



Revision of DMRB Volume 11 Section 3 Part 11

Geology and Soils Scoping Report

December 2010
Highways Agency

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Abbreviations

Current

AGS	Association of Geotechnical and Geo-environmental Specialists
ALC	Agricultural Land Classification
BGS	British Geological Survey
CCW	Countryside Council for Wales
CLEA	Contaminated Land Exposure Assessment
DEFRA	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
DMRB 11/3/11	Volume 11 Section 3 Part 11 of the DMRB
EA	Environment Agency
EIA	Environmental Impact Assessment
HA	highways Agency
IAN	Interim Advice Note
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
MLURI	Macaulay Land Use Research Institute
MPPW	Minerals Planning Policy Wales
MPS	Mineral Policy Statement
NIEA	Northern Ireland Environment Agency
NNR	National Nature Reserve
PPG	Pollution Prevention Guidance
PPS	Planning Policy Statement
RIGS	Regionally Important Geological/Geomorphological Sites
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
SOAFD	Scottish Office Agriculture and Fisheries Department
SPP	Scottish planning Policy
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TAN	Technical Advice Note
WAG	Welsh Assembly Government

Historic

HMIP	Her Majesty's Inspectorate of Pollution
ICRCL	Inter-Departmental Committee on the Redevelopment of Contaminated Land
MAFF	Ministry of Agriculture, Fisheries and Food
NRA	National Rivers Authority
PPG	Planning Policy Guidance

1. Introduction

1.1 Background

Mott MacDonald has been commissioned by the Highways Agency (HA) to produce a scoping report for the revision of Geology and Soils Guidance contained within the Design Manual for Roads and Bridges (DMRB) Environmental Assessment Volume. Revision of the guidance itself is to be undertaken as a separate task.

The existing guidance on the Environmental Impact Assessment (EIA) of HA Schemes relating to geology and soils can be found in Volume 11 Section 3 Part 11 of the DMRB (DMRB 11/3/11), which was published in August 1994 and has undergone only minor amendments since. It was based on best practice at the time, however it is now out of date in a number of areas and there is a risk that geology and soils aspects of HA projects are currently not being given adequate consideration in the EIA process.

Public bodies such as the HA have a duty to ensure the protection and conservation of geological resources, therefore the guidance needs to be revised to take into account current legislation and best practice.

1.2 Aim of Scoping report

The assessment of geology and geological features is a relatively well established process, however over the last 15 years there have been many developments within our understanding of soil mechanics, processes and interactions with other environmental media. There is also significant potential for overlap with existing guidance within Volume 11, other sections of the DMRB and external guidance. A robust scoping document is required to assess the consequences of these influences and how they impact on the DMRB 11/3/11 and future revisions.

The key aim of this scoping report is to clarify what needs to be considered when assessing the impacts on geology and soils from road schemes and to determine the extent to which existing guidance within the DMRB achieves this. The functions of soils in particular is a complex area, some aspects of which will be covered in other Parts of Volume 11 Section 3. The scoping report will therefore need to assess the interactions with other disciplines, recognising that some functions may be included elsewhere.

A number of topics have been cross-referenced in this Scoping Report (such as geotechnics, drainage, waste etc), though it is recognised that the revised DMRB 11/3/11 will lead only on aspects of geology and soils relevant to EIA and will **not** provide design advice.

1.3 Methodology

There is the potential for overlap between the revised Geology and Soils Guidance and Geotechnical Guidance provided within the DMRB Volume 4. To allow a distinction to be made, this report has been written following the general principle that the DMRB 11/3/11 is concerned with assessing 'the impacts the road has on the geology' rather than 'the impacts the geology has on the road', which is the principle of Volume 4.

The methodology followed in order to result in the production of this Geology and Soils Scoping Report is as follows:

- Review of the DMRB 11/3/11 to identify what is currently contained within the guidance and what its limitations are (**Chapter 2**);
- Initial identification of potential topics to be considered within the new Geology and Soils Guidance and where overlaps may occur with other DMRB Guidance, **to be provided as a basis for consultation (Chapter 3)**;
- Consultation with key consultees (statutory and non-statutory) **to determine which topics should be included from the initial list** produced and which key legislation, policy and guidance should be considered (**Chapter 4**);
- **The incorporation of consultee comments** to provide suggested appropriate topics and guidance to be included in the revised DMRB 11/3/11 and a recommended table of contents produced using all available data and consultation responses (**Chapter 5**); and
- The provision of relevant references (**Chapter 6**).

1.4 Devolved Administration Issues

This Scoping report was commissioned by the Highways Agency but has been developed in partnership and with contributions from the overseeing organisations across the UK. It is planned that this scoping report will be used to help inform the production of UK wide guidance.

2. Review of Existing DMRB Geology and Soils Guidance

2.1 Content of Current Volume 11 Section 3 Part 11

2.1.1 Sections 1 and 2 - Introduction and Details of Statutory Bodies

The current introduction is very brief and provides little background information. Details of statutory bodies are provided, including:

- English Nature – for the identification and notification of Sites of Special Scientific Interest (SSSIs);
- Scottish Natural Heritage – in a similar but wider role to English Nature;
- The Countryside Council for Wales (CCW), and;
- The Environment Service: Countryside and Wildlife, of the Department of the Environment for Northern Ireland.

Other sources of advice and information are provided including the British Geological Survey, Local Authorities, Ministry of Agriculture, Fisheries and Food (MAFF), Scottish Office Agriculture and Fisheries Department (SOAFD) and Macaulay Land Use Research Institute (MLURI).

2.1.2 Sections 3 and 4 - Statutory and Non-Statutory Designated Sites

The only statutory designated sites discussed are Sites of Special Scientific Interest (SSSIs). In terms of non-statutory designated sites, Regionally Important Geological/Geomorphological Sites (RIGS) are identified.

2.1.3 Section 5 - Potential Impact of Road Schemes on Geology and Soils

Direct impacts on geology and soils are briefly discussed, but not in detail and without any guidance on the classification of their significance.

Geological impacts are advised to include impacts on underground workings, hydrogeology and protected features such as SSSIs, while soil impacts are noted to include direct impacts on agricultural soils, seed banks, palaeoenvironmental remains and on soils from air borne and spray pollutants.

Contaminated land is considered in a separate paragraph, where the requirement for careful analysis is mentioned.

2.1.4 Section 6 - Mitigation

Limited information is provided on mitigation for geology other than the recommendation that new roads are sited carefully and suitable engineering techniques are used to limit impacts.

The mitigation of soils impacts is not discussed, with the exception of contaminated land, where the potential requirement for treatment is mentioned, although not in detail.

2.1.5 Section 7 - Stage of Assessment

In this section three stages of assessment are discussed:

- The first to identify geology and soils constraints identified with particular routes or corridors;
- The second to undertake sufficient assessment to identify the factors and the significance of effects upon them, and;
- The third, to undertake sufficient assessment of the preferred route to identify any significant impact on geology and soils.

2.2 Limitations of Existing Guidance

The existing guidance has not been revised since it was published in 1994 and is now out of date in a number of areas; these are discussed in the following sections.

2.2.1 Statutory and Non-Statutory Bodies

Statutory bodies listed in the original document are very limited and largely outdated. Many new statutory bodies have been created since the Guidance was first written, while others have changed names or no longer exist, for example:

- English Nature ceased to exist in October 2006. It was integrated with parts of both the Rural Development Service and the Countryside Agency from 1st October 2006, to form a new body called Natural England;
- The Environment Agency (for England and Wales) came into existence in April 1996 and was not a regulatory body when the Guidance was first written. It took over the roles and responsibilities of the National Rivers Authority (NRA), Her Majesty's Inspectorate of Pollution (HMIP) and the waste regulation authorities in England and Wales. The Scottish Environment Protection Agency (SEPA) was established at the same time and is responsible for the protection of the natural environment in Scotland;
- The Environment Service: Countryside and Wildlife (ES: CW) Department of Environment for Northern Ireland (DoENI) – This body no longer exists and its role has been amalgamated into the Northern Ireland Environment Agency (NIEA) (formed in July 2008). The NIEA replaced the former Environment and Heritage Service (EHS) and covers all environmental areas; and
- MAFF was dissolved in 2002, at which point its responsibilities had been merged into the Department for Environment, Food and Rural Affairs (Defra). Although Defra only work directly in England, they work closely with the devolved administrations in Wales, Scotland and Northern Ireland.

The majority of the key current statutory and non-statutory consultees and sources of information included in the current DMRB 11/3/11 are therefore now not relevant.

2.2.2 Statutory and Non-Statutory Designated Sites

SSSIs/ASSIs (statutory sites) – the legislation referenced under which SSSIs are protected is outdated. SSSIs were originally set up by the National Parks and Access to the Countryside Act 1949, but the current legal framework for SSSIs is provided by the Wildlife and Countryside Act 1981, amended in 1985 and further substantially amended in 2000 (by the Countryside and Rights of Way Act 2000), in Scotland by the Nature Conservation (Scotland) Act 2004. The official nature conservation bodies for the United Kingdom now comprise Natural England, Northern Ireland Environment Agency, Scottish Natural Heritage and the Countryside Council for Wales.

The statutory and non-statutory designated sites mentioned are very limited and it is not recognised that geology and soils can directly impact other environmental areas, for example ecological habitats, buried cultural heritage resources, groundwaters and the surrounding land, surface water and air. Therefore it is likely that many of the site designations that could be impacted by geology and soils are not included in this section.

2.2.3 Lack of Identification of Appropriate Legislation, Policy and Guidance

Over the sixteen years that have passed since the original DMRB 11/3/11 was written, an abundance of legislation, policy and guidance has been released that will directly impact the environmental assessment of geology and soils.

The original guidance contained very limited references to legislation; a review of pertinent legislation would therefore be considered essential.

2.2.4 Limited Impact Identification and Mitigation

The existing guidance on the identification of impacts and appropriate mitigation measures is very limited, with soils in particular being poorly represented, especially for mitigation. The functions of soils are not considered and the contaminated land guidance is vague. Impacts are mentioned, but not defined and there is no guidance provided for assessing the significance of impacts.

To identify all relevant impacts and mitigation details required for the revised DMRB 11/3/11, a review of all potential impacts and overlaps with other guidance would have to be undertaken and associated likely mitigative measures identified.

2.2.5 Changes to Assessment Approach

In August 2008, guidance on the approach to environmental impact assessment contained in Section 2 of Volume 11 was revised. As a result, Part 11 no longer reflects the current consequential approach to environmental impact assessment comprising scoping, simple and detailed assessments.

3. Identification of Relevant Topics

The scope of assessment for geology and geological features appears to be fairly straight forward and there do not seem to be any significant conflicts with guidance elsewhere, although there is the potential for overlap on geotechnical and hydrogeological issues.

However, the position for soils is less clear as there appears to be significant scope for overlaps with existing guidance both within Volume 11, the rest of DMRB and externally. It is now recognised that soils can perform a range of functions although not all soils can perform all functions to the same extent. There has been a range of new guidance released over the past ten years including:

- In 1999, the UK Government gave a commitment in its Sustainable Development Strategy “*A Better Quality of Life*” to ensure soil received equal protection to that of air and water;
- In 2001 the Scottish Environment Protection Agency (SEPA) published its “*State of the Environment*” Report for Soils, and in 2004 the Environment Agency did the same for England and Wales;
- The publication of Defra’s first “*Soil Action Plan*” (2004) and the “*EU Thematic Strategy on Soil Protection*” (2006) has developed knowledge on the role and function of soils and, consequentially, its value; and
- In May 2009, The Scottish Government published its Soil Framework.

The Environment Agency’s report “*The State of Soils in England and Wales*”, the “*Scottish State of the Environment Report for Soils*” and the “*Scottish Soil Framework*” all identify the same key primary functions of soil (although they are grouped slightly differently in each report), namely:

- Support of ecological habitat and biodiversity;
- Food and fibre production;
- Environmental interaction (the interface between air, land and water) including the consideration of carbon stores and sinks;
- Providing a platform for construction;
- Providing raw materials; and
- Protecting cultural heritage.

While at first glance the relevance of these soil functions to HA schemes may not be apparent, when considered in more detail the impacts of a road on geology and soils, the interactions between roads, geology, soils and the wider environment become apparent. This is represented in the Conceptual Model Drawing provided in Appendix A.

It appears that a sensible approach would be for the revised guidance for soils to focus on the environmental impacts of highways projects on these functions, while avoiding conflicts with existing

guidance. The key impacts will be different for construction and maintenance projects, however to consider this further at this stage would be beyond the scope of this document.

This has been used as a basis for consultation to identify the key topics to be considered for inclusion in the revised Volume 11 Section 3 Part 11.

3.1 Geology Topics

The following topics can primarily be considered to be of geological origin.

- **Geology and Geomorphology** – This can be considered to include the more ‘traditional’ geological aspects including protected sites like SSSIs, RIGS and similar and impacts of schemes physical geology issues such as mining.

SSSIs

The selection of Geological SSSIs is different to the selection of biological SSSIs. It has been undertaken by academic geological specialists reviewing literature and choosing the most important sites for each geological topic. Each of these sites is published in the Geological Conservation Review (GCR), becoming a GCR site. All GCR sites are notified as geological SSSIs, of which there are two principal types:

1. Exposure sites: Where access to quarries, cuttings, cliffs or other exposures has been made feasible. If the exposure becomes obscured, the feature could in principle be re-exposed elsewhere.
2. Deposit sites: Sites such as these are generally limited in extent or particularly delicate (e.g. caves, sediment lenses). If such features become damaged they cannot be recreated and must be protected from erosion or other damage.

RIGS

RIGS are non-statutory sites that do not enjoy the legal protections of SSSI's or NNR's. In England they are called 'Local geological Sites', In Scotland they are called 'Local Geodiversity Sites' and in Wales they are called 'Regionally Important Geodiversity Sites'. However, it should be noted that the term 'Regionally Important Geological/Geomorphological Sites' (RIGS) has been in usage now for many years and is still used to describe Local Geological/Geodiversity Sites and should be regarded as synonymous.

- **Raw Materials** – This topic includes several different aspects. The presence of geological resources (e.g. sands, clays, coal measures) present at a site which may potentially be sterilised by a scheme need to be considered. In addition, the potential for re-use of excavated materials both on-site and off-site is an important aspect.
- **Geotechnical** – The implementation of a road project will utilise soils and underlying geological strata in providing a platform for construction. In doing so it will prevent it from being used for other construction purposes and so will have an impact on strategic or local plans (this may be considered to be a planning aspect). In addition, geohazards may impact upon the progression of road schemes.

- **Hydrogeology** – Schemes have significant potential to adversely impact on groundwaters. Groundwaters can be affected in several different ways; groundwater baseflow supplying surface water courses and abstractions can be impacted, as can its quality – particularly in designated vulnerable zones. Any changes to groundwater levels can also have ecological impacts on groundwater fed ecosystems such as wetlands, fens and marshes.

3.2 Soils Topics

The following topics are primarily concerned with soils.

- **Biodiversity** – Impacts on soils can have impacts on dependent habitats and associated biodiversity. Soil can support a range of organisms and support diversity in its own right with the presence of seed banks and microbiological resources.
- **Cultural Heritage** – The disturbance, stripping and removal of soil could have an impact on buried archaeological resources, either through their direct removal or the removal of their protective medium (i.e. soils). There is also the potential for the direct disturbance of palaeoenvironmental remains.
- **Biomass Production** – This relates to the contribution soil makes to agricultural production and the way in which the quality of the soil (which is generally linked to underlying geology) influences agricultural land quality along with potentially supporting forestry.
- **Environmental Interactions** – Soils play an important role as the interface between water, land and air. Deposition from the air pollution can lead to soil contamination and in turn contamination to water. Water can cause significant erosion of soils which can in turn impact on the ability of soils to act as a sink for carbon, support agricultural production or protect groundwater. Soil characteristics can influence drainage, flood risks, groundwater vulnerability and the risks of suspended solid pollution. There is also the potential for soils to be carbon sources.
- **Land Quality** – The presence and disturbance of potentially contaminated land can have significant human health and environmental (including controlled waters) impacts. Contaminated sites may require remediation to ensure a site is fit for purpose and that development of a site does not lead to the mobilisation of contamination off-site or to sensitive receptors. Remediation has the potential to generate waste materials which will require classification and treatment/disposal.

3.3 Summary of Relevant Topics

Potential topics to be considered for inclusion by consultees during the consultation process for the revised DMRB 11/3/11 are summarised in Table 3.1.

Table 3.1: Summary of Geology and Soils Topics for Consideration

Topic	Aspect
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)
	Mining (historic/current)
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)
	Re-use of excavated materials on site
	Re-use/disposal of excavated materials off-site
Geotechnical	Platform for construction
	Prevention of use for other construction purposes
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)
	Groundwater quality and vulnerability
	Groundwater fed ecosystems
Biodiversity	Ecological habitat
	Soil layer biodiversity (seed bank, microbiological etc)
	Food chain
Cultural Heritage	Evidence of cultural heritage
	Protection of cultural heritage
	Palaeoenvironmental remains
Biomass Production	Agriculture (land class etc)
	Forestry
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)
	Soil as a buffer zone
	Soil and pollutants
	Soil/geology and drainage/flood risk
Land Quality	Contaminated land
	Human health and environmental risks
	Remediation
	Waste classification and disposal

3.4 Potential for Overlap with Other HA Guidance

It has been noted that (particularly for soils impacts) there is the potential for duplication of the relevant topics identified in Table 3.1 with the other Parts in Volume 11 Section 3 of the DMRB, along with additional HA guidance. The content of, and potential for overlaps with, other pertinent HA guidance have been summarised in the following sections.

It should be noted that new guidance is emerging all the time – it is therefore essential to ensure that the potential for overlap has not changed when progressing to the next stage of drafting the revised DMRB 11/3/11.

3.4.1 Part 2 HA 208/07 Cultural Heritage

The existing guidance in the DMRB Volume 11 Section 3 Part 2 Cultural Heritage (HA208/07) considers the impact on archaeological deposits, historic land use patterns and landscape elements due to the

removal and disturbance of soils for the purposes of excavations, topsoil stripping and topsoil removal (paras 4.9-4.11). HA208/07 is inherently concerned with the function of soil as a protective medium for archaeological remains and notes the importance of geology (paras 7.1.3, 7.1.8) when assessing the historic landscape character of a site.

Although the existing guidance briefly mentions the procedure for assessing the presence of palaeo-environmental remains (para 4.1.7) consideration of impacts on pre-human geological deposits is minimal. Additionally, while it considers designated sites with cultural heritage value, there is no specific consideration of potential impacts to historic mines and quarries, which often have high geological importance.

In HA208/07 it suggested that geological and archaeological investigation of a site could be coordinated for road schemes (para 5.7.13). The guidance deals with invasive methods of archaeological field survey that might also be used for geological survey. For instance, trial pitting, the installation of boreholes and geological sampling may be capable of integration with preliminary archaeological investigation. Standing buildings in the site vicinity may also provide geological evidence. It would be useful to highlight that these activities need not be undertaken in isolation from each other.

It is difficult to see how impacts on soil in this context could be evaluated without reference to the Cultural Heritage guidance in HA 208/07.

3.4.2 Part 4 Ecology and Nature Conservation

The existing guidance in the DMRB on ecology and nature conservation can be found in Volume 11, Section 3 Part 4, which is currently being revised by others. While the guidance considers the impacts on habitats and biodiversity directly supported by soils, there is little consideration given to soils directly.

The guidance does not consider the importance of soil as a microbiological habitat and the potential impacts that construction schemes may have on soil ecosystems. Although geological features are covered briefly in the guidance within the discussion on designated sites (paras 1.1, 3.3), there is no specific guidance on the importance of geo-diversity within nature conservation.

Specific topics relevant to geology and soils which *are* covered in the existing guidance include the impact on flora due to salt deposition on soil from road de-icing spray (para 5.1(i)) and inadvertent, or deliberate, movement of seed banks to and from protected areas via soil translocation (para 6.2(i)). The guidance also briefly touches on the importance of local hydrogeology and how *“changes in the flow and volume of sub-surface water”* can impact on wetland habitats (para 5.1(d)).

The draft Interim Advice Note (IAN) produced for the new Ecology and Nature Conservation Guidance has been made available, which provides direction on natural resource valuation, characterisation of ecological impacts and determination of significance of effects.

Within the DMRB Vol 11 Section 3 Part 4 working draft the following references to geology and soils are included: Geological features of SSSIs are mentioned in the context of EclA providing an opportunity to deliver statutory duties (para 2.5); Changes in soils, hydrology and abiotic conditions are discussed as an example of indirect impacts that can impact ecology and nature conservation resources e.g changes in abundance and species composition; and Gathering information on the receiving environment, including soils, is recommended as part of Scoping (Annex 2).

3.4.3 Part 5 Landscape Effects

The existing DMRB Volume 11 Section 3 Part 5 guidance on landscape effects has not been updated since 1993 and does not discuss impacts on geology or soils in any detail. Consequently the likelihood of overlap is minimal. However, the guidance does note the importance of underlying geology (paras 1.1, 3.11(a)) and historical landforms on the landscape of an area and recommends that the geology and landform of an area should be taken into account when assessing the impact of a scheme on the surrounding landscape.

3.4.4 Part 6 Land Use

The existing information on Land Use in the DMRB Volume 11 Section 3 Part 6 is to be revised and renamed as 'People and Communities' guidance. Part 6 currently includes advice on agricultural land quality (para 7.1) which is inherently associated with soils and the underlying geology of an area. However, other than their impact on land quality, geology and soils are not considered in any specific detail.

It is understood that Agricultural Land Classifications (ALC) are not to be included in the revised People and Communities guidance, consequently there is potential for these classifications to be included in the revised DMRB 11/3/11. The presence of forest assets is not considered within the existing Part 6 and it is not known if it is to be considered within the revised guidance. It would seem likely that forestry issues, while dependent on suitable soils, would fit better with People and Communities.

The links to the People and Communities guidance will need to be monitored to minimise possible areas of overlap as the revised document develops.

3.4.5 Part 10 HD 45/09 Road Drainage and the Water Environment

The existing DMRB Volume 11 Section 3 Part 10 – Road Drainage and the Water Environment (HA216) provides many of the tools to assess the impacts of flooding and road run off. Soil does feature to an extent in these assessments.

The existing guidance discusses the role of soil as an attenuating medium for potential groundwater pollutants relating to road drainage (para 2.23) and briefly considers the movement of wind blown soils from adjacent land (para 3.5). It also considers the impact on groundwater fed ecosystems (para 3.7) from groundwater pollution and the impact of soil and rock mineralogy on groundwater pollution risk (3.21).

HD45/09 uses hydrogeological information, such as the presence of groundwater abstractions and conveyance of flows to assess the potential impacts to the water environment and so is concerned with groundwater, which is considered as a baseflow supplier for surface water bodies. However, the guidance is predominantly concerned with pollution of surface and groundwaters from road runoff and spillages and does not consider in detail groundwater quality and the interactions between site geology, soils and groundwater.

There is the potential for overlaps with this guidance in the revised DMRB 11/3/11, however there are also areas not currently covered in either, specifically relating to groundwater quality impacts.

3.4.6 Part 12 Impact of Road Schemes on Policies and plans

As the existing Policies and Plans guidance located in the DMRB Volume 11 Section 3 part 12 is to be incorporated into the individual topic guidance, this issue will need to be addressed in the revised DMRB 11/3/11.

3.4.7 Materials

Guidance on the use and sustainability of raw materials including soils is to be covered by the new Materials Part of DMRB Volume 11 Section 3, which is currently under production. The minimisation and management of wastes including wastes soils is also believed to be included in the forthcoming guidance on Site Waste Management Plans (SWMPs).

An IAN produced for the new Materials DMRB Guidance summarises the proposed content of the document, which will cover material resources and waste. The definition of material resources encompasses the materials and construction products required for the construction, improvement and maintenance of the trunk road network. Material resources include primary raw materials such as aggregates and minerals, and manufactured construction products. Many material resources will originate off site, purchased as construction products, and some will arise on site such as excavated soils or recycled road planings. The IAN does not specifically discuss geology and soils although the potential environmental impacts associated with material extraction (such as depletion of non-renewable resources) are noted. However, it is not believed that the new Materials Guidance will address the impacts of development on the potential sterilisation of geological resources. There was also no mention made of materials carbon calculations within the draft IAN.

The proposed content of the new Materials Guidance should be monitored as it develops to ensure overlap between it and the revised Geology and Soils Guidance is minimised.

3.4.8 DMRB Volume 4 Geotechnics and Drainage Section 1 Earthworks

The Geotechnics Guidance in DMRB Volume 4 Section 1, in particular Standard HD22/08 (Managing Geotechnical Risk), provides the procedures to be followed to assess the geotechnical risks associated with HA schemes. This includes the suitability and use/reuse of soils and geology as a raw material for earthworks and as a substrate for structures and pavements.

HD22/08 Managing Geotechnical Risk

HD22/08 is a standard for reporting geotechnical information which refers to aggressive soil chemistry (e.g. sulphate concentration) (App E), the on site hydrogeology (para 5.5), engineering properties of soils (e.g. compressibility and shear strength) (App C) and the presence of underlying geological formations. The standard also briefly mentions the potential impact of contaminated soils on construction schemes (1.10, 1.11, 5.5).

It may be considered that the degree to which the geology and soils provide a suitable geotechnical medium and geotechnical risk assessment are purely an engineering design area rather than one for consideration within the environmental assessment, and as such are not appropriate to be included within the revised DMRB 11/3/11.

HD41/03 Maintenance of Highway Geotechnical Assets

DMRB Standard HD 41/03 (Maintenance of Highway Geotechnical Assets) provides guidance on geotechnical inspection, recording and risk assessment. It should be noted that this guidance is currently being revised.

HA73/95 Site Investigation for Highway Works on Contaminated Land

See Section 3.4.10.

3.4.9 DMRB Volume 4 Geotechnics and Drainage Section 2 Drainage

Additional pertinent guidance of highways drainage is provided within the DMRB Volume 4 Section 2 which includes:

- HA 103/06 Vegetative Treatment Systems for Highway Runoff
- HA 107/04 Design of Outfall and Culvert Details
- HA 118/06 Design of Soakaways
- HA 119/06 Grassed Surface Water Channels for Highway Runoff

The guidance relates specifically to design issues rather than EIA, subsequently the potential for overlap is considered to be minimal. It is recommended that this is addressed in greater detail during the next stage of 11/3/11 development.

3.4.10 Land Quality

The DMRB Standard HD22/08 includes procedures for geo-environmental assessments and supported by HA73/95 “*Site Investigation for Highway Works on Contaminated Land*”, provides advice on the investigation and environmental assessment of contaminated land. It is understood that further guidance is planned on contaminated land investigations and it is anticipated that HA73/95 will be withdrawn.

The existing HA73/95 contains advice regarding the pollution of waters due to disturbance or presence of contaminated land (paras 5.3, 6.13, 10.5), the risks posed to human health (paras 1.1, 2.2, section 6) and the environment from contaminated land (paras inc 1.5, 1.6, 2.2, 3.16) and the limited potential for re-use of contaminated soils (paras 3.16(iv, (v))). It also describes the interactions between contaminants and soil, and the potential for the creation of toxic or explosive gases due to the degradation of organic soil components or microbial activity within the soil (paras 3.11, 6.4(vii), 6.16, 7.11).

HA73/95 dates from 1995 and since this time there have been significant changes to the investigation, assessment, reporting and remediation of potentially contaminated sites. Part 2A of the Environmental protection Act 1990 came into force in the UK in 2000 providing the legislative framework for the identification and remediation of contaminated land, introducing for the first time a statutory definition of contaminated land.

The guidance is out of date in many areas, for example it references the withdrawn Inter Departmental Committee for the Redevelopment of Contaminated Land (ICRCL) standards, refers to regulatory bodies

which no longer exist and was written before the current EA/Defra Contaminated Land Exposure Assessment (CLEA) guidance for soils or Remedial Targets Methodology for groundwaters was produced. In addition the methodology does not cover the currently accepted method of producing conceptual models to identify source-pathway-receptor linkages and no information is provided on the formation of remediation strategies.

While this guidance is out of date, there is essentially no other guidance within the DMRB which sufficiently covers the environmental assessment of risks relating to land quality from HA schemes. However, there is external guidance available, most importantly BS10175 (Investigation of potentially contaminated sites: Code of practice) the CLEA Framework and Remedial Targets Methodology.

- BS10175 is the key guidance document in the UK for the investigation of potentially contaminated sites or where there are naturally elevated concentrations of potentially toxic substances. It is wider in scope than much of the other UK guidance on the investigation of potentially contaminated sites and is referenced in guidance documents produced by industry, local authorities, the EA, Defra and a range of other bodies. It is also currently under revision.
- The EA/Defra CLEA project develops tools that provide a government supported methodology that can be used to help estimate the risks to people from contaminants in soil on a given site over a long duration of exposure. It provides levels of contamination in soil below which the risks are considered minimal and provides a starting point to help assess risks, for instance under Part 2A of the Environmental Protection Act 1990. The key report is Contaminated Land Report (CLR) 11 "Model Procedures for the Management of Land Contamination" (EA/Defra, 2004).
- Remedial Targets Methodology Hydrological Risk Assessment for Land Contamination (produced in 2006 by the EA, with the support of SEPA and the Northern Ireland Heritage and Environment Service) for the assessment of risks to the aquatic environment – this is one of the tools supporting CLR11.

3.4.11 Other Guidance

Air quality guidance in HA207/07 considers air pollutant impacts on soils in designated sites through air quality protection for the environment/habitats and ecosystems. Construction dust is also considered although no specific mention of soil is made.

Climate change and soils' role as a carbon sink is not considered in current EIA guidance. The significance of this issue will need to be considered in the revision.

Geodiversity conservation is a fundamental part of nature conservation, but is not currently covered within the DMRB guidance. Volume 10 – Environmental Design and management includes nature conservation and biodiversity, but does not consider geo-diversity.

4. Consultation

4.1 Issues addressed

Initial consultation was undertaken in July 2010. Twenty-four key statutory and non-statutory consultees were sent a consultation form asking for their comments on the identified topics for consideration, along with any comments on other issues to be addressed by the revised Guidance (see Appendix B for an example consultation letter and form) and additional legislation/emerging research to be aware of.

Further consultation should be undertaken with key consultees once the scoping report has been finalised.

4.2 Key consultees

The statutory and non-statutory bodies consulted are listed below in alphabetical order:

- Association of Geotechnical and Geoenvironmental Specialists (AGS)
- British Geological Survey
- CADW
- Coal Authority
- Countryside Council for Wales (CCW)
- Department for the Environment Food and Rural Affairs (DEFRA) soils team
- English Heritage
- Environment Agency (EA)
- Environment Agency (Wales)
- Forestry Commission
- GeoConservation UK
- Geological Survey of Northern Ireland
- Highways Agency
- Historic Scotland
- Institute for Environmental Management and Assessment (IEMA)
- Joint Nature Conservation Committee
- Natural England
- Northern Ireland Environment Agency
- Northern Ireland Roads Service
- Scottish Natural Heritage
- Scottish Environment Protection Agency (SEPA)
- Soil Association
- Transport Scotland
- Welsh Assembly Government (Transport)

4.3 Consultee responses

Out of the twenty-four statutory and non-statutory bodies consulted, fourteen participated in the consultation process. Individual consultee responses can be found in Appendix C. Details of the consultees who responded have been provided in Table 4.1, grouped based on their area of expertise:

Table 4.1: Consultees Contacted – Respondees are Highlighted in Grey

	Transport Environment	Cultural Heritage	Biodiversity/Biomass	Geology	Soils	General Environment
Consultees	Welsh Assembly Government (Transport)	English Heritage	Scottish Natural Heritage (SNH)	British Geological Survey (BGS)	Department for Environment, Food and Rural Affairs (Defra)	Environment Agency (EA)
	Transport Scotland	Cadw	Natural England	Association of Geotechnical and Geo-environmental Specialists (AGS)	The Soil Association	Environment Agency (Wales)
	DRD (N.Ireland) Roads Service	Historic Scotland	Countryside Council for Wales (CCW)	Geological Survey of Northern Ireland		Scottish Environment Protection Agency (SEPA)
	Highways Agency	NIEA - Cultural Heritage	Forestry Commission	The Coal Authority		Northern Ireland Environment Agency (NIEA)
				GeoConservation UK (Association of UK RIGS Groups)		Institute of Environmental Management and Assessment (IEMA)
						The Joint Nature Conservation Committee

It should be noted that several of the major environment consultees did not respond within the allocated consultation period. However, there will be additional time provided for consultation and for consultee opinions to be taken into account at the next stage of the revised DMRB 11/3/11 development.

4.4 Results of Consultation

The results of the consultation exercise regarding the content of the revised DMRB 11/3/11 are summarised within Table 4.2. It details consultee opinions on the topics and aspects of geology and soils suggested for inclusion, which should be scoped in or out and any comments they may have regarding the scope of inclusion/exclusion of each topic.

Table 4.2: Consultation Results relating to Topics for Inclusion

Topic	Aspect	Of the Opinion that Impacts <u>ARE</u> to be Considered in Revised Geology and Soils Guidance	Comments from Consultees	Of the Opinion that Impacts <u>ARE NOT</u> to be Considered in Revised Geology and Soils Guidance
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	BGS, DEFRA, DRD Roads Service, EA Wales, Forestry Commission, JNCC (inferred from guidance document provided), Natural England (Geology), Transport Scotland, WAG	<ul style="list-style-type: none"> •BGS – Very important to ensure SSSIs are protected and local authorities & amateur/professional societies are engaged in process at an early stage. 	-
	Mining (historic/current)	BGS, DEFRA, DRD Roads Service, English Heritage, EA Wales, JNCC (inferred from guidance document provided), Natural England (Geology), Transport Scotland, WAG	<ul style="list-style-type: none"> •BGS – It is vital to ensure that unforeseen ground conditions are minimised. •English Heritage – Have interest in historic mining and extraction. •Transport Scotland - Mining should be considered to the extent that it has altered the underlying geological baseline. Their view is that mining as an activity should be covered elsewhere in Volume 11 as a land use activity (i.e. in the developing advice note for People and Communities). 	-
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	BGS, DEFRA, DRD Roads Service, JNCC (inferred from guidance document provided), Natural England (Geology), Transport Scotland, WAG	<ul style="list-style-type: none"> •BGS – Vital to ensure that resources are not sterilised and where possible local resources can be used in construction. 	-
	Re-use of excavated materials on site	DEFRA, DRD Roads Service, EA Wales, Forestry Commission, Natural England (Geology), Transport Scotland	<ul style="list-style-type: none"> •Transport Scotland – To the extent that re use of such materials on site affects the soil quality or geological resource. Otherwise it should be considered within the developing Materials advice. 	<ul style="list-style-type: none"> •WAG – Will be covered by Vol11 Section 3 (materials)
	Re-use/disposal of excavated materials off-site	DEFRA, DRD Roads Service, Wales, Natural England (Geology)	-	<ul style="list-style-type: none"> •Transport Scotland – Off-site materials/resource use is not strictly an impact on geology and soils and should be dealt with in the Materials advice. •WAG – will be covered by Vol11 Section 3 (materials)

Topic	Aspect	Of the Opinion that Impacts <u>ARE</u> to be Considered in Revised Geology and Soils Guidance	Comments from Consultees	Of the Opinion that Impacts <u>ARE NOT</u> to be Considered in Revised Geology and Soils Guidance
Geotechnical	Platform for construction	BGS, DEFRA, DRD Roads Service, EA Wales, Forestry Commission, JNCC (inferred from guidance document provided), WAG	<ul style="list-style-type: none"> •BGS – Vital to ensure that unforeseen ground conditions are minimised 	<ul style="list-style-type: none"> •Transport Scotland – Whilst one of the regularly quoted functions of a soil is to provide a development platform, we do not consider that in the context of EIA this is a legitimate part of the assessment of effects of the project on geology and soils. The degree to which the soils in the project study area provide a suitable geotechnical medium is a matter for the engineering design rather than for environmental assessment.
	Prevention of use for other construction purposes	DEFRA, DRD Roads Service, EA Wales, Transport Scotland, WAG	<ul style="list-style-type: none"> •Transport Scotland – Although this is a planning/zoning issue, it should probably be considered now that DMRB Vol 11 is moving towards inclusion of planning policy issues within each technical area (rather than in a single policies and plans section as currently). 	-
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	BGS, DEFRA, DRD Roads Service, EA Wales, JNCC - inferred from guidance document provided, Natural England (Geology)	<ul style="list-style-type: none"> •BGS – Very important to understand the hydrogeological properties and groundwater conditions/dynamics within the locality of any development. Would suggest the use of the word levels here. •DRD Roads Service – Recommend it is included but not as a primary area. 	<ul style="list-style-type: none"> •Transport Scotland - The assessment of effects of the project on groundwaters is covered in HD45/09 (Vol 11/3/10 Road Drainage and the Water Environment) therefore it is suggested that these aspects would cause duplication of baselines and impact assessment reporting. •WAG – Covered by Vol 11 Section 3 Road Drainage and the Water Environment (Part 10)
	Groundwater quality and vulnerability	BGS, DEFRA, DRD Roads Service – but not a primary area, EA Wales, JNCC (inferred from guidance document provided), Natural England (Geology)	<ul style="list-style-type: none"> •BGS – Vital to assess the prevailing groundwater chemistry within the locality of any development to establish a baseline against which future impacts can be measured and to ensure that prevailing conditions will not adversely impact on development. It is also very important to ensure that risks to groundwater are assessed to ensure that relevant environmental objectives are not compromised and/or groundwater pollution does not arise. •DRD Roads Service – Recommend it is included but not as a primary area. 	
	Groundwater fed ecosystems	DEFRA, EA Wales, Natural England (Geology)	<ul style="list-style-type: none"> •BGS – Vital to ensure that risk of potential impacts to groundwater receptors – wetlands, abstraction etc – are assessed both at the development/construction stage and post-construction. Would suggest that this is called Groundwater receptors – drinking water abstractions, groundwater dependent ecosystems (terrestrial and aquatic) 	

Topic	Aspect	Of the Opinion that Impacts <u>ARE</u> to be Considered in Revised Geology and Soils Guidance	Comments from Consultees	Of the Opinion that Impacts <u>ARE NOT</u> to be Considered in Revised Geology and Soils Guidance
Biodiversity	Ecological habitat	BGS, DEFRA, EA Wales, Natural England (Soils)	<ul style="list-style-type: none"> Natural England (Soils) – In general terms but presume will be covered in more detail in Part 4. Impacts on 'undisturbed' soils might be considered here. 	<ul style="list-style-type: none"> Transport Scotland – To avoid duplication it is suggested that ecological issues associated with the habitats supported by soils are dealt with under the ecological assessment, with only specific reference in the soils section to the microbiological importance of the soil resource. WAG – Covered by Vol 11 Section 3 Nature Conservation (Part 4)
	Soil layer biodiversity (seed bank, microbiological etc)	BGS, DEFRA, EA Wales, Natural England (Soils), Transport Scotland, WAG	<ul style="list-style-type: none"> DEFRA - Should also include macro-biological. Natural England (Soils) - Important to get over message that soil is 'living' not just a collection of mineral particles and organic matter. However it will be difficult to consider impacts except in general terms (e.g. as part of wider good soil management/maintenance of soil quality). 	-
	Food chain	DEFRA, Natural England (soils)	<ul style="list-style-type: none"> Natural England (soils) – in general terms but presume will be covered in more detail in other sections 	<ul style="list-style-type: none"> Transport Scotland - to avoid duplication it is suggested that ecological issues associated with the habitats supported by soils are dealt with under the ecological assessment, with only specific reference in the soils section to the microbiological importance of the soil resource. WAG – It is an ecosystem function
Cultural Heritage	Evidence of cultural heritage	DEFRA, English Heritage, Historic Scotland, NIEA	<ul style="list-style-type: none"> English Heritage – Needs to take into account deposits dating back nearly 800,000 years and their potential for evidence of very early human activity. 	<ul style="list-style-type: none"> Transport Scotland - generally we consider that archaeological interests should be dealt with under Cultural Heritage with the possible exception of paleoenvironmental remains which, similar to microbiology, are an inherent soils based resource. WAG – Covered by Vol 11 Section 3 Cultural Heritage (Part 2)
	Protection of cultural heritage	DEFRA, English Heritage, Historic Scotland, Natural England (Soils), NIEA	<ul style="list-style-type: none"> English Heritage – Key soil function is the protection of buried archaeological remains. This should be mentioned. Natural England (Soils) – Should be included as a soil function. 	
	Palaeoenvironmental remains	DEFRA, English Heritage, Historic Scotland, Natural England (Geology), NIEA	<ul style="list-style-type: none"> English Heritage – Evidence of past environments crucial to understanding early human activity; considerable cross-over with geological importance. 	

Topic	Aspect	Of the Opinion that Impacts <u>ARE</u> to be Considered in Revised Geology and Soils Guidance	Comments from Consultees	Of the Opinion that Impacts <u>ARE NOT</u> to be Considered in Revised Geology and Soils Guidance
Biomass Production	Agriculture (land class etc)	DEFRA, EA Wales, Natural England (Soils)	•Natural England (Soils) – Should focus on amount and quality of land. Natural England is a source of data and expertise on Agricultural Land Classification. Effects on individual holdings such as severance and need for accommodation works should be dealt with elsewhere (perhaps under updated part 6 'People and Communities'?)	•Transport Scotland - agriculture and forestry are anthropological activities therefore our view is they should be considered as part of land use assessment (and economic activity) within People and Communities.
	Forestry	DEFRA, EA Wales, Forestry Commission	-	•WAG – Covered by Vol 11 Section 3 Landscape (Part 3)
Environmental Interactions	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	BGS, DEFRA, EA Wales, Natural England (Soils), Transport Scotland, WAG	<ul style="list-style-type: none"> •BGS – Vital to ensure that unforeseen ground conditions are minimised in the future once road and associated structures are built (e.g. problems with shrink swell, and activation of relict landslides). •DEFRA – Should also include soil as a carbon source (depending on timescales). •Natural England (Soils) – Impact on peaty and organic soils as carbon stores will be particularly important. 	-
	Soil as a buffer zone	BGS, DEFRA, EA Wales, Transport Scotland	<ul style="list-style-type: none"> •BGS. Vital to ensure that risks to human health and other environmental risks are considered. •Natural England & WAG – Needs defining better. 	-
	Soil and pollutants	BGS, DEFRA, EA Wales, Transport Scotland	<ul style="list-style-type: none"> •BGS. Vital to ensure that risks to human health and other environmental risks are considered. •WAG – Needs defining better. 	-
	Soil/geology and drainage/flood risk	BGS, DEFRA, DRD Roads Service, EA Wales, Natural England (Geology), Natural England (Soils), Transport Scotland	<ul style="list-style-type: none"> •BGS – Vital to ensure that unforeseen events are minimised in the future once road and associated structures are built (e.g. problems with SuDS schemes). •Natural England (Soils) - Impact on water infiltration /aquifer recharge will also be relevant. 	•WAG – Covered by Vol 11 Section 3 Landscape (part 3)
Land Quality	Contaminated land	BGS, DEFRA, DRD Roads Service, EA Wales, JNCC (inferred from guidance document provided), Transport Scotland, WAG.	<ul style="list-style-type: none"> •BGS – Vital to ensure that risks associated with re-development of contaminated land are assessed. •DRD Roads Service – Recommend it is included but not as a primary area. •WAG – Questioned difference between this and soil & pollutants 	-
	Human health and environmental risks	BGS, DEFRA, EA Wales, Transport Scotland	<ul style="list-style-type: none"> •BGS - Vital to ensure that risks to human health and other environmental risks are considered. •Transport Scotland – Only where specific to the issue of land contamination which could be exposed to new receptors and pathways as a result of the project. 	•WAG – Risks to human health are covered by H&S or Health Impact Assessments, not EIA
	Remediation	DEFRA, EA Wales, Transport Scotland	•Transport Scotland – Only where specific to the issue of land contamination which could be exposed to new receptors and pathways as a result of the project.	•WAG – Possible covered by Vol 11 Section 3 Materials (Part 6)

Topic	Aspect	Of the Opinion that Impacts <u>ARE</u> to be Considered in Revised Geology and Soils Guidance	Comments from Consultees	Of the Opinion that Impacts <u>ARE NOT</u> to be Considered in Revised Geology and Soils Guidance
	Waste classification and disposal	EA Wales	-	<ul style="list-style-type: none"> •Transport Scotland - Consider this is not relevant to environmental assessment and should be dealt with elsewhere. •WAG – Covered by Vol 11 Section 3 Materials (Part 6)

Note 1: The Association of Geotechnical and Geoenvironmental Specialists (AGS) agreed with all the proposed topics and provided no specific comments.

Note 2: The Highways Agency is listed as a consultee but not in the table as this is a HA report. This report is therefore considered to be the HA response to consultation, incorporating input from HA specialists.

4.5 Additional Comments

A number of the consultees provided additional general comments on the revision of the Guidance, these are summarised below. **It should be noted that some of the consultees refer to geotechnical topics which may be considered more relevant to the DMRB Volume 4**, however all comments are included for completeness. Topics for inclusion within the revised Geology and Soils Guidance are considered in more detail in Chapter 5.

- **BGS** – *“Consideration should be made of the impact of geohazards such as landslides, effects of shrinking and swelling clays and karstic subsidence. These geohazards can be easily identified, areas of known susceptibility should be highlighted and ensure that unforeseen ground conditions are minimised.”*
- **DEFRA** – *“All of the topics are important issues which should be considered when undertaking impact assessments of roads and bridges infrastructure projects. On the whole, soils are not well considered in the original guidance which covers in more detail geology and contaminated land. More consideration of the value and functions of soil would be useful. An update is therefore important to ensure more comprehensive treatment of the issues.”*
- **Forestry Commission** – *“The following are considered to be emerging issues which need to be considered when writing the Scoping Document:*
 - *Climate Change, mitigation and adaptation;*
 - *Sustainability;*
 - *Carbon emissions reduction, carbon calculators;*
 - *Geotechnical risk registers;*
 - *Peat stability;*
 - *Vehicle variable tyre pressures for reduced bearing;*
 - *Geomembranes/cells;*
 - *Ground penetrating radar;*
 - *Global positioning satellite for plant control;*
 - *Soil cleaning for reuse, and;*
 - *General reduce, reuse, recycle.”*
- **Historic Scotland** – *“Standing buildings may be able to provide geological evidence. Soil test pitting and geological sampling may be capable of coordination/integration with preliminary archaeological investigation for road schemes – it would be useful to highlight that these activities need not be undertaken in isolation from each other. A cross reference to the cultural heritage section of the DMRB would suffice. That section 5.7 of that Guidance deals with invasive methods of archaeological field survey that might also be used for geological survey and the differences between the requirements.”*
- **Natural England (Geology)** – *“What is most important is to ensure geodiversity is considered at the earliest possible point in any planned road development so that it can be appropriately accommodated during works, and where appropriate, in terms of long-term provision of accessible sections.”*

Volume 10 covers nature conservation and biodiversity and this is perhaps where the practical approach to conserving geodiversity should be covered as geodiversity conservation is a fundamental part of nature conservation (Planning Policy Statement 9: biodiversity and geological conservation provides a context for this) and is at the moment not covered in this section.

A cross link with section 5 on landscape would also be worth considering as many issues around landscape will have strong links with geology, soils, biodiversity and the historic environment.

These sorts of cross-links are very important and a lot of work is going into 'Ecosystems' and Ecosystem Services' currently, this may be worth exploring a bit further, certainly as context. Join up and cross-referencing between Parts would be valuable."

- **Natural England (Soils)** – Consider *"the concept of 'ecosystem services' as a way of making linkages between the individual topics. Due to the change in Government the new administration's attitude to soil protection is not completely clear."*
- **NIEA (Cultural Heritage)** – *"Is your proposal to briefly comment on the importance of considering cultural heritage remains, which will be found above, within and beneath the soil and then refer to Part 2 Cultural Heritage for guidance?"*
- **Transport Scotland** – *"The table perhaps slightly underplays the significance of carbon and climate change in the consideration of soils. Scotland in particular (but also parts of England, Wales and Northern Ireland) has some very carbon rich soils which form a carbon sink which is significant in terms of national carbon inventories. Research has shown that climate change and loss of organic matter are the two most significant threats to soils functioning (in Scotland although the report references similar findings from England). Soils are therefore vulnerable not only to loss of carbon/organic matter from development activities, but also from changes in climate, which have the potential to reverse soil function in the carbon cycle from sink to source e.g. from greater erosion, land slips, heat dessication etc. Finally we consider that the role of soils in combating climate change and helping to adapt to it could also be more prominent."*
- **Welsh Assembly Government (Transport)** – *"The final column in the table – some of the aspects considered are "features" as oppose to impacts to be considered. Need to be clear on why an aspect is important for an EIA. Recommend adding "Soil" as an independent topic, to reflect the title of the Guidance."*

4.6 Legislation

4.6.1 Baseline List

In addition to requesting the opinions of consultees on the topics to be considered in the revised DMRB 11/3/11, a shortlist of relevant legislation and policy to be considered was drawn up and consultees asked for their comments in order to identify any additional legislation which should be taken into account. The initial list supplied is as follows:

Roads

- The Design Manual for Roads and Bridges
- Highways Act 1980
- Roads (NI) Order 1993
- Roads (Scotland) Act 1984

General Environmental

- Environmental Protection Act 1990
- Environment Act 1995

Contaminated Land

- Contaminated Land (England) Regulations 2006 SI 1380
- Environmental Damage (Prevention and Remediation) Regulations 2009 SI 153
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 SR 252 as amended
- Waste and Contaminated Land (Northern Ireland) Order 1997 SI 2778 (NI 19) (including updates)
- Contaminated Land (Scotland) Regulations 2005 SSI 658
- Environmental Liability (Scotland) Regulations 2009 SSI 266
- Contaminated Land (Wales) Regulations 2006 SI 2989
- Environmental Damage (Prevention and Remediation)(Wales) Regulations 2009 SI 995
- Dangerous Substances Directive, 76/464/EEC
- Control of Asbestos Regulations 2006

Water Resources

- Water Framework Directive 2000/60/EC
- Groundwater Daughter Directive 2006/118/EC
- The Water Resources Act 1991 (WRA)
- The Groundwater Regulations 1998
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- The Water Environment (Water Framework Directive) (Northern Ireland) Regulations 2003
- The Water Environment and Water Services (Scotland) Act 2003
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended)

Air Quality

- Air Quality Framework Directive
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007 revision)

Cultural Heritage

- Ancient Monuments and Archaeological Areas Act 1979
- Historic Monuments and Archaeological Objects (NI) Order 1995
- The Planning (Listed Buildings and Conservation Areas) Act 1990
- The Planning (NI) Order 1991
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997

Soils

- EU Thematic Strategy on Soils Protection 2006
- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

EIA

- EU Directive 85/337/EEC amended 97/11/EC
- Highways (Assessment of Environmental Impacts) Regulations 1988/1999

Biodiversity

- Wildlife and Countryside Act 1981
- The Conservation of Habitats and Species Regulations 2010

Planning

- Planning Policy Statement (PPS) 1: Planning and Climate Change
- PPS 9: Biodiversity and Geological Conservation
- PPS 23: Planning and Pollution Control (Specifically Annex 2 – Development on Land Affected by Contamination)
- Technical Advice Note (TAN) 5: Nature Conservation and Planning
- TAN 6: Agricultural and Rural Development
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

4.6.2 Additional Legislation recommended

Additional legislation, policies and guidance documents to be considered for inclusion were highlighted by consultees as detailed in Table 4.3:

Table 4.3: Additional Legislation Recommended

Consultee	Legislation
BGS	<p>The Climate Change Act 2008</p> <p>The Flood and Water Management Act 2010</p> <p>Planning Policy Guidance (PPG) 14: Development on Unstable Land</p> <p>Planning Policy Statement (PPS) 25: Flood Risk</p> <p>Mineral Policy Statement (MPS) 1: Minerals</p> <p>Minerals Planning Policy Wales (MPPW) (2001)</p>
DEFRA	<p>Planning Policy Statement 7</p> <p>Code of Practice for the Sustainable Management of Soils on Construction Sites (WRAP, BIS, Defra)</p> <p>Comprehensive coverage of EU legislation should be incorporated (i.e. I don't see mention above of the IPPC Directive?). Must not include the EU Soil Framework Directive (which does not exist).</p> <p>Defra Circular 01/2006 Environmental Protection Act 1990: Part 2A Contaminated Land (though this is under review – plans for public consultation later this year).</p> <p>Guidance on the Legal definition of Contaminated Land (July 2008)</p> <p>Control of Asbestos Regulations 2006</p> <p>Dangerous Substances Directive, 74/464/EEC (which may have been replaced by Directive 2008/105/EC of the European Parliament and of the Council on environmental quality standards in the field of water policy).</p> <p>NB the status of the England Soil Strategy is that it is no longer current following the change of Government this year (it represents a policy statement from a previous administration).</p>

Consultee	Legislation
EA Wales	<p>A Welsh Soils Action Plan will be launched by WAG in the Autumn</p> <p>Planning Policy Wales</p> <p>TAN 5 Nature and Planning conservation</p> <p>TAN 15 Development of Flood Risk</p> <p>TAN 18 Transport</p> <p>TAN 21 Waste</p>
Forestry Commission	<p>Quarries Regulations 1999</p> <p>Aggregates Levy</p> <p>CDM regs 2007</p> <p>Climate Change Acts 2008 2009</p> <p>Flood Risk Management (S) Act 2009</p> <p>Flood and Water Management Act 2010</p> <p>CEEQUAL sustainability assessment</p> <p>Eurocodes e.g. 7</p> <p>Pollution prevention & control regs 2008 2009</p> <p>EIA regs 2009</p> <p>Environmental Liability regs 2009</p> <p>Environmental Damage (prevention & remediation) regs 2009</p> <p>Conservation regs 2009</p>
Natural England (Geology)	<p>Geological conservation a guide to good practice.</p> <p>Larwood and Markham, 1995. Roads and geological conservation: a discussion document</p> <p>R679 - The impact of rock fall mesh/netting on scientifically and educationally important geology (2006, Colin Prosser)</p> <p>Defra guidance on Local Sites (formerly known as RIGS), Local Sites – guidance on their identification, selection and management Defra 2006</p>
Natural England (Soils)	<p>PPS 7 Sustainable Development in Rural Areas (Deals with development and 'best and most versatile' agricultural land)</p> <p>Defra's Construction Code of Practice for the Sustainable use of soils on Construction Sites (2009)</p> <p>MAFF (2000) Good Practice Guide for Handling Soils</p> <p>Natural England's Technical Information Note 049 Agricultural Land Classification: protecting the 'best and most versatile' agricultural land</p>
NIEA (Cultural Heritage)	<p>Planning Policy Statement (PPS) 6: Planning, Archaeology and the Built Heritage</p> <p>Environmental good practice for archaeological excavations – NIEA Technical Guidance Booklet. This guidance booklet is currently being redrafted.</p>
Transport Scotland	<p>The Environmental Impact Assessment (Scotland) Regulations 1999 (as amended)</p> <p>W. Towers, I.C. Grieve, G. Hudson, C.D. Campbell, A.Lilly, D.A. Davidson, J.R. Bacon, S.J. Langan and D.W. Hopkins (2006) Scotland's Soil Resource – Current State and Threats, Scottish Executive (2004) Scotland's Biodiversity – It's in Your Hands, Scottish Biodiversity Strategy</p> <p>Proposed EU Framework Directive on the Protection of European Soils.</p> <p>SEPA is due to publish a State of Scotland's Soils report in 2011.</p>
WAG (Transport)	<p>Suggest looking at Planning Policy Wales, Edition 3, July 2010 -</p> <p>The National Parks and Access to the Countryside Act 1949 amended under Wildlife and Countryside Act (1981) and CRoW Act (2000).</p> <p>Part IIA of the Environmental Protection Act (inserted by Section 57 of the Environment Act 1995)</p> <p>Part IIA Statutory Guidance on Contaminated Land (Welsh Assembly Government 2006).</p> <p>The Wildlife and Countryside Act 1981.</p> <p>EA PPG 6: Working at construction and demolition sites (June 2010) – Section 3 Excavations; Section 4 Materials storage, stockpiles and exposed ground.</p> <p>The Air Quality Standards (Wales) Regulations 2010</p>

Consultee	Legislation
HA Specialists	Directive on Ambient Air Quality and Cleaner Air for Europe (transposed through Air Quality Standards regulations 2010) Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007 revision) (in Air Quality (England) Regulations 2000, as amended 2002 and the Devolved Administration equivalents)

5. Conclusions

5.1 Suggested Topics for Inclusion

A summary table of the proposed topics for inclusion, taking into account the initial identification of relevant topics in Chapter 3 and all the consultee responses in Chapter 4 is provided within Table 5.1

5.2 Key Legislation and Guidance

Combining the initial list identified with consultee suggestions, the following is a recommended list of legislation, policy and guidance which will need to be taken into account when revising the DMRB 11/3/11:

Roads

- The Design Manual for Roads and Bridges
- Highways Act 1980
- Roads (NI) Order 1993
- Roads (Scotland) Act 1984

General Environmental

- Environmental Protection Act 1990
- Environment Act 1995
- The Climate Change Act 2008

Geological Conservation

- ST118 - Geological conservation: a guide to good practice
- Larwood and Markham, 1995 – Roads and Geological Conservation: A Discussion Document
- Local Sites – Guidance on their Identification, Selection and Management (Defra 2006)
- R679 – The Impact of Rock Fall Mesh/Netting on Scientifically and Educationally Important Geology (2006, Colin Prosser)

Contaminated Land

- DEFRA Circular 01/2006, Environmental Protection Act:Part 2A Contaminated Land (under review)
- DEFRA Guidance on the Legal Definition of Contaminated Land (2008)
- Part 2A Statutory Guidance on Contaminated Land (WAG 2006)
- Contaminated Land (England) Regulations 2006 SI 1380
- Environmental Damage (Prevention and Remediation) Regulations 2009 SI 153
- Environmental Damage (Prevention and Remediation)(Wales) Regulations 2009 SI 995
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 SR 252
- Waste and Contaminated Land (Northern Ireland) Order 1997 SI 2778 (NI 19) (including updates)
- Contaminated Land (Scotland) Regulations 2005 SSI 658
- Environmental Liability (Scotland) Regulations 2009 SSI 266
- Contaminated Land (Wales) Regulations 2006 SI 2989
- Dangerous Substances Directive, 76/464/EEC
- Control of Asbestos Regulations 2006
- Pollution Prevention Guidelines 6, Working at Construction and Demolition Sites (June 2010)
- Eurocode 7
- Environment Agency CLEA Guidance, Remedial Targets Methodology, EIC/AGS/CL:AIRE Generic Assessment Criteria Report

Table 5.1: Summary of Topics for Inclusion

Topic		Aspect	Impact to be Considered Reference to Other Guidance		Impact Not to be Considered	Potential for Overlap with Other HA Guidance	Suggested Boundaries to be Drawn
Geology: Geology and Geomorphology	Protected sites (Geological SSSIs, RIGS or similar)	✓				-	<ul style="list-style-type: none">Only sites designated specifically for geological value/sites that are specifically dependent on geological conditions should be considered within the revised DMRB 11/3/11.
	Mining (historic/ current)	✓				Cultural Heritage Guidance (HA208/07) People and Communities Guidance (revised Land Use Guidance)	<ul style="list-style-type: none">Mining should be considered where it has altered the underlying geological baseline.Any geohazards caused by mining should be assessed within Volume 4 of the DMRB, while environmental hazards caused by mining (e.g. ground contamination, soil removal) and potential sterilisation of geological resources (discussed in more detail in the raw materials section below) should be assessed within the revised DMRB 11/3/11.If historic mining aspects are present which have cultural heritage significance, the Cultural Heritage Guidance (HA208/07) should be cross-referenced.If current mining has a cultural/economic value to the community, the People and Communities Guidance should be cross referenced.
Geology: Raw Materials	Geological resources (e.g. sands, clays, coal measures)	✓				New Materials Guidance	<ul style="list-style-type: none">The sterilisation of geological resources should be considered within the revised DMRB 11/3/11 relating to the coverage of potential resource sites (natural deposits with economic value) with roads/hardstanding.
	Re-use of excavated materials on site	✓				New Materials Guidance New Site Waste Management Plan (SWMP) Guidance	<ul style="list-style-type: none">The excavation and reuse of geological materials on-site where land quality is NOT an issue (i.e. natural materials) should be covered in the new Materials Guidance.If land quality IS an issue, and material excavation and re-use on site has the potential to adversely impact the human or aquatic environment, its re-use on site should be considered within the revised DMRB 11/3/11 as it is intrinsically linked to contaminated land. However, materials mass balance aspects should be included within the new Materials Guidance.
	Re-use of excavated materials off-site		✓				<ul style="list-style-type: none">The off-site transport of geological materials for re-use elsewhere is more appropriate to be considered within the new Materials Guidance and should be cross referenced accordingly. Likewise the new SWMP guidance should be referenced where appropriate.
Geology: Geotechnical	Platform for construction			✓		DMRB Volume 4	<ul style="list-style-type: none">The provision of a suitable geotechnical medium for construction is a geotechnical engineering issue – HD22 and other geotechnical guidance in Volume 4 of the DMRB should be referenced.Geohazards are considered to be a geotechnical engineering issue and should only be considered within the EIA process if the resultant geotechnical requirements may adversely impact upon sensitive environmental receptors e.g. piling in an area of protected karst landscape.Otherwise, geohazards are recommended to be covered by the geotechnical guidance in Volume 4 of the DMRB and this should be cross-referenced accordingly.
	Geohazards (e.g. landslides, shrinking/swelling clays, karstic subsidence)			✓			
Geology: Hydrogeology	Groundwater levels, flow and supply (gradients, abstractions etc)			✓		Road Drainage and the Water Environment (HD45/09)	<ul style="list-style-type: none">Road Drainage and the Water Environment (HD45/09) considers groundwater quantity – the issues of groundwater levels, flow and supply along with water quality impacts from road drainage. This Guidance should therefore be cross referenced in the revised DMRB 11/3/11. However, HD45/09 does not consider the wider impacts on groundwater from broader pollution sources such as contaminated soils.The impacts of site soils on groundwater quality should therefore be addressed in full within the revised Geology and Soils Guidance e.g. if contaminated soils are present on site which have the potential to adversely impact groundwater quality via contaminant transport pathways created during the construction/operation of the HA scheme.Groundwater receptors should be considered only where they have the potential to be adversely impacted by site soils.Technical issues regarding design of drainage to groundwater should be covered by the DMRB Volume 4 Section 2.
	Groundwater quality and vulnerability	✓					
	Groundwater Receptors (drinking water abstractions, groundwater fed ecosystems, surface waters)			✓		Road Drainage and the Water Environment (HD45/09) Ecology and Nature Conservation Guidance (Part 4)	
Soils: Biodiversity	Ecological habitat			✓		Ecology and Nature Conservation Guidance (Part 4)	<ul style="list-style-type: none">Although ecological habitats can be directly dependent on soils, to avoid duplication with the Ecology and Nature Conservation Guidance, Part 4 should be cross referenced rather than being covered in the revised DMRB 11/3/11.The soil layer biodiversity (including aspects such as microbiological qualities and seed bank preservation) is not currently understood to be considered in the revised Ecology and Nature Conservation Guidance. It can be considered to be an intrinsic property of the soil itself and should be included within the revised Geology and Soils Guidance. However, the revised Ecology and Nature Conservation Guidance should be closely monitored as it develops to prevent overlaps.Soil can be considered to support the base of the land food chain. However as the majority of the food chain is inherently biological in nature, it is considered to be best covered by the revised Ecology and Nature Conservation Guidance to avoid unnecessary overlaps with the revised DMRB 11/3/11.
	Soil layer biodiversity (seed bank, microbiological, macrobiological etc)	✓					
	Food chain				✓		
Soils: Cultural Heritage	Evidence of cultural heritage			✓		Cultural Heritage Guidance (HA208/07)	<ul style="list-style-type: none">The presence of cultural heritage resources within soil layers is considered to be better covered in the Cultural Heritage Guidance which should be referenced. The opportunity to undertake concurrent Cultural Heritage and Geology and Soils intrusive investigations should be noted.Soil as a protective layer over buried cultural heritage assets should be mentioned but the Cultural Heritage Guidance referenced for further information.Palaeoenvironmental remains are an inherent soil based resource. These do not include any human-based remains which would be considered within the Cultural Heritage Guidance. Palaeosols (fossil soils found buried within either sedimentary or volcanic deposits) and other natural soil remains would be covered in the DMRB 11/3/11.
	Protection of cultural heritage			✓			
	Palaeoenvironmental remains	✓					
Soils: Biomass Production	Agriculture (land class etc)	✓				People and Communities Guidance	<ul style="list-style-type: none">Agriculture and forestry are anthropological activities, however Agricultural Land Classification (ALC) is understood not to be included in the revised Land Use Guidance (People and Communities). As ALC is directly related to the soil quality it is therefore recommended to be included within the revised DMRB 11/3/11, focussing on the amount and quality of land.Forestry is less dependent on soil quality and is considered to be more appropriately included within the People and Communities Guidance as a land use with commercial value and/or value to the community.
	Forestry			✓			
Soils: Environmental Interactions	Soil and climate change	✓				None identified	<ul style="list-style-type: none">Soil and climate change is not assessed elsewhere within the DMRB and is considered to be appropriate within the revised Geology and Soils Chapter. Particular impacts should be considered for areas of peaty/organic rich soils. Soil as a carbon sink/source and impacts from loss of vegetation should also be considered.The impacts of road usage and diffuse/acute pollution from spray/spillage etc on adjacent soils and the soil's attenuating capacity for pollutants is briefly discussed in HD45/09 relating to the removal of the upper unsaturated zone reducing the potential for contaminant attenuation. This will need to be covered in more detail within the revised DMRB 11/3/11 and communication between those writing each Section would be required to prevent overlap.Although the type of soils and geology present directly influence the drainage properties of a site, to avoid duplication it is considered best for this to be covered in the Road Drainage and the Water Environment Guidance and referenced accordingly.
	Soil and pollutants	✓				Road Drainage and the Water Environment (HD45/09)	
	Soil/geology and drainage/flood risk			✓			

Topic	Aspect	Impact to be Considered	Reference to Other Guidance	Impact Not to be Considered	Potential for Overlap with Other HA Guidance	Suggested Boundaries to be Drawn
Soils: Land Quality	Contaminated land	✓			HD22 (DMRB Vol 4, Section 2) HA73/95 (DMRB Vol 4, Section 2) DMRB Vol 10 (Environmental Design) External Con Land Guidance New Materials Guidance New SEMP Guidance External Con Land Guidance	<ul style="list-style-type: none"> Land quality needs to be assessed if there is the potential for contaminated soils and/or groundwaters to be present at a HA site where intrusive works are required, or works that will significantly alter the soil/groundwater conditions are to be carried out. To put it another way, it will be necessary to assess impacts relating to land quality at sites where significant pollutant linkages (as defined within Part IIA of the Environmental Protection Act) are present at the site to be developed or significant pollutant linkages are likely to be created during the course of project construction or operation. Current HA land quality guidance is outdated and does not comply with current best practice. External land quality guidance is constantly evolving and therefore this topic will need to be carefully addressed to prevent the revised Part 11 guidance from becoming out of date quickly. To repeat any of this external guidance within HA guidance may lead to confusion and inconsistencies. Therefore, It is recommended that existing best practice <u>external</u> guidance (such as BS10175, the CLEA framework, and Remedial Targets Methodology) is used in the design and implementation of ground investigations for land quality purposes (which would normally to be undertaken in conjunction with geotechnical investigations), and for the subsequent contaminated land risk assessments. It is recommended that the results of the risk assessment following external best practice guidance be summarised within the revised DMRB 11/3/11 and the results used to allow the overall assessment of geology and soils impacts and significance of effects in relation to the HA scheme in question. The requirement for remediation should be included within the revised DMRB 11/3/11 at sites where significant pollutant linkages have been identified or significant pollutant linkages are likely to be created during the course of project construction or operation. i.e. if the soil is found to be unsuitable due to its QUALITY, the remediation of the soil should be included within this DMRB 11/3/11 as a mitigative measure. However, any remediation to be undertaken (and the production of any remediation strategies) should be designed in line with external best practice guidance e.g. CLR11 methodology (and its future revisions). Regarding remediation design, there is the potential for overlap with the DMRB Volume 10 (Environmental Design), which is understood to be due for revision. There is the potential for overlap with the new materials guidance with regards to waste classification and disposal. However the materials guidance is predominantly concerned with new materials to be imported to the site. It is suggested that the boundary between the two parts is as follows: <ul style="list-style-type: none"> Geology and Soils: If soils are found to be unsuitable to remain on site for QUALITY reasons (i.e. they would have adverse impacts on the environment by remaining or being re-used on site), the classification of the waste for disposal (chemical testing and Waste Acceptance Criteria (WAC) testing if required) should be covered in the revised DMRB 11/3/11. Materials: If soils cannot remain on site for QUANTITY reasons (i.e. mass balance) but are of suitable quality to remain, the re-use or disposal of these soils off-site should be covered in the new Materials Guidance.
	Human health and environmental risks	✓				
	Remediation	✓				
	Waste classification and disposal		✓			
Other: Planning	Prevention of use for other construction purposes	✓			Policies and Plans Guidance (Part 12)	<ul style="list-style-type: none"> The DMRB volume 11 is moving towards the inclusion of planning policy issues within each Guidance (and the withdrawal of the Policies and Plans Guidance (Part 12)), therefore this should be considered within the revised DMRB 11/3/11.

Water Resources

- Water Framework Directive 2000/60/EC
- Groundwater Daughter Directive 2006/118/EC
- The Water Resources Act 1991 (WRA)
- The Groundwater Regulations 1998
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- The Water Environment (Water Framework Directive) (Northern Ireland) Regulations 2003
- The Water Environment and Water Services (Scotland) Act 2003
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended)
- The Flood and Water Management Act 2010
- Flood Risk management (Scotland) Act 2000

Air Quality

- Air Quality Framework Directive
- Directive on Ambient Air Quality and Cleaner Air for Europe (transposed through Air Quality Standards regulations 2010)
- Air Quality Strategy for England Scotland, Wales and Northern Ireland (2007 revision) (in Air Quality(England) Regulations 2000, as amended 2002 and the Devolved Administration equivalents)

Cultural Heritage

- Ancient Monuments and Archaeological Areas Act 1979
- Historic Monuments and Archaeological Objects (NI) Order 1995
- The Planning (Listed Buildings and Conservation Areas) Act 1990
- The Planning (NI) Order 1991
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997
- Environmental Good Practice for Archaeological Excavations – NIEA technical Guidance Booklet (currently being revised)

Soils

- EU Thematic Strategy on Soils Protection 2006
- DEFRA Soil Strategy for England 2009 (no longer current following change of Government – may need updating)
- Scottish Soil Framework 2009
- Code of Practice for the Sustainable Management of Soils on Construction Sites (WRA, BIS, DEFRA)
- Welsh Soils Action Plan (currently under production by WAG)
- State of Scotland's Soils report (to be published in 2011)
- Natural England's Technical Information Note 049, Agricultural land Classification
- W. Towers, I.C. Grieve, G. Hudson, C.D. Campbell, A.Lilly, D.A. Davidson, J.R. Bacon, S.J. Langan and D.W. Hopkins (2006) Scotland's Soil Resource – Current State and Threats
- Proposed EU Framework Directive on the Protection of European Soils

EIA

- EU Directive 85/337/EEC amended 97/11/EC
- Highways (Assessment of Environmental Impacts) Regulations 1988/1999
- Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended)

- The Environmental Impact Assessment (Scotland) regulations 1999 (as amended)
- The Planning (Environmental Impact Assessment) (Amendment) Regulations (Northern Ireland) 2008

Biodiversity

- Wildlife and Countryside Act 1981
- The Conservation of Habitats and Species Regulations 2010
- Scottish Executive (2004) Scotland's Biodiversity – It's in Your hands, Scottish Biodiversity Strategy

Planning

- Planning Policy Guidance (PPG14 Development on Unstable Land)
- Planning Policy Statements (PPS1 Planning and Climate Change, PPS7 Sustainable Development in Rural Areas, PPS9 Biodiversity and Geological Conservation, PPS23 Planning and Pollution Control (Specifically Annex 2 – Development on Land Affected by Contamination), PPS25 Development and Flood Risk)
- NI Planning Policy Statements (PPS2 Planning and Nature Conservation, PPS6 Planning, Archaeology and the Built Heritage, PPS13 Transportation and Land Use)
- Mineral Policy Statements (MPS1 Minerals)
- Minerals Planning Policy Wales (MPPW, 2001)
- Technical Advice Notes (TAN5 Nature Conservation and Planning, TAN6 Agricultural and Rural Development, TAN15 Development and Flood Risk, TAN18 Transport, TAN21 Waste)
- Planning Policy Wales (Edition 3, July 2010)
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)

5.3 Suggested Table of Contents

Below is a suggested table of contents for the revised DMRB 11/3/11 to be used as a basis for the further development of the Geology and Soils guidance and discussion. This Scoping Report has provided the basis for the formation of the initial chapters (1-3) of the revised guidance.

- 1.0 Introduction: Summarising the way geology and soils interact with the other disciplines and the scope of the assessment bearing in mind the relevant topics and overlaps discussed in Section 3.
 - 1.1 Background
 - 1.2 Scope
 - 1.3 Purpose
- 2.0 UK Management of Geology and Soils: Using the key legislation, policy and guidance as recommended within Section 5.2.
 - 2.1 Legislation, Policy and Guidance Review
 - 2.2 Planning
 - 2.3 Resource Management
- 3.0 Potential Impacts: Either considering potential impacts directly or cross-referencing other more appropriate guidance in the DMRB as recommended within Table 5.1.
 - 3.1 Construction
 - 3.2 Operation

- 3.3 Maintenance
- 3.4 Decommissioning

The remaining suggested Chapters (4-8) need to be assessed further and developed as part of the next stage of DMRB 11/3/11 revision.

- 4.0 Procedure for Assessing Impacts
 - 4.1 General
 - 4.2 Cumulative
 - 4.3 Significance of Effects
- 5.0 Levels of Assessment of Impacts
 - 5.1 Scoping
 - 5.2 Simple
 - 5.3 Detailed
- 6.0 Reporting
 - 6.1 Scoping
 - 6.2 Simple
 - 6.2 Detailed
- 7.0 Mitigation of Impacts
- 8.0 References
- 9.0 Appendices

5.4 Topics Requiring Further Discussion

Table 5.1 provides a summary of the suggested topics for inclusion. We are satisfied with the inclusion of the majority of topics identified at the current time, however are aware that further discussion of the topics would prove beneficial to ensure the revised DMRB 11/3/11 does not become too ambitious or broad in scope.

Some specific aspects recommended for further discussion include:

- Climate change and soils – should this be included in Part 11, or would it be better addressed by completely separate guidance on climate change?
- Contaminated land – boundaries for the inclusion of land quality as a topic have been suggested within this report. Are they considered to be suitably well defined to avoid confusion? Contaminated land is discussed briefly in HD22, would it be more relevant to include it in this document?
- Soil layer biodiversity – (microbiology) this is not covered elsewhere and is directly related to soils. Would this be better placed within the Ecology and Nature Conservation Guidance (Part 4) which is currently being reviewed?

- Hydrogeology – groundwater quality impacts are covered from a point of view of road drainage but not the wider pollution sources i.e. contaminated land. Are the suggested boundaries in Table 5.1 practical?
- Sterilisation of geological resources – this has been suggested for inclusion within this report, but would it be better placed to consider the loss of access to such resources within the revised People and Communities guidance?
- Regarding the on site re-use of excavated materials, it has been suggested that the impacts should be considered in 11/3/11 where land quality is an issue because it is closely linked to contaminated land i.e. if material excavation and re-use on site has the potential to adversely impact the human or aquatic environment. However, excavated materials quantity and mass balance aspects have been recommended as more suitably placed within the new Materials Guidance. Is this distinction considered to be the most suitable or would it generate the potential for duplicated work?

The revision of the DMRB 11/3/11 will largely be based around existing environmental assessment frameworks, such as best practice guidance for the assessment of contaminated land. However, it should be noted that there is the scope for specific HA environmental impact assessment guidance to be produced for certain topics where there is currently no guidance for impact assessment, for example the assessment of the impacts relating to soils and climate change.

6. References

- Legislation policy and guidance as listed in Section 5.2.

Documents:

- BS10175 Investigation of potentially contaminated sites: Code of practice
- Defra Soil Action Plan, 2004
- Design Manual for Roads and Bridges
- EA Remedial Targets Methodology Hydrological Risk Assessment for Land Contamination, 2006
- EA State of the Environment Report for Soils, 2004
- EA/Defra Contaminated Land Report (CLR) 11 Model Procedures for the Management of Land Contamination, 2004
- EU Thematic Strategy on Soil Protection, 2006
- HA Draft Materials Interim Advice Note
- Scottish Soil Framework, 2009
- SEPA State of the Environment Report for Soils, 2001
- Sustainable Development Strategy A Better Quality of Life (1999)

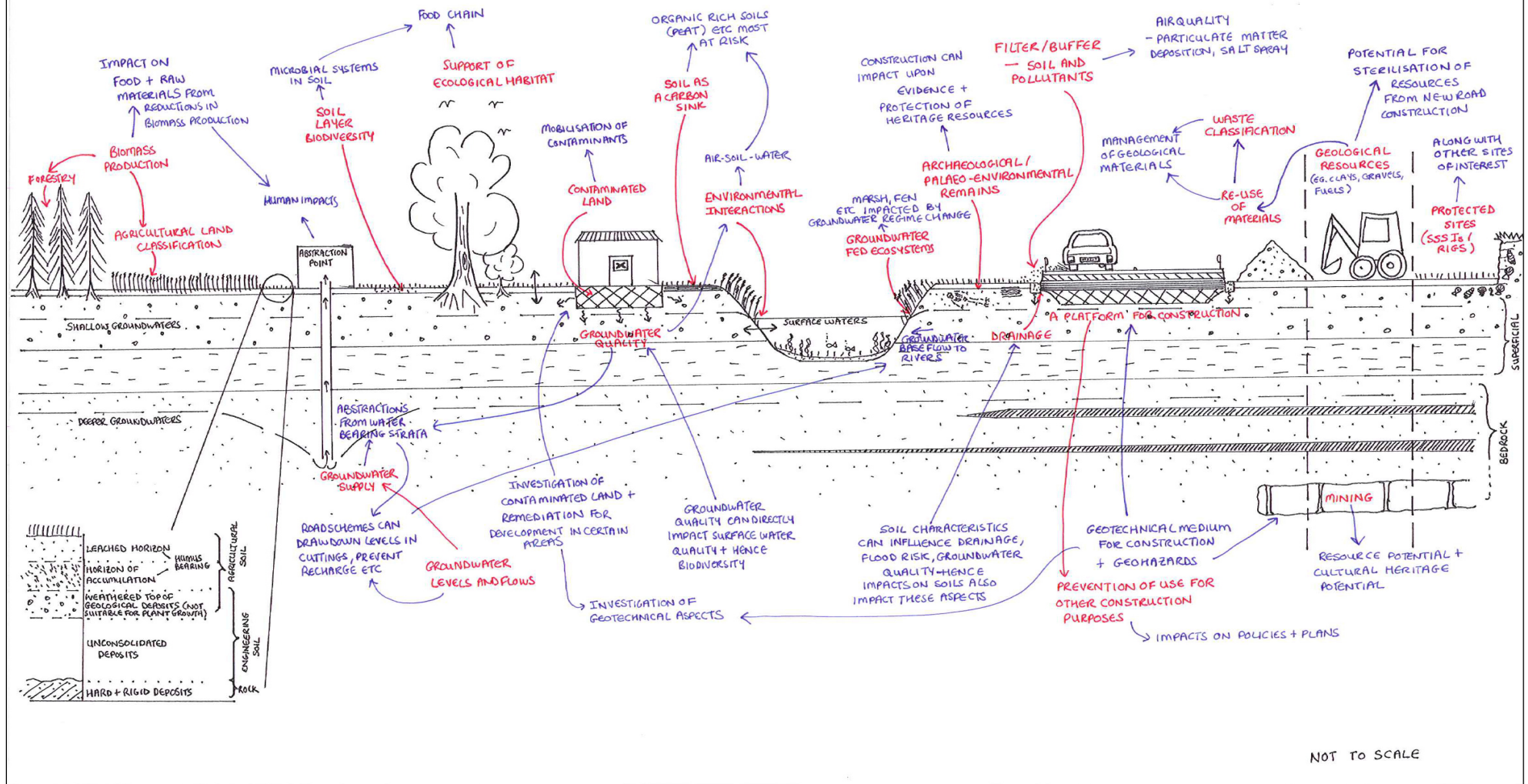
Websites:

- ww2.defra.gov.uk
- www.environment-agency.gov.uk
- www.google.co.uk
- www.ni-environment.gov.uk
- www.sepa.org.uk

Appendix A. Drawings

Figure A.1 Conceptual Model Drawing

Figure A.1 Geology and Soils Conceptual Model Drawing



Appendix B. Example Consultation Letter and Form

Our ref 273068/JP/ID/AL/NB

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Your ref

Consultee Address Line 1

Consultee Address Line 2

Consultee Address Line 3

Consultee Address Line 4

Consultee Address Line 5

13th July 2010

For the Attention of Consultee

Dear Consultee,

Revision of the DMRB Volume 11 Section 3 Part 11 – Geology and Soils

The Highways Agency (HA), on behalf of the Highways Authorities across the UK plans to revise the existing guidance on assessing the environmental impact of highways schemes on geology and soils contained within the Design Manual for Roads and Bridges (DMRB).

The funding has now been allocated for the production of a scoping report which Mott MacDonald are undertaking on behalf of the HA - the revision of the guidance itself will be a separate task undertaken next year subject to the availability of funding. The purpose of the scoping report is to clarify what needs to be considered when assessing the impacts on geology and soils from road schemes and to determine the extent to which existing guidance within the DMRB achieves this. The functions of soils in particular is a complex topic, some aspects of which will be covered in other environmental chapters. A key objective of the scoping report therefore, is to assess the interactions with other disciplines, recognising that some soil functions may be included elsewhere.

The existing guidance on the environmental impact assessment of HA projects on geology and soils can be found in Volume 11 Section 3 Part 11 of the DMRB, which was published in August 1994 and has undergone only minor amendments since. It was based on best practice at the time, however it is now out of date in a number of areas. Therefore, there is currently a risk that soils and geology aspects of HA projects are not being given adequate consideration in environmental impact assessments and the guidance needs to be revised to take into account current legislation and best practice.

General assessment of geology and geological features is a relatively well established process, however, there have been many developments within our understanding of soil processes and interactions over the last 15 years. Therefore, there is significant potential for overlap with existing guidance within Volume 11, other sections of the DMRB and external guidance, creating the need for a robust scoping document.

We have contacted you as a key consultee in the field of geology and soils to provide input to the content of the scoping report and hence the direction that the geology and soils guidance takes. We would like to get your opinions on the aspects of geology and soils that you feel should be considered. This project is at a very early stage and you will be consulted again later in the process when the scoping report is used to update the guidance.

The existing Soils and Geology Chapter can be found at <http://www.standardsforhighways.co.uk/dmr/vol11/section3/11s3p11.pdf>. All other chapters in Section 3 are at <http://www.standardsforhighways.co.uk/dmr/vol11/section3.htm>. The remaining Volumes within the DMRB can be found at <http://www.standardsforhighways.co.uk/dmr/index.htm>.

The other DMRB Volume 11 Section 3 Chapters with which we believe there is likely to be some overlap include:

- Part 1 Air Quality (HA207/07)
- Part 2 Cultural Heritage (HA208/07)
- Part 4 Ecology and Nature Conservation (currently under review)
- Part 5 Landscape Effects
- Part 6 Land Use (to be reviewed as 'Community and Private Assets')
- Part 10 Road Drainage and the Water Environment (HD45/09)
- Part 12 Policies and Plans (to be included in new topic chapters)

There is also a draft Materials Chapter under production along with forthcoming guidance on site waste management plans. HD22/08 (Managing Geotechnical Risk) is a pertinent document within the DMRB along with HA 73/95 (Site Investigation for Highway Works on Contaminated Land), although this is anticipated to be withdrawn following the production of further guidance on contaminated land.

At the end of this letter please find attached an initial consultation form which we would be very grateful if you could take the time to complete for the sections relevant to your area of expertise. We have undertaken an initial screening exercise identifying the potential topics to be included in the revised Geology and Soils Chapter and would value your opinion on whether they belong. Also, if you have any other suggestions of topics that you believe have been omitted from the list, there is the opportunity for you to specify as such.

In general we are considering using the approach that the geology and soils guidance should provide an overview of most aspects but only provide specific EIA guidance for aspects which are not already addressed elsewhere in HA guidance.



If you would be able to return the consultation form either by post or electronically to myself at the address provided by the 2nd August I would be very grateful.

If you have any further queries please do not hesitate to contact me.

Yours sincerely,

Andrew Lawrance

For Mott MacDonald Ltd

DMRB Volume 11 Part 3 Section 11: Initial Consultation Form

Organisation.....

Contact.....

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	
	Mining (historic/current)	
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	
	Re-use/disposal of excavated materials off-site	
Geotechnical	Platform for construction	
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	
	Groundwater quality and vulnerability	
	Groundwater fed ecosystems	
Biodiversity	Ecological habitat	
	Soil layer biodiversity (seed bank, microbiological etc)	
	Food chain	
Cultural Heritage	Evidence of cultural heritage	
	Protection of cultural heritage	
	Palaeo-environmental remains	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Biomass Production	Agriculture (land class etc)	
	Forestry	
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	
	Soil as a buffer zone	
	Soil and pollutants	
	Soil/geology and drainage/flood risk	
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

Roads

- The Design Manual for Roads and Bridges
- Highways Act 1980
- Roads (NI) Order 1993
- Roads (Scotland) Act 198

General Environmental

- Environmental Protection Act 1990
- Environment Act 1995

Contaminated Land

- Contaminated Land (England) Regulations 2006 SI 1380
- Environmental Damage (Prevention and Remediation) Regulations 2009 SI 153
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 SR 252 as amended
- Waste and Contaminated Land (Northern Ireland) Order 1997 SI 2778 (NI 19) (including updates)
- Contaminated Land (Scotland) Regulations 2005 SSI 658
- Environmental Liability (Scotland) Regulations 2009 SSI 266
- Contaminated Land (Wales) Regulations 2006 SI 2989
- Environmental Damage (Prevention and Remediation)(Wales) Regulations 2009 SI 995
- Dangerous Substances Directive, 76/464/EEC
- Control of Asbestos Regulations 2006

Water Resources

- Water Framework Directive 2000/60/EC
- Groundwater Daughter Directive 2006/118/EC
- The Water Resources Act 1991 (WRA)
- The Groundwater Regulations 1998
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- The Water Environment (Water Framework Directive) (Northern Ireland) Regulations 2003
- The Water Environment and Water Services (Scotland) Act 2003
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended)

Air Quality

- Air Quality Framework Directive
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007 revision)

Cultural Heritage

- Ancient Monuments and Archaeological Areas Act 1979
- Historic Monuments and Archaeological Objects (NI) Order 1995
- The Planning (Listed Buildings and Conservation Areas) Act 1990
- The Planning (NI) Order 1991

- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 2006

Soils

- EU Thematic Strategy on Soils Protection 2006
- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

EIA

- EU Directive 85/337/EEC amended 97/11/EC
- Highways (Assessment of Environmental Impacts) Regulations 1988/1999

Biodiversity

- Wildlife and Countryside Act 1981
- The Conservation (Natural Habitats & c.) Regulations 1994

Planning

- Planning Policy Statement (PPS) 1: Planning and Climate Change
- PPS 9: Biodiversity and Geological Conservation
- PPS 23: Planning and Pollution Control (Specifically Annex 2 – Development on Land Affected by Contamination)
- Technical Advice Note (TAN) 5: Nature Conservation and Planning
- TAN 6: Agricultural and Rural Development
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

List of Consultees:

- British Geological Survey
- CADW
- Countryside Council for Wales
- DEFRA
- English Heritage
- Environment Agency
- Environment Agency (Wales)
- GeoConservation UK
- Geological Survey of Northern Ireland
- Historic Scotland
- Institute for Environmental Management and Assessment
- Natural England
- Northern Ireland Environment Agency
- Northern Ireland Roads Service
- Scottish Natural Heritage
- Scottish Environment Protection Agency
- The Association of Geotechnical and Geoenvironmental Specialists (AGS)
- The Coal Authority
- The Forestry Commission
- The Highways Agency
- The Joint Nature Conservation Committee
- The Soil Association
- Transport Scotland
- Transport Wales

Appendix C. Consultee Response Forms

DMRB Volume 11 Part 3 Section 11: Initial Consultation Form

Organisation: Welsh Assembly Government

Contacts: Tim Dorken,
Len Wyatt,
Jessica Byers

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Yes
	Mining (historic/current)	Yes
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	Yes
	Re-use of excavated materials on site	No – will be covered by Vol11 Sec3 Materials (Part 6)
	Re-use/disposal of excavated materials off-site	No – will be covered by Vol11 Sec3 Materials (Part 6)
Geotechnical	Platform for construction	Yes
	Prevention of use for other construction purposes	Yes
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	No – is covered by Vol11 Sec3 Road Drainage and Water Environment (Part 10)
	Groundwater quality and vulnerability	No – is covered by Vol11 Sec3 Road Drainage and Water Environment (Part 10)
	Groundwater fed ecosystems	No – is covered by Vol11 Sec3 Road Drainage and Water Environment (Part 10)
Biodiversity	Ecological habitat	No – is covered by Vol11 Sec3 Nature Conservation (Part 4)
	Soil layer biodiversity (seed bank, microbiological etc)	Yes
	Food chain	No – is a function of the ecosystems.
Cultural Heritage	Evidence of cultural heritage	No – is covered by Vol11 Sec3 Cultural Heritage (Part 2)

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
	Protection of cultural heritage	No – is covered by Vol11 Sec3 Cultural Heritage (Part 2)
	Palaeo-environmental remains	No – is covered by Vol11 Sec3 Cultural Heritage (Part 2)
Biomass Production	Agriculture (land class etc)	No – is covered by Vol11 Sec3 Landscape (Part 3)
	Forestry	No – is covered by Vol11 Sec3 Landscape (Part 3)
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	Yes
	Soil as a buffer zone	To what? Could this be explained please?
	Soil and pollutants	Is this different from contaminated land?
	Soil/geology and drainage/flood risk	No – is covered by Vol11 Sec3 Road Drainage and Water Environment (Part 10)
Land Quality	Contaminated land	Is this different from soil and pollutants?
	Human health and environmental risks	No – Risks to human health are covered by H&S or Health Impact Assessments, not EIA.
	Remediation	This may possibly be covered by Vol11 Sec3 Materials (Part 6) – please check with Matt Winter, HA who is leading on this guidance.
	Waste classification and disposal	No – will be covered by Vol11 Sec3 Materials (Part 6)

*Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.

Comments on the above:

- The final column in the table – some of the aspects considered are “features” as oppose to impacts to be considered. Need to be clear on why an aspect is important for an EIA.
- Would it have been useful to have established overlaps with other HA DMRB guidance prior to the circulation of the consultation document?
- Recommend adding “Soil” as an independent topic, to reflect the title of the chapter, for example:

Topic	Aspect	Impacts to be Considered
Soil	Soil classification (clay, sandy, silty, peaty etc)	
	Permeability	
	Structure (porosity, compaction)	
	Soil quality	

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

(A) EIA Process/Approach

Is it perhaps important to go back to the beginning of the EIA process and consider how the advice is being used and the approach/method that is required to apply the advice.

The advice will be used primarily to conduct EIAs on highway schemes to meet the EIA Directive and the EIA Highway Regulations 1999. As a secondary function, we feel it may be used to ensure a scheme meets legislative and policy commitments.

We suggest that the approach should provide a clear and transparent method of taking a decision-making, as follows:

- Define the **study area**;
- Identify what the **existing environmental situation** ie. the 'baseline conditions';
- Identify **receptors/resources** that can be assigned an environmental value/sensitivity/importance¹. Which receptors/resources have potential to be affected by highway schemes and in what way? Are the receptors/resources of a local, regional, national or international importance, sensitivity or value?
- Identify what the **likely/potential environmental impacts** (or threats) will be on the environmental receptors/resources;
- Estimate the **magnitudes of impacts**² on the environmental receptors;
- Determine the **significance of these impacts**³; and
- Identify **measures to avoid, reduce and if possible remedy** adverse effects.

With reference to the above, would it not be a useful exercise might be to go through each of these and brainstorm? Initial suggestions are provided on the following pages.

(A) Receptors/resources

With reference to Table A4.1 Volume 11 Section 3 Part 10 HD 45/09, the following format may be useful.

Feature/ Receptor/ Resource	Attribute	Indicator of Quality	Possible Measure
Soil	Soil Quality	Soil Structure (e.g. platy, prismatic, columnar, granular, and blocky)	Permeability and Porosity (indicator of compaction)
		Soil chemistry	Soil pH ranges from 3 to 10
		Organic matter	Peat content?
	Value to Project	Soil texture/composition	Soil texture classification (clays, sandy soils, silts and loams)
		Presence of contamination/pollution	Chemical analysis of samples - laboratory tests Quantities of contaminated/polluted

¹ Table 2.1 Volume 11 Section 2 Part 5 HA 205/08

² Table 2.2 Volume 11 Section 2 Part 5 HA 205/08

³ Table 2.3 and 2.4 Volume 11 Section 2 Part 5 HA 205/08

			soil Areas with invasive species Soil Guideline Values (SGV) – see EA website Records of accidental spillages and pollution incidents in area
		Physical stability and support	
	Biodiversity (plant growth, land use)	Soil productivity Land use	Quantities of topsoil Soil nutrients
	Climate change	Carbon storage/sequestration	Proportion of N and C
Superficial deposits	Value to Project	Type	Quantities of fill
		Physical stability and support	
Solid Geology	Geo-Conservation	Educational, research, historical or aesthetic importance	Designated status (statutory and non-statutory) e.g. RIGS, SSSI etc
	Quality	Solid geology - bedrock Erosion and degradation	Type and depth of solid strata Vegetation encroachment Evidence and type of erosion
	Value to Project	Geological resources	Foundation Conditions, platform for construction Quantities of aggregate Usability as material
		Physical stability and support	Structural stability (wrt. slopes, embankments, cuttings) Mining, quarries (historic/current) Fault lines Subsistence (compressible ground subsidence, landslides, subsidence due to ground dissolution or gulls and cambering)
Geomorphology			
Hydrogeology			
Hydrology			

A format similar to Table A4.3 Volume 11 Section 3 Part 10 HD 45/09 could be used to estimate the importance of the different features/receptors/resources –see example below.

Importance / Value/Sensitivity	Example criteria/typical descriptors
Very High	Very rare and of very high national and regional geological/geomorphological importance with no potential for replacement.
High	Of medium national and high regional geological/geomorphological importance with limited potential for replacement.
Medium	Of low regional and high local geological/ geomorphological importance with some potential for replacement.
Low (or Lower)	Of local geological/ geomorphological importance with potential for replacement.
Negligible	Of little local geological/ geomorphological interest.

(B) Likely/potential environmental impacts/or threats

Soils and geology face a number of threats/impacts. These may be a. Permanent and temporary; b. direct, indirect and secondary; or c. cumulative. Some examples are listed below.

Potential threats/impacts to soils include:

- Climate change
- Compaction
- Contamination/pollution
- Erosion
- Loss of biodiversity
- Loss of organic matter
- Sealing

For further details refer to: <http://www.defra.gov.uk/environment/quality/land/soil/background/threats/>

The Soil Thematic Strategy: http://ec.europa.eu/environment/soil/three_en.htm

Also refer to: <http://www.ciwem.co.uk/policy/policies/soils.asp>

The following DEFRA research reports may also be worth considering:

- | |
|--|
| <ul style="list-style-type: none"> • <u>The impacts of climate change on soil functions</u>
 http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=12894&FromSearch=Y&Publisher=1&SearchText=SP0538&SortString=ProjectCode&SortOrder=Asc&Paging=10 |
| <ul style="list-style-type: none"> • <u>Sources and impacts of past, current and future contamination of soil</u>
 http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=13317&FromSearch=Y&Publisher=1&SearchText=SP0547&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description |
| <ul style="list-style-type: none"> • <u>Soil quality indicators - developing biological indicators</u>
 http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=11502&FromSearch=Y&Publisher=1&SearchText=SP0529&SortString=ProjectCode&SortOrder=Asc&Paging=10
 http://www.defra.gov.uk/environment/quality/land/soil/research/ |

Also of interest: NERC Soil Biodiversity Programme (on NERC website)

Potential threats/impacts to geology include:

- Concealment or destruction of geological features (e.g. RIGS, SSSIs)
- Natural degradation (uncontrolled vegetation encroachment, slumping of faces)
- Loss of access to geological features (e.g. due to flooding, subsidence)
- Decrease in slope stability
- Potential slope failure,
- New rock exposures that could be of geological interest

(C) Magnitudes of impacts

Estimating the magnitude of an impact could be achieved using the following as a base:

- Table 2.2 Volume 11 Section 2 Part 5 HA 205/08

- Table A4.4 Volume 11 Section 3 Part 10 HD 45/09

(D) Significance of these impacts

Arriving at significance of effect categories could be achieved using the following guidelines:

- Table 2.3 and 2.4 Volume 11 Section 2 Part 5 HA 205/08
- Table A4.5 Volume 11 Section 3 Part 10 HD 45/09

Examples of magnitude of impact criteria:

Magnitude	Example
Minor Benefit	Formation of rock outcrop of geological interest
Minor Adverse	In burial of important deposits or strata Minor reduction in soil quality or minor loss of local geological interest
Moderate Adverse	Partial destruction of a designated geological or geomorphological feature Minor ground movements or changes to hydrogeology Minor ground movements e.g. Translational slips
Major Adverse	Total loss and destruction of a designated geological or geomorphological feature The collapse of underground caves/mines or other major ground movements Changes to the hydrogeological regime which would damage rock strata or function Impact to contaminated areas that would result in threat to ground and/or surface water Contamination of strata or function Destruction of sensitive areas e.g. SSSI, RIGS

(E) Measures to avoid, reduce and mitigate

Examples given for soil:

Mitigation

- Soil structure improvement - The benefits of improving soil structure for the growth of plants include: reduced erosion due to greater soil aggregate strength and decreased overland flow; improved root penetration and access to soil moisture and nutrients; improved emergence of seedlings due to reduced crusting of the surface and; greater water infiltration, retention and availability due to improved porosity.
- Soil erosion management
- Soil stabilisation
- Soil carbon storage
- Soil handling and storage – Care to be taken to avoid deterioration of the top soil to be excavated and reused.
- Contaminated soil – minimise mobilisation of potential contaminants.

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

EIA (should always come first)

- EU Directive 85/337/EEC amended 97/11/EC
- Highways (Assessment of Environmental Impacts) Regulations 1988/1999

Roads

- The Design Manual for Roads and Bridges
- Highways Act 1980
- Roads (NI) Order 1993
- Roads (Scotland) Act 198

General Environmental

- Environmental Protection Act 1990
- Environment Act 1995

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- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 SR 252 as amended
- Waste and Contaminated Land (Northern Ireland) Order 1997 SI 2778 (NI 19) (including updates)
- Contaminated Land (Scotland) Regulations 2005 SSI 658
- Environmental Liability (Scotland) Regulations 2009 SSI 266
- Contaminated Land (Wales) Regulations 2006 SI 2989
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- Groundwater Daughter Directive 2006/118/EC
- The Water Resources Act 1991 (WRA)
- The Groundwater Regulations 1998
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- The Water Environment (Water Framework Directive) (Northern Ireland) Regulations 2003
- The Water Environment and Water Services (Scotland) Act 2003
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended)

Air Quality

- Air Quality Framework Directive
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007 revision)

Cultural Heritage

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- Historic Monuments and Archaeological Objects (NI) Order 1995
- The Planning (Listed Buildings and Conservation Areas) Act 1990
- The Planning (NI) Order 1991
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 2006

Soils

- EU Thematic Strategy on Soils Protection 2006

- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

Biodiversity

- Wildlife and Countryside Act 1981
- The Conservation (Natural Habitats & c.) Regulations 1994

Planning

- Planning Policy Statement (PPS) 1: Planning and Climate Change
- PPS 9: Biodiversity and Geological Conservation
- PPS 23: Planning and Pollution Control (Specifically Annex 2 – Development on Land Affected by Contamination)
- Technical Advice Note (TAN) 5: Nature Conservation and Planning
- TAN 6: Agricultural and Rural Development
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

Suggest looking at Planning Policy Wales, Edition 3, July 2010 -

<http://wales.gov.uk/topics/planning/policy/ppw2010/?lang=en>

The National Parks and Access to the Countryside Act 1949 establishes a legal framework for nature conservation including geological conservation. The Act was amended under Wildlife and Countryside Act (1981) and CROW Act (2000).

Part IIA of the Environmental Protection Act (inserted by Section 57 of the Environment Act 1995) provides a regime for the control of specific threats to health or the environment from existing land contamination. Guidance on the implementation of the scheme is currently provided in the Part IIA Statutory Guidance on Contaminated Land (Welsh Assembly Government 2006).

The Wildlife and Countryside Act 1981 provides for the notification of geological sites as SSSI's.

The Countryside and Rights of Way Act (CROW) 2000 strengthened legislation relating to the conservation of geology in England and Wales. The Act places a general duty on public bodies to take reasonable steps to further the conservation and enhancement of the flora, fauna or geological or physiological features by reason of which the site is of special interest. In particular it made it an offence for anyone to recklessly damage a SSSI, such as partaking in irresponsible fossil or mineral collecting.

EA PPG 6: Working at construction and demolition sites (June 2010) – Section 3 Excavations; Section 4 Materials storage, stockpiles and exposed ground.

The Air Quality Standards (Wales) Regulations 2010

DMRB Volume 11 Part 3 Section 11: Initial Consultation Form

Organisation: Transport Scotland

Contact: Angus Corby (this response drafted by Angus Corby & Henry Collin)

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Yes
	Mining (historic/current)	Yes(1)
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	Yes
	Re-use of excavated materials on site	Yes(2)
	Re-use/disposal of excavated materials off-site	No(3)
Geotechnical	Platform for construction	No (4)
	Prevention of use for other construction purposes	Yes (5)
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	No(6)
	Groundwater quality and vulnerability	No(6)
	Groundwater fed ecosystems	No(6)
Biodiversity	Ecological habitat	No(7)
	Soil layer biodiversity (seed bank, microbiological etc)	Yes(7)
	Food chain	No(7)

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	No(8)
	Protection of cultural heritage	No(8)
	Palaeo-environmental remains	Yes(8)
Biomass Production	Agriculture (land class etc)	No(9)
	Forestry	No(9)
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	Yes
	Soil as a buffer zone	Yes
	Soil and pollutants	Yes
	Soil/geology and drainage/flood risk	Yes
Land Quality	Contaminated land	Yes
	Human health and environmental risks	Yes(10)
	Remediation	Yes(10)
	Waste classification and disposal	No(11)

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

We have annotated the responses in the table with notes which are provided below to explain the logic behind our responses. In each case we have considered the relevance of the proposed sub-topic from the perspective of the purpose of Volume 11 (EIA) and the intentions of the EIA Directive, as well as from an understanding through the TPB of where closely related topics are being addressed. However we acknowledge that there will be some diversity of views across stakeholders on what should be included and the overall priority should be to ensure a comprehensive advice note is developed which is not unduly imbalanced and which avoids duplication with other parts of Volume 11.

Yes(1) – mining should be considered to the extent that it has altered the underlying geological baseline. Our view is that mining as an activity per se should be covered elsewhere in Volume 11 as a land use activity (ie in the developing advice note for *People & Communities*).

Yes(2) – to the extent that re use of such materials on site affects the soil quality or geological resource. Otherwise it should be considered within the developing *Materials* advice.

No(3) – similar to the above but we consider that off-site materials/resource use is not strictly an impact on geology and soils and should be dealt with in the *Materials* advice.

No(4) – whilst it is accepted that one of the regularly quoted functions of a soil is to provide a development platform, we do not consider that in the context of EIA this is a legitimate part of the assessment of effects of the project on geology and soils. The degree to which the soils in the project study area provide a suitable geotechnical medium is a matter for the engineering design rather than for environmental assessment.

Yes(5) – this might be considered germane to the assessment on the basis that it is effectively a planning/zoning issue which should probably be considered now that DMRB Vol 11 is moving towards inclusion of planning policy issues within each technical area (rather than in a single policies and plans section as currently).

No(6) - the assessment of effects of the project on groundwaters is covered in HD45/09 (Vol 11/3/10 *Road Drainage and the Water Environment*) therefore it is suggested that these aspects would cause duplication of baselines and impact assessment reporting.

No/Yes(7) – to avoid duplication it is suggested that ecological issues associated with the habitats supported by soils are dealt with under the ecological assessment, with only specific reference in the soils section to the microbiological importance of the soil resource.

No/Yes(8) – generally we consider that archaeological interests should be dealt with under *Cultural Heritage* with the possible exception of paleo environmental remains which, similar to microbiology, are an inherent soils based resource.

No(9) – agriculture and forestry are anthropological activities therefore our view is they should be considered as part of land use assessment (and economic activity) within *People and Communities*.

Yes(10) – but only where specific to the issue of land contamination which could be exposed to new receptors and pathways as a result of the project.

No(11) – as (9) we consider this is not relevant to environmental assessment and should be dealt with elsewhere.

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

The table perhaps slightly underplays the significance of carbon and climate change in the consideration of soils. Scotland in particular (but also parts of England, Wales and Northern Ireland) has some very carbon rich soils which form a carbon sink which is significant in terms of national carbon inventories. Research* has shown that climate change and loss of organic matter are the two most significant threats to soils functioning (in Scotland although the report references similar findings from England). Soils are therefore vulnerable not only to loss of carbon/organic matter from development activities, but also from changes in climate, which have the potential to reverse soil function in the carbon cycle from sink to source eg from greater erosion, land slips, heat dessication etc. Finally we consider that the role of soils in combating climate change and helping to adapt to it could also be more prominent.

* For example Towers et al (2006) Report on the current state and threats to Scotland's soil resource. Scottish Executive Environmental Research Report 2006/1.

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

Roads

- The Design Manual for Roads and Bridges
- Highways Act 1980
- Roads (NI) Order 1993
- Roads (Scotland) Act 1984

General Environmental

- Environmental Protection Act 1990
- Environment Act 1995

Contaminated Land

- Contaminated Land (England) Regulations 2006 SI 1380
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- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

EIA

- EU Directive 85/337/EEC amended 97/11/EC
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- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

- The Environmental Impact Assessment (Scotland) Regulations 1999 (as amended)
- W. Towers, I.C. Grieve, G. Hudson, C.D. Campbell, A.Lilly, D.A. Davidson, J.R. Bacon, S.J. Langan and D.W. Hopkins (2006) Scotland's Soil Resource – Current State and Threats, Scottish Executive Environmental Research Report 2006/01
<http://www.scotland.gov.uk/Publications/2006/09/21115639/0>
- Scottish Executive (2004) Scotland's Biodiversity – It's in Your Hands, Scottish Biodiversity Strategy

It may also be worth referencing the proposed EU Framework Directive on the Protection of European Soils.

SEPA is due to publish a State of Scotland's Soils report in 2011.

DMRB Volume 11 Part 3 Section 11: Initial Consultation Form

Organisation Northern Ireland Environment Agency.....

Contact Paul Logue.....

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	
	Mining (historic/current)	
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	
	Re-use/disposal of excavated materials off-site	
Geotechnical	Platform for construction	
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	
	Groundwater quality and vulnerability	
	Groundwater fed ecosystems	
Biodiversity	Ecological habitat	
	Soil layer biodiversity (seed bank, microbiological etc)	
	Food chain	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	YES
	Protection of cultural heritage	YES
	Palaeo-environmental remains	YES
Biomass Production	Agriculture (land class etc)	
	Forestry	
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	
	Soil as a buffer zone	
	Soil and pollutants	
	Soil/geology and drainage/flood risk	
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

Is your proposal to briefly comment on the importance of considering cultural heritage remains, which will be found above, within and beneath the soil and then refer to *Part 2 Cultural Heritage* for guidance?

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

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- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 2006

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- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

EIA

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- Highways (Assessment of Environmental Impacts) Regulations 1988/1999

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- The Conservation (Natural Habitats & c.) Regulations 1994

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- PPS 9: Biodiversity and Geological Conservation
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- Technical Advice Note (TAN) 5: Nature Conservation and Planning
- TAN 6: Agricultural and Rural Development
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- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

Planning Policy Statement (PPS) 6: Planning, Archaeology and the Built Heritage

This planning guidance statement came into being in 1999 and is used by NIEA to guide archaeological planning advice to Planning Service and planning applicants in Northern Ireland.

Environmental good practice for archaeological excavations – NIEA Technical Guidance Booklet

This guidance booklet is currently being redrafted in order to offer advice to a wider audience such as the engineering contractors involved in the removal of topsoil etc from road schemes. It is a joint undertaking by the NIEA Historic Monuments Unit, Water Management Unit and Strategy Unit.

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Organisation **Natural England (Soils)**

Contact **Julie Holloway**

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	
	Mining (historic/current)	
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	
	Re-use/disposal of excavated materials off-site	
Geotechnical	Platform for construction	
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	
	Groundwater quality and vulnerability	
	Groundwater fed ecosystems	
Biodiversity	Ecological habitat	Yes – in general terms but presume will be covered in more detail in Part 4. Impacts on 'undisturbed' soils might be considered here.

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
	Soil layer biodiversity (seed bank, microbiological etc)	Yes - Important to get over message that soil is 'living' not just a collection of mineral particles and organic matter. However it will be difficult to consider impacts except in general terms (e.g. as part of wider good soil management/maintenance of soil quality)
	Food chain	Yes – in general terms but presume will be covered in more detail in other sections
Cultural Heritage	Evidence of cultural heritage	
	Protection of cultural heritage	Yes - should be included as a soil function.
	Palaeo-environmental remains	
Biomass Production	Agriculture (land class etc)	Yes - Should focus on amount and quality of land. Natural England is a source of data and expertise on Agricultural Land Classification. see http://naturalengland.etraders.com/naturalenglandshop/product.aspx?ProductID=88ff926a-3177-4090-aecb-00e6c9030b29 . Effects on individual holdings such as severance and need for accommodation works should be dealt with elsewhere (perhaps under updated part 6 'Community and Private Assets'?)
	Forestry	
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	Yes – impact on peaty and organic soils as carbon stores will be particularly important
	Soil as a buffer zone	Not clear what is meant? – ability to buffer pollutants?

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
	Soil and pollutants	
	Soil/geology and drainage/flood risk	Yes – impact on water infiltration /aquifer recharge will also be relevant.
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

Consider the concept of 'ecosystem services' as a way of making linkages between the individual topics

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

Due to the change in Government the new administration's attitude to soil protection is not completely clear. For further information I suggest you contact Defra's soil policy team in the first instance (Jenny McClelland). (I would also suggest that Defra soils people are included in this consultation, if you have not already done so)

I would also suggest that you include the Institute of Professional Soil Scientists in your list of consultees as many of its members will be involved in highway developments and have useful contributions to make. They can be contacted at admin@soils.org.uk

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

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- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

PPS 7 Sustainable Development in Rural Areas (Deals with development and 'best and most versatile' agricultural land)

<http://www.communities.gov.uk/publications/planningandbuilding/pps7>

Defra's *Construction Code of Practice for the Sustainable use of soils on Construction Sites* (2009) <http://www.defra.gov.uk/environment/quality/land/soil/built-environ/documents/code-of-practice.pdf>

MAFF (2000) *Good Practice Guide for Handling Soils*

<http://webarchive.nationalarchives.gov.uk/20090306103114/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm>

Natural England's Technical Information Note 049 *Agricultural Land Classification: protecting the 'best and most versatile' agricultural land*

<http://naturalengland.etraderstores.com/NaturalEnglandShop/Product.aspx?ProductID=88ff926a-3177-4090-aecb-00e6c9030b29>

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Organisation.....Natural England – comments on geology

Contact.....Jonathan Larwood

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	yes
	Mining (historic/current)	yes
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	yes
	Re-use of excavated materials on site	yes
	Re-use/disposal of excavated materials off-site	yes
Geotechnical	Platform for construction	
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	yes
	Groundwater quality and vulnerability	yes
	Groundwater fed ecosystems	yes
Biodiversity	Ecological habitat	
	Soil layer biodiversity (seed bank, microbiological etc)	
	Food chain	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	
	Protection of cultural heritage	
	Palaeo-environmental remains	yes
Biomass Production	Agriculture (land class etc)	
	Forestry	
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	
	Soil as a buffer zone	
	Soil and pollutants	
	Soil/geology and drainage/flood risk	yes
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

Existing guidance (Volume 11, section 3, part 11) - the references below will provide a good starting point in terms of current guidance and approaches to mitigation and environmental impact assessment. What is most important is to ensure geodiversity is considered at the earliest possible point in any planned road development so that it can be appropriately accommodated during works, and where appropriate, in terms of long-term provision of accessible sections.

Looking at volume 10 – environment design and management. This covers nature conservation and biodiversity and this is perhaps where the practical approach to conserving geodiversity should be covered as geodiversity conservation is a fundamental part of nature conservation (*Planning Policy Statement 9: biodiversity and geological conservation* provides a context for this) and is at the moment not covered in this section.

A cross link with section 5 on landscape would also be worth considering as many issues around landscape will have strong links with geology, soils, biodiversity and the historic environment.

These sorts of cross-links are very important and a lot of work is going into 'Ecosystems' and Ecosystem Services' currently, this may be worth exploring a bit further, certainly as context. Join up and cross-referencing between chapters would be valuable.

recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

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Is there any additional external legislation, guidance and policy you think should be included?

For guidance on the principles of geological conservation I would recommend reference to *Geological conservation a guide to good practice* (available on the Natural England website at <http://naturalengland.etraderstores.com/NaturalEnglandShop/ST118>.) – there is a specific section on roads, rail and canal cuttings focusing on their management and construction in relation to geology and geomorphology. The document covers a whole range of wider principles which will be relevant as well.

An earlier publication, which still is very relevant, is Larwood and Markham, 1995. Roads and geological conservation: a discussion document

Also worth noting is R679 - *The impact of rock fall mesh/netting on scientifically and educationally important geology* (2006, Colin Prosser) (available at <http://naturalengland.etraderstores.com/NaturalEnglandShop/R679>) which discusses mesh which is commonly used in relation to cuttings and needs to be utilised in a sensitive way when considering geology.

Would be worth being aware of the Defra guidance on Local Sites (formerly known as RIGS) – *Local Sites – guidance on their identification, selection and management* Defra 2006

DMRB Volume 11 Part 3 Section 11: Initial Consultation Form

Organisation...Historic Scotland.....

Contact.....Adele Shaw.....

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Revised chapter should highlight the need for avoidance of sites not protected for geological reasons (e.g. scheduled monuments) to be factored into the choice of locations for geological investigations. A cross reference to the cultural heritage chapter would suffice
	Mining (historic/current)	Agreed that evidence of historic mining activity is relevant to this chapter. A cross reference to the cultural heritage chapter would highlight the issue that historic mining sites also form part of the historic environment and that some of these sites may be designated for their cultural and/or historic interest.
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
	Re-use/disposal of excavated materials off-site	
Geotechnical	Platform for construction	
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	
	Groundwater quality and vulnerability	
	Groundwater fed ecosystems	
Biodiversity	Ecological habitat	
	Soil layer biodiversity (seed bank, microbiological etc)	
	Food chain	
Cultural Heritage	Evidence of cultural heritage	Standing buildings may be able to provide geological evidence.
	Protection of cultural heritage	
	Palaeo-environmental remains	<p>Soil test pitting and geological sampling may be capable of coordination/integration with preliminary archaeological investigation for road schemes. It would be useful to highlight that these activities need not be undertaken in isolation from each other.</p> <p>A cross reference to the cultural heritage section of the DMRB would suffice. That section 5.7 of that chapter deals with invasive methods of archaeological field survey that might also be used for geological survey and the differences between the requirements them.</p>

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Biomass Production	Agriculture (land class etc)	
	Forestry	
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	
	Soil as a buffer zone	
	Soil and pollutants	
	Soil/geology and drainage/flood risk	
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....



3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

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Is there any additional external legislation, guidance and policy you think should be included?

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Organisation: Forestry Commission –
Forestry Civil Engineering.....

Contact: Alan Dickerson.....

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	yes
	Mining (historic/current)	
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	yes
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Geotechnical	Platform for construction	yes
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	
	Groundwater quality and vulnerability	
	Groundwater fed ecosystems	
Biodiversity	Ecological habitat	
	Soil layer biodiversity (seed bank, microbiological etc)	
	Food chain	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	
	Protection of cultural heritage	
	Palaeo-environmental remains	
Biomass Production	Agriculture (land class etc)	
	Forestry	yes
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	yes
	Soil as a buffer zone	
	Soil and pollutants	
	Soil/geology and drainage/flood risk	
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

Climat Change, mitigation & adaption
Sustainability
Carbon emissions reduction, Carbon calculators
Geotechnical risk registers
Peat stability
Vehicle variable tyre pressures for reduced bearing
Geomembranes/cells
Ground penetrating radar
Global positioning satellite for plant control
Soil cleaning for reuse
General reduce reuse recycle

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- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

Quarries Regulations 1999

Aggregates Levy

CDM regs 2007

Climate Change Acts 2008 2009

Flood Risk Management (S) Act 2009

Flood and Water Management Act 2010

CEEQUAL sustainability assessment

Eurocodes, eg 7

Pollution prevention & control regs 2008 2009

EIA regs 2009

Environmental Liability regs 2009

Environmental Damage (prevention & remediation) regs 2009

Conservation regs 2009

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Organisation.....English Heritage

Contact (to 18 Oct 2010)

Anne Locke

(alternative contact after 18 Oct 2010)

Dr Jim Williams MlfA

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	
	Mining (historic/current)	Yes - English Heritage interest in historic mining and extraction
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	
	Re-use/disposal of excavated materials off-site	
Geotechnical	Platform for construction	
	Prevention of use for other construction purposes	
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	
	Groundwater quality and vulnerability	
	Groundwater fed ecosystems	
Biodiversity	Ecological habitat	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
	Soil layer biodiversity (seed bank, microbiological etc)	
	Food chain	
Cultural Heritage	Evidence of cultural heritage	Needs to take into account deposits dating back nearly 800,000 years and their potential for evidence of very early human activity.
	Protection of cultural heritage	Key soil function is the protection of buried archaeological remains. This should be mentioned.
	Palaeo-environmental remains	[No need for hyphen]. Evidence of past environments crucial to understanding early human activity; considerable cross-over with geological importance.
Biomass Production	Agriculture (land class etc)	
	Forestry	
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	
	Soil as a buffer zone	
	Soil and pollutants	
	Soil/geology and drainage/flood risk	
Land Quality	Contaminated land	
	Human health and environmental risks	
	Remediation	
	Waste classification and disposal	

*Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.

Comments on the above:

Protection of cultural heritage is one of the six key functions of soil, so it would be good to bring this section of the DMRB into line with the terminology used in Defra soil action plan etc. For the purposes of this document, there is considerable cross over between cultural heritage and geology which should be capitalised on, including evidence of early human activity in gravel terrace and proto-river deposits, see for example recent dating and continued excavation at the site of Happisburgh, Norfolk (http://www.britishmuseum.org/research/research_projects/happisburgh.aspx).

Equally, palaeoenvironmental remains are as relevant to geological periods as they are within archaeological time frames and understanding, conserving and enhancing their special scientific interest should be a vital component of this guidance

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....



3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

Roads

- The Design Manual for Roads and Bridges
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Soils

- EU Thematic Strategy on Soils Protection 2006
- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

EIA

- EU Directive 85/337/EEC amended 97/11/EC
- Highways (Assessment of Environmental Impacts) Regulations 1988/1999

Biodiversity

- Wildlife and Countryside Act 1981
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- Planning Policy Statement (PPS) 1: Planning and Climate Change
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- TAN 6: Agricultural and Rural Development
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

- The *European Landscape Convention*
http://www.coe.int/t/dg4/cultureheritage/heritage/landscape/default_en.asp;
- PPS5 *Planning for the Historic Environment*
<http://www.communities.gov.uk/publications/planningandbuilding/pps5>
- English Heritage's *Historic Environment Planning Practice Guide* to PPS5
<http://www.english-heritage.org.uk/publications/pps-practice-guide/pps5practiceguide.pdf>
- The government's *Statement on the Historic Environment for England*
http://webarchive.nationalarchives.gov.uk/+http://www.culture.gov.uk/reference_library/publications/6763.aspx
- Highways Agency/English Heritage/DfT *Assessing the Effect of Road Schemes on Historic Landscape Character*, March 2007
<http://www.helm.org.uk/server/show/nav.19605>
- English Heritage's *Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment*
<http://www.helm.org.uk/upload/pdf/Strat-env-ass.pdf?1271906549>

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Organisation.....Environment Agency Wales

Contact.....Zoe Frogbrook

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Yes
	Mining (historic/current)	Yes
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	
	Re-use of excavated materials on site	Yes
	Re-use/disposal of excavated materials off-site	Yes
Geotechnical	Platform for construction	Yes
	Prevention of use for other construction purposes	Yes
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	Yes
	Groundwater quality and vulnerability	Yes
	Groundwater fed ecosystems	Yes
Biodiversity	Ecological habitat	Yes
	Soil layer biodiversity (seed bank, microbiological etc)	Yes
	Food chain	

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	
	Protection of cultural heritage	
	Palaeo-environmental remains	
Biomass Production	Agriculture (land class etc)	Yes
	Forestry	Yes
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	Yes
	Soil as a buffer zone	Yes
	Soil and pollutants	Yes
	Soil/geology and drainage/flood risk	Yes
Land Quality	Contaminated land	Yes
	Human health and environmental risks	Yes
	Remediation	Yes
	Waste classification and disposal	Yes

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

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- TAN 6: Agricultural and Rural Development
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

- A Welsh Soils Action Plan will be launched by WAG in the Autumn
- Planning Policy Wales
- TAN 5 Nature and Planning conservation
- TAN 15 Development of Flood Risk
- TAN 18 Transport
- TAN 21 Waste

The names for the Statutory Bodies need updating

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Organisation Roads Service (Northern Ireland)

Contact Brian Solan

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Yes
	Mining (historic/current)	Yes
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	Yes
	Re-use of excavated materials on site	Yes
	Re-use/disposal of excavated materials off-site	Yes
Geotechnical	Platform for construction	Yes
	Prevention of use for other construction purposes	Yes
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	Yes but not a primary area
	Groundwater quality and vulnerability	Yes but not a primary area
	Groundwater fed ecosystems	N/A
Biodiversity	Ecological habitat	N/A
	Soil layer biodiversity (seed bank, microbiological etc)	N/A
	Food chain	N/A

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	N/A
	Protection of cultural heritage	N/A
	Palaeo-environmental remains	N/A
Biomass Production	Agriculture (land class etc)	N/A
	Forestry	N/A
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	N/A
	Soil as a buffer zone	N/A
	Soil and pollutants	N/A
	Soil/geology and drainage/flood risk	Yes
Land Quality	Contaminated land	Yes but not a primary area
	Human health and environmental risks	N/A
	Remediation	N/A
	Waste classification and disposal	N/A

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

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- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

The following would be a useful reference sites for inclusion

<http://www.planningni.gov.uk/index.htm>

<http://www.riversagency.cyni.gov.uk/>

<http://www.ni-environment.gov.uk/>

<http://www.loughs-agency.org/site/>

<http://www.bgs.ac.uk/gsni/>

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Organisation...Defra, Soils Team

Contact...Sean Crawford

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Y
	Mining (historic/current)	Y
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	Y
	Re-use of excavated materials on site	Y
	Re-use/disposal of excavated materials off-site	Y
Geotechnical	Platform for construction	Y
	Prevention of use for other construction purposes	Y
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	Y
	Groundwater quality and vulnerability	Y
	Groundwater fed ecosystems	Y
Biodiversity	Ecological habitat	Y
	Soil layer biodiversity (seed bank, micro <u>macro etc</u> biological etc)	Y
	Food chain	Y

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Cultural Heritage	Evidence of cultural heritage	Y
	Protection of cultural heritage	Y
	Palaeo-environmental remains	Y
Biomass Production	Agriculture (land class etc)	Y
	Forestry	Y
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, or source, depending on timescales! loss of vegetation etc)	Y
	Soil as a buffer zone	Y
	Soil and pollutants	Y
	Soil/geology and drainage/flood risk	Y
Land Quality	Contaminated land	Y
	Human health and environmental risks	Y
	Remediation	Y
	Waste classification and disposal	Y

**Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.*

Comments on the above:

All of the above are important issues which should be considered when undertaking impact assessments of roads and bridges infrastructure projects. On the whole, soils are not well considered in the original guidance which covers in more detail geology and contaminated land. More consideration of the value and functions of soil would be useful. An update is therefore important to ensure more comprehensive treatment of the issues.

Geology and Geomorphology – should include Geoparks as a designation.

Biodiversity – not clear what's meant by soil layer biodiversity – is this the whole soil profile or just the A horizon (top soil)? This should also include micro *and* macro flora and fauna more clearly (“microbiological” etc is too vague).

Environmental Interactions (air, land, water) – should note that functions of soils as a carbon sink is very important to cover, but also that soils can act as a carbon source in certain circumstances and timescales, so this would also need coverage.

Biomass Production – odd title for this topic, which seems to be about agricultural production I think, and not just biomass production (which infers biomass for energy alone). This topic appears to touch on agricultural land classification (ALC) (“land class etc”), and it is important that ALC is covered, including the protection of Best and Most Versatile agricultural land in line with current planning policy (outlined at the moment in PPS7).

Other notes on the Guidance and on this consultation:

1. The list statutory consultees is in need of review – Environment Agency are not mentioned once (for example, in relation to treatment of waste, landfilling, environmental permitting). In addition, MAFF is currently listed as the statutory consultee on Agricultural Land Classification and developments affecting Best and Most Versatile agricultural land, which is wrong as MAFF no longer exists (this should be Natural England). Institute of Professional Soil Scientists is missing, and want to ensure also that other Government Departments are included.
2. Note that treatment of Agricultural Land Classifications is misleading – ALC is not related to geology but is instead derived from a combination of soil and climate data. ALC is not a function of geology.
3. Section 5.4 (Impact on soils) – this section is poor on soils, and does not contain any coverage of damage to soil biota, impacts of disturbance, or recovery time etc.
4. Contaminated land - most of the information on contaminated land is now out of date and this is in need of a wholesale review.
5. Section 6 (Mitigation) - doesn't actually mention soils, but seems to focus instead on geology and contaminated land, and this will need to be addressed.
6. Section 6.5 similarly needs reviewing. The text around 'may be possible to treat contaminated land' is actually about disposal in landfill site, rather than actually treating/remediating contaminated land. Suggest CL:AIRE or EA as useful contacts on this subject.
7. Contaminated land is definitely an area in which current thinking has evolved since the document was originally written, including on remediation technologies (Defra has undertaken research which may be relevant:

SP1001: ***Contaminated land remediation***

Aim is to summarise the current understanding and utilisation of different contaminated land remediation techniques, to identify current and likely future factors influencing their selection and to set out the relative economic, environmental and social costs and benefits (i.e. the sustainability) of each technique.

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=16184&FromSearch=Y&Publisher=1&SearchText=soil&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

(Publication is likely to be in the autumn.)

8. Legislation (the ones missing from list - that I am aware of):
Environmental Permitting regs.

Environmental Protection Act 1990 Part 2A - Contaminated Land
Planning Policy Statement 23: Planning and Pollution Control

9. Section 2 under the Land topic there is reference to "waste classification and disposal". However there is no reference to relevant waste legislation (which Defra waste colleagues should be able to advise on) in section 3.

2. Your recommendations for additional topics to be included and reasoning: Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.

Contaminated land (see above).

3. Your recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

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- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

- Planning Policy Statement 7
- Code of Practice for the Sustainable Management of Soils on Construction Sites (WRAP, BIS, Defra)
- Comprehensive coverage of EU legislation should be incorporated (i.e. I don't see mention above of the IPPC Directive?). Must not include the EU Soil Framework Directive (which does not exist).
- Defra Circular 01/2006 Environmental Protection Act 1990: Part 2A Contaminated Land (*though this is under review – plans for public consultation later this year*).
- Guidance on the Legal definition of Contaminated Land (July 2008)

- Control of Asbestos Regulations 2006
- Dangerous Substances Directive, 74/464/EEC (which may have been replaced by Directive 2008/105/EC of the European Parliament and of the Council on environmental quality standards in the field of water policy).

NB the status of the England Soil Strategy is that it is no longer current following the change of Government this year (it represents a policy statement from a previous administration).

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Organisation ***British Geological Survey***.....

Contact ***Dr Helen Reeves***.....

1. Topics to be included in the scoping report either fully or in part. Please complete the sections of the following table relevant to your area of expertise by answering yes or no, or commenting as appropriate:

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Geology and Geomorphology	Protected Sites (SSSIs, RIGS or similar)	Yes. Very important to ensure SSSIs are protected and local authorities & amateur/professional societies are engaged in process at an early stage planning
	Mining (historic/current)	Yes. Vital to ensure that unforeseen ground conditions are minimised
Raw Materials	Geological Resources (e.g. sands, clays, coal measures)	Yes. Vital to ensure that resources are not sterilised and where possible local resources can be used in construction.
	Re-use of excavated materials on site	-
	Re-use/disposal of excavated materials off-site	-
Geotechnical	Platform for construction	Yes. Vital to ensure that unforeseen ground conditions are minimised
	Prevention of use for other construction purposes	-

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
Hydrogeology	Groundwater flow and supply (gradients, abstractions etc)	Yes. Very important to understand the hydrogeological properties and groundwater conditions/dynamics within the locality of any development
	Groundwater quality and vulnerability	Yes. Vital to assess the prevailing groundwater chemistry within the locality of any development to establish a baseline against which future impacts can be measured and to ensure that prevailing conditions will not adversely impact on development. It is also very important to ensure that risks to groundwater are assessed to ensure that relevant environmental objectives are not compromised and/or groundwater pollution does not arise.
	Groundwater fed ecosystems	Yes. Vital to ensure that risk of potential impacts to groundwater receptors – wetlands, abstraction etc – are assessed both at the development/construction stage and post-construction
Biodiversity	Ecological habitat	Yes (BGS's sister NERC institute CEH could advise further as this is there area of expertise)
	Soil layer biodiversity (seed bank, microbiological etc)	Yes (BGS's sister NERC institute CEH could advise further as this is there area of expertise)
	Food chain	-
Cultural Heritage	Evidence of cultural heritage	-

Topic	Aspect	Impacts to be Considered in Revised Chapter?*
	Protection of cultural heritage	-
	Palaeo-environmental remains	-
Biomass Production	Agriculture (land class etc)	-
	Forestry	-
Environmental Interactions (air, land, water)	Soil and climate change (soil as a carbon sink, loss of vegetation etc)	Yes. Vital to ensure that unforeseen ground conditions are minimised in the future once road and associated structures are built (e.g. problems with shrink swell, and activation of relict landslides)
	Soil as a buffer zone	Yes. Vital to ensure that risks to human health and other environmental risks are considered
	Soil and pollutants	Yes. Vital to ensure that risks to human health and other environmental risks are considered
	Soil/geology and drainage/flood risk	Yes. Vital to ensure that unforeseen events are minimised in the future once road and associated structures are built (e.g. problems with SuDS schemes)
Land Quality	Contaminated land	Yes. Vital to ensure that risks associated with re-development of contaminated land are assessed.
	Human health and environmental risks	Yes. Vital to ensure that risks to human health and other environmental risks are considered
	Remediation	-
	Waste classification and disposal	-

*Topics will only be included in the Geology and Soils Chapter if there is no overlap with other HA guidance.

Comments on the above:

2. Your recommendations for additional topics to be included and reasoning:

Please tell us if there is any research or emerging issues that we should be aware of, or if there is anything you think we have missed.....

- Consideration of the impact of geohazards such as landslides, effect of shrinking and swelling clays and karstic subsidence. These geohazards can be easily identified and areas of known susceptibility highlighted (<http://www.bgs.ac.uk/products/geosure/home.html>) and ensure that unforeseen ground conditions are minimised.

recommendations for external legislation, guidance and policy to be considered in addition to our shortlist below:

Roads

- The Design Manual for Roads and Bridges
- Highways Act 1980
- Roads (NI) Order 1993
- Roads (Scotland) Act 198

General Environmental

- Environmental Protection Act 1990
- Environment Act 1995

Contaminated Land

- Contaminated Land (England) Regulations 2006 SI 1380
- Environmental Damage (Prevention and Remediation) Regulations 2009 SI 153
- Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 SR 252 as amended
- Waste and Contaminated Land (Northern Ireland) Order 1997 SI 2778 (NI 19) (including updates)
- Contaminated Land (Scotland) Regulations 2005 SSI 658
- Environmental Liability (Scotland) Regulations 2009 SSI 266
- Contaminated Land (Wales) Regulations 2006 SI 2989
- Environmental Damage (Prevention and Remediation)(Wales) Regulations 2009 SI 995
- Dangerous Substances Directive, 76/464/EEC
- Control of Asbestos Regulations 2006

Water Resources

- Water Framework Directive 2000/60/EC
- Groundwater Daughter Directive 2006/118/EC
- The Water Resources Act 1991 (WRA)
- The Groundwater Regulations 1998
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- The Water Environment (Water Framework Directive) (Northern Ireland) Regulations 2003
- The Water Environment and Water Services (Scotland) Act 2003
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (as amended)

Air Quality

- Air Quality Framework Directive
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007 revision)

Cultural Heritage

- Ancient Monuments and Archaeological Areas Act 1979
- Historic Monuments and Archaeological Objects (NI) Order 1995
- The Planning (Listed Buildings and Conservation Areas) Act 1990
- The Planning (NI) Order 1991

- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 2006

Soils

- EU Thematic Strategy on Soils Protection 2006
- DEFRA Soil Strategy for England 2009
- Scottish Soil Framework 2009

EIA

- EU Directive 85/337/EEC amended 97/11/EC
- Highways (Assessment of Environmental Impacts) Regulations 1988/1999

Biodiversity

- Wildlife and Countryside Act 1981
- The Conservation (Natural Habitats & c.) Regulations 1994

Planning

- Planning Policy Statement (PPS) 1: Planning and Climate Change
- PPS 9: Biodiversity and Geological Conservation
- PPS 23: Planning and Pollution Control (Specifically Annex 2 – Development on Land Affected by Contamination)
- Technical Advice Note (TAN) 5: Nature Conservation and Planning
- TAN 6: Agricultural and Rural Development
- Scottish Planning Policy (SPP) (Replacing all previous SPPs and NPPGs)
- Planning Policy Statement NI (PPS) 2: Planning and Nature Conservation
- PPS NI 13: Transportation and Land Use

Is there any additional external legislation, guidance and policy you think should be included?

General Environmental

The Climate Change Act 2008

Water Resources

The Flood and Water Management Act 2010

Planning

Planning Policy Guidance (PPG) 14: Development on Unstable Land

Planning Policy Statement (PPS) 25: Flood Risk

Mineral Policy Statement (MPS) 1: Minerals

Minerals Planning Policy Wales (MPPW) (2001)