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9. SOILS, GEOLOGY AND WATER

9.1 Executive Summary

9.1.1 An assessment has been undertaken of the potential effects on geology (including soils and peat) and the water environment (hydrology and hydrogeology) during the construction and operational phases of the Proposed Development.

9.1.2 Information for the study area was compiled using baseline information from a desk study, which was verified by an extensive programme of field work. The site and the immediate area have been subject to much previous investigation and assessment and this information has been used to characterise baseline conditions. The assessment undertaken considered the sensitivity of receptors identified during the baseline study and mitigation measures incorporated in the development design. It has also considered potential future changes to baseline conditions.

9.1.3 The scope of the assessment was informed by existing nearby assessments, pre-application advice and scoping and consultation responses received during the route and alignment selection stages of the Proposed Development.

9.1.4 The assessment is supported by Appendices that consider potential effects on carbon rich soils and peat (peat management plan), and peat stability (peat landslide hazard risk assessment).

9.1.5 Subject to adoption of best practice construction techniques and a site-specific Construction Environmental Management Plan (CEMP), no significant adverse effects on geology (including soils and peat) and the water environment have been identified. The CEMP includes provision for drainage management plans which would be agreed with statutory consultees, including Scottish Environment Protection Agency (SEPA), and which would be used to safeguard water resources and manage flood risk. A commitment to deploy Sustainable Drainage Systems (SuDS) in these plans has been made. The CEMP would also include provision of a Pollution Prevention Plan which would be agreed with statutory consultees including SEPA prior to any construction works being undertaken.

9.1.6 The design of the Proposed Development has been informed by a detailed programme of peat depth probing as required by National Planning Framework 4 (NPF4) and it has been shown that wherever possible areas of deep peat have been avoided. The assessment of peat and carbon rich soils has considered all of the proposed infrastructure, including temporary and permanent access tracks. A project specific outline peat management plan has been prepared which confirms the soils disturbed by the development are limited in volume and that these soils can be readily and beneficially reused in restoration works.

9.1.7 Notwithstanding these safeguards, a programme of baseline and construction phase water quality monitoring is proposed which would be used to confirm that the Proposed Development does not have a significant effect on geology and the water environment. It is proposed that the monitoring programme is agreed with statutory consultees.

9.2 Introduction

9.2.1 This Chapter considers the potential effects of the Proposed Development on geology (including soils and peat) and the water environment (hydrology and hydrogeology) during construction and operation. Where likely significant effects are predicted appropriate mitigation measures are proposed, and the significance of predicted residual effects are assessed.

9.2.2 The assessment should be read in conjunction with **Chapter 7 - Ecology** as information contained in that Chapter and assessment are used to complete the assessment of habitats (such as peat and ground water

dependent terrestrial ecosystems (GWDTE)) and ecological receptors (such as designated sites) that are sustained by water.

9.2.3 This assessment has been carried out by SLR Consulting Ltd (SLR) and overseen and reviewed by Gordon Robb (BSc, MSc, MBA, C.WEM, FCIWEM). Gordon is a Technical Director (Hydrology and Hydrogeology) and has more than 30 years' experience assessing renewable energy and electrical infrastructure projects and specifically their potential effects on soils, geology and the water environment. He is based in Scotland and has worked throughout Scotland, including on sites in similar environments to the Proposed Development. He has also prepared and given expert witness testimony for renewable and electrical infrastructure projects. A table presenting relevant qualifications and experience of key staff involved in the preparation of this Chapter is included in **Appendix 5.1** of this EIA Report.

9.3 Scope of Assessment

Study Area

9.3.1 The study area encompasses the area over which all desk-based and field data were gathered to inform the assessment presented in this Chapter and includes a buffer of 500 m to all the proposed works and access tracks that would be used during construction and operation of the Proposed Development.

9.4 Consultation

9.4.1 To inform the scope of the assessment for the Proposed Development, consultation was undertaken with statutory and non-statutory bodies through a formal EIA scoping process. Full details of the consultation process and responses are included in **Chapter 4 - Scope and Consultation** and associated appendices.

9.4.2 Specific responses relating to soils, geology and the water environment are included in **Table 9.1**.

Table 9.1: Scoping Responses

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
SEPA **Scoping Response** 12th April 2024	As this is a relatively small-scale proposal and the reason for EIA does not specifically seem to relate to SEPA's interests we have no site specific advice to provide and simply refer you and the developer to the relevant standing advice in our sepa-triage-framework-and-standing-advice.pdf which is equally applicable to Electricity Act applications. Notwithstanding this it is the applicant's responsibility to meet their obligations and mitigate environmental impacts under Schedule 9 of the Electricity Act 1989.	Noted.
NatureScot **Scoping Response** 12th April 2024	The proposal has the potential to significantly affect the following protected sites: • Caithness and Sutherland Peatlands Special Area of Conservation (SAC) • Caithness and Sutherland Peatlands Special Protected Area (SPA) The applicant should assess the direct and indirect impacts on these protected sites and their qualifying interests in context of their conservation / management	Assessment of the direct and indirect impacts on the Caithness and Sutherland Peatlands SAC (and Ramsar) is presented in **Chapter 7** (see also **Appendix 7.6: Shadow Habitats Regulations Assessment (SHRA) for the Caithness and Sutherland Peatlands SAC / Ramsar**). Potential impacts on the Caithness and Sutherland Peatlands SPA ornithology features are assessed in **Chapter 8 -**

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	objectives. The assessment should consider the impact of the proposal both as a single development and cumulatively with other relevant developments affecting these protected sites.	**Ornithology** (see also **Appendix 8.4: Shadow Habitats Regulations Appraisal (SHRA) for the Caithness and Sutherland Peatlands SPA**). The assessments include consideration of potential cumulative impacts.
	For a full application we will require the following information so that we can comment with regards to NPF4 and our remit for protected areas. The information we require will include: • Habitat survey (NVC) and maps identifying areas / features mentioned in Annex 1 of our guidance. • Construction management plan detailing how construction methods will minimise impacts on peatland during direct disturbance and changes in hydrology. This should also include information on maintenance and fault resolution will likely impact on the habitat. • Peat management plan. • Habitat management plan.	Details of the National Vegetation Classification (NVC) survey are presented in **Chapter 7** and a habitat map showing the extent and distribution of NVC habitat types is displayed on **Figure 7.8**. An assessment on potential areas of GWDTE are included in this Chapter. An outline CEMP has been prepared (see **Appendix 3.7**). A Peat Management Plan is represented as **Appendix 9.2**. An overarching Outline Habitat Management Plan (HMP) for the Connagill Cluster Grid Connections is being developed in consultation with NatureScot (see **Appendix 7.8**). This will aim to deliver landscape-scale habitat enhancement and mitigate the potential cumulative impacts on peatland habitat within the Caithness and Sutherland Peatlands SAC, SPA and Ramsar. This will also include measures to compensate for direct and indirect permanent impacts on peatland habitats outwith the SAC / Ramsar boundary.
	The proposed project lies within the proposed Flow Country World Heritage Site (WHS)[1]. This is being considered for WHS status due to it being the most outstanding example of blanket bog ecosystem globally. The Outstanding Universal Value (OUV) of the site encompasses a number of attributes including: the blanket bog habitat, ecosystem processes and the bird and plant assemblages it supports. Where a proposal affects one or more of these attributes, this could result in impacts on the site's OUV.	Assessment of the potential impacts on the Flow Country WHS is included in **Chapter 7** and **Appendix 7.7**.
	We note that the proposal lies within Class 1 and Class 2 peatland habitats. From the information provided we advise that the proposal for grid connection is likely to result in a loss of size of blanket bog habitats, loss in ability to actively sequester	Potential impacts on peat and proposed safeguards are summarised in this Chapter and presented in full in **Appendix 9.1: PLHRA** and **Appendix 9.2: Outline PMP**. The condition of the peat is discussed in **Chapter 7** and an assessment of the

[1] At the time of the Scoping consultation, the Flow Country was a candidate WHS. This has since been inscribed a WHS by Unesco in July 2024.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	carbon and potentially an ability to reduce water quality. We advise that the proposal is likely to have a significant effect on the proposed WHS.	potential impacts on the Flow Country WHS is included in **Appendix 7.7**. Proposals for habitat restoration and management are presented in **Chapter 7** and **Appendix 7.8**.
	The Highland Council has produced a toolkit and a Planning Position Statement for developers to use in assessments to consider impacts to the WHS.	Assessment of the potential impacts on the Flow Country WHS is included in **Appendix 7.7**.
Scottish Water **Scoping Response** 2nd April 2024	Scottish Water has no objection to this planning application; however, the applicant should be aware that this does not confirm that the proposed development can currently be serviced.	Noted.
	A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.	Noted.
RSPB **Scoping Response** 12th April 2024	The site is part of the wider Flow Country, internationally important for its blanket bogs which, when in a healthy condition, naturally sequester and store of carbon. The SNH Carbon and Peatland Map 2016 identifies that the proposed OHL passes through significant areas of nationally important Class 1 and Class 2 habitat.	Assessment of the potential impacts on peat is included in this Chapter and **Chapter 7**.
	A peat depth survey should be undertaken in order to minimise impacts on peat by helping to avoid areas deeper than 0.5m. Horizontal directional drilling through bedrock should be considered for sensitive peatland habitats that cannot be avoided.	**Appendix 9.1** and **Appendix 9.2** present a detailed plan of peat depths, confirms the peat excavation quantities and characteristics of the peat.
	We do not agree that in Section 11.6.8 of the scoping report it is stated that climate change is scoped out of the EIA assessment. Although we understand that the proposed development would support the renewable network, however, an assessment on carbon emissions (in line with Policy 5diii of NPF4) requires a detailed site specific assessment to identify 'the likely net effects of the development on climate emissions and loss of carbon'.	The potential effects of climate change and how that may change baseline conditions are considered in this Chapter. **Appendix 9.2** presents details that would be used to safeguard peat and sequestered carbon within the peat. **Chapter 4 - Scope and Consultation** sets out why a detailed assessment of climate change is not included as part of the EIA Report.
	The site overlaps with the candidate Flow Country World Heritage Site[1]. This is noted by the Applicant in Section 6.3.4 of the scoping report, but no proposals are set out for assessing this. This Highland Council's Flow Country Candidate World	Assessment of the potential impacts on the Flow Country WHS is included in this Chapter, **Chapter 7** and **Appendix 7.7**.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	Heritage Site Planning Position Statement, states that developments within the WHS must be assessed utilising the UNESCO Impact Assessment Guidance Toolkit. Therefore, we recommend that this is undertaken alongside the EIA.	
THC **Scoping Response** 27th June 2024	The developer should submit a Peat Management Plan to overcome significant effects on peatland and Carbon Rich Soils, Deep Peat, and Priority Peatland Habitat (CPP). We also expect an up to date National Vegetation Classification (NVC) survey and a commitment to undertake peatland restoration on an area of increased size to that of the application site	A peat management plan is presented as **Appendix 9.2** and details safeguards that would be used to safeguard peat and sequestered carbon within the peat. The results of the NVC survey and proposals for habitat restoration and management are presented in **Chapter 7** and **Appendix 7.8**.
	The EIAR needs to address the aquatic interests within local watercourses, including downstream interests that may be affected by the development.	Potential effects on surface and groundwater flows and quality are assessed in this Chapter. Potential effects on fisheries interests are discussed in **Chapter 7**.
	The EIAR should include a map and assessment of impacts upon Groundwater Dependent Terrestrial Ecosystems (GWDTE) and buffers, these habitats are easily damaged by insensitive drainage.	An assessment on potential areas of GWDTE are included in this Chapter.
	The EIAR must consider the risks of engineering instability relating to presence to peat on the site. A comprehensive peat slide risk assessment in accordance with the Scottish Government Best Practice Guide for Developers will be expected. Assessment should also address pollution risk and environmental sensitivities of the water environment.	**Appendix 9.1** and **Appendix 9.2** present a detailed plan of peat depths, confirms the peat excavation quantities and characteristics of the peat. **Appendix 9.1** assess risks of engineering instability and pollution risk.
	The EIAR should include a full assessment on the impact of the development on peat. Policy 55 Peat and Soils, of the Highland-Wide LDP, states that development proposals should demonstrate how they have avoided unnecessary disturbance, degradation or erosion of peat and soils. The mitigation hierarchy must be followed, with impacts avoided and minimised where possible.	**Appendix 9.2** presents a detailed plan of peat depths, application of the mitigation hierarchy and confirms the peat excavation quantities and characteristics of the peat.
	The EIAR should fully describe the likely significant effects of the development on the local geology including aspects such as borrow pits, earthworks, site restoration and the soil generally including direct effects and any indirect.	Considered in this Chapter.

Organisation & Date	Summary of Consultation Response	EIA/Design Response to Consultee
	The EIAR needs to address the nature of the hydrology and hydrogeology of the site, and of the potential impacts on water courses, water supplies including private supplies, water quality, water quantity and on aquatic flora and fauna. Impacts on watercourses, lochs, groundwater, other water features including bog pools surrounding the proposed infrastructure, and sensitive receptors such as water supplies, need to be assessed and it demonstrated will not be degraded by site drainage and excavations.	Assessed in this Chapter.
	Measures to prevent erosion, sedimentation or discolouration will be required, along with monitoring proposals and contingency plans.	Measures are presented in this Chapter.
	The EIAR will be expected to identify all water crossings and include a systematic table of watercourse crossings or channelising.	It is confirmed that no new watercourse crossings are proposed.
	The applicant will be required to carry out an investigation to identify any private water supplies, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption.	A private and public water supply risk assessment is included in this Chapter.
	It would be the preference of the Planning Authority that a full flood risk assessment is provided.	A flood risk assessment is provided in this Chapter.
	It is the Planning Authority's view that effects on geology should be scoped in to ensure this is appropriately assessed and considered, given the location of the proposal within the Candidate Flow Country World Heritage Site.	Effects on geology and peat are presented in this Chapter.
	Given potential impacts on the Candidate Flow Country World Heritage Site, this (a geomorphology assessment) should be scoped in any future assessment.	An assessment of potential change of surface water flow and erosion and sedimentation characteristics which could affect the geomorphology of watercourses is presented in this Chapter.

Potential Impacts Assessed in Full

9.4.3 The following potential impacts have been assessed in full in relation to the Proposed Development:

- potential impact on areas of peat, including peat stability, during construction and operation;
- potential impacts on peat condition;
- pollution risk, including potential impact on surface water and groundwater quality and public and private water supplies during construction and operation;

- erosion and sedimentation which could give rise to potential impact on surface water and groundwater quality, and public and private water supplies during construction and operation;
- fluvial flood risk resulting from changes to runoff volumes and rates and modifications to natural and man-made drainage patterns during operation;
- potential impact upon the linkage between groundwater and surface water during construction and operation;
- potential impact on areas of GWDTE during construction and operation; and
- potential cumulative impacts during construction and operation.

Issues Scoped Out of Assessment

9.4.4 On the basis of the desk based and survey work undertaken, policy, guidance and standards, the professional judgement of the EIA team, feedback from consultees and experience from other relevant projects in similar settings, the following topic areas have been 'scoped out':

- Effects on geology as, with the exception of carbon rich soils and peat, no sensitive geological features have been identified within the study area.
- Detailed Flood Risk and Drainage Impact Assessment (DIA). Published mapping confirms that virtually all of the Proposed Development is not located in an area identified as being at flood risk and where flood risk is recorded it is typically small in extent and bounds watercourse corridors. A simple screening of potential flooding sources (fluvial, coastal, groundwater, infrastructure etc.) is therefore presented and measures that would be used to control the rate and quality of runoff will be specified in the site-specific CEMP and form part of a DIA which will be prepared as part of the detailed design stage of the Proposed Development.
- Baseline water quality monitoring, as water quality data is published by SEPA and can be used to characterise baseline water quality in this assessment.
- Increased flood risk caused by blockages to flow in watercourses during operation and maintenance of the Proposed Development as any required permanent watercourse crossings would be subject to maintenance requirements under the Water Environment (Controlled Activity) (Scotland) Regulations 2011 (as amended).
- A Geomorphological Assessment as construction activities would not be required adjacent to the watercourses and with the safeguards proposed no geomorphological effects are anticipated.
- Decommissioning Effects. If the Proposed Development were to be decommissioned all components of the OHL, inclusive of steel from the towers, conductors and fittings, and CSE compound would be removed from site and either recycled or disposed of appropriately. A method statement would be agreed with THC setting out the detail of the decommissioning process for OHL. Efforts would be made to repurpose the Proposed Development for future connections prior to any decommissioning. Consent to be applied for is therefore in perpetuity. The effects associated with the construction phase can be considered to be representative of worst-case decommissioning effects, and therefore no separate assessment of decommissioning has been undertaken as part of this EIA Report.

9.5 Legislation, Policy and Guidance

9.5.1 The aquatic environment in Scotland is afforded significant protection through key statutes and the regulatory activity of SEPA and the local authorities. Relevant legislation and guidance documents have been reviewed and considered as part of this assessment.

Legislation

9.5.2 Relevant legislation includes:

- EU Water Framework Directive (2000/60/EC);

- EU Drinking Water Directive (98/83/EC);
- EU The Habitats Directive (92/43/EEC);
- The Conservation of Habitats and Species Regulations 2017;
- The Water Environment (Controlled Activities) (Scotland) Amendment Regulations, 2011 (CAR) (as amended);
- The Environment Act 1995;
- Environmental Protection Act 1990;
- The Water Supply (Water Quality) (Scotland) Regulations, 2001;
- The Flood Risk Management (Scotland) Act 2009;
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017; and
- The Electricity Act 1989.

Policy

9.5.3 NPF4 provides planning guidance and policies regarding sustainable development, tackling climate change and achieving net zero. Policies relevant to this Chapter include:

- Policy 2 (Climate Mitigation and Adaptation);
- Policy 5 (Soils);
- Policy 20 (Blue and Green Infrastructure); and
- Policy 22 (Flood Risk and Water Management).

9.5.4 In addition, THC's Highland-wide Local Development Plan (HwLDP) provides planning guidance on the type and location of development that can take place in the region. The HwLDP presents policies of which the following are relevant to this assessment:

- Policy 53: Minerals;
- Policy 54: Mineral Wastes;
- Policy 55: Peat and Soils;
- Policy 60: Other Important Habitats and Article 10 Features;
- Policy 62: Geo-diversity;
- Policy 63: Water Environment;
- Policy 64: Flood Risk;
- Policy 66: Surface Water Drainage; and
- Policy 69: Electricity Transmission Infrastructure.

Guidance

9.5.5 The following guidance is also applicable to the assessment:

9.5.6 Planning Advice Notes (PANs) are published by the Scottish Government. Applicable PANs include:

- PAN 61 Planning and Sustainable Urban Drainage Systems (SUDS); and
- Online Planning Advice on Flood Risk (which supersedes PAN 69).

9.5.7 SEPA Guidance for Pollution Prevention (GPP):

- GPP01 Understanding your environmental responsibilities – good environmental practices;

- GPP02 Above Ground Oil Storage;
- GPP03 Use and Design of Oil Separators in Surface Water Drainage Systems;
- GPP05 Works and Maintenance in or near Water;
- GPP06 Working on Construction and Demolition Sites;
- GPP08 Safe Storage and Disposal of Used Oils;
- GPP13 Vehicle Washing and Cleaning;
- GPP21 Pollution Incident Response Planning; and
- GPP22 Dealing with Spills.

9.5.8 Construction Industry Research and Information Association (CIRIA) publications:

- C532 Control of Water Pollution from Construction Sites (2001);
- C648 Control of Water Pollution from Linear Construction Projects – Technical Guidance (2006);
- C741 Environmental Good Practice on Site (2015);
- C753 The SUDS Manual (2015); and
- R179 Ground Engineering Spoil: Good Management Practice (1997).

9.5.9 SEPA Publications (it is noted that several of these documents are currently being reviewed following publication of NPF4):

- Triage Framework: Guidance for Planning Authorities and SEPA, Version 3 (December 2022);
- Engineering in the Water Environment: Good Practice Guide – River Crossings (2010);
- Engineering in the Water Environment: Good Practice Guide – Sediment Management (2010);
- Groundwater Protection Policy for Scotland, Version 3 (2009);
- Land Use Planning System, SEPA Guidance Note 2a, Version 4 – Flood Risk (2018);
- Land Use Planning System, SEPA Guidance Note 2e, 1 – Soils (2015);
- Land Use Planning System, SEPA Guidance Note 31, Version 3 - GWDTE (2017);
- Position Statement – Culverting of Watercourses (2015); and
- Regulatory Position Statement – Developments on Peat (2010).

9.5.10 Other Guidance:

- The Flow Country Candidate World Heritage Site Impact Assessment Toolkit published by The Highland Council (no date of publication) and The Highland Council's World Heritage Site Planning Position Statement (April 2023);
- Scottish Government, Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (2017);
- Forestry Commission Scotland & Scottish National Heritage, Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads (2010);
- Institute of Civil Engineers, Managing Geotechnical Risk: Improving Productivity in UK Building and Construction (2001);
- Scottish Executive, Scottish Roads Network Landslides Study Summary Report (2005);
- Forestry Commission, Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat (2006);
- Department of Environment, Food and Rural Affairs (DEFRA) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2011); and
- DEFRA Good Practice Guide for Handling Soils (Ministry of Agriculture, Fisheries and Food (MAFF) 2000).

9.6 Methodology

Desk Study

9.6.1 An initial desk study has been undertaken to determine and confirm the baseline characteristics by reviewing available information relating to geology, soils and water. The following sources of information have been consulted to characterise and assess the baseline conditions within the study area:

- Strathy Wood Wind Farm section 36 application and supporting documents;
- Strath Halladale to Dallangwell 132 kV Grid Connection section 37 application and supporting documents;
- Ordnance Survey (OS) 1:50,000 and 1:25,000 scale mapping;
- Natural England MAGIC map;
- NatureScot SiteLink;
- Scottish Natural Heritage (now NatureScot) Carbon and Peatland 2016 Map;
- James Hutton Institute, The National Soil Map of Scotland (1:250,000);
- British Geological Survey (BGS) Onshore GeoIndex (1:50,000);
- BGS Hydrogeological maps of Scotland (1,100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets);
- Details of private water supplies provided by THC;
- Details of Drinking Water Protected Areas published by the Scottish Government;
- SEPA river and loch waterbody nested catchments;
- SEPA flood maps;
- SEPA reservoir flooding map;
- SEPA Water Classification Hub;
- SEPA Water Environment Hub;
- SEPA rainfall data;
- National River Flow Archive; and
- SEPA environmental data.

Field Survey

9.6.2 The project hydrologists, geologists and ecologists have worked closely on this assessment to ensure that appropriate information is gathered to allow a comprehensive impact assessment to be completed. Detailed site visits and walkover surveys have been undertaken by SLR on the following dates:

- November 2023 – Phase I peat probing and condition assessment;
- April and May 2024 – Phase II peat probing and condition assessment.

9.6.3 In addition, site surveys were undertaken by the project ecologists to undertake habitat surveys, NVC surveys and assess the condition of peat at site (see **Chapter 7**). With regard to this Chapter the field work has been undertaken in order to:

- verify the information collected during the desk and baseline study;
- assess peat depths and condition, and undertake geomorphological mapping;
- allow appreciation of the study area and undertake visual assessment of the main surface waters; and
- identify drainage patterns, areas vulnerable to erosion or sedimentation deposition and any pollution risks.

Assessment of Effects

9.6.4 The significance of effects of the Proposed Development have been assessed by considering two factors: the sensitivity of the receiving environment and the potential magnitude of impact, should that effect occur.

9.6.5 This approach provides a mechanism for identifying the areas where mitigation measures are required and for identifying mitigation measures appropriate to the significance of likely effects presented by the Proposed Development.

9.6.6 Criteria for determining the significance of effect are provided in **Table 9.2, Table 9.3,** and **Table 9.4**.

Sensitivity / Importance

9.6.7 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria which is set out in **Table 9.2**.

9.6.8 Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

Table 9.2: Criteria for Assessing Sensitivity of Receptors

Sensitivity	Definition
High	• soil type and associated land use is highly sensitive (e.g. unmodified blanket bog or peatland); • SEPA Water Framework Directive Water Body Classification: High-Good or is close to the boundary of a classification: Moderate to Good or Good to High; • receptor is of high ecological importance or National or International value (e.g. Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), habitat for protected species) which may be dependent upon the hydrology of the site; • receptor is at high risk from flooding in the future (to the year 2080) and / or water body acts as an active floodplain or flood defence; • receptor is used for public and/or private water supply (including Drinking Water Protected Areas); • groundwater vulnerability is classified as High; and • if a Groundwater Dependent Terrestrial Ecosystem or Geological Conservation Review site is present and identified as being of high sensitivity.
Moderate	• soil type and associated land use is moderately sensitive (e.g. arable, commercial forestry); • SEPA Water Framework Directive Water Body Classification: Moderate or is close to the boundary of a classification: Low to Moderate; and • moderate classification of groundwater aquifer vulnerability.
Low	• soil type and associated land use not sensitive to change in hydrological regime and associated land use (e.g. intensive grazing of sheep and cattle); • SEPA Water Framework Directive Water Body Classification: Poor or Bad; • receptor is not at risk of flooding in the future (to the year 2080); and • receptor not used for water supplies (public or private).
Not Sensitive	• receptor would not be affected by the Proposed Development e.g. lies within a different and unconnected hydrological / hydrogeological catchment.

Magnitude of Impact

9.6.9 The potential magnitude of impact would depend upon whether the potential impact would cause a fundamental, material or detectable change. In addition, the timing, scale, size and duration of the potential

impact resulting from the Proposed Development are also determining factors. The criteria that have been used to assess the magnitude of impact are defined in **Table 9.3**.

Table 9.3: Criteria for Assessing Magnitude of Impact

Magnitude of Impact	Criteria	Definition
Major	Results in loss of attribute	Long term or permanent changes to the baseline geology, hydrology, hydrogeology and water quality such as: • permanent degradation and total loss of soils habitat (inc. peat) and geology; • loss of important geological structure / features; • wholesale changes to watercourse channel, route, hydrology or hydrodynamics; • changes to the site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns; • major changes to the water chemistry; and • major changes to groundwater levels, flow regime and risk of groundwater flooding.
Medium	Results in impact on integrity of attribute or loss of part of attribute	Material and short to medium term changes to baseline geology, hydrology, hydrogeology and water quality, such as: • loss of extensive areas of soils and peat habitat, damage to important geological structures / features; • some changes to watercourses, hydrology or hydrodynamics; • changes to site resulting in an increase in runoff within system capacity; • changes to erosion and sedimentation patterns; • changes to the water chemistry of surface runoff and groundwater; and • changes to groundwater levels, flow regime and risk of groundwater flooding.
Low	Results in minor impact on attribute	Detectable but non-material and transitory changes to the baseline geology, hydrology, hydrogeology and water quality, such as: • minor or slight loss of soils and peat or slight damage to geological structures / feature; • minor or slight changes to the watercourse, hydrology or hydrodynamics; • minor or slight changes to Site resulting in slight increase in runoff well within the drainage system capacity; • minor or slight changes to erosion and sedimentation patterns; • minor or slight changes to the water chemistry of surface runoff and groundwater; and • minor or slight changes to groundwater levels, flow regime and risk of groundwater flooding.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	No perceptible changes to the baseline geology, hydrology, hydrogeology and water quality such as:

Magnitude of Impact	Criteria	Definition
		• no impact or alteration to existing important soils (inc. peat) geological features; • no alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns; • no pollution or change in water chemistry to either groundwater or surface water; and • no alteration to groundwater recharge or flow mechanisms.

Significance of Effect

9.6.10 The sensitivity of the receiving environment together with the magnitude of the impact determines the significance of the effect, which can be categorised into levels of significance as identified in **Table 9.4**.

9.6.11 **Table 9.4** provides a guide to assist in decision making. However, it should not be considered as a substitute for professional judgment and interpretation. In some cases, the potential sensitivity of the receiving environment or the magnitude of potential impact cannot be quantified with certainty and, therefore, professional judgement remains the most robust method for identifying the predicted significance of a potential effect.

Table 9.4: Criteria for Assessing Significance of Effect

Magnitude of Impact	Sensitivity of Receptor			
	High	**Moderate**	**Low**	**Not Sensitive**
Major	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

9.6.12 Effects of ‘Major’ and ‘Moderate’ significance are considered to be ‘significant’ in terms of the EIA Regulations.

Cumulative Assessment

9.6.13 The assessment considers the potential cumulative effects associated with other material developments within 5 km from the nearest element of the Proposed Development infrastructure and within the same surface water catchment as the Proposed Development. A cumulative effect is considered to be the effect on a hydrological, hydrogeological or geological receptor arising from the Proposed Development in combination with other developments. A 5 km buffer is used as beyond this any potential effects are unlikely to be demonstrable.

Limitations to the Assessment

9.6.14 The assessment uses site investigation, survey data and publicly available data sources, including but not limited to SEPA, THC and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.

9.6.15 It is considered that the data and information used to complete this assessment is robust and that there are no significant data gaps or limitations.

9.7 Baseline Conditions

9.7.1 This section outlines the baseline soils (including peat), geology and water environment conditions within the study area. The study area is shown on **Figures 9.1 to 9.7**.

Designations

9.7.2 Review of NatureScot Sitelink confirms that approximately 3 km of Proposed Development is within the West Halladale SSSI which is also part of the larger Caithness and Sutherland Peatlands SAC, SPA and Ramsar site, as shown on **Figure 9.1**. The SSSI, SAC, SPA and Ramsar site has been designated for breeding bird assemblage, otters, marsh saxifrage and various freshwater and upland habitats including blanket bog habitats. The qualifying or notified features of the designated sites are sensitive to changes in peat and water quality.

9.7.3 As discussed in **Table 9.1**, the Proposed Development is located in the western extent of the Flow Country WHS (see **Figure 9.1**). The Outstanding Universal Value (OUV) of the WHS includes:

- most extensive near continuous example of natural, actively accumulating blanket bog ecosystem found globally;
- bog macroform diversity;
- carbon sequestration and storage;
- ongoing scientific and educational use;
- water filtration and the impact on water quality of associated riverine habitats; and
- diverse and genetic range of biodiversity, birds and plants associated with the blanket bog habitats.

9.7.4 It is evident that some of the habitats within the study area are highly regarded and protected at national and international level. Furthermore, the blanket bog and peat habitats are water dependent. Therefore, the Caithness and Sutherland Peatlands SAC, SPA and Ramsar sites (including the West Halladale SSSI) and the Flow Country WHS have been considered further in this assessment. Potential effects as a consequence of the Proposed Development on the designated sites are also considered in **Chapter 7**.

9.7.5 No other designated sites are recorded within the study area.

Soils and Geology

Soils

9.7.6 An extract of the 1:250,000 National Soil Map of Scotland is presented as **Figure 9.2**, which indicates that the Proposed Development is underlain by peat gleys and peaty podzols.

Superficial Deposits (including Peat)

9.7.7 An extract of BGS superficial deposit mapping is presented as **Figure 9.3**.

9.7.8 Superficial geological mapping shows that the northern and part of the southern extent of the Proposed Development, near the River Strathy, is underlain by glaciofluvial deposits, alluvium and river terrace deposits. The remainder of the Proposed Development is shown to underlain by peat and hummocky glacial deposit which comprise of sand gravel and boulders.

9.7.9 Peatland classification mapping (refer to **Figure 9.4**) indicates that approximately 460 m and 1.7 km of the proposed OHL alignment is located within Class 1 and Class 2 peatland respectively. Class 1 and Class 2 peatlands are considered nationally important carbon rich soils, deep peat and priority peatland habitats with high conservation and restoration value. Towers 17, 18 and 19 and two proposed ‘H’ wood poles (wood poles 128A and 129A) are located in mapped Class 1 peatland. Towers 5, 6 and 10 to 14 are in mapped Class 2 peatland.

9.7.10 The remainder of the Proposed Development is mapped as Class 3 and Class 5 peat, with areas of Class 3 situated across the western extents of the Proposed Development from Towers 7 to 9 and 16 and Class 5 peat mapped predominantly in the southern extents of the Proposed Development (Towers 1 to 4 and the proposed CSE compound) and localised areas in the northern extent of the study area. Class 3 peatland is not considered priority peatland habitat, however, most of the soils are carbon-rich and areas of deep peat may be present. Class 5 peatland indicates no peatland habitat but soils are carbon-rich and deep peat may be present.

9.7.11 As part of the baseline assessment a peat probing and characterisation exercise has been undertaken, the results of which are presented in full in **Appendix 9.1** and **Appendix 9.2** within Volume 4 of this EIA Report. In summary the investigations undertaken have confirmed:

- more than 3,000 peat probes were advanced (to the full depth of the soil / peat);
- approximately 80% of the probe locations recorded a peat depth of <1m;
- approximately 60% of the peat probes recorded a peat / soils depth of <0.5m;
- where present, the peat was recorded as fibrous to pseudo fibrous;
- amorphous peat was rare;
- the peat was sampled (using an auger) at two locations – logs and photographs are presented in **Appendix 9.1**; and
- the shallow peat deposits are classified as H2 – H6 (insignificant to moderate decomposition) and the deeper deposits H7 – H8 using the von Post classification.

9.7.12 There are localised deep peat deposits situated across the Proposed Development. However, these deposits are generally situated across flatter expanses and in minor topographic lows. Extensive deep peat is rare, generally confined by topography and rarely situated across slopes. There is an area of blanket bog at Towers 18 and 19 and the two proposed 'H' wood poles (wood poles 128A and 129A). Peat depths up to 2.2 m were recorded across this area.

9.7.13 Aerial photographs show there are no peat haggs or erosional features and this was confirmed by the site visits. Artificial drainage and peat cuttings are frequently observed on aerial photography and were confirmed during site visits. This was generally associated with the existing track leading to forestry in the south of the Proposed Development, which was upgraded for construction of the operational Strathy North Wind Farm. The upgrade is currently being extended for use during the construction of the consented Strathy Wood and Strathy South wind farms. There is also evidence of historic peat cuttings, predominantly in the northern and central areas near Towers 10 to 16 and adjacent to Towers 18 and 19 and the two proposed 'H' wood poles (wood poles 128A and 129A).

Bedrock Geology

9.7.14 An extract of BGS bedrock and linear features geology mapping is presented as **Figure 9.5**.

9.7.15 The Proposed Development is underlain by metamorphic bedrocks of the Kirtomy Gneisses which comprises semipelites and gneissose. Minor granite intrusions of the Scottish Highland Ordovician Suite are also noted within the northern extent of the Proposed Development.

Hydrogeology

Groundwater Levels and Flow

9.7.16 Review of SEPA's environmental data website indicates that no groundwater level monitoring is undertaken within the study area.

9.7.17 An extract of the BGS 1:625,000 scale Hydrogeological Map of Scotland and 1:100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets are presented in **Figure 9.6** and **Figure 9.7** respectively.

9.7.18 **Figure 9.6** confirms that the Proposed Development is underlain by rocks classified as a low productivity aquifer whereby small amounts of groundwater are expected in near surface weathered zones and secondary fractures.

9.7.19 The Aquifer Productivity and Groundwater Vulnerability dataset classifies the underlying aquifer (superficial and bedrock) according to the predominant groundwater flow mechanism (fracture or intergranular) and the estimated groundwater productivity. Review of **Figure 9.7** indicates that the bedrock aquifer underneath the Proposed Development is considered to be a low productivity aquifer generally without groundwater except at shallow depths and with flow almost entirely through fractures and other discontinuities.

9.7.20 The peat and hummocky glacial superficial deposits within the study area are not considered significant aquifers. The alluvial, river terrace and glaciofluvial deposits, where present, are considered to be a high productive aquifer with intergranular flow; groundwater within these deposits are likely to be in hydraulic conductivity with adjacent watercourses.

9.7.21 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being most vulnerable. The Proposed Development is shown to be underlain by groundwater vulnerability Classes 5 to 4b. The highest vulnerability is noted within the northwestern extent of the study area where no or shallow superficial deposits are recorded, and thus little attenuation of potential pollutants prior to entry to groundwater. Groundwater is less vulnerable where overlain by superficial deposits.

Groundwater Quality

9.7.22 All of Scotland's groundwater bodies have been designated as Drinking Water Protected Areas (DWPA) under the Water Environment (Drinking Water Protected Area) (Scotland) Order 2013 and require protection for their current use or future potential as drinking water resources.

9.7.23 SEPA has identified that the Proposed Development is underlain by the Northern Highlands groundwater body (SEPA ID: 150701) which in 2022 (the latest reporting cycle) was classified with a Good overall status and no pressures have been identified.

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

9.7.24 An NVC habitat mapping exercise was conducted as part of the ecology baseline assessment, and this has been used to identify potential areas of GWDTEs. The methodology and results of the NVC habitat mapping exercise are discussed in detail within **Chapter 7** and **Appendix 7.3: Habitat Technical Report** within Volume 4 of this EIA Report. Areas of potential GWDTE are shown on **Figure 7.7** within Volume 2 of this EIA Report.

9.7.25 The location and potential GWDTE and their likely dependency on groundwater is discussed in **Table 9.5**.

Table 9.5: SEPA Surface Waterbody Classifications (2022)

NVC Community	GWDTE Potential	Location and Distribution on Site
M15	Moderate	M15 dominant polygons are recorded to the south of the proposed CSE compound and across the NVC study area between Towers 5 and 19. The habitat is underlain by several geological deposits including; peat, river terrace deposits, hummocky glacial deposits, glaciofluvial deposits and metamorphic bedrock. These deposits are either characterised by a low bulk permeability or likely to be in hydraulic conductivity with the River Strathy. It is noted that small amounts of groundwater may be present within the upper weathered surface of the bedrock. The habitat is not rare and is present across large areas of Scotland. This distribution is not typical of that by

NVC Community	GWDTE Potential	Location and Distribution on Site
		emergent groundwater but rather by surface water runoff and water logging of soils.
M23	High	M23 dominant polygons are located on the banks of the River Strathy within the southern extent of the Proposed Development. The polygons are underlain by alluvium and river terrace deposits where groundwater will likely be in hydraulic conductivity with the adjacent river. It is therefore considered that the habitats are sustained by surface water and waterlogging of soils.
M25	Moderate	M25 dominant polygons are located within the southern extent of the Proposed Development near the River Strathy and in areas between Towers 6 to 17. The habitat is underlain by several superficial deposits (peat, hummocky glacial deposits, alluvium, river terrace deposits and glaciofluvial deposits) and metamorphic bedrock. The low permeability peat and hummocky glacial deposits will facilitate local water logging of soils in response to rainfall and groundwater within the alluvium and river terrace deposits will be hydraulically connected to the River Strathy. It is therefore considered that these habitats are sustained by rainfall, surface water runoff and waterlogging of soils rather than by groundwater.
M6	High	M6 dominant polygons are generally recorded in small linear polygons across the study area including, in the River Strathy floodplain west of Towers 5 and 6, along the west of the existing access track, approximately 75 m south-east of Tower 11 and 70 m north of Tower 17. The habitat is either located adjacent to watercourses or underlain by low permeability deposits. It is therefore considered that the M6 habitats are predominately sustained by surface water, runoff and waterlogging of soils rather than by groundwater.
MG9	Moderate	MG9 dominant polygons are recorded in the River Strathy floodplain, east of Tower 2 to 4. The habitat is underlain by alluvium and river terrace deposits whereby groundwater will be hydraulically connected to the River Strathy. It is therefore considered that these habitats are sustained by rainfall, surface water runoff and waterlogging of soils rather than by groundwater.
MG10	Moderate	MG10 dominant polygons are recorded in the River Strathy floodplain, west of Tower 5 and 6. The habitat is underlain by river terrace deposits whereby groundwater will be hydraulically connected to the River Strathy. It is therefore considered that these habitats are sustained by rainfall, surface water runoff and waterlogging of soils rather than by groundwater.
W1	Moderate	W1 dominant polygon is noted between Tower 17 and 18 near the banks of the Uidh nan Con Luatha (a tributary of the River Strathy). It is therefore considered that the W1 habitats are predominately sustained by surface water, runoff and waterlogging of soils rather than by groundwater.

9.7.26 Review of **Table 9.5** shows that the potential high and moderate GWDTE are located on ground which is underlain by low bulk permeability deposits, adjacent to watercourses or underlain by deposits which are

hydraulically connected to the River Strathy. This distribution is not typical of a habitat sustained by groundwater but rather it is likely to be supported by rainfall, surface water runoff and water logging of soils.

9.7.27 Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the surface water sources to these habitats would need to be maintained during construction and operation of the Proposed Development, details of which are included in **Section 9.8**.

Hydrology

Local Hydrology

9.7.28 The local hydrology is shown on **Figure 9.1**.

9.7.29 The Proposed Development is located entirely within the River Strathy surface water catchment. The River Strathy flows northwards within the southern and western extent of the study area before discharging to the sea at Strathy Bay, some 5 km north of the study area. The Proposed Development would cross over the River Strathy at NGR NC 82402 56287 (between Towers 1 and 2) and NC 82780 56932 (between Towers 4 and 5).

9.7.30 The study area is drained by the following sub catchments of the River Strathy (from north to south):

- Bowside Burn sub catchment which drains a small area along the north eastern boundary of the study area. The burn flows generally westwards before discharging into the River Strathy immediately north of the study area;
- River Strathy – The Uair sub catchment. The Uair drains part of the south eastern extent of the study area and discharges into the River Strathy within the south eastern extent of the study area. No development is proposed within this sub catchment; and
- Allt nan Clach / River Strathy sub catchment. The Allt nan Clach is a tributary of the River Strathy which discharges into the River Strathy approximately 940 m south west of the study area.

9.7.31 The surface water catchment of the Bowside Burn has been designated as a DWPA, as shown on **Figure 9.1**, however no development is proposed within this catchment.

Rainfall and Surface Water Flow

9.7.32 SEPA has provided precipitation data for Strathy Bridge rainfall gauge (station number 234319) which is located approximately 4.3 km north of the study area. In 2023 an annual rainfall of 972 mm was recorded.

9.7.33 The National Flow Archive records stream flow data along the River Strathy at Strathy Bridge (located at NGR NC 835 651, approximately 4.3 km north of the study area) and reports a mean flow of 2.63 m^3/s.

Surface Water Quality

9.7.34 The River Strathy is monitored by SEPA and classified in 2022 (the latest reporting cycle). A summary of the SEPA classifications is shown in **Table 9.6**.

Table 9.6: SEPA Surface Waterbody Classifications (2022)

Waterbody ID (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical	Hydromorphology	Pressures
River Strathy – The Uair to sea (20610)	Good	Good	High	Good	None
Allt nan Clach / River Strathy – The Uair to u/s Strathy Forest (20611)	Good	Good	High	Good	None

Flood Risk

9.7.35 SEPA has developed national flood maps that present modelled flood extents for river, coastal, surface water and groundwater flooding which were developed using a consistent methodology to produce outputs for the whole of Scotland, supplemented with more detailed, local assessments where available and suitable for use. Flood extents are presented in three likelihoods: High, Medium, and Low.

- High likelihood: a flood event is likely to occur in the defined area on average more than once in every ten years (1:10), or a 10% chance of happening in any one year;
- Medium likelihood: a flood event is likely to occur in the defined area on average more than once in every two hundred years (1:200), or a 0.5% chance of happening in any one year; and
- Low likelihood: a flood event is likely to occur in the defined area on average more than once in every thousand years (1:1000), or a 0.1% chance of happening in any one year.

9.7.36 SEPA has also produced reservoir inundation maps for those sites currently regulated under the Reservoir Act 1975.

9.7.37 A summary of the potential sources of flooding and a review of the potential risks posed by each source is presented in **Table 9.7**.

Table 9.7: SEPA Surface Waterbody Classifications (2022)

Potential Source	Potential Flood Risk to Application	Justification
Coastal Flooding	No	The Proposed Development is not in proximity to the coast and is remote from areas of mapped tidal or coastal flood risk.
River Flooding	Yes	SEPA river flood mapping highlights that there is low to high likelihood of flooding along the River Strathy within the study area. The area delineated as being at risk of flooding is wider than the immediate river channel particularly within the southern extent of the study area. With the exception of Tower 4, the Proposed Development is located out with the floodplain. Tower 4 is shown to be on the edge of the floodplain (e.g. where flood depths and velocities will be low). It has been located here as technical restrictions prevent a larger span being used to connect to Towers 3 or 5. The base of the proposed steel lattice towers are considered water compatible and therefore not considered to be at risk of fluvial flooding nor increase flood risk in the river itself. It is noted that the SEPA flood maps are unlikely to show flooding of the smaller watercourses within the study area, however, floodplains associated with the watercourses are likely to be limited and confided to the watercourse corridors. Where technically and practically it is not possible, no permanent development has been proposed within 20 m of watercourses. It is therefore considered that the site is not at risk from fluvial flooding.
Surface Water Flooding	Yes (minor)	SEPA records several small, isolated areas at risk of surface water flooding across the study area. It is noted that the mapped flood risk is minor and localised and does not form large, linked areas or flood paths, unless associated with watercourse corridors or local low points on the ground surface where water can pond / accumulate. Surface water flooding is not considered to present a development constraint and potential effects can be mitigated by good site design.

Potential Source	Potential Flood Risk to Application	Justification
Groundwater Flooding	No	SEPA groundwater flood mapping highlights the study area is not at risk of groundwater flooding. Additionally, review of the baseline geology and hydrogeology confirms that the geology at and near to the Proposed Development is unlikely to contain significant quantities of groundwater.
Flooding due to dam or reservoir failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of the SEPA Inundation Mapping highlights that the Proposed Development is not at risk from any potential breach scenarios.
Flood Defence Breach (failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	No significant drainage systems are present near to the Proposed Development.

9.7.38 SEPA also publish potential future flood extents (to the year 2080) which account for the potential upfit in rainfall depths and intensities as a consequence of climate change. An extract of this mapping is show on **Figure 9.1** and confirms that the majority of the Proposed Development, with the exception of one tower; Tower 4, is not located within the predicted floodplain extents. Flood risk associated with this tower is discussed in **Table 9.7**.

Watercourse Crossings

9.7.39 The Proposed Development would cross several watercourses however construction activities would not be required adjacent to the watercourses as the proposed OHL conductors (e.g. not tracks) would span the crossings. The length of proposed new permanent access track has been minimised and existing tracks have been utilised where possible.

Private Water Supplies and Licensed Sites (Abstractions / Discharges / Waste)

9.7.40 Consultation with THC and SEPA has been conducted regarding records of registered and licenced water abstractions and discharges. Recorded private water supplies (PWS) and SEPA Controlled Activity Regulation (CAR) registrations / licences are shown on **Figure 9.1** and are discussed below.

9.7.41 A review of the THC data and previous assessments within the study area indicates that there are two private water supplies within the study area:

- Dallangwell Farmhouse. Historically water was abstracted from the gravels which bound the River Strathy however, the property was purchased by SSE Renewables when Strathy North Wind Farm was constructed, and it is confirmed that the farmhouse is now not residential. The PWS source is no longer used and therefore is not considered further in the assessment.
- Braerathy. The PWS is sourced from a small lochan on the hill to the south of the property which drains to two troughs. Water is abstracted from the troughs to a holding tank which is located adjacent to the existing track before it is piped to the property. It is noted that the Strathy Wood Wind Farm EIA Report indicates that the property is proposed to be converted to a substation (for the Strathy Wood Wind Farm development). This property has now been demolished and the PWS source will no longer be used and therefore it is not considered further in the assessment.

9.7.42 Eight CAR licences have been identified within the study area, seven within the northern extent of the study area associated with private sewage disposals and engineering works for Strathy North Wind Farm and one

within the southern extent of the study area associated with engineering works for Strathy Wood Wind Farm. None of these are considered at risk from the Proposed Development.

Future Baseline

9.7.43 Due to consent being sought in perpetuity the temporal scope requires the consideration of the potential for climate change to impact on future baseline conditions. Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside higher average temperatures. This suggests that there is likely to be greater pressures on water supplies and water levels in summer months in the future. In addition, summer storms are predicted to be of greater intensity. Therefore, peak fluvial flows associated with extreme storm events may also increase in volume and velocity.

Summary of Sensitive Receptors

9.7.44 **Table 9.8** outlines the receptors identified as part of the baseline study, and their sensitivity based upon the criteria contained in **Table 9.2**. These receptors form the basis of the assessment, and as per the previously introduced methodology, are used in conjunction with an estimate of the magnitude of an effect to determine significance.

Table 9.8: Sensitivity of Receptors

Receptor	Sensitivity	Reason for Sensitivity
Water Dependent or Geological Statutory Designated Sites	High	The Proposed Development is located within part of the West Halladale SSSI, Caithness and Sutherland SAC, SPA and Ramsar site and the Flow Country WHS, which include qualifying features that are water dependent.
Peat and Carbon Rich Soils	High	Presence of peat and carbon rich soils have been confirmed by site investigation and are also considered nationally and internationally important deposits. These are important carbon stores and need to be safeguarded.
Superficial and Bedrock Geology	Not sensitive	Deposits have been shown to be common regionally and have no rarity value. No geological designated sites are recorded within the study area.
Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as Moderate to High.
GWDTE	High	Areas of potential GWDTE have been identified by NVC mapping. It has been shown that these habitats are not sustained by groundwater but by surface water. Measures will be required to sustain existing surface water flow paths to these habitats.
Surface Water	High	The surface water watercourses have been classified by SEPA as Good.
Flooding	Moderate	Floodplains have been identified adjacent to the larger watercourses, particularly the River Strathy.
Drinking Water Protected Areas	Not sensitive	None of the surface water catchments which drain the study area have been designated as a DWPA.
Private Water Supplies	Not sensitive	Previous assessments have identified two private water supplies within the study area however these are no longer in use.
Licenced Sites	Not sensitive	No third party licenced abstractions have been identified within the study area. Licensed sites are related to engineering activities or discharges which are not at risk from the Proposed Development.

9.8 Embedded Mitigation and Mitigation by Design

9.8.1 Mitigation has been developed as the project design has progressed through the route and alignment selection, and EIA stages of the project. The impact assessment and mitigation process has been iterative and therefore mitigation has been developed for the design to be as specific as possible and as an assumed part of the OHL and associated infrastructure. This process has included, for example, using existing access tracks where possible, citing infrastructure generally in areas that avoid ecologically and hydrologically sensitive areas where practicable. In addition to the mitigation embodied in the design and routeing of the project, best practice construction measures have also been developed to ensure that disturbance and pollution during construction is avoided.

9.8.2 A description of all elements of the Proposed Development is given in **Chapter 3 - The Proposed Development**. Embedded mitigation and mitigation by design relevant to soils, geology and the water environment is presented below.

Good Practice Measures

9.8.3 As a principle, preventing the release of any pollution / sediment is preferable to dealing with the consequences of any release. There are several general measures which cover all effects assessed within this Chapter, details are given below.

9.8.4 The Proposed Development would be constructed in accordance with good practice guidance, including UK and Scottish guidance on good practice for construction projects as detailed in Section 9.5 of this Chapter.

9.8.5 In addition, the Applicant has established best practice construction techniques and procedures that have been agreed with statutory consultees, including SEPA and NatureScot. These are set out within the Applicant's General Environmental Management Plans (GEMPs), included in **Appendix 3.5** within Volume 4 of this EIA Report. The Proposed Development would be constructed in accordance with these plans.

Construction and Environmental Management Plan

9.8.6 A contractual management requirement of the successful Principal Contractor would be the development and implementation of a comprehensive and site-specific CEMP. This document would detail how the successful Principal Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIA Report, Applicant's GEMPs, statutory consents and authorisations, and industry best practise and guidance, including pollution prevention guidance.

9.8.7 The CEMP would also outline measures to ensure that the works minimise the risk to soils (inc. peat), groundwater, surface water and water dependent designated sites.

9.8.8 It is expected that the following would be included within the CEMP and would ensure the works are undertaken in accordance with good practice guidance, which includes, but is not limited to the following:

- any above ground on-site fuel and chemical storage would be bunded;
- emergency spill response kits would be maintained during the construction works;
- a vehicle management system would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision;
- suitable access routes would be chosen which minimise the potential requirement for either new access tracks or for tracking across open land which could contribute to the generation of suspended solids;
- a speed limit would be used to reduce the likelihood and significance of any collisions;
- drip trays will be placed under vehicles which could potentially leak fuel / oils;

- any temporary construction / storage compounds required would be located remote from any sensitive surface water receptors or private water supplies and would be constructed to manage surface water run-off in accordance with best practice - details of which will be provided by the Principal Contractor and agreed with regulators as required by the Controlled Activity Regulations ;
- any water contaminated with silt or chemicals would not be discharged directly or indirectly to a watercourse without prior treatment; and
- water for temporary site welfare facilities would be brought to site, and foul water would be collected in a tank and collected for offsite disposal at an appropriately licensed facility.

9.8.9 A wet weather protocol would be developed. This would detail the procedures to be adopted by all staff during periods of heavy rainfall. Tool box talks would be given to engineering / construction / supervising personnel. Roles would be assigned and the inspection and maintenance regimes of sediment and runoff control measures would be adopted during these periods.

9.8.10 In extreme cases, the above protocol would dictate that work on-site may have to be temporarily suspended until weather / ground conditions allow.

Environmental Clerk of Works

9.8.11 To ensure all reasonable precautions are taken to avoid negative effects on the water environment, a suitably qualified Environmental Clerk of Works (EnvCoW) would be appointed prior to the commencement of construction to advise the Applicant and the Principal Contractor on all ecological and hydrological matters. The EnvCoW would be required to be present on-site during the construction phase and would carry out monitoring of works and briefings with regards to any ecological and hydrological sensitivities on the site to the relevant staff of the Principal Contractor and subcontractors.

9.8.12 With respect to the water environment, the EnvCoW would also have responsibility to ensure water flow paths and quality to water dependant habitat are sustained during all phases of the Proposed Development.

Safeguarding of Carbon Rich Soils and Peat

9.8.13 As required by NPF4, a detailed review of the distribution, condition and depth of peat at the site is contained in **Appendix 7.3**, **Appendix 9.1** and **Appendix 9.2** within Volume 4 of this EIA Report. The Proposed Development design has applied the mitigation hierarchy detailed in Policy 5 of NPF4 and specifically avoided areas of deep peat wherever technically feasible. It is shown in **Appendix 9.2** that disturbed soils and peat can be readily managed and accommodated and would be safeguarded. No surplus peat would be generated.

9.8.14 A Design and Geotechnical Risk Register would be compiled to include risks relating to peat instability.

9.8.15 Good construction practice and methodologies to prevent peat instability within areas that contain peat deposits are identified in **Appendix 9.1**. These include:

- minimisation of ‘undercutting’ of peat slopes, but where this is necessary, a more detailed assessment of the area of concern would be required;
- careful micro-siting of access track alignments to minimise effects on the prevailing surface and sub-surface hydrology;
- raising peat stability awareness for construction staff by incorporating the issue into the Site Induction (e.g. peat instability indicators and good practice);
- introducing a ‘Peat Hazard Emergency Plan’ to provide instructions in the event of a peat slide or discovery of peat instability indicators;

- developing methodologies to ensure that degradation and erosion of exposed peat deposits does not occur as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. minimisation of off-track plant movements within areas of peat); and
- developing drainage systems that would not create areas of concentrated flow or cause over-, or under-saturation of peat habitats.

9.8.16 Notwithstanding any of the above good construction practices and methodologies, detailed design and construction practices would need to consider the particular ground conditions and the specific works at each location throughout the construction period. An experienced and qualified engineering geologist / geotechnical engineer would be appointed as a supervisor, to provide advice during the setting out, micro-siting and construction phases of the Proposed Development.

Buffer to Water Features

9.8.17 As part of the Proposed Development design, a buffer of more than 20 m has been applied to watercourses and water features such as lochs and ponds, where technically and practically possible. All the proposed towers have been designed to be outwith the 20 m watercourse buffer however the temporary working areas (in some locations) may be a minimum of 10 m from watercourses and water features. These areas will be demarked and necessary additional safeguards agreed with the site EnvCoW prior to construction works commencing. A 10 m buffer is specified in SSEN Transmission's GEMP Working in or Near Water (Revision 1.02, March 2024, see **Appendix 3.5**) and has been previously agreed with stakeholders. This buffer is typical for developments of this nature and provides a standoff to watercourses and water features that, in combination with industry good practice, minimises the risk to water bodies.

Water Quality Monitoring

9.8.18 Water quality monitoring would be used to ensure that the quality and / or quantity of water within the study area is not significantly impacted by the Proposed Development. Monitoring would be undertaken throughout the construction phase and immediately post construction. Monitoring would be used to allow a rapid response to any pollution incident and also to assess the impact of good practice or remedial measures. Monitoring frequency would increase during the construction phase if remedial measures to improve water quality were implemented. Water quality monitoring plans would be developed during the detailed design stage of the project (Scottish Water, SEPA, THC and appropriate local fishery board would be consulted on the plans) and would be contained within the CEMP.

9.8.19 The performance of the good practice measures would be kept under constant review by the water monitoring schedule, based on a comparison of data taken during construction with a baseline data set, sampled prior to the construction period.

Pollution Risk

9.8.20 Good practice measures in relation to pollution prevention would include the following:

- refuelling would take place at least 30 m from watercourses and where possible it would not occur when there is risk that oil from a spill could directly enter the water environment. For example, periods of heavy rainfall or when standing water is present would be avoided;
- foul water generated onsite would be managed in accordance with GPP04;
- areas would be designated for washout of vehicles which are a minimum distance of 30 m from a watercourse;
- washout water would also be stored in the washout area before being treated and disposed of;
- a vehicle management plan and speed limit would be strictly enforced onsite to minimise the potential for accidents to occur;

- if any water is contaminated with silt or chemicals, runoff would not enter a watercourse directly or indirectly prior to treatment;
- water would be prevented as far as possible, from entering excavations such as tower foundations;
- procedures would be adhered to for storage of fuels and other potentially contaminative materials in line with the Controlled Activity Regulations, to minimise the potential for accidental spillage; and
- a plan for dealing with spillage incidents would be designed prior to construction, and this would be adhered to should any incident occur, reducing the effect as far as practicable. This would be included in the final CEMP for the Proposed Development.

Erosion and Sedimentation

9.8.21 Good practice measures for the management or erosion and sedimentation would include the following:

- all stockpiled materials would be located out with a minimum 10 m buffer from watercourses;
- water would be prevented as far as possible, from entering excavations such as tower foundations through the use of appropriate cut-off drainage;
- where the above is not possible, water would pass through a number of settlement areas and silt / sediment traps to remove silt prior to discharge into the surrounding drainage system;
- clean and dirty water on-site would be separated and dirty water would be filtered before entering the water environment;
- if the material is stockpiled on a slope, silt fences would be located at the toe of the slope to reduce sediment transport;
- the amount of ground exposed, and time period during which it is exposed, would be kept to a minimum;
- silt / sediment traps, single size aggregate, geotextiles or straw bales would be used to filter any coarse material and prevent increased levels of sediment. Further to this, activities involving the movement or use of fine sediment would avoid periods of heavy rainfall where possible; and
- SSEN Transmission's construction personnel and the Principal Contractor would carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas.

Fluvial Flood Risk

9.8.22 It is proposed to adopt Sustainable Drainage Systems (SuDS) as part of the Proposed Development. SuDS techniques aim to mimic pre-development runoff conditions and balance or throttle flows to the rate of runoff that might have been experienced prior to development. Good practice in relation to the management of surface water runoff rates and volumes where new permanent tracks or temporary compounds and laydown areas are proposed would include the following:

- drainage systems would be designed to ensure that any sediment, pollutants or foreign materials which may cause blockages are removed before water is discharged into a watercourse;
- on-site drainage would be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the original drainage design causing localised flooding; and
- appropriate drainage would attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk.

9.8.23 Further information on ground conditions and drainage designs would be provided in the final CEMP.

Water Abstraction

9.8.24 Abstraction of water for construction activities is not anticipated. If, however, a source of water is required for construction, an application for a CAR Licence would be made to SEPA and managed through the regulation of the CAR Licence(s). Should a suitable source not be identified, a water bowser would be used.

9.8.25 Good practice that would be followed in addition to the CAR Licence regulations includes:

- water use would be planned so as to minimise abstraction volumes;
- water would be re-used where possible;
- abstraction volumes would be recorded; and
- abstraction rates would be controlled to prevent significant water depletion in a source.

Temporary Access Tracks

9.8.26 In general, proposed construction site access would be taken via the existing public road network and would utilise the existing access track that was upgraded for the construction of the operational Strathy North Wind Farm. The upgrade of the track is currently being extended for use during the construction of the consented Strathy Wood and Strathy South wind farms. The Proposed Development would also use the existing Strathy North Wind Farm access tracks (in addition to a new section of permanent track) to access towers positioned on the western side of the River Strathy. New permanent and temporary 'spurs' constructed off the existing track to access each tower/ pole location, and to the CSE compound, would be required where there are no existing tracks.

9.8.27 All new tracks would be constructed in accordance with best practice construction methods, and with reference to NatureScot's good practice guide on constructing tracks in Scottish uplands.

9.8.28 The current layout shows that no new temporary watercourse crossings are required to facilitate the Proposed Development. Should any temporary watercourse crossings be required, the following methodology would be applied:

- Fording would be used where an appropriate crossing point is already in place (on current tracks) with a suitable bed for crossing (where necessary the bed will be protected by the installation of bog mats or similar for running on). Fording would only be used where limited traffic is expected and impacts on the bed and crossing point generally would be monitored with appropriate mitigation being implemented if required.
- For watercourses less than 2 m wide, General Binding Rules (GBRs) would be adhered to. Bog mats, or similar, would be positioned across the watercourse to enable access, where necessary, side rails would be installed with silt mitigation at either end and / or across if required to ensure that silt impacts from vehicles crossing are controlled at all times. Crossings would be cleaned at the end of the day if required.
- Where possible large water crossings would be avoided by works being accessed and undertaken on either side of the watercourse. Appropriate protection measures (trestles and tables, pilot lines and supports etc.) would be implemented for conductor works to ensure that the conductor does not enter the watercourse.

9.8.29 Once access routes have been confirmed, water crossing requirements would be assessed in advance of works with regards to compliance with the CAR and any required authorisations would be gained prior to works progressing – at this time it is expected that all works would be able to be completed under appropriate GBRs.

9.8.30 All proposed crossing locations and methodologies would be reviewed and approved by the EnvCoW, prior to any works being undertaken.

Permanent Steel Lattice Tower Foundation Construction

9.8.31 The following measures are proposed to mitigate the effects of tower foundation construction on the water environment:

- tower foundations would be located and excavated wherever possible in the driest locations with well consolidated superficial geology, and wetland areas such as deep peat would be avoided. Wherever technically feasible, towers would not be located within 20 m of waterbodies;
- wherever possible and technically feasible, towers have and would be located out with the floodplain to reduce potential effects on flooding;
- where excavations for tower foundations encounter localised limited quantities of groundwater or become flooded due to surface water runoff or heavy rainfall, appropriate treatment of dewatering would be instigated under direction of the site EnvCoW;
- no dewatering discharge would be permitted directly adjacent to watercourses;
- unless directed otherwise by the site EnvCoW, dewatering discharge would drain across buffer areas of vegetation (e.g. grassland, heather) of at least 10 m width, which would provide for natural attenuation and dispersal of the flow and removal of silt;
- where no suitable vegetation is available for natural treatment of dewatering, the discharge would be passed through on-site settling tanks / lagoons prior to discharge by soakaway or to a watercourse;
- the requirement for dewatering would be minimised in all locations by timely and efficient excavation of the foundation void and subsequent concrete pouring and backfilling;
- excavated soils would be used to restore foundations and be placed in the order they were removed from the foundation when excavated;
- turves would be used to dress the restored foundations;
- all procedures for dewatering would be agreed by the Principal Contractor with SEPA, THC and NatureScot and detailed within the CEMP; and
- the Principal Contractor would develop a method statement to address the transport, transfer, handling and pouring of liquid concrete at tower foundation sites.

Concrete Batching, Transport and Pouring

9.8.32 In relation to works involving concrete batching, transport and pouring, the following mitigation would be adopted:

- where concrete transfers are required, measures would be adopted at the point of concrete transfer to prevent accidental spillage of liquid concrete and no transfers would be undertaken in proximity to watercourses or areas of standing water;
- there would be no wash-out of concrete carrying vehicles at tower foundation sites (except the concrete chute) with wash-out undertaken at the nearest compounds where suitably bunded / protected facilities would be provided. Chutes would be washed out to a suitable container, allowed to settle and disposed at suitably licensed facilities;
- excess concrete or wash-out liquid would not be discharged to drains or watercourses. Drainage from washout facilities would be collected and treated or removed to an appropriate treatment point / licensed disposal site; and
- vehicles and plant working at tower foundations would be confined to the area required for safe working only to prevent compaction, rutting and habitat damage to adjacent areas of land. Working areas would be clearly marked out and temporary fencing used where risk assessments indicate a requirement. Similar procedures would be adopted to demarcate areas where plant access is required for conductor stringing and tensioning works.

9.9 Potential Effects

9.9.1 The assessment of effects is based on the Proposed Development description outlined in **Chapter 3** and is structured as follows:

- construction effects of the Proposed Development; and
- operational effects of the Proposed Development.

Construction Effects

9.9.2 Potential construction impacts on soils, geology and the water environment have been identified with reference to relevant guidance, through consultation and project team discussions, through targeted research on hydrological and water quality effects and by considering the information provided by the project engineers on infrastructure and construction methods.

9.9.3 During the construction phase the Proposed Development has the potential to result in the following effects without appropriate controls or mitigation:

- adverse effects on carbon rich soils and peat through inappropriate handling and safeguarding;
- an adverse effect on surface water or groundwater quality from pollution, fuel, oil, concrete or other hazardous substances;
- potential adverse change of surface and groundwater flow paths and contribution to areas of peat and GWDTEs and water dependent habitats; and
- increased flood risk to areas downstream of the site through increased surface water runoff.

Peat and Carbon Rich Soils

9.9.4 The peat management plan (see **Appendix 9.2** within Volume 4 of this EIA Report) and peat landslide hazard risk assessment (see **Appendix 9.1** within Volume 4 of this EIA Report) present the result of a detailed programme of site investigation and show that areas of deeper peat and organic soils have generally been avoided by the design of the Proposed Development. This 'embedded mitigation' set out in section 9.8 greatly reduces the potential adverse effect on peat and carbon rich soils.

9.9.5 Best practice measures to maintain the integrity and structure of peat and organic soils are set out in section 9.8. Peat and organic soils are considered highly sensitive receptors. The Proposed Development and proposed safeguards embedded in the development design reduce the magnitude of potential impact to low, during the construction phase. The significance of effect is therefore assessed as **Negligible** and **not significant**. No additional mitigation, over and above that detailed in the peat management plan (**Appendix 9.2**) and peat landslide hazard risk assessment (**Appendix 9.1**) is required.

9.9.6 The safeguards included in the Proposed Development design and committed best practice construction techniques would also safeguard the peat deposits which form part of the designated interests of the West Halladale SSSI, Caithness and Sutherland Peatlands SAC, SPA and Ramsar site and the Flow Country WHS.

Surface Water and Groundwater Quality

9.9.7 As stated above the works would be undertaken in accordance with the Applicant's GEMPs (see **Appendix 3.5** within Volume 4 of this EIA Report) and relevant technical guidance, GPPs and other codes of best practice, to limit the potential for contamination of both ground and surface waters. In addition, a site-specific CEMP (see **Appendix 3.7** within Volume 4 of this EIA Report) would be prepared by the Principal Contractor and include a surface and groundwater quality management plan.

9.9.8 The above measures would significantly reduce the likelihood of pollutants, including suspended solids, being discharged to nearby watercourses or groundwater.

9.9.9 The safeguards included in the Proposed Development design and the committed best practice construction techniques would also safeguard the quality of water which sustains water dependant designated sites, including the West Halladale SSSI, Caithness and Sutherland Peatlands SAC, SPA and Ramsar site and the Flow Country WHS.

9.9.10 Surface water, groundwater and designated sites are considered highly sensitive receptors. The Proposed Development and proposed safeguards embedded in the development design reduce the magnitude of potential impact to low, during the construction phase. The significance of effect is therefore assessed as **Negligible** and **not significant**. No additional mitigation, over and above confirmatory monitoring, is therefore required.

Surface and Groundwater Flow

9.9.11 No significant deep or expansive earthworks are proposed when compared to surface and groundwater catchments at any location of the Proposed Development and therefore there would be no significant impact on catchment scale surface water or groundwater flows. Notwithstanding this, the best practice measures listed above would be included in the CEMP and would be used to control and manage surface and groundwater flows and maintain existing water flow paths at a local scale and be used to ensure water flow paths to water dependent habitat would be maintained.

9.9.12 Surface and groundwater are highly sensitive receptors. With these safeguards, the potential impact on ground and surface water flows is assessed as negligible and thus the resultant significance of effect is **Negligible** and **not significant**. No additional mitigation, over and above confirmatory monitoring, is required.

Flood Risk

9.9.13 Areas of flood risk are considered to have a moderate sensitivity. As part of the detailed site design the Principal Contractor would prepare a detailed construction method statement which would have regard to areas of known and potential flood risk. This would ensure no new permanent features which are sensitive to flooding are located within the floodplain. As discussed in **Table 9.7**, Tower 4 is shown to be on the edge of the floodplain (e.g. where flood depths and velocities will be low). It is not possible to locate this tower outside of the floodplain for technical reasons (span of the conductor and turbine wake effects). This is not considered a development constraint as the base of the proposed steel lattice towers are water compatible and therefore not considered to be at risk of fluvial flooding nor will they increase flood risk.

9.9.14 It is proposed that access to the Proposed Development would use existing tracks and existing watercourse crossings wherever possible. No new permanent or temporary watercourse crossings are proposed as part of the Proposed Development. Should any minor watercourse crossings or works to existing crossings be required, the following measures would be implemented to protect surface water and groundwater quality as well as to mitigate a potential increase in flood risk:

- silt traps / check dams would be used to capture suspended solids generated during construction;
- construction would be carried out in accordance with appropriate SEPA and CIRIA guidance; and
- the design and capacity of the watercourse crossings would be agreed by the Principal Contractor and the project EnvCoW, and if required in consultation with SEPA as part of the detailed design.

9.9.15 With these safeguards the magnitude of potential impact is assessed as negligible and the resultant significance of effect is assessed as **Negligible** and **not significant**. No additional mitigation is required.

Designated Sites within Hydraulic Connection to the Proposed Development

9.9.16 The baseline assessment has confirmed that the West Halladale SSSI, Caithness and Sutherland Peatlands SAC, SPA and Ramsar site and the Flow Country WHS are hydraulically connected to the Proposed Development. The designated sites are highly sensitive receptors.

9.9.17 The controls which would be adopted at site in accordance with best practice and discussed above would be used to ensure water resources and qualifying features of the designated sites are not impaired and significant erosion and sedimentation does not occur. This would ensure, with regards to soils, geology and water, that the potential impact on the designated sites is negligible and thus the significance of effect is **Negligible** and **not significant**. No additional mitigation, over and above confirmatory monitoring and mitigation measures outlined in the peat management plan (see **Appendix 9.2** and **Appendix 7.8** within Volume 4 of this EIA Report), is required.

Operational Effects

9.9.18 During the operational phase of the Proposed Development, it is anticipated that routine maintenance of infrastructure and tracks would be occasionally required.

9.9.19 The operational phase the Proposed Development has the potential to result in the following effects without appropriate controls or mitigation:

- adverse changes to surface water flow paths, watercourse discharge rates and volumes, and alteration of watercourse geomorphology;
- as a result of an alteration of groundwater and surface water flow paths, an adverse effect on water abstractions and water dependent habitat;
- an adverse effect on surface water or groundwater quality from pollution, fuel, oil, concrete or other hazardous substances from site traffic associated with maintenance activities; and
- increased flood risk through increased surface water runoff from new impermeable areas.

9.9.20 Should any maintenance be required onsite which would involve construction activities, method statements would be developed and used which would adopt the best practices agreed with regulators as part of the construction phase CEMP.

Peat and Carbon Rich Soils

9.9.21 During the operational phase there would be no requirement to undertake earthworks which could impair peat or carbon rich soils. In an unlikely event where earthworks are required, these would be undertaken using the same controls and safeguards which would be used during the construction phase.

9.9.22 The likelihood, magnitude of impact and duration of works which have the potential to impair peat or carbon rich soils would be negligible following adherence to good practice measures. Therefore, the potential significance of effect on peat and carbon rich soils is **Negligible** and **not significant**. No mitigation is therefore required.

Surface Water and Groundwater Quality

9.9.23 The possibility of a pollution event, resulting in impairment of surface water or groundwater impairment, occurring during operation is very unlikely as there would be a limited number of vehicles required on-site for routine maintenance.

9.9.24 Any maintenance activities would be undertaken using the same controls agreed with statutory consultees and deployed during the construction phase, including adherence to a CEMP, and supervision of all works. Further the scope of works which might be undertaken are no different to the work which would be undertaken during the construction phase.

9.9.25 Immediately post-construction, newly excavated drains and track dressings may be prone to erosion as any vegetation would not have matured. Appropriate design of the drainage system, incorporating sediment traps, would reduce the potential for the increased delivery of sediment to natural watercourses. Potential effects from sedimentation or erosion during the operational phase are considered to come from linear features on steeper slopes, where velocities in drainage channels are higher. Immediately post-construction, flow attenuation

measures would remain and be maintained to slow runoff velocities and prevent erosion until vegetation becomes established.

9.9.26 An outline site restoration plan is presented as **Appendix 3.4: Outline Site Restoration Plan** within Volume 4 of this EIA Report and would be undertaken in accordance with the best practice and safeguards detailed in this Chapter.

9.9.27 Based upon this, the potential risk associated with frequency, duration and likelihood of a pollution event is low. It is, therefore, anticipated that the magnitude of a potential impact on surface water or groundwater during the operational phase of the Proposed Development would be negligible, as no detectable change would likely occur. Therefore, the significance of effect during the operational phase of the Proposed Development is predicted to be **Negligible** and **not significant** on surface water and groundwater. No further or additional mitigation, therefore, is required.

Surface and Groundwater Flow

9.9.28 During the operation of the Proposed Development, it is not anticipated that there would be any excavation or need to stockpile large volumes of soils, reducing the potential for effects on surface and groundwater flows. Should any excavation be required, this is likely to be limited and required for maintenance of tracks etc. Any excavation, handling and placement of material would be subject to the same safeguards that would be used during the construction phase of the project.

9.9.29 Should any non-routine maintenance be required at the sections of track crossing wet areas (defined visually on-site by a contractor or operational personnel) then the good practice measures as detailed for the construction phase would be required on a case-by-case basis. Extensive work adjacent to the water environment may require approval from SEPA under the CAR (depending upon the nature of the activity).

9.9.30 The likelihood, magnitude and duration of works which have the potential to alter surface and groundwater flow paths would be negligible following adherence to good practice measures. Therefore, the potential significance of effect on surface and groundwater is **Negligible** and **not significant**. No mitigation is, therefore, required.

Flood Risk

9.9.31 Culverts beneath permanent access tracks could become blocked without routine inspection or maintenance. Any reduction in conveyance could locally increase flood risk.

9.9.32 In accordance with the Applicants GEMPs, proposed infrastructure would be subject to routine inspection, and if required maintenance. Where identified, any remedial works would be undertaken using the same controls and authorisations detailed above and would be deployed during the construction phase of the project.

9.9.33 The likelihood, magnitude of impact and duration of works which have the potential to alter surface and groundwater flow paths would be negligible following adherence to good practice measures. Therefore, the potential significance of effect on surface and groundwater is **Negligible** and **not significant**. No mitigation is therefore required.

Designated Sites within Hydraulic Connection to the Proposed Development

9.9.34 The controls which would be adopted at site during the operational phase, and which are in accordance with best practice, would safeguard surface water and groundwater quality, surface water and groundwater flows, and mitigate flood risk. They would ensure that the potential impact of the West Halladale SSSI, Caithness and Sutherland Peatlands SAC, SPA and Ramsar site and the Flow Country WHS is negligible and thus the significance of effect is **Negligible** and **not significant**. No additional mitigation is required.

9.10 Cumulative Effects

9.10.1 The following developments that are within 5 km and in the same water catchments as the Proposed Development include:

- Wind Farms
  - Strathy North Wind Farm (operational) in the River Strathy surface water catchment (including the Allt nan Clach sub catchment);
  - Strathy Wood Wind Farm (consented) in the River Strathy surface water catchment (including the Allt nan Clach and the Uair sub catchments);
  - Strathy South Wind Farm (including on-site substation) (consented);
  - Melvich Wind Energy Hub (including on-site substation) (proposed); and
  - Kirkton Energy Park (including on-site substation) (proposed).
- Grid Infrastructure
  - Strathy South Wind Farm 'Southern Section' Grid Connection in the River Strathy surface water catchment (including the Allt nan Clach sub catchment);
  - Strathy South Wind Farm 'Northern Section' Grid Connection (Proposed or Alternative Alignment) (scoping);
  - Melvich Wind Energy Hub Grid Connection (anticipated to be permitted development);
  - Kirkton Energy Park Grid Connection (pre-scoping); and
  - Strathy Switching Station (pre-scoping).

9.10.2 These developments have been constructed recently or may be constructed in coming years and therefore would be expected to comply with current industry standard guidelines and be managed in accordance with best practice, industry standards and relevant legalisation, planning policy and guidance regulated by statutory consultees. These standards ensure, with respect to the soils, geology and the water environment, potential impacts are mitigated and controlled at source.

9.10.3 The magnitude of cumulative impact is therefore considered negligible and the potential effect on identified receptors is **Negligible** and **not significant**.

9.11 Mitigation

9.11.1 As there are no predicted likely significant effects as defined by the EIA regulations, other than the good practice measures that SSEN Transmission implement as standard, no specific mitigation is required.

9.12 Residual Effects

9.12.1 No significant residual effects on soils (inc. peat), geology, surface water or groundwater receptors including designated water dependent sites are predicted during the construction and operation of the Proposed Development.

9.13 Summary and Conclusions

9.13.1 Existing soils, geological, hydrogeological and hydrological conditions have been identified and used to assess the potential effects that the Proposed Development may have on geology, soils and the water environment.

9.13.2 Best practice construction techniques that would safeguard soils, geology and the water environment and would be incorporated in the detailed design of the works have been identified. Subject to the adoption of the best practice, peat resources, soils, geology, and the water environment can be safeguarded during and following development.

9.13.3 Specifically, the assessment has shown, with regard to soils, (inc. peat), geology and the water environment the potential effect of the West Halladale SSSI, Caithness and Sutherland Peatlands SAC, SPA and Ramsar site and the Flow Country WHS is negligible and not significant.

9.13.4 A summary of assessed effects and identified mitigation measures required to reduce the potential effects to acceptable levels are identified in **Table 9.9**.

Table 9.9: Summary of Effects and Proposed Mitigation Measures

Potential Effect	Proposed Mitigation / Enhancements	Resultant Significance of Effect
Construction Phase		
• Adverse effect on carbon rich soils and peat. • Alteration of surface water or groundwater flow. • Impairment of surface water or groundwater quality. • Increase in flood risk. • Adverse effect on water dependent designated sites.	• Mitigation by design • Good practice construction techniques to be included in the final CEMP • Confirmatory water quality monitoring • Peat management plan; and • Outline Habitat Management Plan	Negligible and not significant
Operational Phase		
No additional effects or mitigation / enhancements identified		
Cumulative Effects		
No additional effects or mitigation / enhancements identified		

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