8 Ground Conditions (including Waste)

Introduction

8.1 This Section of the Screening and Scoping Report details the methodology which will be followed during the assessment of ground conditions in relation to the Proposed Project. The Environmental Assessment Report will define existing geo-environmental conditions, including geology, soils, contaminated land and hydrogeology. Potential impacts associated with the construction, operation and decommissioning phases of the Proposed Project will be considered, particularly concerning geotechnical conditions and contamination. Should significant adverse impacts be identified, suitable mitigation measures will be proposed.

Legislation and Policy

National Legislation – Land Contamination

8.2 The key legislative drivers for dealing with risks to human health and the environment from historical land contamination include:

- Part 2A of the Environmental Protection Act 1990 (EPA) (the Contaminated Land Regime);
- The Environment Act 1995;
- The Water Resources Act 1991;
- The Water Act 2003 and 2014;
- The Town and Country Planning Act 1990; and,
- The Building Act, 1984.

8.3 Acts of Parliament are implemented by specific regulations that apply to the regulation and assessment of contaminated land related issues. These regulations include, but are not limited to:

- The Contaminated Land (Wales) Regulations 2006 and (Amendment) 2012;
- The Environmental Damage (Prevention and Remediation) Regulations 2009: Guidance for England and Wales;
- The Environmental Permitting (England and Wales) Regulations 2010;
- Water Resources, England and Wales: The Anti-Pollution Works Regulations 1999;
- EC Water Framework Directive (WFD) (2000/60/EC), implemented in river basin districts within England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009;
- The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016;
- The Building Regulations, 2000;
- The Groundwater (England and Wales) Regulations 2009.

Other Relevant Policy and Guidance

8.4 Relevant planning policy includes Planning Policy Wales (2016), Technical Advice Notes (TAN) and the local development plan of each of the affected Local Planning Authorities.

8.5 The Part 2A principles of risk-based assessment and suitability for use have been widely adopted for the management of land contamination under other UK regulatory regimes. This approach has been codified by Environment Agency/ Defra Contaminated Land Report 11, Model Procedures for the Management of Land Contamination, 2004 (CLR11), the Environment Agency Guiding Principles for Land Contamination (GPLC, 2010) and the joint National House-Building Council (NHBC)/ Environment Agency /Chartered Institute of Environmental Health Guidance (CIEHG) for the safe development of housing on land affected by contamination.

8.6 Other relevant policy and guidance include the Environment Agency Guiding Principles for Land Contamination (2010), Groundwater Protection: Principles and Practice (GP3) and relevant Pollution Prevention Guidance (PPGs), Guidance for Pollution Prevention (GPP where PPGs have been replaced); Construction Industry Research and Information Association (CIRIA) Guidance documents C532 'Control of Water Pollution from Construction Sites: Guidance for Consultants, Contractors' and C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'.

Waste

8.7 National Policy on waste management is defined in a series of policy documents, including but not limited to the National Policy Statement for Energy (DECC, 2011) and National Planning Policy for Waste (DCLG, 2014). Similar themes are mirrored in the devolved Welsh Government's "Towards Zero Waste" overarching waste strategy document for Wales (WAG, 2010) which in turn guides local waste policy for North Wales and Snowdonia National Park. National and devolved Government policy on waste is intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Where this is not possible, waste management regulation ensures that waste is treated and/or disposed of in a way that is least damaging to the environment and to human health. Sustainable waste management is implemented through the "waste hierarchy", which sets out the priorities that must be applied when managing waste:

- Prevention
- Preparing for reuse
- Recycling
- Other recovery e.g. Energy
- Disposal

8.8 The legislation and policy review will have regard to relevant waste sector legislation, including (but not limited to):

- European Directives and UK/national legislation and regulation, such as:
- The Waste Framework Directive 2008/98/EC;
- The Landfill Directive 1999/31/EC;
- The End of Waste Regulations 333/2011; and
- The Waste (England and Wales) Regulations 2011, as amended 2012.

8.9 National Policy, such as (but not limited to):

- National Policy Statement for Energy EN-1;
- National Policy Statement for Electricity Networks Infrastructure EN-5;
- Planning Policy Wales;
- Minerals Planning Policy Wales;
- Technical Advice Note (TAN) 21: Waste.
- Towards Zero Waste - the overarching waste strategy document for Wales.

8.10 Local planning policy of relevance to Waste and Materials Management and National Grid Corporate Policy including:

- Our Contribution: National Grid's Environmental Sustainability Strategy;
- Sustainable Construction: Implementation Plan.

Baseline Context

8.11 The data and information within this Section of the Screening and Scoping Report has been derived for the Area of Search for Permeant and Temporary Works from the British Geological Society (BGS) including the BGS GeoIndex (BGS, 2018), the Coal Authority (Coal Authority Interactive Map viewer), Natural Resources Wales Data.gov.uk (website online viewer), the UK Soil Observatory (UKSO mapping), and the MAGIC interactive natural environment map viewer website (Defra MAGIC mapping).

Solid (Bedrock) Geology

8.12 The bedrock underlying and in the vicinity of the Area of Search for Permanent and Temporary Works generally comprises mudstones, siltstones and sandstones of various formations. Numerous igneous intrusions are noted within the wider area outside of the Area of Search for Permanent and Temporary Works, to the north and east and further to the west, with one Igneous intrusion noted in the north western extent.

8.13 Broadly the Area of Search for Permanent and Temporary Works comprises the Maentwrog Formation which is recorded to the far eastern end and progresses westwards to the Ffestiniog Flags Formation underlying the Dwyryd Estuary; whilst the Dolgellau Formation abuts the north western edge of the estuary beyond which the Dol-Cyn-Afon Formation makes up the majority of the underlying geology of the western end of the Area of Search for Permanent and Temporary Works. All strata are shown by the BGS as dipping steeply in a generally northerly direction (BGS, 1997).

8.14 The western side of the Dwyryd Estuary within the Area of Search for Permanent and Temporary Works is underlain predominantly by the Dol-Cyn-Afon Formation (Mudstone and Siltstone). This typically comprises grey mudstone, and silty mudstone and siltstone, with bioturbated sandstones locally. The Dol-Cyn-Formation (Sandstone) is reported to be present within the southern section of the Area of Search for Permanent and Temporary Works.

8.15 The Igneous intrusion within the Area of Search for Permanent and Temporary Works is unnamed by the BGS but described as a microgabbro of Ordovician age. The Igneous intrusion is recorded within the Dol-cyn-afon Formation and extends into the north western end of the Area of Search for Permanent and Temporary Works, crossing the Garth (Minffordd) Quarry. The intrusion is oriented west to east, trending towards south west to north east at its eastern end to the north of the Area of Search. The intrusion is in places partly bound by the Garth Grit Member of interbedded Sandstone and Conglomerate.

8.16 The Dolgellau Formation is recorded crossing the Area of Search for Permanent and Temporary Works on a south west to north east orientation on the north western edge of the estuary, following in part the Cambrian Coast Railway Line. The Dolgellau Formation is described as Cambrian Mudstones and Siltstones, bound to the north west (and overlain by) the Dol-cyn-afon Formation, and bound to the south east (and underlain by) the Ffestiniog Flags Formation.

8.17 The eastern/ south eastern portion of the Area of Search for Permanent and Temporary Works to the east of the Cambrian Coast Railway Line (south of the Dwyryd Estuary) is, in its majority, recorded to be underlain by the Ffestiniog Flags Formation (Mudstone, Siltstone and Sandstone), which is generally comprised of regular alternatives of quartzose siltstone and sandstone in beds up to 2m thick, interbedded with silty mudstone. Abundant sedimentary structures are present. The Ffestiniog Flags Formation extends northwards across the estuary.

8.18 At the eastern end of the Area of Search for Permanent and Temporary Works, to the east of the A496, the bedrock is recorded as the Maentwrog Formation (Mudstone, Siltstone and Sandstone), which is recorded as generally comprising interbedded mudstones, coarse-grained sandstones and fine-grained turbiditic sandstones. Within this formation there are numerous recorded igneous intrusions of Ordovician age further to the east; these are recorded as microgabbro.

8.19 The general area is heavily faulted, with an inferred north to south trending fault crossing the north western portion of the Area of Search for Permanent and Temporary Works, approximately crossing Minffordd Railway Station, and another inferred fault crossing north to south through Penrhyndeudraeth Railway Station with other inferred faults shown adjacent to within the northern and eastern extents of the Area of Search for Permanent and Temporary Works.

Drift (Superficial) Geology

8.20 The presence of superficial deposits is sparse over much of the Area of Search for Permanent and Temporary Works, with the exception of the Dwyryd Estuary and the estuary margins.

8.21 The north western end of the Area of Search for Permanent and Temporary Works is recorded to be underlain by alluvium, which is described as being normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger desiccated surface zone may be present. To the north of the Porthmadog and Minffordd Bypass (A487), and to the south of the A487 in the east, the area is underlain by head/polymict deposits, comprising gravel, sand and clay, locally with lenses of silt, clay or peat and organic material, depending on upslope source and distance from source. They comprise poorly sorted and poorly stratified deposits formed mostly by solifluction and/ or hillwash and soil creep. A broadly linear area of peat is recorded stretching from Minffordd, north east to Penrhyndeudraeth.

8.22 The recorded deposits along the Dwyryd Estuary comprise tidal flat deposits of clay, silt and sands, with shifting sands noted. Comparison of online aerial photographs and Ordnance Survey 1:25,000 mapping indicates that the main estuary channel downstream of the recently constructed Pont Briwet rail / road bridge has changed considerably.

8.23 These tidal flat deposits, extend further east and south east of the estuary broadly covering the majority of the eastern portion of the Area of Search for Permanent and Temporary Works, extending up to the A496. The deposits extending around the base of Y Garth hill, broadly follow low level topography with higher areas noted as being devoid of recorded superficial deposits.

8.24 Made ground of variable composition and unknown extent is recorded within the Minffordd area and adjacent to the A487, within the north western portion of the Area of Search for Permanent and Temporary Works. Made ground is not denoted within the remainder of the Area of Search for Permanent and Temporary Works, however, other areas of made ground may be present, associated with development.

Soils

8.25 Soils comprise freely draining acid clayey to silty loamy soils, with a mudstone and/or sandstone parent material.

8.26 The majority of the central Area of Search for Permanent and Temporary Works is generally reported to comprise marine/ estuarine saltmarsh soils and this is also shown as marshy land on the Ordnance Survey mapping. There will most likely be areas of very shallow bedrock depth.

Peat

8.27 National Grid have recently undertaken ground investigations to assist with the design of the Proposed Project. Peat has been encountered within the Proposed SEC/ Tunnel Head House Search Area on the eastern side of the Dwyryd Estuary. Peat has been recorded as having a thickness of between 1.5m- 3m but it is estimated that this could go as deep as 5m.

Groundwater and Surface Water

8.28 The majority of the Area of Search for Permanent and Temporary Works is relatively low lying, in an estuarine environment adjacent to the Dwyryd Estuary. As a consequence, those areas where development including farming has taken place appear to be drained by formal surface water drainage systems, whilst the central portion of the Area of Search for Permanent and Temporary Works is dominated by large areas of saltmarsh. It is likely that the groundwater and surface water levels will be shallow and could locally be tidally influenced. The potential for tidally variable water levels and saline waters will have implications for below ground excavations e.g. tunnel construction, the impacts of which will need to be assessed.

8.29 The topography to the immediate south and east the Area of Search for Permanent and Temporary Works is relatively steep and a number of springs are noted on this hillside outside of the Area of Search, and to the north east of the Area of Search .

8.30 The bedrock in the vicinity of the Area of Search for Permanent and Temporary Works is currently classified by Natural Resources Wales as a Secondary B Aquifer. There are no known groundwater abstractions identified by Natural Resources Wales within 1km of the Area of Search for Permanent and Temporary Works.

Contamination

8.31 Based on the records available through Natural Resources Wales Data.gov.uk, no current or historical landfill sites are recorded within the Area of Search for Permanent and Temporary Works.

8.32 The majority of the Area of Search for Permanent and Temporary Works is undeveloped. However a number of locations pose a risk of contamination which will be considered during ground investigation works and the scheduling of testing including: the presence of Garth (Minffordd) Quarry in the north western end of the Area of Search for Permanent and Temporary Works and historic quarries within the northern boundaries; the areas around the Cilfor Welsh Water Sewerage treatment works and a second Sewage Works noted west

of Pont Briwet to the south west of the Cookes Industrial estate; and local residential developments and associated infrastructure within the north west of the Area of Search for Permanent and Temporary Works and west of Afon Dwyryd. Outside of the Area of Search areas of potential ground contamination include the former Cooke's/ Nobel explosives works which was located to the north of Pont Briwet and 'Penrhyndeudraeth Works' a waste collection facility on the boundary of the site in Cookes Industrial Estate.

8.33 The two operation railway lines running through the Area of Search for Permanent and Temporary Works may pose a risk of potential contamination of soils and groundwater both beneath and adjacent to the tracks as a result of the historical and ongoing railway operations.

Mineral Exploitation Sites

8.34 BGS' GeoIndex records Minffordd Quarry in Porthmadog, north of Minffordd, which produces roadstone and railway ballast. This quarry is situated on the north western boundary of the Area of Search for Permanent and Temporary Works. There are also a number of mineral occurrences shown to the east and south of the Area of Search, which in a number of locations have associated metal mines.

8.35 No coal seams were recorded by the Coal Authority within the vicinity of the Area of Search for Permanent and Temporary Works.

Designated Sites for Geological Protection

8.36 A number of designated sites fall within the Area of Search for Permanent and Temporary Works (see Section 5 of this report); Morfa Harlech Site of Special Scientific Interest (SSSI) and the Glaslyn SSSI are of particular relevance to geomorphological interest. As these designations fall within the marine environment the scope of the assessment to be undertaken on the qualifying features is provided in Section 16 (Marine Physical Environment) and 17 (Marine Ecology).

8.37 No other sites designated for their geological interest have been identified to date.

Potential Impacts

Ground Conditions

8.38 The majority of impacts could potentially occur during the construction and decommissioning phases of the Proposed Project and will be temporary and of short duration. Potential issues that will be addressed as part of the Environmental Assessment Report include:

- Disturbance of geology from shaft and tunnel construction.
- Construction of the tunnel would require facilities for the removal of waste rock spoil at one / both access shafts. Spoil would need to be disposed of off-site as a waste, or reused on site under a CL:AIRE Code of Practice Materials Management Plan (MMP).
- Disturbance of, and damage to, soils, including peat soils and the potential effects of carbon sequestration.
- Possible presence and mobilisation of localised areas of contaminated ground that may have resulted from historical uses or be occurring currently.
- Presence of potential geo-engineering hazards including those presented in Table 8.1.

Table 8.1: Potential Geo-engineering Hazards

Hazard	Comment
Unforeseen Ground Conditions	Soft/ loose ground. Temporary works and settlement issues.
Soft ground deposits	Pockets of peat may be present.
Shallow bedrock.	Possible hard/difficult rock excavation. Implications for drilling and tunnelling.
Groundwater/ surface water	Excavation stability, buoyancy and flotation issues, contamination of ground and surface water resources as a result of construction activities.
Contaminated Land	Contamination associated with development of the area (including sewage works and former Cooke's Nobel works, railways, farming, residential developments, roads) may be present. Re-use of spoil and waste disposal issues.
Ground Stability	Excavations and trenches may become unstable due to groundwater ingress if the groundwater level is high. Such problems could occur in underground trenches.

- The potential presence of mineral reserves and the potential for their sterilisation as a result of the Proposed Project.
- Potential contamination impacts to groundwater from construction activities (potential impacts to water receptors will be discussed in greater detail in Section 8. Water Resources and Section 16 Marine Physical Environment).
- Potential for shallow groundwater and surface water to impact on construction works including tidally influenced impacts (potential impacts to water receptors will be discussed in greater detail in Chapter 7. Water Resources).

Waste

8.39 In the context of waste management, the Proposed Project is likely to generate waste streams during the various phases:

- Construction - by differing construction activities, tunnel construction, tunnelling, sealing end compound construction, OHL and pylon removal, temporary compounds and access tracks;
- Operation – as part of inspection, maintenance and refurbishment works (this is considered to be minimal and with therefore be scoped out of the assessment); and
- Decommissioning – A general narrative will be provided; however National Grid prefers to maintain and upgrade existing assets rather than decommission once the assets reach the end of their operational life.

8.40 Wastes generated during the construction phase will be the primary focus of waste documentation and will likely comprise:

- Bulk excavation arisings – from shaft sinking and linear tunnelling which may comprise both alluvial deposits and rock;
- Metals – from pylon decommissioning; and,
- Materials (concrete) – from pylon base decommissioning.

8.41 National Grid estimates that bulk excavation arisings (alluvial deposits and rock) may total approximately 125,000m^3 however some of this material may be 'reworked for onsite use'. An estimated volume of rock arisings of approximately 123,000m^3 may be generated by the linear tunnelling activity and shaft construction (2,000m^3 will be soft alluvium, based on National Grid preliminary estimates).

8.42 Construction of the tunnel would require facilities for the removal of waste rock spoil at one or both access shafts. The primary potential impact is that, depending on physical and chemical composition, suitable end uses which accord with the waste hierarchy will be identified which may include:

- On-Site re-use within the Proposed Project (possibly under the CL:AIRE Development Industry Code of Practice);
- Off-Site material re-use as a primary aggregate under an appropriate non-waste industry protocol (e.g. WRAP Aggregates Protocol);
- Off-Site material re-use/recovery at a suitable receiving Site under an appropriate Environmental Permit regulated by Natural Resources Wales; and
- Off-Site material disposal at a suitable receiving Site (inert landfill) under and appropriate Environmental Permit regulated by Natural Resources Wales.

Proposed Assessment Methodology

Ground Conditions

8.43 An assessment of the potential impacts of the Proposed Project on the underlying geology, soils, contaminated land and hydrogeology will be undertaken. This assessment will be undertaken largely by means of a desk study and a site walkover, utilising information from published mapping and preliminary assessment to identify geo-hazards such as superficial deposits and bedrock geology, former mining, made ground, former surface mineral sites (which may contain non-engineered fill, wastes, etc.), peat, compressible ground, running (sand) conditions, shrink swell clays and landslip.

8.44 The following activities will be undertaken as part of the Environmental Assessment to further define baseline conditions:

- A Study Area comprising the Area of Search for Permeant and Temporary Works and a 250m buffer will be defined for baseline data collection;
- Liaison with Gwynedd Council, Natural Resources Wales, Snowdonia National Park Authority and other relevant organisations will be undertaken to obtain available baseline information relating to groundwater, waste, mining and contamination in the defined Study Area;
- A review will be undertaken of available waste and minerals plans, and liaison with the relevant Minerals Teams, to ensure the accurate identification of mineral reserves and waste sites which could potential be affected by the Proposed Project;
- A review will be undertaken of historical maps in order to assess the potential for contamination and made ground across the Study Area;
- A review will be undertaken of intrusive ground investigation information collated in 2017 and 2018 at selected locations in order to obtain geotechnical and geo-environmental information;
- A site walkover will be undertaken to verify baseline conditions on site and record targeted peat information based on a visual assessment of the presence and nature of peat deposits identified (as well as any natural or man-made topographical,

hydrological, and hydrogeological features, type of vegetation cover and any other relevant features).

Peat

8.45 Areas of peat have the potential to contain highly compressible organic soil. In addition, they also have the potential to contain significant amounts of water which may require additional construction land-take due to poor cohesion of the deposits. Geotechnical risks associated with construction in peat (the proposed eastern SEC / Tunnel Head House, the terminal pylon and temporary pylon) will be considered in the Environmental Assessment Report, in particular foundation construction.

8.46 As well as being a consideration in terms of construction, peatland habitats are important as a nature conservation resource and in wider respects in terms of their importance relating to carbon storage and sequestration.

8.47 The assessment will determine the overall effects of the Proposed Project on peat, identifying areas affected and likely quantities, as well as identifying mitigation measures and opportunities for its reuse.

Significance of Effect

8.48 In assessing the significance of potential effects of the Proposed Project on the baseline environment, two factors will be taken into account:

- The sensitivity/ value of the receptor (Table 8.2); and
- The magnitude of the potential impact.

Table 8.2: Sensitivity/ Value of the Receptor

Value	Criteria	Feature / Receptor / Resource	Example
High	Medium national and high regional importance with limited potential for replacement	Hydrology	Water Framework Directive Class 'Good'
		Hydrogeology	'Principal Aquifer' Principal aquifer providing locally important resource or supporting river ecosystem (SPZ) 2 – Outer protection zone
		Geomorphology	For contaminated land this would relate to a moderate risk. Site of local geological importance
Medium	Low regional and high local importance with some potential for replacement	Hydrology	Water Framework Directive Class 'Moderate'
		Hydrogeology	'Secondary Aquifer' Aquifer providing water for agricultural or industrial use with limited connection to surface water (SPZ) 3 – Source catchment protection zone
		Geomorphology	For contaminated land this would relate to a low risk. Mineral Safeguarding Area

Value	Criteria	Feature / Receptor / Resource	Example
Low	Local importance with potential for replacement	Hydrology	Water Framework Directive Class 'Poor'
		Hydrogeology	'Unproductive strata'
		Geomorphology	Sites with little local geological/soils interest. For contaminated land this would relate to a very low risk.
Very Low	Very low importance and rarity, local scale	Hydrology	Water Framework Directive Class 'Poor'
		Hydrogeology	'Unproductive strata'
		Geomorphology	Sites with no local geological/soils interest. For contaminated land this would relate to a negligible risk

Table 8.3: Magnitude of Potential Impact

Magnitude	Criteria	Aspect	Typical Examples
High	Results in loss of receptor and/ or quality and integrity of the receptor	Hydrology	Fundamental change to hydrological conditions including deterioration in water quality High risk of pollution from surface water run-off or accidental spillages
		Hydrogeology	Loss of, or extensive change to, an aquifer Potential high risk of pollution to groundwater Loss of, or extensive change to, groundwater supported designated wetlands
		Geomorphology	Loss/sterilisation of the resource and/or quality and integrity of resource; severe damage to important characteristics, features or elements.
Medium	Results in effect on integrity of receptor, or loss of part of receptor	Hydrology	Detectable but non-fundamental change to hydrological conditions Some deterioration in water quality likely to temporarily affect valuable receptors Medium risk of pollution from surface water run-off or accidental spillages
		Hydrogeology	Partial loss or change to an aquifer Potential medium risk of pollution to groundwater Partial loss of the integrity of groundwater supported designated wetlands

Magnitude	Criteria	Aspect	Typical Examples
		Geomorphology	The site's integrity will not be adversely affected, but the Proposed Project may lead to a loss of or damage to important characteristics, features or attributes or partial sterilisation
Low	Results in some measurable change in receptor quality or vulnerability	Hydrology	Detectable but minor change to hydrological conditions Slight deterioration in water quality unlikely to affect valuable receptors Low risk of pollution from surface water run-off or accidental spillages
		Hydrogeology	Potential low risk of pollution to groundwater Minor effects on groundwater supported wetlands
		Geomorphology	A measurable minor negative impact on important characteristics, features or attributes is evident.
Very Low	Results in effect on receptor , but of insufficient magnitude to affect the use or integrity	Hydrology	Undetectable change in hydrological conditions including water quality The Proposed Project is unlikely to affect the integrity of the water environment Very low risk of pollution from surface water run-off or accidental spillages
		Hydrogeology	No measurable impact upon an aquifer and risk of pollution from spillages
		Geomorphology	Minor alteration to one or more characteristics, features or elements or no observable impact.

8.49 A combination of the magnitude of the impact under consideration and the sensitivity or value of the receiving environment/ receptor can be used in considering the overall significance of an effect. The general approach adopted for classifying effects is outlined in Table 3.1.

Waste and Materials Management

8.50 It is not proposed to undertake an Environmental Assessment of the waste arising from the Proposed Project, it is therefore not proposed to define the significance of waste impacts, rather an Outline Waste Management Plan will be prepared for the planning submission and will form an appendix to the Ground Conditions Chapter of the Environmental Assessment Report.

8.51 The Outline Waste Management Plan will be undertaken by means of a desk study; a site visit (if required), consultations with the key consultees with a responsibility for controlling waste re-use disposal (Gwynedd Council, Snowdonia National Park Authority and Natural Resources Wales) and waste management operators, confirmation of waste arisings from the Proposed Project, and identification of possible sites or end-use route by which waste arisings from the site may be sent for appropriate re-use or disposal.

8.52 The Outline Waste Management Plan will include an overview of the Proposed Project in terms of

- the principal materials requirements and waste outputs;

- The volume of the waste generated;
- The nature and characteristics of the waste generated;
- The level at which the management of the waste sits within the waste hierarchy,
- The ability to effectively manage the waste through the Outline Waste Management Plan;
- The availability of suitable disposal options; and
- The location and capacity of waste receptors.

Proposed Mitigation Measures

Ground Conditions

8.53 The majority of the potential effects of the Proposed Project are associated with the construction and decommissioning phases. The resulting impacts are likely to be closely associated with the final choice of route alignment, selected construction technology and detailed engineering design.

8.54 Mitigation measures to avoid or reduce potential impacts will be embedded within the design and will be proposed if the impact assessment process identifies potentially significant impacts arising from the Proposed Project.

8.55 Appropriate management methods will be developed to protect site neighbours, the environment and site workers during construction and decommissioning works in terms of health and safety and pollution prevention.

Waste and Materials Management

8.56 An Outline Waste Management Plan will be developed and form an Appendix to the Ground Conditions Chapter of the EAR. The purpose of the Outline Waste Management Plan will be to set out the principles and procedures for the management of waste during the construction of the Proposed Project. The objectives of the Outline Waste Management Plan (in order of preference, in accordance with the waste hierarchy) are:

- minimise raw materials consumed, and the volume of waste produced;
- re-use any waste produced, where practicable;
- recycle waste, where reuse is not practicable;
- recover waste, where feasible; and
- dispose of any remaining waste streams in accordance with legislative requirements.

8.57 The Outline Waste Management Plan will cover the following key areas:

1. Introduction - To include; background to the project; guiding principles and the waste hierarchy; description of stakeholders and statutory bodies; and indicative roles and responsibilities.

2. Policy and Legislation – A summary of relevant prevailing National planning policy associated with waste management, to also include: devolved powers policy (Wales); Regional and Local Policy. Section will also include a summary of prevailing waste legislation including the overarching Waste Framework Directive (WFD), ancillary legislation and National instruments.

3. National Grid Waste Management Policy –National Grid's Corporate Procedures for Waste Management which form part of its accredited EMS. The Outline Waste

Management Plan will include requirements from these procedures that are of relevance to the Proposed Project.

4. Waste Types and Volumes – It is envisaged that this section of the Outline Waste Management Plan will provide an initial estimate of the likely types and volumes of waste arising as a result of the construction of the Proposed Project, however these initial estimates will need to be fully determined, on an iterative basis, during the detailed design stage.

5. Sustainable Waste Management Principles –this section will be developed to provide project specific examples of how the application of the waste hierarchy, as required by the Waste Regulations 2011, may be applied in practice.

6. Example Site Waste Management Plan (SWMP) – A template example SWMP will be provided as part of the Outline Waste Management Plan. The template SWMP will follow the general requirements of the Site Waste Management Regulations 2008 (repealed) and ensure that the following key areas are identified in an appropriate and accessible format:

- Who will be responsible for resource management;
- What types of waste will be generated;
- How the waste will be managed – will it be reduced, reused or recycled?
- Which contractors will be used to ensure the waste is correctly recycled or disposed of responsibly and legally; and
- How the quantity of waste generated by the Proposed Project will be measured.

Issues to be Scoped Out

8.58 It is not proposed to undertake a formal Environmental Assessment of waste arising from the Proposed Project, rather an Outline Waste Management Plan will be prepared for the construction phase for the planning submission and will form an appendix to the Ground Conditions Chapter of the Environmental Assessment Report.

8.59 Operational and decommissioning impacts will be scoped out of the assessment and the Outline Waste Management Plan.

Overview of the Likely Significance of Effect

8.60 The Proposed Project has been designed by specialist geotechnical engineers who have embedded potential geotechnical risk into the design from the outset. A summary of the geotechnical risk factors taken into account will be summarised in the Ground Conditions Chapter of the Environmental Assessment Report.

8.61 From the information currently available, it is not anticipated that the Proposed Project will give rise to significant residual impacts.