Chapter and cross reference should be made to Chapter 8 for more detail on this issue.

5.2.23 However soils as a growing medium make an important contribution to the mitigation measures for the project both in terms of:-

- the effective establishment of landscape measures such as tree and shrub planting and new hedges
- the establishment of habitat creation including species rich grassland and wetland.

5.2.24 Landscape measures require the use of high quality, fertile top soils spread to a depth of 300mm to encourage the healthy establishment of young plants followed by rapid growth to achieve design objectives.

5.2.25 Habitat creation measures on the other hand generally require shallower soils of less fertility. Success requires the identification of subsoils within clearly defined nutrient levels and organic content, with appropriate storage and deployment to achieve project objectives.

5.2.26 This chapter does assess impacts on the soil resource for planting and habitat creation. Potential impacts would be:-

- the loss of soils required for planting or habitat creation
- deterioration in the quality of soil required through inappropriate earth moving machinery, method of handling, weather conditions and storage
- contamination of soils during construction for example by fuel or chemical spills.

5.2.27 The sensitivity of soils is defined by the criteria set out in Table 5.6 below which are consistent with those used to define agricultural soils in Chapter 8 Community and Private Assets.

Table 5.6: Sensitivity Categories for Soils

Sensitivity	Criteria
Very High	High importance and rarity, international scale and limited potential for substitution.
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or Medium importance and rarity, regional scale and limited potential for substitution.
Low	Low or Medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

5.2.28 The magnitude of impacts for soils is defined by criteria in Table 5.7, again the same as those in Chapter 8.

Table 5.7: Magnitude of Impact and Typical Descriptors for Soils

Magnitude	Criteria
Major	• Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements (Adverse). • Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial)
Moderate	• Significant impact on the resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse). • Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Minor	• Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse) • Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial)
Negligible	• Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse) • Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial)
No change	• No loss or alteration of characteristics, features or elements; no observable impact in either direction.

5.2.29 The significance of effects is determined by the use of the same matrix and descriptors of significance for Geology and set out in Tables 5.4 and 5.3 respectively.

Construction Materials

5.2.30 Impacts arising from construction materials require a different approach and are focussed upon making the most efficient use of materials on site to minimise the need for imported primary materials and to minimise the creation and disposal of waste through:-

- Reduction
- Re-use
- Recycling

5.2.31 Performance benchmarks are set out in Section 5.6 and will be included in the Contractor's Site Waste Management Plan (SWMP). They are used to identify potential effects for the environment as follows:-

- Exceedance or betterment of the benchmark will be regarded as a *Beneficial* effect.
- Failure to meet the benchmark will be regarded as an *Adverse* effect.

- Meeting the benchmark will be regarded as a *Neutral* effect.

5.2.32 Following completion of the design, performance against benchmarks has been estimated and reported in the ES. This process will then be continued through the development of the scheme as the SWMP is finalised prior to construction and implemented.

Consultations

5.2.33 The approach and methodology for assessing materials was set out in the Comparative Environmental Assessment Scoping Report[2], forwarded to statutory consultees in March 2009.

5.2.34 A detailed response was provided by the EA in May 2009.

5.2.35 In terms of waste materials the EA consider that the development may require several waste exemptions to be notified under the Environmental Permitting (England and Wales) Regulations 2007[7].

5.2.36 The use of a mobile screening and crushing plant on site may also require an Environmental Permit under a Part B mobile plant[8]. These are regulated by the Local Environmental Health Authority and may also require notification to the EA.

5.2.37 The EA have requested that these details be included within the Environmental Statement.

5.2.38 The EA have also referred to:-

- areas of Made Ground mainly associated with borrow pits associated with various earlier phases of road construction, which they consider appear to have been infilled with 'inert' construction waste
- the Cleanaway landfill site to the south of M6 which was licenced between 1977 and 1986 to take domestic and industrial wastes.

5.2.39 These areas are described in detail in Section 5.4 Baseline Conditions below. In terms of methodology for assessing these the EA suggest the approach set out in CLR11, Model Procedures for the Management of Land Contamination[5], described above, and the undertaking of a detailed study using the 'Source Pathway – Receptor Protocol'**.**

5.3 LEGISLATION AND POLICY FRAMEWORK

International and National Policies

5.3.1 Various pieces of legislation are relevant to the M1 Junction Improvement which are discussed below, these relate to waste management, contaminated land, mineral extraction and agriculture.

5.3.2 The European Union's Landfill Directive 1999/31/EC[9] includes provisions on the locations of landfills and technical and engineering requirements for aspects such as water control and leachate management, protection of soil and water and methane emissions control.

5.3.3 The Mines and Quarries Act (1954)[10] (as amended) sets out requirements relating to abandoned and disused mines and quarries. Minerals extraction is also dealt with under the Town and Country Planning Act 1990[19]. PPG14[11] explains briefly the effects of land instability on development and land use. The responsibilities of the various parties to any development are considered and the need for instability to be taken into account in the planning process is emphasised.

5.3.4 Waste legislation relating to the proposals is set out in a series of regulations within the Environmental Protection Act (EPA) 1990[12]. Environmental Permitting (England and Wales) Regulations[7] require that waste materials are disposed of at an appropriately licensed site unless exemption can be obtained from the EA. Licensing and disposal of landfills is covered by the Landfill (England and Wales) Regulations 2002[14].

5.3.5 The Environmental Protection (Duty of Care) (England) (Amendment) Regulations 2003[15] require that anyone who produces, handles or receives waste must supply a written description of that waste and a record of the waste transfer. The Hazardous Waste Regulations 2005[16] provide a consignment note system for the EA to monitor the movement and location of hazardous waste. The Regulations implement the requirements of the European Union's Hazardous Waste Directive 91/689/EEC[17].

5.3.6 The Directive's aim is "to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect as well as any resulting risk to human health, from the landfilling of waste, during the whole life-cycle of the landfill".

5.3.7 Legislation on contaminated land is included within the EPA together with the Environment Act 1995[18]. These define contaminated land and the procedures to identify and initiate remediation of such land. Contaminated Land is defined as land where due to the presence of substances it appears to the Local Authority that "Significant Harm is being caused or there is a Significant Possibility of such harm being caused or Pollution of Controlled Waters is being or is likely to be caused."

5.3.8 Land contamination issues have been a material consideration within the planning legislation since 1974. The Town and Country Planning Act 1990[19] sets out the legislative framework for the role of the Planning Authority, and its scope to control the development of the land affected by contamination through the use of planning conditions.

5.3.9 In terms of waste materials the scheme may require several waste exemptions to be notified under the Environmental Permitting (England and Wales) Regulations 2007[7]. The use of a mobile screening and crushing plant on site may also require an Environmental Permit under a Part B mobile plant[8].

5.3.10 Under the Site Waste Management Plans Regulations 2008[20] the project will require a formal, detailed SWMP:-

- describing each waste type expected to be produced in the course of the project
- the estimated quantity of each different waste type expected to be produced
- identifying the waste management action proposed for each different waste type including re-using, recycling, recovery and disposal.

5.3.11 The plan must also contain a declaration that the client, the Highways Agency and the Principal Contractor, Skanska, will ensure that all waste from the site is dealt with in accordance with the waste duty of care in Section 34 of the Environmental Protection Act (1990)[12] and the Environmental Protection (Duty of Care) Regulations[15]. The operation of the SWMP is described in Section 5.5 Mitigation below.

5.3.12 Government policy on the protection of agricultural and including 'best and most versatile' land is described in Chapter 8, Community and Private Assets.

5.3.13 Government planning policy on the use of agricultural land for development is set out in Planning Policy Statement 7: Sustainable Development in Rural Areas[21]. In particular PPS7 states that the presence of BMV agricultural land, defined as land in Grades 1, 2 and 3a of the Agricultural Land Classification, alongside other sustainability considerations including the protection of natural resources such as soil quality, should be taken into account by authorities when determining planning applications.

5.3.14 The Government's strategy for soils 'Safeguarding our Soils'[22] published in September 2009 includes guidance on the sustainable use of soils and protection of soil resources. The 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'[25], published at the same time aims to improve use and management of soils through all stages of the construction process including restoration of temporarily utilised areas. . In developing the draft strategy, account was taken of the EU Thematic Strategy for Soil Protection published by the European Commission in September 2006 and of the accompanying proposals for an EU Soil Framework Directive. Natural England's Draft Position on Soil[43] identifies priorities for soil protection, including within construction projects.

5.3.15 The cross compliance rules of the Single Payment Scheme[23] require farmers and landowners to manage their land to relevant soils standards. Guidance on the working and restoration of agricultural land for minerals is contained in Mineral Planning Guidance Notes[24] and the Good Practice Guide for Handling Soils (2001)[25].

Regional Policies

West Midlands Regional Spatial Strategy (2008)[26]

5.3.16 The Regional Spatial Strategy for the West Midlands was adopted in 2008 and includes policies covering Materials which include CC1: Climate Change, QE3: Creating a High Quality Built Environment and M3: Minerals – The Use of Alternative Sources of Materials. Policy CC1 encourages the efficient uses of resources and effective waste management. Policy QE3 also encourages the minimisation of waste and the use of recycled materials. Policy M3 aims to encourage the use of alternative sources of materials in construction.

East Midlands Regional Plan (2009)[27]

5.3.17 The East Midlands Regional Plan was adopted in 2009 and includes the provision of up to date regional policies. There is only one policy which relates to materials which is Policy 38: Regional Priorities for Waste Management. Policy 38: Regional Priorities for Waste Management is the only policy relevant to this Chapter. Policy 38 encourages all relevant public and private sector organisations to:-

' work together to implement the Regional Waste Strategy and promote policies and proposals that will result in zero growth in all forms of controlled waste by 2016 and waste being treated higher up in the 'waste hierarchy' set out in the National Waste Strategy (Waste Strategy for England 2007). '

Local Policies

Daventry District Council Local Plan 1997[28]

5.3.18 The Daventry District Council Local Plan was adopted in 1997. In September 2007 any policies not "saved" expired, there are no saved policies that are relevant to Materials. These policies are to be eventually replaced with emerging policies under the Local Development Framework (LDF). Daventry are producing a joint Core Strategy as part of the LDF which is the West Northamptonshire Joint Core Strategy (2007) which is currently at the Issues and Options Stage. This means that any policies are currently only in draft form. As the Core Strategy is currently at Issues and Options Stage there are not yet any policies but the strategy does set out Strategic Objectives which will inform the basis of future policies. Strategic Objective 8 of the Core Strategy aims to ensure that development is sensitive to its environment.

Harborough District Council Local Plan 2001[29]

5.3.19 The Harborough District Local Plan was adopted in 2001 and as mentioned above all policies that were not formally saved expired in September 2007. Saved policy RM10: Maintenance and Protection of Habitats – Ecological and Geological Diversity, seeks to protect geological interests within or adjoining development sites.

5.3.20 Harborough are in the process of producing their Core Strategy which is currently at alternative options stage. Within this document there are no policies relevant to materials.

Rugby Borough Council Local Plan 2006[30]

5.3.21 The Rugby Borough Local Plan was adopted in 2006 and contains a number of saved policies. Of these saved policies E7: Development Affecting Sites of Importance for Nature Conservation (including Sites of Importance for Geology) and E8: Ecological habitats and Geological Features are relevant to materials. These policies aim to protect and maintain geological features and where possible contribute to geological science.

5.3.22 In addition to the saved policies in the Local Plan Rugby are also in the process of writing their Core Strategy which is currently at the preferred options stage. Within the Core Strategy there are no policies relevant to materials.

North Northamptonshire Core Strategy (2008)[31]

5.3.23 The North Northamptonshire Core Strategy was adopted in 2008 and is a joint Core Strategy covering the areas of Corby, Kettering, Wellingborough and East Northamptonshire. Within this document there are two policies which are relevant to materials, Policy 13: General Sustainable Development Principles and Policy 14: Energy Efficiency and Sustainable Construction. Policy 13 requires development to use a minimum amount of non-reusable materials in construction and where possible should reuse existing materials and structures. Policy 14 requires that development should incorporate sustainable construction techniques.

5.4 BASELINE CONDITIONS

Geology

5.4.1 The geology of the area of the M1 Junction 19 Improvement is described in the following British Geological Survey (BGS) maps and memoirs:-

- Solid and Drift Sheet 170 Market Harborough, 1:50000 (1969)[32]
- Solid and Drift Memoir 170 Market Harborough (1968)[33]

5.4.2 Information on the geological strata present in the area of M1 Junction 19 Improvement has also been obtained from a number of ground investigations undertaken in the area. These investigations are summarised in the Preliminary Sources Study Report (PSSR) produced by White Young Green in 2004[34]. The geology of the area has been summarised below and can be seen in Figure 5.1.

5.4.3 Information from geological maps, memoirs and historical investigations at the site show the site is underlain by drift deposits comprising alluvium, river terrace deposits and glacial till. The underlying solid geology consists of Lias Clay. Further details of the Made Ground at the site are given below under the heading Made Ground and Contaminated Land.

5.4.4 River terrace deposits and alluvium are shown to be present as thin ribbons along the river valleys to the north and northwest of the site. More extensive fluvial (river) drift deposits are present to the south of the site associated with the River Avon.

5.4.5 Glacial till is present over much of the higher ground to the north and southwest of the site. However, in the central part of the scheme area, fluvial (river) erosion has exposed the underlying Lias Clay in the river valleys.

5.4.6 Topsoil thickness varies across the site, but generally extends to 0.25m below ground level consisting of organic brown sandy silty clay with occasional gravel of flint and traces of rootlets.

5.4.7 According to Environment Agency Vulnerability map of the area[35] the underlying strata would be classed as a non-aquifer due to the high clay content, with the exception of alluvial deposits and river terrace deposits which are classified as minor aquifers. Further information on the water environment and the distribution of minor aquifers can be found within Chapter 9, Road Drainage and the Water Environment.

5.4.8 Leicestershire and Northamptonshire County Council were consulted to provide any information, if available, on particular planning designations within the area including sensitive sites, quarries, mines or landfills. Information gained confirmed that there are no Special Sites of Scientific Interest (SSSIs) or Regionally Important Geological Sites (RIGSs) relating to geological features in the vicinity of the study area. Their records show that excavation activity in the area was only associated with the Cleanaway landfill and known borrow pits.

5.4.9 The Mineral Valuer was consulted on past mineral extraction, mining in the area and identified mineral deposits. Consultations indicate that there are no licensed mining activities relating to the site area. Clays have previously been extracted from borrow pits around the site (further detailed provided under section 5.4.13). Materials extracted are, however, believed to have only been used for local construction

activity relating to the local highway infrastructure. The study area contains glacial till and Lower Lias deposits which could be utilised as future sources of clay. To the south between the proposed junction and the River Avon, are river terrace deposits which could be utilised as a source of gravel aggregate. Sand and gravel workings were (at the time of this consultation) being carried out within these deposits outside of the study area. The Mineral Valuer however indicates that there are presently no plans to extract minerals from the study area itself.

5.4.10 At the time of writing a ground investigation (GI) is underway on the site. Preliminary records suggest that the ground conditions encountered on site confirm those anticipated from previous studies and published records.

Made Ground and Contaminated Land

5.4.11 Made Ground is present in the form of four borrow pits as well as engineered Made Ground associated with the infrastructure earthworks. The areas, together with other potential constraints, are indicated on Figure 5.2. The description of the sites is based on the earlier soils investigations listed under Geology above.

- The Cleanaway landfill site is located to the south of the M6. This was used as a source of material for construction of the original M6 in the 1960s.
- Brookside Farm Borrow Pit is located east of the M6 to M1 south on-slip road is backfilled with inert clay to approximately 7m depth, which has been confirmed through previous ground investigation. No evidence of significantly contaminated backfill was noted, however, there is a possibility that minor areas of contaminated backfill may still be present. This borrow pit was used as a source of fill in the 1990s upgrade of the junction.
- An un-named borrow pit is located to the south of the M6 and directly to the west of the landfill site. This was used as a source of materials for construction of the M6 motorway in the 1960s. There are no records available relating to the depth of the pit, however this is assumed to be filled with inert materials. However, as backfilling was prior to the Landfill Regulations in 1974, no records exist to confirm this.
- A former construction depot at Stonebank is located to the north west of the site. No information is available on fill which has been placed in this area but the historical use of the site suggests that fill may be limited to a shallow depth of construction material. Local contamination may potentially be present here, however no further information is available.

5.4.12 Additionally, areas of embankment are present around the site associated with the construction of the existing junction. These embankments have been typically constructed with side slopes of approximate gradient 1 (vertical) in 3 (horizontal) and typically comprise engineered fill described as stiff to very stiff clay. Some instability has been identified in the existing embankments particularly in the area of the M6 embankment in the vicinity of the Catthorpe to Shawell Road Bridge, identified as historical remedial works to slopes on Figure 5.2. Where instabilities have been identified, these have been repaired through regrading of the slope and replacement of clay fill with granular fill.

5.4.13 Cleanaway landfill site is located to the south of the M6 and west of Swinford Road (also known as Catthorpe Landfill). Following excavation to about 20m depth it was licensed to accept domestic and industrial waste. The Preliminary Sources Study Report[34] notes that in 1979 a bund was constructed around the northern and western

boundary of the site to prevent the loss of leachate. The report notes that in the past leachate has leaked over the top of the bund and polluted the adjacent watercourse. EA records show that the Cleanaway landfill site was registered to accept waste until 1980. It was subsequently capped and sealed with a groundwater and gas monitoring system installed. Information included in the Preliminary Sources Study Report[34], notes that monitoring in the 1980s showed the landfill to be under artesian head hydrogeological conditions.

5.4.14 It is likely that Made Ground or fill material is present in this area of the site associated with development of the landfill site. This landfill is adjacent to the M1 Junction 19 Improvement area, however the landfill boundary is anticipated to lie beyond the scheme extents.

5.4.15 A study of Ordnance Survey maps of the area from 1886 to present have shown that the only previous use of the land was for agriculture, therefore there are not expected to be areas of significant contamination. The land uses in the area including those described above which may have lead to minor contamination of the ground are:-

- presence of a former railway line
- presence of former motorway construction depot
- former borrow pits including Cleanaway Landfill
- existing M1, M6, A14 and the associated junction
- agricultural development.

5.4.16 The railway line formerly ran through the southern section of the area and is now part of a footpath and farm access track. There is a possibility of small areas of minor contamination associated with rail activities since construction of the railway in the nineteenth century.

5.4.17 The Stonebank area immediately to the north west of the existing junction, area 4 as described above, has been identified as a former depot used during construction of the existing junction. The area of the depot may be associated with local minor contamination related to previous spills and leaks of fuels and other materials used in construction during use of the depot.

5.4.18 The Cleanaway landfill site and other filled in borrow pits may potentially be sources of contamination as discussed above.

5.4.19 Minor spills may be associated with the existing M1 and M6 giving rise to localised areas of contamination.

5.4.20 Agricultural development in the area may have led in the past to minor spills of polluting substances or placement of contaminated fill during backfilling of small ponds or streams.

5.4.21 Consultations with the EA have found that there are no designated areas of Contaminated Land or recorded significant pollution incidents within the study area.

5.4.22 The site is not located within a Source Protection Zone (SPZ) as designated for the protection of groundwater and public drinking water supplies. No information is available on private abstraction licenses in the area, however the geology of the area

does not lend itself to providing large amounts of groundwater for abstraction purposes and a large number of private abstractions in the area would be unlikely.

5.4.23 Preliminary records from the ground investigation do not suggest any areas of gross contamination, however, test results for the investigation are yet to be assessed.

5.4.24 Extensive botanical surveys have been carried out to inform the ecological assessment reported in Chapter 3, Ecology and Nature Conservation. These surveys have confirmed that no notifiable weeds such as Japanese Knotweed are present on the site.

Soils

5.4.25 The baseline for agricultural soils is set out in Chapter 8, Community and Private Assets and reference should be made to this Chapter and its accompanying maps for detail.

5.4.26 Information has been gathered on soils at various stages in the development of the project:-

- In 2003 and 2004 the Agricultural Development and Advisory Services (ADAS) surveyed the soils in the area immediately surrounding Junction 19 using auger sampling and trial pits to determine soil characteristics for the Agricultural Land Classification of the farmland.
- In 2005 further areas identified for temporary use including the location of the site compound were examined. The locations of the soil testing are indicated on Figure 5.3 against a background of the farm holdings. The plot numbers are consistent with those used in Chapter 8, Community and Private Assets. Of the areas sampled in 2005, part of Plot 10 sampled as a flood compensation area is no longer affected by the Preferred Route. Soil depth, texture and appearance were assessed and recorded. Samples of topsoil were collected for laboratory analysis of available nutrients and organic matter content, to devise strategies for sustainable soil management and restoration of the areas to agricultural use.
- Given amendments to the layout for the junction since 2005, in 2009 a similar survey was carried out on further areas required for temporary use. This survey also included an investigation to identify possible low nutrient subsoils for use in habitat creation areas. The areas sampled are also shown on Figure 5.3.

5.4.27 As confirmed in Chapter 8, the area immediately surrounding M1 Junction 19 is mapped as Beccles 3 Association on the Soil Survey of England and Wales map[36]. This is characterised by deep sandy clay loam soils which overlie clay. Between the M1 and the A14 soils described as the Wickham 2 Association occur. These soils typically have clay loam to silty clay loam topsoil and overlie similar to heavier subsoils. To the north of the junction, soils are described as the Ragdale Association. These are typically clay or clay loam over clay.

5.4.28 The majority of the land is in arable production, except for an area to the north of A14 and the Cleanaway Site. In terms of the Agricultural Land Classification, Grades vary between 2 and 3a which can be described as ‘Best and Most Versatile’ and 3b, as set out in Chapter 8.

5.4.29 Detailed descriptions of the soils sampled on site in 2005 and 2009 for handling and reuse within the project are set out in the 2005 and 2009 Soil Resources Report in Appendix B.

5.4.30 The findings indicate that:

- Agricultural soils in the temporarily disturbed areas can be worked and restored in accordance with normal agricultural restoration practice. Particular attention will need to be given to the topsoil stripping and replacement, especially the timing of operations. Measures are set out in Section 5.5 Mitigation, including the implementation of a Soil Management Plan.
- Subsoils are available in the areas sampled to provide the low nutrient soils required for habitat creation and wetlands. The management of soils including their stripping, storage and deployment is similar to that required for agricultural soils.

Construction Materials

5.4.31 The current M1 Junction 19 consists of embankment and landscape fill, though to be won from the borrow pits within the study area. There are several structures of reinforced concrete such as bridges and roads with hot rolled asphalt surfaces overlying sub base materials. Geogrid reinforcement is also present within the M6 on-slip embankment. The existing drainage system consists of various pipes, culverts and granular drainage material.

5.4.32 Most of the existing earthworks are covered with semi-mature vegetation. Boundaries consist of timber post and four rail fencing and hedgerows. The whole junction is lit with steel lamp columns. There are also several existing signs and gantries which will include steel, aluminium and concrete.

5.4.33 During the operation of the current junction and its routine maintenance, waste materials which arise are road sweepings and gully arisings, metals from replacement signs, green waste from landscape maintenance, lanterns and traffic debris including tyres.

5.4.34 The following comprises a list of materials which may be present at the site in its current condition and which therefore are likely to be considered in plans for reduction, reuse, recycling or disposal:-

- asphalt planings
- reinforced concrete and concrete
- aggregate sub-base
- drainage piping
- steel lamp columns
- signs and gantries of steel, aluminium and concrete
- wood fencing
- semi-mature vegetation including boundary hedges
- plastics (including plastic geogrid reinforcement)
- gully arisings
- metals from replacement signs,
- traffic debris including tyres
- asbestos in some structures (bearings/gaskets/drainage) and as roadside verge contamination

- oily waste (silt/sludge) which may be present in drainage.

Baseline Sensitivity

5.4.35 In terms of sensitivity of the baseline, any potential features which may be impacted as part of the M1 Junction Improvement have been outlined below together with their sensitivity, using the criteria set out in Tables 5.1 and 5.6 as a guide.

Table 5.8: Baseline Sensitivity

Feature	Sensitivity	Comment / Mitigation
Geology		
Above ground geological features including SSSIs or RIGS.	High to Medium	None present
Below ground geological deposits, mainly clay and some alluvial gravels.	Low	
Mining activities.	Negligible	No present or planned future mining.
Construction activities – disturbance of geology due to cutting construction.	Low	Detailed design in liaison with EA. Continued monitoring of groundwater (non-aquifer and therefore not a sensitive receptor).
Construction activities – disturbance of geology due to drainage and flood compensation areas.	Low	Detailed design in liaison with EA. Continued monitoring of groundwater.
Construction activities – disturbance of geology due to foundation construction.	Low	
Made Ground and Contaminated Land		
Release and spread of contamination, disturbance of Cleanaway Landfill Site.	Low	Detailed liaison with EA to avoid direct disturbance of landfilled area. Proposals outside boundary. Detailed GI underway to obtain samples for testing.
Release and spread of contamination – disturbance of backfill to former borrow pits during construction	Low	Detailed GI underway of areas of known potential contamination. As necessary, design of any remediation based on risk assessments.
Released spread of contamination – possible disturbance of additional unknown local contamination during construction.	Low	Detailed GI underway at any suspected areas. Where contamination encountered during investigation or during construction, risk assessment undertaken to identify any remediation required.
Release and spread of potentially contaminated dust during construction.	Low	Dust suppression systems would be in use, especially in the area of a mobile screening and crushing plant. As set out in OCEMP.
Accidental spillages on the highway during the operational phase.	Low	Appropriate pollution prevention measures would be implemented during any clean up activity. Site would be covered by hardstanding which would limit mitigation of contamination.
Potentially contaminated run-off from	Very High	Appropriate measures implemented

Feature	Sensitivity	Comment / Mitigation
the highway during construction and operational phase. Dealt with in Chapter 9 Road Drainage and the Water Environment.	to Low (See Chapter 9)	during construction to collect any contaminated water, as set out in OCEMP. Appropriate drainage to collect, treat or contain run-off as set out in Chapter 9.
Soils		
Permanent or temporary loss of soils to agriculture. Dealt with in Chapter 8, Community and Private Assets.	Medium / Low (See Chapter 8)	Sensitivity varies between Medium for best and most versatile soils, Grades 2 and 3a, and Low for Grades 3b and 4. Soil handling and restoration to be controlled by soil management plan.
Soils for use in landscape measures and habitat creation.	Medium	Topsoils and subsoils required for planting, species-rich grasslands and wetlands respectively.

5.4.36 As set out in the table, features in terms of Geology, Made Ground and Soils are considered to be generally of *Low* sensitivity. In terms of the criteria at Table 5.1 they are not in general currently protected and unlikely to require specific protection in the future. In terms of the criteria in Table 5.6, they are of local importance.

5.4.37 Exceptionally, receiving waters for potential contamination have varied values between *Very High* and *Low*, depending on the attributes under consideration. As set out in Chapter 9, Road Drainage and the Water Environment, the River Avon is graded as a River Ecosystem Class RE1. However impacts and affects on these receiving waters are dealt with in Chapter 9 and are not repeated in this Chapter to avoid double counting.

5.4.38 Similarly impacts on higher grades of agricultural land in terms of their permanent or temporary loss are dealt with in Chapter 8, Community and Private Assets.

5.4.39 Designated geological sites, either SSSIs or RIGSs would have *High* or *Medium* sensitivity respectively, but none are present.

5.4.40 As set out in Section 5.2 Methodology, Construction Materials are being considered against industry benchmarks rather than in terms of sensitivity, impact magnitude, significance of effect analysis.

5.4.41 The relative sensitivity of the materials likely to be present on the site and listed above has therefore not been defined against the criteria in Tables 5.1 and 5.6. In general their sensitivity can be considered as *Low*, in that they would only be of local importance. Exceptionally, the presence of asbestos would be regarded as of *High* sensitivity given its potential implications for human health. As set out in Section 5.5 Mitigation below, if asbestos were encountered in existing structures to be demolished, it would require particular care in handling and disposal.

Page Not Used

5.5 MITIGATION

Geology

5.5.1 In terms of geology a number of mitigation measures for reducing the impact upon geological features would be implemented as part of the M1 Junction 19 Improvement as follows: -

- Ensuring that excavations of geological materials maximise the potential for their reuse and minimise the requirement for off-site disposal or importation of off-site resources. Prior to excavation soils would be classified in terms of re-usability and contamination. Excavation would be undertaken with regard to maximising reuse and minimising off site disposal, through as necessary separation and protection of soils during excavation and zoning of fill during placement.
- Where earthworks are necessary these would be designed so as to minimise land take and earthwork material requirement.
- Ensuring embankments and cuttings are designed at a stable angle. Stability analyses will be undertaken for earth placement to define stable slopes prior to placement in particular with regard to areas of previous instability.
- Cuttings are required through the Lias Clay and glacial drift deposits which are classed as non-aquifers. Continued monitoring will be carried out in order to assess the groundwater levels within underlying geology. Any dewatering that takes place is not likely to have a significant effect on the local or regional water table.
- Geological materials excavated by the proposals to create features such drainage ponds would be reused in new earthworks either as structural embankments or earth shaping as landscape fill, depending upon the nature of the material. The latter would play a positive role in the mitigation of the M1 Junction 19 Improvement, by helping to blend earthworks into their surroundings by using natural profiles, or by creating mounds to provide screening to affected properties / areas. The earthworks design will maximise reuse on site where necessary by the separation and protection of soils during excavation and the zoning of fill during placement.
- There are no proposals for any future mining of minerals in the area, however there are minerals in the area which could be used in the future. These include the river terrace gravels underlying the existing dumbbell roundabout and the terrace gravels associated with the River Avon, mitigation would involve minimising the excavation of these materials.
- The potential for settlement and bearing failure of weak backfill in former backfilled areas will be assessed as part of the engineering design.
- It is expected that in general piled foundations will be appropriate for the structures. However these are not expected to have any significant impact upon underlying geology.
- Geological strata may also have the potential to be disturbed by the construction of drainage, flood compensation areas, cutting construction and foundation construction. The impacts of these works would be mitigated by the detailed design of the improvement works which will be designed in liaison with the EA.

5.5.2 Mitigation to protect above ground important geological features would not be required as there are no recorded important geological features in the form of geological SSSIs or RIGSs in the vicinity of the site.

Made Ground and Contaminated Land

5.5.3 In terms of Made Ground and Contaminated Land mitigation measures for the construction and operational phases of the site would consist of:-

- A ground investigation has been carried out in Autumn 2009, including investigation of land adjacent to the Cleanaway Landfill, and investigation of Brookside Farm borrow pit, and the borrow pit adjacent to the Cleanaway Landfill. The nature and extent of any contamination will be assessed in accordance with CLR 11[5]. Any potential sources of contamination will be identified and the potential risk to any identified receptors assessed. If required, appropriate protective and/or remedial measures will be identified, incorporated into the design and implemented during construction. If additional areas of unknown contamination are encountered (which have not been identified as part of the baseline) an appropriate investigation and assessment would be carried out to determine an appropriate mitigation strategy, either removal of the material or its treatment to protect sensitive receptors.
- There is limited potential for the Cleanaway landfill site to impact upon the scheme as it is not expected to underlie the area directly affected by the project. Detailed design of the improvements (in liaison with the EA) would be undertaken to avoid disturbance of the landfill waste and to prevent the formation of pathways for migration of leachate or landfill gas from the area. The potential impact of historic leakage of landfill leachate and leachate escaping under artesian conditions would be considered during the detailed design stage. No temporary use of the land during construction is anticipated which would prevent disturbance to the fill material. The proposed haul road, for use during construction, would also be routed to avoid the landfill site.
- Monitoring wells will be installed in any areas which may have the potential for gas generation, including land adjacent to the Cleanaway landfill. Mitigation would then be designed to control migration and any impacts of gases identified.
- Where it is necessary (due to a shortfall of material after appropriate assessment) to import suitable materials for earthworks the material would be assessed in order to determine the suitability for use at the site in terms of geochemical and geotechnical properties.
- Topsoil and subsoil would also be stored in stockpiles to a maximum height of 2 metres for reuse the works as described under Soils below.
- During construction good site practice and proper handling, treatment and (if necessary) disposal of any contaminated arisings as set out in PPG6[37] would minimise the possibility of creating a contaminant migration pathway.
- All appropriate measures would be taken to avoid discharge of any substances into controlled waters as set out in PPG5[38]. The control measures to be employed are described in the OCEMP[39]. This would prevent a linkage between contaminants and ground and surface water. Any contaminated waters produced (for example from dewatering of excavations) may require off-site disposal at an appropriate facility in accordance with Environmental Permitting Regulations[7].
- Measures to achieve the above standards of practice will be included within the full Construction Environmental Management Plan and SWMP. An outline of the SWMP is provided under Construction Materials below.
- There would be the limited potential for accidental spillages or incidents during the operational phase of the site. The risk of this occurrence and its potential impact on receiving waters are dealt with in Chapter 9, Road Drainage and the Water Environment. Chapter 9 also sets out the proposed measures to contain spillages, including the linking of drainage ponds and penstocks.

- Dust suppression measures would be used on site especially in the area of the mobile screening plant to ensure that excessive amounts of potentially contaminated dust have little potential to impact upon the surrounding environment. Local Authority Pollution Prevention and Control (LAPPC) consent would be sought for the screening plant.

Soils

5.5.4 As set out in Chapter 8, Community and Private Assets, the construction works would involve the temporary use of agricultural land for:-

- working space
- laydown areas for materials
- haul roads and temporary carriageway diversions
- contractors site compound
- formation of flood plain compensation areas
- creation of a public bridleway link between Swinford and Station Road Lilbourne.

5.5.5 The extent of these areas is shown on Figure G, Areas Required During Construction, included in Appendix 1 of Volume 1 of the ES.

5.5.6 Most of the areas illustrated would be returned to agricultural use. Soil survey data presented in Appendix B will be used to devise a Soil Management Plan at detailed design stage, in advance of construction, to include measures to ensure careful stewarding of the soil resources during the construction period, proper restoration of the land and subsequent agricultural aftercare, including any necessary land drainage.

5.5.7 Soil management operations generally would be in accordance with Defra's Good Practice Guide for Handling Soils[25] including the following measures:-

- stripping of topsoil and subsoil when weather and soil conditions are suitable
- separate storage and management of topsoil and subsoil storage heaps
- return of these soils to plot, also in separate layers
- use of appropriate machinery to minimise compaction
- relief of any compaction of restored soils
- surface and underdrainage of restored sites
- aftercare of restored soils, including appropriate cropping, for example a temporary grass ley if required, and associated soil nutrient requirements.

5.5.8 More detail of the measures to be incorporated in the Soil Management Plan are included in the ADAS Soil Resources Reports in Appendix B.

5.5.9 The Soil Management Plan will also deal with the stripping, storage and placement of soils required for mitigation measures, i.e.:-

- topsoil required for tree and shrub planting and new hedgerows
- low nutrient subsoils required for habitat creation including wetlands and species rich grassland.

5.5.10 The ADAS Soil Resources Report in Appendix B has identified suitable subsoil resources within the footprint of the project from plots 3, 5 and 7 to provide low

nutrient substrates for the areas of species rich grassland and wetlands illustrated on the Environmental Master Plan, Figure B in Appendix 1 of Volume 1 of the ES.

5.5.11 As set out in Appendix B the available subsoil resources are likely to be low nutrient . Soil tests pH values of 6.3 to 6.4 which would enable the establishment of neutral grassland types as set out in Chapter 3, Ecology and Nature Conservation.

5.5.12 The Soil Management Plan would identify the resources required, their storage, separate from other soil resources needed for agriculture or tree planting and their deployment to achieve the Environmental Master Plan.

Construction Materials

Construction

5.5.13 During the M1 Junction 19 Improvement works various materials would be necessary for the construction works. The works have been designed so as to minimise the production of waste materials and to use as few new construction materials as possible by reduction, reuse and recycling of any existing materials at the junction where practical. This is to minimise the quantity of materials needing to be disposed of off-site, any additional/excessive excavation of materials for earthworks, and to minimise the import of primary materials.

5.5.14 As set out in Section 5.2 Methodology, under the Site Waste Management Plans Regulations 2008[20] the project would require a formal detailed Site Waste Management Plan in advance of construction:-

- describing each waste type expected to be produced in the course of the project
- estimating the quantity of each different waste type expected to be produced
- identifying the waste management action proposed for each different waste type, including re-using, recycling, recovery and disposal.

5.5.15 The plan has to identify whether the proposed actions are intended to be carried out on or off site and whether surplus / unacceptable material is sent to landfill or otherwise disposed of.

5.5.16 The Regulations require the plan to be updated, and during the works the contractor must record on the plan:-

- the identity of the person removing the waste
- the waste carrier registration number
- the written description of the waste, as required under Section 3.4 of the Environmental Protection Act 1990[12]
- where the site the waste is being taken to and whether the site holds permit under the Environmental Permitting (England and Wales) Regulations 2007[7] or is registered as a waste operation except from the need for such a permit.

5.5.17 To accurately reflect the progress of the project the contractor is required to record the actual quantities of waste produced, reused, recycled, recovered or disposed of and monitor the comparison between estimated and actual quantities.

5.5.18 An outline of the SWMP for the design at this stage is set out in Table 5.9 below for the list of materials recorded in Section 5.4 Baseline Conditions. Estimated quantities have been included.

5.5.19 As described in the introduction the assessment takes into account the advance reconstruction of the Catthorpe Viaduct as a maintenance project. Here it is noted that the reconstruction of the viaduct would require the net import of bulk fill. However this assessment assumes that materials arising from the demolition of the old bridge would be available for reuse in the Junction 19 Improvement project. The intention would be to stockpile the materials on site for reuse and only if the orders for M1 Junction 19 Improvement were not confirmed would the materials have to be taken off site. On the basis of this assumption Table 5.9 includes the replacement of Catthorpe Viaduct. A separate analysis of the materials arising from the Catthorpe Viaduct above is contained in the Catthorpe Viaduct Replacement Environmental Assessment[40].

5.5.20 The Contractor will also operate the Definition of Waste: Development Industry Code of Practice[41] for the M1 Junction 19 Improvement works which promotes the reuse of contaminated materials on site.

Table 5.9: Site Waste Management Plan

Waste Type	Estimated Quantity	Action Proposed
Earthworks	390,000m^3	Import of 20,000m^3 of fill for Catthorpe Viaduct Replacement and specialist backfill for bridge abutments. Existing earthworks and inert material arising from excavations including piling operations, to be reused on site.
Structures • concrete • steel	 25,000m^3 3,900 tonnes	 Re-use of concrete on site following screening and crushing. Steel to be sent off-site for recycling.
Carriageway materials • asphalt surfacing • asphalt planings • aggregates used in sub-base or drainage	 144,000 tonnes 90,000 tonnes 150,000 tonnes	Re-use on site or leave in-situ
Wood / timber waste • fencing • semi-mature vegetation	 200m^3 260m^3	 Reduce by keeping as much vegetation in–situ as possible Limited reuse on site as hibernacula Remainder sent off site for:- • recycling into new timber products • energy recovery as fuel • biological recovery as compost
Metals • railings • signs • gantries • lamp columns	850 tonnes	Sent off-site for recycling

Waste Type	Estimated Quantity	Action Proposed
• armco barriers • cables		
Plastics • drainage pipes • packaging • cable covering	14,500 lin m	Sent off site for recycling dependant on type of plastic. Some plastic may require disposal to landfill.
Hazardous Materials • contaminated soils • asbestos • oil-based waste • contaminated packaging • road sweepings	Not possible to quantify at this stage	Reduce Contaminated soils would be avoided, as in the case of the Cleanaway Site or wherever possible treated in-situ. Further contamination, e.g. by accidental spillage avoided by operation of CEMP. Alternatives to the use of hazardous chemicals used wherever possible. Where necessary hazardous materials to go for disposal at nearest licensed facility.
Office / Canteen waste • paper • electrical goods / computers • furnishings • packaging • food waste • sewage waste / water	Not possible to quantify at this stage	Reduce use of paper and packaging materials. Reuse furnishings / electrical goods at other sites. All recyclable materials including paper, packaging and redundant electrical goods to be collected for off site recycling. Food waste collection for biological recovery. Sewage waste water disposed of off site via public sewer.

5.5.21 Further detail on the proposed mitigation is set out below:-

- Existing earthworks – the design is being prepared to minimise the disturbance to existing earthworks, where possible, but materials that have to be excavated would be reused as fill as part of the overall earthworks balance. Any material such as cohesive fill which is found to be unsuitable for use due to moisture content would be treated by drying out or wetting and/or be treated with lime or cement to produce a suitable fill material for inclusion in the works. Where treatment is not practicable and the material is unacceptable for embankment construction it would then be used in landscaping mounds.
- Structures – several concrete bridges would require demolition. The intention is to employ a mobile screening and crushing plant to enable concrete to be reused in the road construction. If reuse on site is not possible it will be sent off site for material recovery via the WRAP (Waste and Resources Action Programme) Quality Protocol[42] which sets common standards for recycled aggregate production.
- Carriageway materials – asphalt planings from redundant carriageways would be processed and reused in the works if suitable, for example as capping material in the permanent works. However the tar content would need to be checked to ensure that the planings are suitable for reuse. The quantity reused would also depend on how far stabilisation of the underlying soil using lime would be feasible.

Lias clay contains natural levels of gypsum which can react adversely with the lime and render this technique unviable. This uncertainty is also discussed in Section 5.6 Environmental Impacts and Significance. Soil stabilisation would also reduce the need for imported foundation materials. Where possible aggregates used in sub-base or roadside drainage would also be reused. In the event of this not being possible such materials would be left in-situ or used as inert fill in landscape areas to prevent the need to dispose of them off-site.

- Wood/timber waste – generated by redundant boundary fencing and the clearance of existing semi-mature vegetation from the earthworks and boundary hedges. It is not anticipated that old boundary fences will be reused, or vegetation replanted. As a first step the amount of wood waste would be kept to a minimum by the retention of existing vegetation in-situ. Sustainable avenues for the reuse or recycling of timber (subject to chemical suitability) would include:-
  - use of cord wood for timber recycling or energy recovery or firewood
  - chipping of brash for timber trade recycling or biological recovery through composting
  - a small amount of timber would be retained for reuse on site as hibernacula in ecological mitigation
- Metals – it is unlikely that metal fittings removed by the scheme would be reused in-situ, but all metal such as railings, signs, gantries, lamp columns, Armco barrier, parapet railings would be collected in designated scrap metal bins and recycled off-site.
- Plastics – some site waste such as plastics may not be suitable for recycling. These would need to be examined on a case by case basis but wherever possible collected for recycling.
- Hazardous materials such as asbestos, oil based waste and contaminated soils would need to be disposed of at the nearest licensed facility using an appropriate hazardous waste consignment note and registering the site as a hazardous waste producer. Contaminated soils from the Cleanaway landfill would not be disturbed during construction and therefore this would not require disposal. If contaminated soils are encountered the first preference would be to treat them in-situ to avoid off site disposal. Alternatives to use of hazardous materials and chemicals will be used wherever possible (e.g. mould oil, resins). Where this is not possible their use would be carefully controlled and any residual materials/contaminated packaging would be disposed of to a licensed facility for recovery/recycling as the first preference, with landfill as a last resort.

5.5.22 It would be necessary to import new materials to construct the scheme including concrete materials, asphalt, aggregates, metals and timber. The detailed design will be carried out to reduce the requirements for such primary materials. For example pavement design, i.e. the carriageway surfacing and its sub base will be carefully considered to minimise the requirements for importing primary material. As set out above, existing materials on site would be reused where possible. The sources of such materials will be identified and their sustainability considered.

5.5.23 The SWMP would also extend to the running of site offices to minimise the generation of waste and to promote the recycling of materials as set out in Table 5.9.

5.5.24 Disposal of waste off-site will only be carried out as a last resort where no other viable options exist. Reduction, reuse and recycling will be employed wherever possible with all the materials used or currently present on site. However, there are still likely to be limited volumes of waste produced which must be considered. All such waste would be dealt with in accordance with the waste duty of care in Section

34 of the Environmental Protection Act 1990[12] and the Environmental Protection (Duty of Care) Regulations 2003[15].

Operational Phase

5.5.25 During the operational phase of the M1 Junction 19 Improvement and its routine maintenance, waste materials would arise from several different sources including:-

- road sweepings and gully arisings
- metals from replacement signs
- green waste form landscape maintenance
- lanterns
- traffic debris – including tyres.

5.5.26 The potential impacts of these materials would be mitigated by appropriate management of the site to include regular street sweeping and collection of any motorway debris which would also be necessary to maintain safety standards of the highway to reduce the potential for future accidents. Any landscape maintenance or routine equipment maintenance will also employ the industry standards of reduction, reuse and recycling of waste prior to disposal.

5.6 ENVIRONMENTAL IMPACTS AND SIGNIFICANCE

Geology

5.6.1 Potential impacts as a result of the M1 Junction 19 Improvement works relating to geology may include the following:-

- loss of geologically important or sensitive features which are not recreated elsewhere
- soil consolidation and deterioration (which is covered in the Soils section)
- earthworks balance and potential loss of geological strata/minerals from the site and surrounding area
- groundwater flowpaths may be disturbed in underlying geology, however as the Lower Lias Clay and glacial till is classed as a non-aquifer, little flow is envisaged and this would not be classed as a sensitive receptor
- mineral extraction or sterilisation
- landslips or other subsidence as a result of disturbance of the geology.

5.6.2 After the implementation of the mitigation measures detailed in Section 5.5 which would be implemented during the works the magnitude of potential residual impacts is detailed in the Table 5.10 below. The table also sets out the significance of effect for each feature taking into account its sensitivity, using the matrix at Table 5.4. The features listed are those set out in Table 5.8:-

Table 5.10 : Geology: Impact Magnitude and Significance of Effects

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Above ground geological features	Negligible	No change	None	Neutral
Below ground geological deposits	Low	Minor adverse	Design to maximise reuse of materials and minimise excavation and land take requirements	Slight adverse
Mining activities-no present or planned future mining	Negligible	No change	None	Neutral
Construction activities-disturbance of geology due to cutting construction	Low	Minor adverse	Detailed design in liaison with the EA. Continued monitoring of groundwater (non-aquifer and therefore not a sensitive receptor)	Slight adverse
Construction activities-disturbance of geology due to drainage and flood compensation areas	Low	Minor adverse	Detailed design in liaison with the EA. Continued monitoring of groundwater.	Slight adverse
Construction activities-disturbance of geology due to foundation construction	Low	Negligible	None	Slight adverse

5.6.3 The overall environmental effect in terms of geology has therefore been assessed as being *Slight Adverse* for the construction phase of the works. No further impacts of effects are anticipated on Geology during the operational phase of the works.

Made Ground and Contaminated Land

5.6.4 In terms of Made Ground and contaminated land a number of potential impacts have been identified (prior to mitigation) which may be associated with the works. These are mainly associated with the construction phases and initial disturbance of the ground. The potential impacts are:-

- disturbance of potentially contaminated land such as landfill and areas of made ground
- mobilising of contaminants in soil which would otherwise be relatively immobile
- remobilisation of residual pollutants (i.e. pollutants that are already present, but stable and inactive in their present condition)
- creation of new pollutant pathways, i.e. routes by which pollutants can reach environmental receptors that are vulnerable to their effects (engineering works such as excavations and piling for foundations may have the potential to create new pathways for contamination to reach groundwater) and also gases to migrate and build up in other areas
- creation of potentially contaminated dust and airborne particles especially in the area of the mobile screening and crushing plant
- potentially contaminated run-off from land (which may also impact upon groundwater and surface water).

5.6.5 Details of potential residual impacts, taking into account mitigation and resulting significance of effects are shown in Table 5.11 below:-

Table 5.11: Made Ground and Contaminated Land: Impact Magnitude and Significance of Effects

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Release and spread of contamination – disturbance of Cleanaway Landfill site during construction	Low	Minor adverse	Detailed liaison with EA to avoid direct disturbance of landfilled area. Design proposals outside landfill boundary. Detailed Ground Investigation (GI) carried out in Autumn 2009 to establish current condition.	Slight adverse
Release and spread of contamination – disturbance of backfill to former borrow pits during construction	Low	Minor adverse	Detailed GI of any known potentially contaminated areas carried out, but data not available for this assessment. As necessary design of any remediation based on risk assessments.	Slight adverse
Release and spread of contamination – possible disturbance of additional unknown local contamination during construction	Low	Minor adverse	Where contamination encountered during construction risk assessment undertaken to identify any remediation required.	Slight adverse
Release and spread of potentially contaminated dust during construction	Low	Minor adverse	Use dust suppression systems especially in the area of the mobile screening and crushing	Slight adverse

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
			plant. LAPPC consent would also be achieved.	
Accidental spillages on the highway during the operational phase	Low	Negligible adverse	Appropriate pollution prevention measures would be implemented during any clean up activity. Site would be covered by hardstanding which would limit migration of contamination.	Neutral
Potentially contaminated run-off from the highway during construction and operational phases	Very High to Low (see Chapter 9)	Minor adverse (construction) Negligible adverse (operation)	Appropriate mitigation measures during construction to collect any contaminated water as set out in OCEMP. Appropriate drainage to collect, treat or contain run-off during operation as set out in Chapter 9.	Slight adverse (construction) Neutral (operation)

5.6.6 The overall environmental impact in terms of Made Ground and Contaminated Land has therefore been assessed as being *Slight Adverse* for the construction phase of the works. There are not considered to be any significant risks in relation to contamination at present due to the limited number of former land uses in the vicinity of the site and surrounding area. The only potentially significant area of contaminated land is that of Cleanaway landfill site which is not expected to underlie the area of the M1 Junction 19 Improvement. However, the potential areas of former borrow pits and the area of the landfill (and its boundary), are still being investigated through a ground investigation and analysis of soils. If following completion of investigation any significant contamination or additional areas of contamination are identified the potential risks will be identified and mitigation/remedial measures identified and implemented following appropriate risk assessment in line with current guidelines and best practice. In terms of the operation of the road, the main potential effect is considered to be pollution of the water environment, either as a result of accidental spillage or due to routine run-off. These issues are dealt with in Chapter 9 and the *Negligible Adverse* impact and *Neutral* effect set out in Table 5.11 as reported in Chapter 9.

Soils

5.6.7 In terms of soils, the potential impacts are mainly confined to the construction phase, though the deployment of soils for landscape and habitat creation which were unsuitable either because they were the wrong type or had deteriorated during handling. This would have impacts during the operational phase due to poor establishment.

5.6.8 The potential impacts are:-

- the permanent or temporary loss of soils to agriculture
- the loss or unavailability of soils required for planting or habitat creation
- deterioration in the quality of soil required through inappropriate earth moving machinery, method of handling, contamination, weather conditions and storage.

5.6.9 The impacts and effects are summarised in Table 5.12 taking into account the proposed mitigation measures.

Table 5.12: Soils: Impact Magnitude and Significance of Effects

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Permanent loss of soils for agriculture (Chapter 8)	Medium / Low	Low / Moderate	Layout designed to keep loss to a minimum.	Slight Adverse
Temporary loss of soils to agriculture	Medium / Low	No change	Implement Soil Management Plan to ensure restoration to agriculture	Neutral
Soils for use in landscape measures and habitat creation	Medium	No change	Implement Soil Management Plan to identify suitable soils and to control handling, storage and deployment	Neutral

5.6.10 The impact on agricultural soils is dealt with in Chapter 8 Community and Private Assets. Chapter 8 confirms that a total of 23.71 hectares of agricultural land would be permanently lost as a result of the M1 Junction 19 Improvement, 12.33 hectares of which is defined as Best and Most Versatile (BMV) in terms of its soil quality. Chapter 8 confirms that there is not practical alternative to taking the BMV land. Its overall importance on a national scale is considered to be *Low* and the impact of the loss is considered to be *Low*, verging on *Moderate* resulting in a *Slight Adverse* overall significance.

5.6.11 A further 6.42 hectares would be affected temporarily. Without the measures for soil restoration described in Section 5.5 and Appendix B the effect of this loss would also be *Slight Adverse* but given restoration controlled by a Soil Management Plan the effect upon return to agricultural use would be *Neutral*.

5.6.12 If suitable soils were not available for planting or habitat creation the impact would be *Major Adverse* resulting in a *Large Adverse* effect as the measures could not be provided.

5.6.13 However these impacts can be avoided:-

- Suitable topsoils and subsoils are readily available as set out in the surveys reported in Appendix B.
- Given the implementation of a Soil Management Plan to ensure the appropriate use of plant, storage, soil handling and deployment, soils would be suitable for the establishment of landscape and habitat creation measures with no adverse impact or effect.

Construction Materials

5.6.14 As set out in Section 5.2 Methodology a different approach has been followed for construction materials compared with Geology, Made Ground and contaminated land as described above.

5.6.15 Effects for construction materials are derived from performance benchmarks set by the Contractor, Skanska, either related to this specific project or in the form of company wide key performance indicators (KPIs).

5.6.16 Table 5.13 below sets out the benchmarks and the anticipated performance.

Table 5.13: Construction Materials: Performance Benchmarks

Benchmark	Target	Source	Anticipated Performance	Effect	Comment
Zero export of bulk earthworks materials	0%	Site Specific	0%	Neutral	Material arising from excavations can be accommodated within the project as general fill or in landscape areas
Zero import of bulk earthworks materials	0%	Site Specific	5%	Adverse	A balance of earthworks had been anticipated but constructing Catthorpe Viaduct as an advance maintenance project requires the importation of 20,000m^3 of bulk earthworks materials
Minimise demolition waste going to landfill by reuse of materials available on site or recycling	10% of demolition materials to landfill	Site Specific	10%	Neutral	Quantities of materials are set out in Table 5.9 Site Waste Management Plan. Figure excludes bulk earthworks (above), office and canteen waste (below) and hazardous materials which cannot be quantified at this stage. Assumes demolition material from Catthorpe Viaduct is retained for use in the M1 Junction 19 project
Minimise importation of primary materials	50% of capping layer to be site won material	Site specific	50% if soil stabilisation is found to be permissible and viable. 0% if no stabilisation possible	Neutral Adverse	Capping layer is set as an example. Site won material from recycled demolition works and road planings is also likely to be used for accommodation tracks and footways.
Minimise project waste, i.e. waste from new materials brought on to site	<10% of new materials to landfill by end 2010	Skanska KPI	5%	Beneficial	Segregation of construction material processes would be instigated to promote recycling potential.
% Skanska occupied offices with proactive waste reduction plans	100% of offices by end 2010	Skanska KPI	100%	Neutral	Includes proposed site office

5.6.17 With the exception of the importation of 5% of bulk earthworks materials for the Catthorpe Viaduct Replacement and the possible scenario that soil stabilisation may not be possible, thus preventing the use of site won material as a capping layer, the anticipated effects are *Beneficial* or *Neutral*, with a *Neutral* effect overall. Even if soil stabilisation is not possible it is still considered that the overall effect would be neutral as steps would be taken to at least meet the 10% target of demolition materials going to landfill.

Catthorpe Viaduct Replacement

5.6.18 The above description of impacts and their significance take into account the replacement of the Catthorpe Viaduct which will be carried out in advance of the M1 Junction 19 Improvement.

5.6.19 An assessment of the impacts of the viaduct replacement in its own right as a separate project is included in the Catthorpe Viaduct Replacement Environmental Assessment[40].

Geology

5.6.20 In terms of Geology impacts would be *Negligible* since works would be confined to the existing highway and confined to the creation of embankments on either side of the bridge, using imported material. There would be no impact due to cuttings on below ground deposits, though some foundation construction would be required. Any effects would be *Slight Adverse***]**, though on a much reduced scale compared with the Junction Improvement.

Made Ground and Contaminated Land

5.6.21 With the exception of the highway itself, no areas of Made Ground and Contaminated Ground would be affected. A *Neutral* effect.

Soils

5.6.22 Two areas of agricultural soils would be affected for the proposed site compound (in the same location as the Junction Improvement compound, though covering a smaller area), as well as an area for the storage of materials. The storage area is within the permanent landtake for the Junction Improvement. Together they comprise 2.1 hectares.

5.6.23 Restoration of this land post construction would be carried out as set out in Section 5.5 above, resulting in a *Neutral* effect.

5.6.24 Soils for planting and habitat creation would be re-used from the areas cleared for the bridge reconstruction after temporary storage. A *Neutral* effect.

Construction Materials

5.6.25 As set out above, replacement of the viaduct would require the importation of 20,000m^3 of fill material. However the handling of materials would be as set out for the Junction Improvement, though on a smaller scale, with a *Neutral* effect. This is based on an assumption that where possible, demolition materials arising can be re-used within the main Junction Improvement. Should this not be possible then steps

would still be taken to minimise the amount of waste going to landfill using the measures described.

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5.7 SIGNIFICANCE OF EFFECTS

5.7.1 As detailed in Section 5.6 above, it is not anticipated that there would be any significant adverse effects in terms of materials, taking into account the mitigation measures described in Section 5.5.

Geology

5.7.2 There are no above ground geological features or mining activities to consider. Effects of construction on below ground geological features including those due to cuttings, drainage and flood compensation areas and foundation construction are all regarded as *Slight Adverse*.

Made Ground and Contaminated Land

5.7.3 On the basis of existing data there are not considered to be any significant risks in relation to contamination due to the limited number of former land uses in the vicinity of the site. No direct effect is anticipated on the Cleanaway landfill site.

5.7.4 The effects identified are regarded as *Slight Adverse*, although it is acknowledged that if further risks arise from the Ground Investigation carried out in Autumn 2009, then these would need to be dealt with in accordance with best practice. Potential effects from contaminated run-off and accidental spillages are dealt with in Chapter 9 Road Drainage and the Water Environment and are regarded as *Neutral* once the road is operational.

Soils

5.7.5 The effects on agricultural soils are dealt with in Chapter 8 Community and Private Assets and are regarded as *Slight Adverse*.

5.7.6 No adverse effect is anticipated on soils required for landscape and habitat creation measures, given the implementation of a Soil Management Plan. A *Neutral* effect overall.

Construction Materials

5.7.7 When considered against the benchmarks set out in Section 5.6 which cover the import and export of bulk earthworks materials, waste from demolition and new construction materials, the reduction of primary materials imported and procedures in place to manage office waste, an overall *Neutral* effect is anticipated.

Significance for Planning Policies

Regional Policy

5.7.8 Policies CC1 and EN2 from the West Midlands Regional Spatial Strategy require all new development to minimise energy resource demand and to encourage the efficient use of resources and materials. In addition, the use of sustainable construction techniques and best practice in energy efficient design encourage the construction of climate proofed developments, ensuring their long-term viability in adapting to climate change. The proposed development would accord with regional energy objectives and sustainability principles and would therefore have a *Beneficial* effect on these Regional policy objectives.

5.7.9 Policies QE1 and QE3 from the RSS encourage developers to adopt high standards for sustainable resource use and management, incorporating energy and water efficiency, the use of renewable energy, sustainable construction and drainage, the use of recycled materials, the minimisation of waste where possible. Policy M3 from the RSS goes further to encourage local authorities and developers to recycle and reuse materials on site in construction projects, having regard to the environmental implications of any proposed operations and their overall acceptability. Again, as the proposed development would take energy and sustainability into account it would also have a *Beneficial* effect on these Regional policy objectives.

Local Policy

5.7.10 Policy GP4 of the Rugby Borough Council Local Plan seeks to ensure that development will minimise where possible the amount of energy resources consumed in its occupation and use, including appropriate materials, form and the use of energy efficient, renewable energy technology, whether new or traditional. The proposed improvement to Junction 19 would accord with the principles within this policy where practicable and would therefore have a *Beneficial* effect on this policy objective.

5.7.11 Policy GN1 from the Daventry District Local Plan states that successful development should safeguard the natural resources of the district. Policies 13 and 14 of the North Northamptonshire Core Strategy regarding renewable energy and materials state that development should meet the highest viable standards of resource and energy efficiency and reduction in carbon emissions, be constructed and operated using a minimum amount of non-renewable resources including where possible the reuse of existing structures and materials.

5.7.12 Saved policy RM10 from the Harborough District Local Plan seeks to maintain and protect geological diversity and geological interests within or adjoining development sites, which would be subject to a slight adverse impact as a result of the proposed development. There are no policies from the emerging core strategy that are relevant to materials.

5.7.13 Overall, the proposed improvement to Junction 19 would not have an *Adverse* effect on Regional or Local Policy. The scheme would have *Beneficial* effect on policy GN1 of the Daventry District Local Plan, GP4 of the Rugby Borough Council Local Plan and Policies 13 and 14 of the North Northamptonshire Core Strategy.

Catthorpe Viaduct Replacement

5.7.13 As set out in Section 5.6 above, it is not anticipated that the replacement of the viaduct as a separate project would result in any significance adverse effects. The summary of effects set out above takes into account the viaduct replacement in combination with the Junction Improvement.

5.8 INDICATION OF DIFFICULTIES ENCOUNTERED

5.8.1 In writing this Materials section of the Environmental Statement a number of limitations were identified, which is not unusual in the assessment of geology, contaminated land and materials. The limitations were associated mainly with lack of site data and specific information relating to ground, contaminants, wastes and materials.

5.8.2 The Ground Investigation, carried out in summer 2009, will provide further detailed information relating to the ground conditions across the site, depth and nature of Made Ground, contamination of any Made Ground encountered, groundwater conditions at the site and the composition and geochemical character of any Made Ground or contamination present. In absence of this information the potential for contamination and the degree of severity has been assessed based on previous investigations and information on land use set out in Section 5.4 Baseline Conditions and the likely potential for significance of contamination. It is considered unlikely that significant contamination will be encountered based on the potential sources, and in the event of contamination being encountered, appropriate risk assessments and remedial measures would be sufficient mitigation in any case.

5.8.3 In relation to Construction Materials, the design is still at a relatively early stage and some uncertainty must be attached to both the estimated quantities set out in Table 5.9 Site Waste Management Plan and the anticipated performance in relation to benchmarks set in Table 5.13. As set out in the table two scenarios are presented on the use of site won material as capping layer depending upon the viability of soil stabilisation. This data is based on the best information available at this stage and will be subject to review and monitoring in accordance with the Site Waste Management Plan as the project develops.

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5.9 SUMMARY

5.9.1 This Chapter has considered the potential environmental effects of the M1 Junction 19 Improvement in terms of: -

- Geology
- Made Ground and contaminated land
- Soils
- Construction Materials

5.9.2 As set out in the Introduction, the assessment has taken into account the reconstruction of Catthorpe Viaduct as a maintenance project in advance of the main junction improvement in combination with the improvement and as a standalone project.

5.9.3 The Chapter sets out the objectives for the project in terms of materials and describes the methodology to be followed in assessing the various issues. For Geology, Made Ground and Contaminated Land and Soils, the potential significance of effects is derived from a consideration of the sensitivity or value of the feature and the magnitude of impact anticipated. For Construction Materials the anticipated performance of the project has been considered in relation to a series of relevant benchmarks for bulk materials, waste disposal and reduction in requirements for primary materials.

5.9.4 Detailed impacts and overall effects are set out in Sections 5.6 and 5.7 respectively.

5.9.5 In overall terms no significant adverse effects are anticipated for materials. Effects of construction activities on below ground geology are regarded as *Slight Adverse*. On the basis of existing data it is not considered there are significant risks in relation to contaminated sites. The Cleanaway landfill site can be avoided and in overall terms potential effects are regarded as *Slight Adverse*.

5.9.6 Agricultural soils are dealt with in Chapter 8, Community and Private Assets which confirms a *Slight Adverse* effect. For this Chapter, implications have been considered for soils required for landscape measures and habitat creation. Surveys have identified that there should be no difficulty in obtaining suitable soils for the works and given the application of a Soil Management Plan and a CEMP, the risks of deterioration during handling and storage can be avoided. A *Neutral* effect overall.

5.9.7 The section on Construction Materials estimates the quantities of waste likely to arise and sets out an initial strategy for dealing with them. This process will develop further under the Site Waste Management Plan as the project continues. The Chapter demonstrates that several performance targets on the use and disposal of materials can be met and improved upon and an overall view is taken that the effect of the project would be *Neutral* in this respect. Exceptionally, the import of bulk material required to replace Catthorpe Viaduct, 5% of the total bulk material handled for the scheme, is an adverse effect compared with an initial target of an earthworks balance in terms of export and import.

5.9.8 Uncertainties with regard to the assessment are acknowledged in terms of the ongoing ground investigation and in the estimation of quantities at this stage of the project.

5.9.9 In terms of the objectives set out in the Introduction: -

- The assessment has demonstrated how materials present on site can be used efficiently taking into account waste reduction, reuse and recycling. Some quantitative targets have been set.
- Similarly disposal to landfill can be minimised and the particular target to avoid the export of bulk earthworks can be met.
- No sites designated for their scientific value are affected.
- Measures are being incorporated to prevent the mobilisation or remobilisation of contamination and the Cleanaway landfill site can be avoided.
- Measures have set out to safeguard the quality for soil for reuse.

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