

**VOLUME 2: CHAPTER 6 – WATER ENVIRONMENT**

<b>6.</b>	<b>WATER ENVIRONMENT</b>	
6.1	Executive Summary	6-3
6.2	Introduction	6-4
6.3	Scope of Assessment and Methodology	6-4
6.4	Baseline	6-12
6.5	Future Baseline	6-55
6.6	Embedded Mitigation and Mitigation by Design	6-56
6.7	Assessment of Likely Significant Effects	6-65
6.8	Mitigation	6-69
6.9	Residual Effects	6-69
6.10	Summary of Effects	6-69

**Appendices (Volume 5 of this EIA Report)**

Appendix V2-6.1: Methodology for Assessing Significance of Effect

Appendix V2-6.2: Schedule of Permanent Watercourse Crossings

Appendix V2-6.3: Drinking Water Protected Area and Private Water Supply Risk Assessment (Confidential)

Appendix V2-6.4: Groundwater Dependent Terrestrial Ecosystems (GWDTE) Assessment

**Figures (Volume 3 of this EIA Report)**

Figure V2-6.1: Local Hydrology

Figure V2-6.2a: Regional Hydrogeology

Figure V2-6.2b: Hydrogeological Map of Scotland

Figure V2-6.3: Groundwater Vulnerability

Figure V2-6.4: GWDTE



## 6. WATER ENVIRONMENT

### 6.1 Executive Summary

- 6.1.1 An assessment has been undertaken on hydrology and hydrogeology (the water environment) during the construction and operational phases of the Proposed Development. The assessment has also considered the potential effects of dismantling the existing 132 kV overhead line (OHL) on hydrology and hydrogeology.
- 6.1.2 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 field work included investigation of private and public water supply sources in order to determine those which might be hydrologically connected to and at risk from the Proposed Development. Measures required to protect these sources have been confirmed.
- 6.1.3 The assessment considers designated sites and where these are water dependant and have a potential hydrologic connection to the Proposed Development these have been considered in the assessment.
- 6.1.4 The assessment was undertaken considering the sensitivity of receptors identified during the baseline study and considering mitigation measures incorporated in the development design. It has also considered potential future changes to baseline conditions.
- 6.1.5 The scope of the assessment was informed by scoping responses received from statutory and non-statutory consultees. Further consultation was undertaken with Scottish Water and residents who benefit from a private water supply to enable a thorough assessment of the potential effects of the Proposed Development on public and private water supply sources.
- 6.1.6 The assessment is supported by Appendices that consider potential effects on Drinking Water Protected Areas and private water supplies, and on habitat which could be sustained by groundwater (Groundwater Dependent Terrestrial Ecosystems). A schedule of proposed permanent watercourse crossings associated with the Proposed Development is also provided as an Appendix.
- 6.1.7 A buffer of at least 20 m to water features has been applied in the Proposed Development design. There are limited locations where, as a consequence of engineering constraints, it has not been possible to maintain this buffer and these locations have been confirmed in this assessment. It is recognised that at these locations additional safeguards are required to protect the water environment and details of these are identified in this assessment.
- 6.1.8 Subject to adoption of best practice construction techniques and a project specific Construction Environmental Management Plan (CEMP), no significant adverse effects on the water environment have been identified. The CEMP includes provision for drainage management plans which will be agreed with statutory consultees, including the Scottish Environment Protection Agency (SEPA) and which will 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 also includes provision of a Pollution Prevention Plan which would also be agreed with statutory consultees including SEPA prior to any construction or dismantling works being undertaken.
- 6.1.9 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 the water environment. The monitoring programme would also be used to ensure private water supplies, Drinking Water Protected Areas, and water dependant designated sites are safeguarded. It is proposed that the monitoring programme is agreed with statutory consultees.

## 6.2 Introduction

6.2.1 This Chapter assesses the potential effects of the Proposed Development on hydrology and hydrogeology (the water environment). It outlines the embedded good practice methods which have been incorporated into the design and would be used to prevent or reduce identified effects and risks.

6.2.2 Further mitigation methods to address any potential effects are proposed, where appropriate, and residual effects are then assessed.

6.2.3 In addition, the assessment uses information and findings presented in **Volume 2, Chapter 4: Ecology** and **Volume 2, Chapter 7: Geology and Soils Environment**. This Chapter also presents summary information from the following Appendices:

- Appendix V2-6.1: Methodology for Assessing Significance of Effect;
- Appendix V2-6.2: Schedule of Permanent Watercourse Crossings;
- Appendix V2-6.3: Drinking Water Protected Area and Private Water Supply Risk Assessment (Confidential); and
- Appendix V2-6.4: Groundwater Dependent Terrestrial Ecosystems (GWDTE) Assessment.

6.2.4 This Chapter has been prepared by SLR Consulting Ltd (SLR), who has also undertaken the assessment. It has been informed by a detailed programme of site investigation and surveys undertaken by the report authors.

### *Statement of Qualifications*

6.2.5 Production of this Chapter has been overseen 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 sites in similar settings 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 is included in **Appendix V1-5.1: EIA Team**, contained within Volume 5 of this EIA Report.

## 6.3 Scope of Assessment and Methodology

6.3.1 The potential effects from the Proposed Development on the water environment have been assessed by completing an initial desk study and a detailed programme of site investigation followed by an impact assessment.

### *The Study Area*

6.3.2 Given the length of the route for the Proposed Development, which extends for approximately 160 km from Ardmore Substation in the northwest of Skye, to Fort Augustus Substation on the mainland, the route of the new 132 kV transmission connection has been split into seven geographically defined 'Sections' to describe more easily the Proposed Development, local baseline conditions, and constraints. These Sections are broadly defined as follows:

- Section 0 – Ardmore to Edinbane;
- Section 1 – Edinbane to North of Sligachan;
- Section 2 – North of Sligachan to Broadford;
- Section 3 – Broadford to Kyle Rhea;
- Section 4 – Kyle Rhea to Loch Cuaich;
- Section 5 – Loch Cuaich to Invergarry; and
- Section 6 – Invergarry to Fort Augustus.

- 6.3.3 A full description of the Proposed Development can be found in **Volume 1, Chapter 3: Project Description**, with further section-specific information presented in **Volume 2, Chapter 2: Section by Section Overview**.
- 6.3.4 The study area includes all elements of the Proposed Development, as described within **Volume 1, Chapter 3: Project Description**. In addition, details of local water use and quality within a buffer of 1 km from the Proposed Development has been considered. The study area encompasses the Proposed Development as well as bodies of water and their catchments which could potentially be affected by the construction (including dismantling of the existing 132 kV OHL) and operation of the Proposed Development.
- Consultation and Scoping*
- 6.3.5 The scope of the assessment has been determined through a combination of professional judgement, reference to the relevant guidance documents and consultation with stakeholders through a formal EIA scoping process and pre-application advice and is based on the formal Scoping Opinion issued by Scottish Ministers.
- 6.3.6 Scoping responses, relevant to the water environment, are provided in **Table V2-6-1**.

**Table V2-6-1: Scoping Responses**

Organisation	Response	Comment
Energy Consents Unit (ECU)	Scottish Water provided information in relation to the presence of any drinking water protected areas or Scottish Water assets on which the Proposed Development could have any significant effect. Scottish Ministers request that the Applicant contact Scottish Water directly to confirm whether there are any Scottish Water assets which may be affected by the development and include details in the EIA Report of any relevant mitigation measures to be provided.	Scottish Water have been contacted directly to obtain information on drinking water protected areas and assets. This Chapter assesses potential impacts on the water environment, Drinking Water Protected Areas and private water supplies and identifies required mitigation measures.
	Scottish Ministers request that the Applicant investigates the presence of any private water supplies which may be impacted by the Proposed Development, and detail these within the EIA Report along with assessment of likely impacts. Mitigation measures should be proposed, where necessary.	The presence of any private water supplies along the route have been determined through consultation with THC and site survey, and likely impacts from the Proposed Development are set out in this Chapter (and Confidential Appendix V2-6.3). Mitigation measures are proposed, where relevant.
	In addition to identifying the main watercourses and waterbodies within and downstream of the Proposed Development area, the Applicant should identify and consider any Special Areas of Conservation (SACs) where fish are a qualifying feature. The Applicant should also consider proposed felling operations, particularly in acid sensitive areas.	Impacts on designated sites of relevance to the water environment are considered in this Chapter. The potential effects on felling are similarly assessed. The potential effects on fish are considered in Volume 2, Chapter 4: Ecology of this EIA Report.

<p>The Highland Council (THC)</p>	<p>THC require that the EIA Report include;</p> <p>assessment of impacts on watercourses, lochs, groundwater, other water features and sensitive receptors, such as water supplies;</p> <p>a systematic table of all watercourse crossings or channelising, with detailed justification for any such elements and design to minimise impact accompanied by photography;</p> <p>The EIA Report should provide information on, and the need for, abstractions of water supplies for concrete works or other operations; and</p> <p>details of onsite survey to identify any private water supplies or private drainage schemes (septic tanks) and details of the measures proposed to prevent contamination or physical disruption of them.</p> <p>assessment of the effects on Ground Water Dependent Terrestrial Ecosystems (GWDTE).</p>	<p>The following confirms where each point listed in THCs response has been addressed:</p> <p>This is provided in this Chapter;</p> <p>A watercourse crossing schedule for permanent watercourse crossings is provided in Appendix V2-6.2 and measures to minimise their impact are given in this Chapter and Volume 2, Chapter 4: Ecology.</p> <p>This is discussed in this Chapter.</p> <p>A Private Water Supply survey has been undertaken, the results of which are included in Confidential Appendix V2-6.3.</p> <p>An assessment of the effects on GWDTE have been undertaken in this Chapter (see also Appendix V2-6.4).</p>
<p>Scottish Environment Protection Agency (SEPA)</p>	<p>The site layout must be designed to avoid impacts upon the water environment. Where activities such as watercourse crossings, watercourse diversions or other engineering activities in or impacting on the water environment cannot be avoided then the submission must include justification of this and a map showing:</p> <p>all proposed temporary or permanent infrastructure overlain with all lochs and watercourses;</p> <p>a minimum buffer of 50 m around each loch or watercourse. If this minimum buffer cannot be achieved each breach must be numbered on a plan with an associated photograph of the location, dimensions of the loch or watercourse and drawings of what is proposed in terms of engineering works; and</p> <p>detailed layout of all proposed mitigation including all cut off drains, location, number and size of settlement ponds.</p>	<p>The following confirms where each point listed in SEPAs response has been addressed:</p> <p>Figures that accompany this Chapter show all proposed temporary and permanent infrastructure overlain with lochs and watercourses. A watercourse crossing schedule for permanent watercourse crossings is provided in Appendix V2-6.2.</p> <p>The potential effects on watercourses and waterbodies, and buffers to be maintained, are discussed within this Chapter. A 20m buffer has been applied for wood poles, towers and underground cable wherever possible. Locations where this is not possible are set out in this Chapter and required safeguards are detailed.</p> <p>Mitigation measures are discussed within this Chapter and principals that will be adopted in the detailed site design are presented.</p>

	<p>If water abstractions are proposed, a table of volumes and timings of abstractions and related mitigation measures must be provided.</p>	<p>It is not currently anticipated that any water abstractions would be required for the Proposed Development.</p>
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*Potential Impacts*

6.3.7 The following potential impacts have been assessed in full in relation to the Proposed Development (potential construction impacts noted below also include dismantling of the existing OHL):

- 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 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 peat during construction and operation;
- potential impact on areas of GWDTE during construction and operation; and
- potential cumulative impact during construction and operation.

*Issues Scoped Out*

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

- Detailed Flood Risk and Drainage Impact Assessment. 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 Construction and Environmental Management Plan (CEMP).
- Effects associated with forest felling, as the extent of proposed felling is very small compared to the surface water catchments in which the felling would occur. Forest felling would also be undertaken in accordance with industry standard best practice with regard to minimising the potential for pollution and alteration of water drainage paths.
- 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 Controlled Activity Regulations.
- A Geomorphological Assessment as photographs and records of baseline water features are recorded and presented in the EIA.
- Watercourse crossing assessment of temporary tracks which would be used as part of the construction phase of the Proposed Development, as measures to mitigate potential effects would be agreed in the site specific CEMP.

- An assessment of potential effects associated with short term or temporary cable trench and cable laying works beneath watercourses as a method statement for this work would be agreed with SEPA and the controls and safeguards proposed in this Chapter with respect to water quality and maintenance of water flows would be applied. An assessment of potential effects on aquatic habitat and fisheries is given in **Volume 2, Chapter 4: Ecology** of this EIA Report. Potential effects associated with Horizontal Directional Drilling are assessed in full in this Chapter.

6.3.9 An assessment of potential cumulative effects associated with the Proposed Development and other proposed electrical transmission projects has also been 'scoped out' of the assessment. Other developments would also be designed, developed and managed in accordance with best practice, industry standards and relevant legislation, planning policy and guidance regulated by statutory consultees. These standards ensure, with respect to the water environment, potential impacts are mitigated and controlled at source.

6.3.10 It will be necessary to establish borrow pits and construction compounds to facilitate the Proposed Development. They do not form part of this Section 37 consent application and measures required to control or mitigate the potential effects of these on the water environment will be presented as part of their respective planning application(s). Indicative locations and a preliminary appraisal of the potential environmental constraints associated with these works is included in **Appendix V1-3.3**.

#### *Legislation, Planning Policy and Guidance*

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

#### Legislation

6.3.12 Relevant legislation includes:

- The Water Environment (Controlled Activities) (Scotland) Amendment Regulations, 2013 (CAR);
- EU Water Framework Directive (2000/60/EC);
- EU Drinking Water Directive (98/83/EC);
- The Environment Act 1995;
- Environmental Protection Act 1990;
- The Water Supply (Water Quality) (Scotland) Regulations, 2001;
- The Flood Risk Management (Scotland) Act 2009;
- Water Environment and Water Services (Scotland) Act 2003 (WEWS Act);
- Private Water Supplies (Scotland) Regulations 2006; and
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017.

#### Planning Policy

6.3.13 In addition to Scottish Planning Policy (SPP) published by The Scottish Government<sup>1</sup>, the Highland Wide Local Development Plan (HwLDP)<sup>2</sup>, provides planning guidance on the type and location of development that can take place in the region. The HwLDP presents development polices of which the following are relevant to this assessment:

- Policy 60: Other Important Habitats and Article 10 Features;
- Policy 63: Water Environment;

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<sup>1</sup> The Scottish Government (2014) Scottish Planning Policy

<sup>2</sup> The Highland Council (April 2012) Highland-wide Local Development Plan



- Policy 64: Flood Risk;
- Policy 66: Surface Water Drainage; and
- Policy 69: Electricity Transmission Infrastructure

### Guidance

6.3.14 Planning Advice Notes (PANs) and Specific Advice Sheets, published by the Scottish Government of relevance to this assessment, include:

- PAN 50 Controlling the Environmental Effects of Surface Mineral Workings;
- PAN 61 Planning and Sustainable Urban Drainage Systems; and
- Online Planning Advice on Flood Risk (which supersedes PAN 69).

6.3.15 SEPA Pollution Prevention Guidance Notes (PPG) and Guidance of Pollution Prevention (GPP):

- GPP01: Understanding your environmental responsibilities – good environment practices;
- GPP02: Above ground oil storage;
- PPG03: Use and design of oil separators in surface water drainage systems;
- GPP05: Works and maintenance in or near water;
- PPG06: Working at construction and demolition sites;
- PPG07: Safe storage - the safe operation of refuelling facilities;
- GPP08: Safe storage and disposal of used oils;
- GPP13: Vehicle washing and cleaning;
- GPP21: Pollution incident response planning; and
- GPP22: Dealing with spills.

6.3.16 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); and
- C753 The SUDS Manual (2015).

6.3.17 SEPA publications:

- 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 2 – Flood Risk (2018)
- Land Use Planning System SEPA Guidance Note 31, Version 3 – GWDTE (2017); and
- Position Statement – Culverting of Watercourses, Version 2.0 (2015).

### *Desk Study*

6.3.18 An initial desk study has been undertaken to determine and confirm the baseline characteristics by reviewing available information relating to the water environment. The following sources of information have been consulted to characterise and assess the water environment within and surrounding the Proposed Development:

- Ordnance Survey (OS) 1:50,000 and 1:25,000 scale mapping;

- Natural England MAGIC map<sup>3</sup>;
- NatureScot SiteLink<sup>4</sup>;
- James Hutton Institute, The National Soil Map of Scotland (1:250,000)<sup>5</sup>;
- British Geological Survey (BGS) Onshore GeoIndex (1:50,000)<sup>6</sup>;
- BGS Hydrogeological maps of Scotland<sup>7</sup>;
- SEPA flood maps<sup>8</sup>;
- SEPA environmental data<sup>9</sup>; and
- Data requests to SEPA and the THC (November 2020).

6.3.19 In addition, the baseline conditions, field surveys and the assessment completed in support of the consented and constructed Quoich to Aberchalder 132 kV wood pole OHL<sup>10</sup> has been reviewed and used to further characterise the site setting of part of the Proposed Development within Section 5 (Loch Cuaich to Invergarry).

#### *Field Work*

6.3.20 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.

6.3.21 Detailed site visits and walkover surveys have been undertaken by SLR on the following dates:

- January 2019 to inspect watercourse crossings and obtain details of private water supplies in support of the Quoich to Aberchalder 132 kV wood pole OHL section 37 application;
- 07 – 18 February 2022 to collect peat depth and condition information and details of proposed permanent watercourse crossings;
- 14 – 25 March 2022 to collect data regarding private water supplies, Drinking Water Protected Areas, proposed permanent watercourse crossings and assess potential areas of GWDTE;
- 16 – 19 May 2022 to collect further data regarding private water supplies, Drinking Water Protected Areas and of proposed permanent watercourse crossings;
- 18 – 21 June 2022 to collect further data regarding private water supplies, Drinking Water Protected Areas and of proposed permanent watercourse crossings; and
- 12 – 14 July 2022 to collect further data regarding Drinking Water Protected Areas and of proposed permanent watercourse crossings.

6.3.22 In addition, several programmes of intrusive field investigation have been undertaken:

- Card Geotechnics Limited (CGL)<sup>11</sup> between 22 November 2021 and 4 February 2022 which included investigation of 66 of the 86 proposed steel lattice towers in Section 1;

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<sup>3</sup> Natural England (2022) MAGIC map, available at <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed February - June 2022]

<sup>4</sup> NatureScot (2022) SiteLink, available at <https://sitelink.nature.scot/home> [Accessed February - June 2022]

<sup>5</sup> James Hutton Institute (2022) National soil map of Scotland <https://soils.environment.gov.scot/maps/> [Accessed February - June 2022]

<sup>6</sup> British Geological Survey (2022) GeoIndex (onshore), available at <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> [Accessed February - June 2022]

<sup>7</sup> British Geological Survey (2022) Hydrogeological maps of Scotland, available at <https://www.bgs.ac.uk/datasets/hydrogeological-maps-of-scotland/> [Accessed February - June 2022]

<sup>8</sup> SEPA (2022) Flood Maps, available at <https://www.sepa.org.uk/environment/water/flooding/flood-maps/> [Accessed February - June 2022]

<sup>9</sup> SEPA (2022) Environmental data, available at <https://www.sepa.org.uk/environment/environmental-data/> [Accessed February - June 2022]

<sup>10</sup> Planning Application 19/O1455/S37

<sup>11</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 1 Edinbane Substation to Sligachan, Geotechnical

- Card Geotechnics Limited (CGL)<sup>12</sup> between 12 January 2022 and 22 March 2022 which included investigation at 30 proposed steel lattice towers and 15 km of underground cabling in Section 2;
- Card Geotechnics Limited (CGL)<sup>13</sup> between 1 November 2021 and 8 April 2022 which included investigation at 77 proposed steel lattice towers in Section 3;
- Card Geotechnics Limited (CGL)<sup>14</sup> between 04 May 2021 and 13 October 2021 which included investigation at 155 of the 170 proposed steel lattice towers in Section 4;
- Card Geotechnics Limited (CGL) between 16 August 2021 and 25 November 2021 which included investigation of 90 proposed steel lattice tower locations in Section 5<sup>15</sup>; and
- Card Geotechnics Limited (CGL) between 18 November 2021 and 11 January 2022<sup>16</sup> which included 15 exploratory holes at proposed Cable Sealing End Compounds and horizontal directional drilling (HDD) locations, and 81 exploratory trial pit locations in Section 6.

6.3.23 The field work has been undertaken in order to:

- verify the information collected during the desk and baseline study;
- allow appreciation of the study area and undertake visual assessment of hydrology relative to the Proposed Development;
- identify and verify private water supplies and Drinking Water Protected Areas;
- identify drainage patterns, areas vulnerable to erosion or sedimentation deposition and any pollution risks;
- assess areas of potential GWDTE; and
- visit proposed new permeant watercourse crossings and prepare a schedule of these.

6.3.24 The scope of the private water supply survey was also informed by data received from THC and Scottish Government, and a review OS mapping and aerial photography as detailed within the Confidential **Appendix V2-6.3**. To complete the Private Water Supply Risk Assessment properties which may have or have a recorded private water supply downstream of the Proposed Development were visited and where possible the source of the water supply was verified and confirmed. Where this was not possible a questionnaire was left with the occupiers of the property and they were asked to provide details of their water supply. Their responses have been incorporated in the assessment. This has ensured a thorough assessment of private water supplies has been completed.

#### *Significance Criteria*

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

6.3.26 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.

6.3.27 Criteria for determining the significance of effect are provided in **Appendix V2-6.1**. Effects of 'major' and 'moderate' significance are considered to be 'significant' in terms of the EIA Regulations.

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<sup>12</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 2, Geotechnical Interpretative Report, Revision 0

<sup>13</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 3, Geotechnical Interpretative Report, Revision 2

<sup>14</sup> Card Geotechnics Limited (2021) LT91 Fort Augustus to Skye OHL Reinforcement – Section 4: Geotechnical Interpretative Report. Revision 0.

<sup>15</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 5 Quoich to Invergarry: Ground Investigation Report. Revision 1.

<sup>16</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 6: Geotechnical Interpretative Report. Revision 0.

### *Limitations of Assessment*

- 6.3.28 The assessment uses site investigation, survey data and publicly available data sources, including but not limited to SEPA, Met Office, THC and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.
- 6.3.29 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.

## **6.4 Baseline**

- 6.4.1 This part of the Chapter outlines the baseline hydrology and hydrogeology within the study area, as shown on **Figure V2-6.1**. The baseline is described on a section by section basis.

### *Section 0: Ardmore to Edinbane*

- 6.4.2 Section 0 is located in a rural area within the north-west of Skye. The Section is between Ardmore Substation, which is centred on National Grid Reference (NGR) NG 22218 61105 in the north to Edinbane Substation, located at NGR NG 35037 44139, in the south, and broadly follows the route of the existing OHL.
- 6.4.3 In the north of Section 0 ground elevations generally decrease westwards towards Loch Bay and the Bay River from between approximately 95 m Above Ordnance Datum (AOD) to less than 10 m AOD near the banks of Loch Bay and Bay River. Ground elevations within the south of the Section fall to the south towards Loch Caroy.

### Designations

- 6.4.4 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Maps 1 – 4), indicates that the following designations are located within the 1 km study area:
- Inner Hebrides and the Minches Special Area of Conservation (SAC). A 1,381,391.37 ha site designated to protect harbour porpoise on the west coast of Scotland. Given the size of the SAC and the proposed controls associated with the Proposed Development it is considered that any effects on the SAC would not be discernible nor impair the qualifying interest of the SAC. It is therefore not considered further in this Chapter.
  - An Cleireach Site of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR). A 64.81 ha site designated for a Tertiary igneous intrusion, which is of significant petrogenetic importance in revealing the characteristics of the dyke-like bodies and sills containing gabbroic-anorthosite and gabbro which intrude the plateau lavas of northwest Skye. The SSSI is not water dependent and is considered in **Volume 2, Chapter 7: Geology and Soils Environment**, and therefore not considered further in this Chapter.

### Geology and Soils

- 6.4.5 A comprehensive description of the geology and soils for this Section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.
- 6.4.6 This Section of the Proposed Development and surrounding area is underlain by basaltic lava flows with intrusives overlain by superficial deposits of glacial deposits (comprising till, sand and gravel) and areas of localised peat, with bedrock outcropping in some areas, and typically on higher ground. The soils within the study area generally comprise mineral gleys in the north and peaty gleys in the south.
- 6.4.7 The published mapping has been confirmed by a programme of site inspection.

6.4.8 Details of the extent and distribution of peat are given in **Volume 5, Appendix V2-7.2: Peat Landslide Hazard Risk Assessment (PLHRA)** which presents the results of a comprehensive peat depth probing campaign.

#### Hydrogeology

##### Aquifer Characteristics and Groundwater Vulnerability

6.4.9 An extract of the Aquifer Productivity mapping is presented as **Figure V2-6.2a**. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.10 The glacial and peat superficial deposits are not considered an important aquifer. Small amounts of groundwater may be present within the sand and gravel horizons of the glacial superficial deposits; however groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement.

6.4.11 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium) are mapped with potential moderate to high productivity.

6.4.12 **Figure V2-6.2b** and **Figure V2-6.3** confirm the low and very low productivity of the bedrock. Groundwater resources in the bedrock are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by intergranular and fracture flow mechanisms.

6.4.13 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer, and with respect to the Proposed Development within Section 0 shows that groundwater, by virtue of its shallow depth (see below), has a vulnerability of Class 3, 4 and 5.

##### Groundwater Levels and Quality

6.4.14 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients that encourage formation of surface water runoff;
- glacial till and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the underlying bedrock (where not weathered or fractured) generally displays a low or negligible permeability that limit groundwater recharge.

6.4.15 This is witnessed by the high density of surface watercourses shown on **Figure V2-6.1** (Maps 1 – 4) and which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

6.4.16 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography.

6.4.17 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.

6.4.18 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the Water Framework Directive (WFD). The Proposed Development, within Section 0, is located within the Skye North groundwater body (SEPA ID: 150688) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).

6.4.19 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area for Section 0.

#### Groundwater Dependent Terrestrial Ecosystems

6.4.20 In accordance with SEPA guidance and their Scoping Response an assessment of GWDTE has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan which has been used to inform the assessment of GWDTE. **Figure V2-6.4** shows the distribution of potential GWDTE (see Maps 1 – 4).

6.4.21 **Appendix V2-6.4** concludes that areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2-6.4** and **Volume 2, Chapter 4: Ecology**.

#### Hydrology

6.4.22 Section 0 crosses three principal surface water catchments: the Bay River, Caroy River and River Ose. Bay River rises at Ben Brokaig and flows in a northerly direction into Loch Bay. Caroy River originates at Strone Geers and flows in a southerly direction into Loch Caroy/Loch Bracadale and the River Ose originates near Loch Connan and flows generally south-westwards into Loch Bracadale. There are numerous tributaries (named and un-named) to these principal watercourses.

6.4.23 There are four DWPA's within the study area:

- DWPA located to the east of Trumpan (ID: DWPA13\_085);
- DWPA located to the east of Loch Bay, near Lusta, associated with the Stein Burn catchment (ID: DWPA13\_091);
- DWPA located to the east of Loch Bay, near Lusta, associated with the Lusta Burn catchment (ID: DWPA13\_093); and
- DWPA located to the east of Loch Caroy, near Balmeanach, associated with the Abhainn Bhaile Mheadhonaich catchment (ID: DWPA13\_112).

6.4.24 The location and extent of the DWPA's are shown on **Figure V2-6.1** (see Maps 1 – 4). The risk the Proposed Development poses to DWPA's has been considered as part of this assessment and is set out in Confidential **Appendix V2-6.3** which confirms which DWPA's are potentially at risk from the Proposed Development and required safeguards to protect these water sources.

6.4.25 Scottish Water confirmed (further consultation, 11 May 2022) that the Proposed Development is a sufficient distance from their abstraction points on the Stein Burn and Lusta Burn that it is likely to be of low risk to water quality, however water quality protection mitigation measures should be put in place during the works in this area. Scottish Water did not comment regarding the DWPA's at Trumpan or Abhainn Bhaile Mheadhonaich.

#### Surface Water Quality

6.4.26 Water quality in Loch Bay, Bay River, Caroy River, Loch Bracadale and River Ose is monitored by SEPA and classified annually in accordance with the requirements of the WFD. Table V2-6.2 provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle). Smaller watercourses within the study area are not monitored by SEPA.

**Table V2-6.2: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
Loch Bay (20136)	Good	Good	-	High	None
Bay River (20728)	Good	Good	Good	Good	None
Caroy River (20726)	Good	Good	Good	Good	None
Loch Braccadale	Good	Good	High	High	None
River Ose (20725)	Good	Good	Good	High	None

#### Fisheries

- 6.4.27 Fisheries on the Isle of Skye are managed by the Skye and Lochalsh Rivers Trust. There are no District Salmon Fishery Boards on the Isle of Skye. Fishery interests are discussed in within **Volume 2, Chapter 4: Ecology**.

#### Watercourse Crossings

- 6.4.28 There are no new permanent watercourse crossings and no existing crossings on tracks which are scheduled to be upgraded within Section 0.

#### Flood risk

- 6.4.29 A summary of the potential sources of flooding within Section 0 and a review of the potential risk posed by each source is presented in **Table V2-6.3**.

**Table V2-6.3: Potential Sources of Flood Risk within Section 0**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	The Proposed Development is situated at elevations between 10 and 95 m AOD. SEPA flood mapping confirms the Proposed Development is not at risk from tidal or coastal flooding.
River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are generally local and do not extend far from the watercourses or lochs. Areas of high risk of flooding are located along the following watercourses which are crossed by the Proposed Development; Caroy River and River Ose. With appropriate design, this is not considered a development constraint.



Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are associated with small topographic lows. Surface water flooding is not considered to be a design constraint and potential effects can be mitigated by good design.
Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant groundwater.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no artificial drainage systems are recorded.
Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates the Proposed Development is not located within an area at risk of flooding due to infrastructure failure.

#### Private Water Supplies and Authorised Sites

- 6.4.30 As part of this assessment, a data request was made to THC (November 2020) who provided details of Private Water Supply (PWS) sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database<sup>17</sup>. In addition to these data sources, a programme of site investigation has been undertaken to confirm the location of PWS sources and the location of DWPA abstraction points.
- 6.4.31 Further consultation was also undertaken with Scottish Water who confirmed that they do not maintain any assets which they consider at risk from the proposed works within Section 0.
- 6.4.32 Confirmed PWS locations and DWPA extents within the study area of Section 0 are shown on **Figure V2-6.1** (Maps 1 – 4).
- 6.4.33 The risk the Proposed Development poses to PWSs and DWPAs has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3**, f which confirms PWS sources that are at potential risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.
- 6.4.34 SEPA Controlled Activity Regulation (CAR) authorisations were obtained from SEPA environmental database. Those recorded in the study area within Section 0 are shown on **Figure V2-6.1** (Maps 1 - 4). SEPA was not able to provide details of the authorisations at the time of reporting.

#### Summary of Sensitive Water Environment Receptors

- 6.4.35 Table **V2-6.4** outlines the receptors within Section 0 identified as part of the baseline study, and their sensitivity based upon the criteria contained in **Appendix V2-6.1**.

<sup>17</sup> Scottish Government (2021) Private Water Supplies within the Highland Council Area, available <https://data.gov.uk/dataset/6e78286f-2014-4a2c-aefa-c1379b9f7199/private-water-supplies-within-the-highland-council-area> [Accessed February - June 2022]



**Table V2-6.4: Sensitivity of Receptors within Section 0**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	Not Sensitive	Inner Hebrides and the Minches SAC is located downstream of the Proposed Development but any effects on its qualifying interests would not be discernible and therefore it is considered not sensitive.
Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as High.
Surface water	High	Surface water watercourses and surface water bodies have been classified by SEPA with Good overall status and several of the catchments have been designated as DWPA.
Flooding	Medium	Minor floodplains have been identified adjacent to the larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	High	It has been confirmed that the Proposed Development crosses and lies within the catchments of DWPA's.  Properties have been identified to be served by a PWS that are downgradient of the Proposed Development.
Licensed sites	Not Sensitive	No licensed activities which are considered at risk are recorded within 1 km of the Proposed Development.

*Section 1: Edinbane to North of Sligachan*

- 6.4.36 Section 1 is located in a rural area to the west of the A87 and north/north-east of Loch Harport. The section is located between Edinbane Substation, which is at National Grid Reference (NGR) NG 35037 44139 in the north to a proposed sealing end compound east of the River Varragill and A87 near Sligachan, located at NGR NG 48068 32110, in the south.
- 6.4.37 Ground elevations range between approximately 440m Above Ordnance Datum (AOD) at Roineval Site of Special Scientific Interest (SSSI) to approximately 50m AOD near Meashader Burn in the western extent of the study area. Elevations are typically between 100m AOD and 200m AOD.

Designations

- 6.4.38 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Maps 4 – 7), indicates that the following designations are located within the 1 km study area:
- Ros a' Mheallain Geological Conservation Review (GCR). It is not water dependant and is not considered further in this Chapter.
  - Roineval SSSI. A 42 ha site designated for earth sciences and in particular its sequence of tertiary igneous rocks. It is not water dependant and is located on elevated ground above the Proposed Development. It is not considered further in this Chapter.
  - Roineval GCR. As per Roineval SSSI, and not considered further in this Chapter.
  - Cuillins Special Protection Area (SPA). A 2,9503 ha site designated for golden eagle breeding. The SPA and potential effects as a consequence of the Proposed Development are considered in **Volume 2, Chapter 5: Ornithology**.
  - Sligachan SSSI. A 532 ha site designated for blanket bog, freshwater lochs, and vascular plants. It is water dependant as it is designated for habitats including lochs. It is located at the eastern extent of the study area and the Proposed Development passes over surface water catchments that drain to the SSSI and therefore it is considered further in this Chapter.
  - Sligachan Peatlands Special Area of Conservation (SAC). A 1,438 ha site designated for freshwater habitats and upland habitats including blanket bog, mires, and heathland. It is also water dependant and is located at the eastern extent of the study area. The Proposed Development passes over surface water catchments that drain to the SAC and it is considered further in this Chapter.

Geology and Soils

- 6.4.39 A comprehensive description of the geology and soils for this section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.
- 6.4.40 The Proposed Development and surrounding area are underlain by basalt, microgabbro, hawaiite, and mugearite of the Skye Lava Group. This bedrock is overlain by superficial deposits of peat across the majority of the study area, alluvium comprising sand and gravel adjacent to larger watercourses, and hummocky (moundy) glacial deposits comprising clay, sand, and gravel near eastern boundary of the study area. Soils are mapped as peaty gleys across the majority of the study area, and smaller areas of mineral podzols, mineral gleys, and peat.
- 6.4.41 The published mapping has been confirmed by a programme of site inspection and investigation.
- 6.4.42 CGL oversaw an investigation programme at 66 tower locations within Section 1 which included boreholes which were advanced to 6.3 m and 16.5 m below ground level. Samples of the soils and geology encountered

were taken for material and strength testing and will be used to inform the detailed design of the proposed tower foundations. In summary, CGL report<sup>18</sup>:

*“... superficial strata across the route vary depending on physical characteristics of the proposed tower location and the proximity to physical features (e.g., plateaus, rivers etc). There is little spatial association between different superficial deposits. There is also little variation in the bedrock deposits across Section 1. The predominant geological unit is the Skye Lava Group; of which basalt, microgabbro and mugearite were encountered.”*

6.4.43 Details of the extent and distribution of peat are given in **Appendix V2.7.2** which presents the results of a comprehensive peat depth probing campaign.

#### Hydrogeology

##### Aquifer Characteristics and Groundwater Vulnerability

6.4.44 An extract of the Aquifer Productivity mapping is presented as **Figure V2-6.2a**. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.45 The glacial and peat superficial deposits are not considered an important aquifer. Small amounts of groundwater may be present within the sand and gravel horizons of the glacial superficial deposits; however groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement.

6.4.46 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium) are mapped with potential moderate to high productivity.

6.4.47 **Figure V2-6.2b** and **Figure V2-6.3** confirm the low and very low productivity of the bedrock. Groundwater resources in the bedrock are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by intergranular and fracture flow mechanisms.

6.4.48 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer, and with respect to the Proposed Development, by virtue of its shallow depth (see below), has a vulnerability of Class 2 (vulnerable to some pollutants), 3, 4a, 4b, and 5 (vulnerable to most pollutants).

##### Groundwater Levels and Quality

6.4.49 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients that encourage formation of surface water runoff;
- glacial till and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the underlying bedrock (where not weathered or fractured) generally displays a low or negligible permeability that limits groundwater recharge.

6.4.50 This is witnessed by the high density of surface watercourses shown on **Figure V2-6.1** (Maps 4 – 7) and which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

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<sup>18</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 1 Edinbane Substation to Sligachan, Geotechnical

- 6.4.51 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography.
- 6.4.52 All of Scotland's groundwater bodies have been designated as DWPA's 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.
- 6.4.53 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. Within Section 1, the Proposed Development is located within the Skye North groundwater body (SEPA ID: 150688) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).
- 6.4.54 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area for Section 1.

#### Groundwater Dependent Terrestrial Ecosystems

- 6.4.55 In accordance with SEPA guidance and their Scoping Response an assessment of Groundwater Dependent Terrestrial Ecosystems (GWDTE) has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan which has been used to inform the assessment of GWDTE. **Figure V2-6.4** (Maps 4 – 7) shows the distribution of potential GWDTE.
- 6.4.56 **Appendix V2.6.4** concludes that areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2.6.4** and **Volume 2, Chapter 4: Ecology**.

#### Hydrology

- 6.4.57 Section 1 of the Proposed Development is located in the following principal surface water catchments:
- River Ose;
  - Abhainn an Acha-leathain;
  - River Glenmore;
  - River Snizort; and
  - River Varragill.
- 6.4.58 The River Ose flows generally south-westwards into Loch Bracadale. The Abhainn an Acha-leathain and River Glenmore flow generally north-westwards into River Snizort which in turn flows generally north-westwards into Loch Snizort Beag, and River Varragill flows generally northwards into Loch Portree.
- 6.4.59 There is one Drinking Water Protected Area (DWPA) within the study area (ID: DWPA13\_115). It covers an area of 459 ha and is associated with the Voaker Burn catchment which extends into the study area.
- 6.4.60 The location and extent of the DWPA is shown on **Figure V2-6.1** (see Map 4 and 5). The risk the Proposed Development poses to DWPA's has been considered as part of this assessment and is presented as **Appendix V2.6.3**, review of which confirms the Proposed Development is not located within the in the DWPA not does it lie upstream of the DWPA. It is, therefore, not considered at risk.

## Surface Water Quality

6.4.61 Water quality in the rivers and lochs is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table V2-6.5** provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle) for Section 1 of the Proposed Development.

**Table V2-6.5: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
River Ose (ID: 20725)	Good	Good	Good	High	None
Loch Bracadale (ID: 200357)	High	High	High	High	None
Abhainn an Acha-leathain (ID: 20734)	Good	Good	Good	Good	None
River Glenmore (ID: 20736)	Good	Good	Good	High	None
River Snizort (ID: 20733)	Good	Good	Good	High	None
Loch Snizort Beag (ID: 200135)	Good	Good	-	High	None
River Varragill (ID: 20706)	Good	Good	Good	High	None
Loch Portree (ID: 200126)	High	High	-	High	None

## Fisheries

6.4.62 Fisheries on the Isle of Skye are managed by the Skye and Lochalsh Rivers Trust. There are no District Salmon Fishery Boards on the Isle of Skye. Fishery interests are discussed within **Volume 2, Chapter 4: Ecology**.

## Watercourse Crossings

6.4.63 The Proposed Development seeks to utilise existing tracks and access routes wherever possible. Notwithstanding this permanent watercourse crossings will be required and there are existing crossings on tracks which are scheduled for upgrade. There are no Horizontal Directional Drill (HDD) locations proposed in Section 1. The locations of the permanent crossings are shown on **Figure V2-6.1** (see Maps 4 – 7) and a schedule of these crossing points, which includes photographs and dimensions of each crossing, is shown in **Appendix V2.6.2**.

## Flood Risk

6.4.64 A summary of the potential sources of flooding within Section 1 and a review of the potential risk posed by each source is presented in **Table V2-6.6**.

**Table V2-6.6: Potential Sources of Flood Risk within Section 1**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	The Proposed Development is remote from the coast and situated at an elevation above 100m AOD. SEPA flood mapping confirms the Proposed Development is not at risk from tidal or coastal flooding.
River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are generally local and do not extend far from the watercourses or lochs. This is not considered a development constraint.
Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are associated with small topographic lows. Surface water flooding is not considered to be a design constraint and potential effects can be mitigated by good design.
Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant groundwater.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no significant infrastructure is anticipated that will impact the development.
Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates no breach scenarios have been recorded.

#### Private Water Supplies and Authorised Sites

- 6.4.65 As part of this assessment, a data request was made to THC (November 2020) who provided details of PWS sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database. In addition, a programme of site investigation has been undertaken to confirm the location of PWS sources and location of DWPA abstraction points.
- 6.4.66 Further consultation was also undertaken with Scottish Water who confirmed they do not maintain any assets or water supply sources which they consider at risk from the Proposed Development within Section 1.
- 6.4.67 Confirmed PWS locations and DWPA extents within the study area are shown on **Figure V2-6.1** (see Maps 4 – 7).
- 6.4.68 The risk the Proposed Development poses to PWSs and DWPAs has been considered as part of this assessment and is presented as **Appendix V2.6.3** review of which confirms PWS sources that are at potential at risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.

6.4.69 SEPA Controlled Activity Regulation (CAR) authorisations were obtained from SEPA environmental database. Those recorded in study area and are shown on **Figure V2-6.1**. SEPA was not able to provide details of the authorisations at the time of reporting. It is noted that the following CAR authorisations are related to hydro schemes: Brae Meadale (NGR NG 39270 34820) and Allt Meadle (NGR NG 39240 34720), both of which are downstream of an existing access road which is proposed to be upgraded as part of the development. Upgrade works are minor and will not alter existing water flow paths and no effect on the yield of the hydro schemes is therefore anticipated.

Summary of Sensitive Water Environment Receptors

6.4.70 **Table V2-6.7** outlines the receptors identified as part of the baseline study within Section 1, and their sensitivity based upon the criteria contained in **Appendix V2-6.1**.

**Table V2-6.7: Sensitivity of Receptors within Section 1**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	High	Sligachan Peatlands SAC and Sligachan SSSI are water dependant and located downstream of Section 1 of the Proposed Development.
Groundwater	High	Groundwater has been classed by SEPA as Good and vulnerability is classified as High.
Surface water	High	Surface water watercourses have been classified by SEPA as either Good or High.
Flooding	Medium	Minor floodplains have been identified adjacent to larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	Not Sensitive	It has been confirmed that Section 1 of the Proposed Development does not lie within a DWPA. No PWS sources have been identified downstream of the site and within the study area.
Licensed sites	Not Sensitive	No licenced activities which are considered at risk are recorded within 1 km of the Proposed Development.

*Section 2: North of Sligachan to Broadford*

6.4.71 Section 2 is located in central Skye between a proposed a new sealing end compound near Sligachan, located at National Grid Reference (NGR) NG 62685 24349 in the west, and the existing Broadford Substation, at NGR NG 48071 32113, in the east.

Designations

6.4.72 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Maps 8 – 10), indicates that the following designations are located within the 1km study area:

- Sligachan SSSI. A 532 ha site designated for blanket bog, freshwater lochs, and vascular plants. It is water dependant as it is designated for habitats including lochs. It is located at the western extent of the study area and the Proposed Development does not pass over surface water catchments that drain to the SAC and it is therefore not considered further in the assessment of Section 2 (it is however considered in the assessment of Section 1 of the Proposed Development).
- Sligachan Peatlands SAC. A 1,438 ha site designated for freshwater habitats and upland habitats including blanket bog, mires, and heathland. It is also water dependant and is located at the western extent of the study area. Section 2 of the Proposed Development does not pass over surface water catchments that drain to the SAC and it is therefore not considered further in the assessment of Section 2 (it is however considered in the assessment of Section 1 of the Proposed Development).
- Cuillins Site of SSSI. A 10,3999.37ha site designated for important exposures of igneous rock dating from the Palaeogene period, Quaternary age glacial geomorphology features, a variety of upland habitats and rich vascular and non-vascular plant assemblages associated with those habitats. The SSSI is not water dependent and is considered in **Volume 2, Chapter 7: Geology and Soils Environment**, and not considered further in this Chapter.
- Meall a' Mhaoil SSSI. A 297.3ha site designated for its exposures of hybrid rocks of the Marscoite Suite, that formed as a result of the mixing of magmas of basic (ferrodioritic) and acid (granitic) composition. The SSSI is not water dependent and is considered in **Volume 2, Chapter 7: Geology and Soils Environment**, and not considered further in this Chapter.
- Inner Hebrides and the Minches SAC. A 1,381,391.37ha site designated to protect harbour porpoise on the west coast of Scotland. Given the size of the SAC and the proposed controls associated with the Proposed Development it is considered that any effects on the SAC would not be discernible nor impair the qualifying interest of the SAC. It is therefore not considered further in this Chapter.

Geology and Soils

6.4.73 A comprehensive description of the geology and soils for this section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.

6.4.74 The Proposed Development and surrounding area is underlain by basaltic lava flows with intrusives overlain by superficial deposits of glacial deposits (comprising till, sand and gravel) and areas of localised peat, with the bedrock outcropping in some areas. The soils within the study area generally comprise peaty gleys.

6.4.75 The published mapping has been confirmed by a programme of site inspection and investigation.

6.4.76 CGL oversaw an investigation programme within Section 2. Samples of the soils and geology encountered were taken for material and strength testing and will be used to inform the detailed design of the proposed tower foundations. In summary, CGL report<sup>19</sup>:

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<sup>19</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 2, Geotechnical Interpretative Report, Revision 0



*“Superficial strata across the route vary depending on physical characteristics of the proposed tower location and the proximity to physical features (e.g., plateaus, rivers etc). There is little spatial association between different superficial deposits. Bedrock geology is generally igneous rock attributed to either the North Britain Paleogene Dyke Suite, Skye Lava Group or Skye Central Complex. Sedimentary bedrock of the Breakish Formation and Berreraig Sandstone Formation was encountered to the southwest of Sconser and west of Strollamus.”*

6.4.77 Details of the extent and distribution of peat are given in **Appendix V2-7.2: Peat Landslide Hazard and Risk Assessment** which presents the results of a comprehensive peat depth probing campaign.

#### Hydrogeology

##### Aquifer Characteristics and Groundwater Vulnerability

6.4.78 An extract of the Aquifer Productivity mapping is presented as **Figure V2-6.2a**. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.79 The glacial and peat superficial deposits are not considered an important aquifer. Small amounts of groundwater may be present within the sand and gravel horizons of the glacial superficial deposits; however groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement.

6.4.80 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium) are mapped with potential moderate to high productivity.

6.4.81 **Figure V2-6.2b** and **Figure V2-6.3** confirm the low and very low productivity of the bedrock. Groundwater resources in the bedrock are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by intergranular and fracture flow mechanisms.

6.4.82 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer, and with respect to the Proposed Development shows that groundwater, by virtue of its shallow depth (see below), has a vulnerability of Class 4 and 5.

##### Groundwater Levels and Quality

6.4.83 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients that encourage formation of surface water runoff;
- glacial till and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the underlying bedrock (where not weathered or fractured) generally displays a low or negligible permeability that limit groundwater recharge.

6.4.84 This is witnessed by the high density of surface watercourses shown on **Figure V2-6.1** (Maps 8 – 10) and which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

6.4.85 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography.

- 6.4.86 All of Scotland's groundwater bodies have been designated as DWPA's 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.
- 6.4.87 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. The Proposed Development, within Section 2, is located within the Skye North groundwater body (SEPA ID: 150688) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).
- 6.4.88 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area for Section 2.

#### Groundwater Dependent Terrestrial Ecosystems

- 6.4.89 In accordance with SEPA guidance and their Scoping Response, an assessment of GWDTE has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan which has been used to inform the assessment of GWDTE. **Figure V2-6.4** (Maps 8 – 10) shows the distribution of potential GWDTE.
- 6.4.90 **Appendix V2-6.4** shows areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2-6.4** and **Volume 2, Chapter 4: Ecology**.

#### Hydrology

- 6.4.91 Section 2 of the Proposed Development crosses three principal surface water catchments: River Sligachan, Abhainn Ceann Loch Ainort, and Abhainn an t-Sratha Mhoir. There are numerous tributaries (named and unnamed) to these principal watercourses.
- 6.4.92 There is one DWPA within the study area located to the south west of Strollamus (ID: DWPA13\_135).
- 6.4.93 The location and extent of the DWPA is shown on **Figure V2-6.1**. The risk the Proposed Development poses to DWPA's has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3** which confirms which DWPA's are potentially at risk from the Proposed Development and required safeguards to protect these water sources.

#### Surface Water Quality

- 6.4.94 Water quality in River Sligachan, Loch Sligachan, Sound of Raasay, Loch Ainort, Abhainn Ceann Loch Ainort, Broadford Bay and Abhainn an t-Sratha Mhoir is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table V2-6.8** provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle) within Section 2. Smaller watercourses within the study area are not monitored by SEPA.

**Table V2-6.8: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
River Sligachan (20707)	High	High	High	High	None
Loch Sligachan (200116)	Good	Good	-	High	None
Sound of Raasay (200492)	Good	Good	High	High	None
Loch Ainort (200112)	Good	Good	-	High	None
Abhainn Ceann Loch Ainort (20708)	High	High	High	High	None
Broadford Bay (200115)	Good	Good	-	High	None
Abhainn an t-Sratha Mhoir (20715)	High	High	High	High	None

#### Fisheries

6.4.95 Fisheries on the Isle of Skye are managed by the Skye and Lochalsh Rivers Trust. There are no District Salmon Fishery Boards on the Isle of Skye. Fishery interests are discussed within **Volume 2, Chapter 4: Ecology**.

#### Watercourse Crossings

6.4.96 The Proposed Development seeks to utilise existing tracks and access routes wherever possible. Notwithstanding there are permanent watercourse crossings and existing crossings on tracks which are scheduled to be upgraded. There are ten proposed HDD locations in this section. The locations of these permanent crossings are shown on **Figure V2-6.1** (Maps 8 – 10) and a schedule of these crossings, which includes photographs and dimensions of each crossing, is shown in **Appendix V2-6.2**. In addition, and to facilitate construction of the proposed underground cable route, a temporary haul road will be required which will cross a number of watercourses as shown on **Figure V2-6.1** (Maps 8 – 10).

#### Flood Risk

6.4.97 A summary of the potential sources of flooding within Section 2 and a review of the potential risk posed by each source is presented in **Table V2-6.9**.

**Table V2-6.9: Potential Sources of Flood Risk within Section 2**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	The Proposed Development is situated at elevations above 20m AOD. SEPA flood mapping confirms the Proposed Development is not at risk from tidal or coastal flooding.

River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are generally local and do not extend far from the watercourses or lochs. Areas of high risk of flooding are located shown for the following watercourses which are crossed by the Proposed Development; River Sligachan and Abhainn an t-Sratha Mhoir.
Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are associated with local topographic lows. Surface water flooding is not considered to be a design constraint and potential effects can be mitigated by good design.
Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant groundwater.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no artificial drainage systems are recorded.
Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates the Proposed Development is not located within an area at risk of flooding due to infrastructure failure.

#### Private Water Supplies and Authorised Sites

- 6.4.98 As part of this assessment, a data request was made to THC (November 2020) who provided details of PWS sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database<sup>20</sup>. In addition to these data sources, a programme of site investigation has been undertaken to confirm the location of PWS sources and the location of DWPA abstraction points.
- 6.4.99 Further consultation was also undertaken with Scottish Water who confirmed they do not maintain any assets which they consider at risk from the proposed works within Section 2.
- 6.4.100 Confirmed PWS locations and DWPA extents within the study area are shown on **Figure V2-6.1** (Maps 8 – 10).
- 6.4.101 The risk the Proposed Development poses to PWSs and DWPAs has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3**, review of which confirms PWS sources that are at potential at risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.
- 6.4.102 SEPA Controlled Activity Regulation (CAR) authorisations were obtained from SEPA environmental database and those recorded in study area and are shown on **Figure V2-6.1** (Maps 8 – 10). SEPA was not able to provide details of the authorisations at the time of reporting.

<sup>20</sup> Scottish Government (2021) Private Water Supplies within the Highland Council Area, available <https://data.gov.uk/dataset/6e78286f-2014-4a2c-aefa-c1379b9f7199/private-water-supplies-within-the-highland-council-area> [Accessed February - June 2022]

*Summary of Sensitive Water Environment Receptors*

6.4.103 **Table V2-6.10** outlines the receptors identified as part of the baseline study within Section 2, and their sensitivity based upon the criteria contained in **Appendix V2-6.1**.

**Table V2-6.10: Sensitivity of Receptors within Section 2**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	Not Sensitive	No statutory designated sites have been classed as water dependent or at risk within 1km of the Proposed Development.
Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as High.
Surface water	High	The majority of surface water watercourses have been classified by SEPA as Good ecological potential and one catchment has been designated as DWPA.
Flooding	Medium	Minor floodplains have been identified adjacent to the larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	High	It has been confirmed that the Proposed Development crosses and lies within the catchment of a DWPA. Properties have been identified to be served by a PWS that are downgradient of the Proposed Development.
Licensed sites	Not Sensitive	No licensed activities which are considered at risk are recorded within 1 km of the Proposed Development.

*Section 3: Broadford to Kyle Rhea*

6.4.104 Section 3 is located in eastern Skye, between Broadford Substation in the west to the existing crossing towers at Kyle Rhea, and broadly follows the route of the existing OHL.

6.4.105 Ground elevations generally decrease northwards towards the Inner Sound. Elevations range from sea level at either end of the section to approximately 220 m AOD to the south of Loch na Beiste.

Designations

6.4.106 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Maps 10 – 13), indicates that the following designations are located within the 1 km study area:

- Strath SSSI and SAC. A 1,847 ha site designated for geological features and a range of limestone habitats including fen, marsh and swamp habitats. The SSSI / SAC is approximately 500 m up slope from the Proposed Development and therefore the hydrology and hydrogeology of the SSSI and SAC will not be impaired by the Proposed Development and it is not considered further in this Chapter. The geological features of this SSSI/SAC are considered in **Chapter 7: Geology and Soils Environment**.
- Cuillins SPA. A 29,503 ha predominantly upland site designated for breeding golden eagles. The northern boundary of this SPA is immediately upslope from the Proposed Development. Its designation is not water dependent and it is not considered further in his Chapter.
- Mointeach Lochain Dubha SSSI and SAC. A 410 ha site designated for blanket bog, comprising a wide range of oceanic mire types over plateaux, terraces, valleys and gentle slopes. The diversity results from the site's topographic and hydrological variation. Also of importance is the general lack of disturbance to the site. The northern boundary of this SSSI and SAC is immediately upslope from the Proposed Development and a temporary access track is proposed within the SSS/SAC. Potential impacts to this SSSI and SAC are considered in this Chapter.
- Loch Ashaig SSSI and GCR site. This 3.3 ha site designated for fossil pine stumps is approximately 700 m downslope from the Proposed Development. The SSSI/GCR is not water dependent and is not considered further in this Chapter. The geological features of this SSSI/GCR are considered in **Volume 2, Chapter 7: Geology and Soils Environment**.
- Kinloch and Kyleakin SSSI and SAC. A 5,275 ha site designated primarily for old sessile oak woods. Other Annex I habitats present within the SAC as qualifying features (but not primary reasons for site designation) include Northern Atlantic wet heaths, dry heaths, Alpine heaths, blanket bogs and forests. The JNCC<sup>21</sup> report that 19% of the site area comprises bogs, marshes, fens or water-fringed vegetation. Approximately 4 km of the Proposed Development crosses this SSSI/SAC. It is considered further in this Chapter.
- Inner Hebrides and the Minches SAC, and Lochs Duich, Long and Alsh Reefs SAC, which lies within the much larger Inner Hebrides and the Minches SAC. Lochs Duich, Long and Alsh Reefs SAC is a 2,373 ha site designated for extensive sheltered reefs, including at Kyle Rhea reefs subject to some of the strongest tidal streams in the UK, where the bedrock supports rich communities typically dominated by the hydroids *Tubularia indivisa* and *Sertularia argentea*, the barnacle *Balanus crenatus*, anemones, sponges and ascidians. The wider Inner Hebrides and Minches SAC is also designated for harbour porpoise. Given the size of both SAC's and the proposed controls associated with the Proposed Development it is considered that any effects on both SAC's would not be discernible nor impair the qualifying interest of the SAC's. They are therefore not considered further in this Chapter.

<sup>21</sup> Kinloch and Kyleakin Hills - Special Areas of Conservation (jncc.gov.uk) [Accessed February 2022].

### Geology and Soils

6.4.107 A comprehensive description of the geology and soils for this section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.

6.4.108 The bedrock beneath the Proposed Development and surrounding area is (from west to east):

- Ardnish Formation sandstone and mudstone;
- Applecross Formation sandstone;
- Breakish Formation limestone;
- Kinloch Formation sandstone and mudstone; and
- Beinn na Seamraig Formation sandstone.

6.4.109 There are no superficial deposits recorded by published mapping beneath most of the Proposed Development.

The exceptions are localised areas of glacial deposits (comprising till, sand and gravel) near Loch na Beiste and Kyle Rhea and discrete areas of peat near Broadford and in part of Kinloch and Kyleakin SSSI/SAC. Discrete areas of alluvium are also recorded adjacent to larger watercourses. The soils within the study area generally comprise brown soils to the west, peaty gleys in the centre and peaty podzols to the east,

6.4.110 The published mapping has been confirmed by a programme of site inspection and investigation.

6.4.111 CGL oversaw an investigation programme within Section 2. Samples of the soils and geology encountered were taken for material and strength testing and will be used to inform the detailed design of the proposed tower foundations. In summary, CGL report<sup>22</sup>:

*“superficial strata across the route vary depending on physical characteristics of the proposed tower location and the proximity to physical features (e.g., plateaus, rivers etc). There is little spatial association between different superficial deposits. There is some variation in the bedrock deposits across Section 3. The Breakish formation, a Jurassic limestone/mudstone can be seen at the western extent of Section 3. Between QB020 and QB050A Torridon Group Sandstone is the most prominent strata. To the east a few instances of igneous rocks belonging to the North Britain Palaeogene Dyke Suite are noted.”*

6.4.112 Details of the extent and distribution of peat are given in **Appendix V2-7.2: Peat Landslide and Hazard Risk Assessment** which presents the results of a comprehensive peat depth probing campaign.

6.4.113 In Section 3 it has been proven that there are no extensive areas of peat and much of the Proposed Development is underlain by peat or organic soils with a depth of less than 0.5 m. Areas of peat with a depth of more than 0.5 m are shown to be discrete and isolated.

### Hydrogeology

#### Aquifer Characteristics and Groundwater Vulnerability

6.4.114 An extract of the Aquifer Productivity mapping is presented as **Figure V2-6.2a**. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.115 The glacial and peat superficial deposits are not considered to be important aquifers. Small amounts of groundwater may be present within the sand and gravel horizons of the glacial superficial deposits; however groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement. Alluvium has

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<sup>22</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 3, Geotechnical Interpretative Report, Revision 2



a greater propensity to store and allow groundwater movement and groundwater in this unit is likely to be shallow and in hydraulic conductivity with the adjacent watercourses.

6.4.116 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium) are mapped with potential moderate to high productivity.

6.4.117 **Figure V2-6.2a and V2-6.3** shows that the bedrock deposits beneath this Section of the Proposed Development are mapped as a 'low productivity aquifer' except the westernmost 1 km of the Section (Ardnish Formation sandstone and mudstone) which is mapped as 'moderately productive'. **Figure V2-6.2a** confirms the low productivity of the bedrock apart from the westernmost 1 km. Groundwater resources in the bedrock beneath all but the westernmost 1km are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by intergranular and fracture flow mechanisms.

6.4.118 More groundwater is expected in the sandstone horizons of the Ardnish Formation. Groundwater flow in the sandstone is likely to occur in fractures and to a lesser degree through the sandstone rock matrix.

6.4.119 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer in the vicinity of the Proposed Development is classified as Class 4a, 4b and 5, generally due to the shallow depth to groundwater and the absence or thin cover of superficial geology.

#### Groundwater Levels and Quality

6.4.120 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients in the eastern half of Section that encourage formation of surface water runoff;
- glacial superficial deposits and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the bedrock beneath most of Section 3 (where not weathered or fractured) generally displays a low or negligible permeability that limits groundwater recharge. There is potential for more groundwater recharge in the westernmost 1 km of the section where the bedrock is Ardnish Formation sandstone and mudstone.

6.4.121 This is evidenced by the generally high density of surface watercourses shown on **Figure V2-6.1** (Maps 10 – 13) which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

6.4.122 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography and flow northwards towards the Inner Sound or Loch Alsh or eastwards towards Kyle Rhea.

6.4.123 All of Scotland's groundwater bodies have been designated as DWPA's 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.

6.4.124 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. The Proposed Development is located within the Northern Highland groundwater body (SEPA ID: 150701) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).

6.4.125 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area for this Section.



## Groundwater Dependent Terrestrial Ecosystems

6.4.126 In accordance with SEPA guidance and their Scoping Response an assessment of Groundwater Dependent Terrestrial Ecosystems (GWDTE) has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan and has been used to inform the assessment of the GWDTE. **Figure V2-6.4** (Maps 10 – 13) shows the distribution of potential GWDTE.

6.4.127 With reference to the NVC mapping it is evident that the wet heath in Section 3 is predominantly mixtures of M15b and M15c, with the vegetation similar in composition to those as described above for Sections 0 to 2. With respect to blanket bog the main communities are M17 followed by M19. The main expanses of blanket bog are between Skulamus and Abhainn Lusa, in a mosaic with areas of wet heath. Areas of blanket bog within the SAC/SSSI are less expansive but are scattered throughout the study area, the largest areas being in the west where M17 and M19 again are the most common forms.

6.4.128 **Appendix V2-6.4** shows areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2.6.4** and **Volume 2, Chapter 4: Ecology**.

6.4.129 Two springs were noted within Section 3 near Harrapool, which corresponded with M32 flush habitats (see **Volume 2, Chapter 4: Ecology**). These M32 habitats are considered to be groundwater dependent, however, these are noted upstream of the Proposed Development and therefore not considered to be at risk.

### Hydrology

6.4.130 This Section of the Proposed Development crosses the following principal surface water catchments (from west to east):

- Broadford River, which flows north-eastwards to Broadford Bay;
- Allt a Mhuilinn, which flows northwards to Broadford Bay;
- Abhainn Lusa, which flows north-westwards to Broadford Bay; and
- Allt Lochan na Saile, which flows northwards into the Inner Sound east of Broadford Bay.

6.4.131 The only DWPA within the study area is in the catchment of Allt a Mhuilinn, located in the western end of Section. The location and extent of the DWPA is shown on **Figure V2-6.1** (see Map 10). The risk the Proposed Development poses to DWPA's has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3** and confirms which DWPA's are potentially at risk from the Proposed Development and required safeguards to protect these water sources.

### Surface Water Quality

6.4.132 Water quality in Broadford River, Abhainn Lusa and Loch Alsh is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table V2-6.11** provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle) within Section 3.

6.4.133 Smaller watercourses within the Site are not monitored by SEPA.

**Table V2-6.11: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
Broadford River (20709)	Good	Good	Good	Good	None
Abhainn Lusa (20710)	High	High	High	High	None
Loch Alsh (200352)	Good	Good	N/A	High	None

#### Fisheries

6.4.134 Fisheries on the Isle of Skye are managed by the Skye and Lochalsh Rivers Trust. Fishery interests are discussed within **Volume 2, Chapter 4: Ecology**.

#### Watercourse Crossings

6.4.135 The Proposed Development seeks to utilise existing tracks and access routes wherever possible. Notwithstanding this there are existing crossings on existing tracks which are scheduled to be upgraded, and new crossings associated with new permanent tracks. There are no proposed HDD locations within Section 3. The locations of permanent crossings are shown on **Figure V2-6.1** (Maps 10 – 13) and a schedule of these crossings points, which includes photographs and dimensions of each crossing, is shown in **Appendix V2-6.2**.

#### Flood Risk

6.4.136 A summary of the potential sources of flooding within Section 3 and a review of the potential risk posed by each source is presented in **Table V2-6.12**.

**Table V2-6.12: Potential Sources of Flood Risk within Section 3**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	SEPA flood mapping confirms the Proposed Development is not at risk from tidal or coastal flooding.
River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are generally local and do not extend far from the watercourses or lochs. Areas of high risk of flooding are located along the following watercourses crossed by the Proposed Development: Broadford River, Allt a Mhuilinn, and Abhainn Lusa.
Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are likely to be associated with small topographic lows. Surface water flooding is not considered to be a design constraint and potential effects can be mitigated by good design.

Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no artificial drainage systems are recorded.
Flooding due to infrastructure failure	Yes (localised)	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates one breach scenario has been recorded along the Allt a Mhuilinn associated with a breach from Loch Buidhe reservoir (reference number RES/R/1128476). The modelled flood extent crosses the Proposed Development, however given the safeguards afforded by the Reservoirs Act the risk of such an event occurring is very low. Therefore flooding from this source is not considered further.

#### Private Water Supplies and Authorised Sites

6.4.137 As part of this assessment, a data request was made to THC (November 2020) who provided details of PWS sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database<sup>23</sup>. In addition, a programme of site investigation has been undertaken to confirm the location of PWS sources and location of DWPA abstraction points.

6.4.138 Confirmed PWS locations and DWPA extents within the study area are shown on **Figure V2-6.1** (Maps 10- 13).

6.4.139 The risk the Proposed Development poses to PWSs and DWPAs has been considered as part of this assessment and is presented as **Appendix V2.6.3**, review of which confirms PWS sources that are at potential at risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.

6.4.140 SEPA CAR authorisations were obtained from SEPA environmental database. Those recorded within the 1 km study area and are shown on **Figure V2-6.1**. SEPA was not able to provide details of the authorisations at the time of reporting.

#### Summary of Sensitive Water Environment Receptors

6.4.141 **Table V2-6.13** outlines the receptors identified as part of the baseline study within Section 3, and their sensitivity based upon the criteria contained in **Appendix V2.6.1**.

**Table V2-6.13: Sensitivity of Receptors within Section 3**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	High	The Proposed Development passes over and through the northern edge of Mointeach Lochain Dubha SSSI and SAC. Approximately 4 km length of the Proposed Development crosses Kinloch and Kyleakin SSSI and SAC.

<sup>23</sup> Scottish Government (2021) Private Water Supplies within the Highland Council Area, available <https://data.gov.uk/dataset/6e78286f-2014-4a2c-aefa-c1379b9f7199/private-water-supplies-within-the-highland-council-area> [Accessed February - June 2022]

Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as High.
Surface water	High	All surface water watercourses assessed by SEPA have been classified as Good / High. One surface water catchment has been designated as DWPA.
Flooding	Medium	Minor floodplains have been identified adjacent to the larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	High	It has been confirmed that the Proposed Development crosses and lies within the catchment of one DWPA. PWS have been identified in hydraulic continuity with the Proposed Development.
Licensed sites	Not Sensitive	No licensed activities which are considered at risk are recorded within 1 km of the Proposed Development.

#### Section 4: Kyle Rhea to Loch Cuaich

6.4.142 Section 4 is located in a rural area to the north and northwest of Loch Cuaich (it is noted that Loch Cuaich and Loch Quoich are used interchangeably) and the northeast of Loch Hourn. The section connects the transmission line from the existing crossing towers at Kyle Rhea to Loch Quoich Dam, which is centred on National Grid Reference (NGR) NH 06992 02484.

6.4.143 Ground elevations range from sea level at Kyle Rhea and Glen More to approximately 470 m AOD at the watershed between Glen More and Loch Hourn, while elevations along the northern side of Loch Cuaich vary between approximately 220-250m AOD.

#### Designations

6.4.144 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Maps 13 – 17), indicates that the following designations are located within the 1 km study area:

- Inner Hebrides and the Minches SAC, and Lochs Duich, Long and Alsh Reefs SAC, which lies within the much larger Inner Hebrides and the Minches SAC. Lochs Duich, Long and Alsh Reefs SAC is a 2,373 ha site designated for extensive sheltered reefs, including at Kyle Rhea reefs subject to some of the strongest tidal streams in the UK, where the bedrock supports rich communities typically dominated by the hydroids *Tubularia indivisa* and *Sertularia argentea*, the barnacle *Balanus crenatus*, anemones, sponges and ascidians. The wider Inner Hebrides and Minches SAC is also designated for harbour porpoise. Given the size of both SAC's and the proposed controls associated with the Proposed Development it is considered that any effects on both SAC's would not be discernible nor impair the qualifying interest of the SAC's. They are therefore not considered further in this Chapter.
- Cosag Sallow Carr SSSI. A 4.8 ha site designated for wet woodland and a lichen assemblage. The wet woodland comprises grey willow *Salix cinerea* and alder typically lining the braided river channels. Potential impacts to the SSSI, which is located approximately 800 m downstream of the Proposed Development, are assessed.
- Druim Losal SSSI and GCR. A 50.6 ha site designated for Lewisian Gneiss rock exposures of the Glenelg Inlier. This is not water dependent and is assessed in **Volume 2, Chapter 7 (Geology and Soils Environment)** and not considered further in this Chapter.
- Beinn a' Chapuill (SSSI and GCR). A 522 ha site designated for Lewisian Gneiss rock exposures of the Glenelg Inlier. This SSSI is approximately 800 m from the Proposed Development. This is not water dependent and not considered further in this Chapter.
- Glen More (GCR) which is not water dependent and is assessed in **Volume 2, Chapter 7 (Geology and Soils Environment)** and not considered further in this Chapter.
- Kinloch Hourn (GCR) which is not water dependent and is assessed in **Volume 2, Chapter 7 (Geology and Soils Environment)** and not considered further in this Chapter.

#### Geology and Soils

6.4.145 A comprehensive description of the geology and soils for this section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.

6.4.146 The Proposed Development and surrounding area is underlain by psammites and gneisses with igneous intrusions overlain in some areas by superficial deposits as follows:

- glacial deposits (comprising diamicton, sand and gravel) in the westernmost 2 km of the OHL immediately east of the Kyle Rhea crossing, along approximately 14 km length of the OHL stretching from 2 km north of the Abhainn a Ghlinne Bhig watercourse to Kinloch Hourn, along the proposed

access track running north-east from the Abhainn a Ghlinne Bhig watercourse to Glen More, and along the northern edge of Loch Cuaich;

- river terrace deposits (gravel and sand with silt and clay) and/or alluvium (clay and silt with sand and gravel) near watercourses e.g. Glenmore River, Abhainn a Ghlinne Bhig, River Arnisdale and Lochourn River; and
- peat in discrete and localised areas.

6.4.147 The soils within the study area generally comprise peaty podzols or peaty gleys.

6.4.148 The published mapping has been confirmed by a programme of site inspection and investigation.

6.4.149 CGL oversaw an investigation programme that comprised of 155 boreholes drilled at proposed tower locations. In summary, CGL report<sup>24</sup>:

*“As expected, superficial strata across the route vary depending on physical characteristics of the proposed tower location and the proximity to physical features (e.g., plateaus, rivers etc). There is little spatial association between different superficial deposits. Bedrock deposits typically follow a west to east younging pattern. The Lewisian Gneiss Complex is encountered in the west of the site around Glenelg, which is unconformably overlain by the Morar Group between Glenelg and Kinloch Hourn. The Morar Group is the dominant bedrock group encountered within the western areas of Section 4.”*

#### Hydrogeology

##### Aquifer Characteristics and Groundwater Vulnerability

6.4.150 An extract of the Aquifer Productivity and Hydrogeological Map of Scotland mapping are presented in **Figure V2-6.2a** and **Figure V2-6.2b** respectively. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.151 The glacial and peat superficial deposits are not considered an important aquifer. Small amounts of groundwater may be present within the sand and gravel horizons of the glacial superficial deposits; however groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement. Alluvium and river terrace deposits have a greater propensity to store and allow groundwater movement, and groundwater in these units is likely to be shallow and in hydraulic conductivity with the adjacent watercourses and lochs.

6.4.152 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium or river terrace deposits) are mapped with potential moderate to high productivity.

6.4.153 **Figure V2-6.2b** shows that the bedrock deposits beneath Section 4 of the Proposed Development are mapped as impermeable rock and characterised as generally without groundwater except at shallow depth. **Figure V2-6.2a** confirms the low or very low productivity of the bedrock. Groundwater resources in the bedrock are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by intergranular and fracture flow mechanisms.

6.4.154 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer in the vicinity of the Proposed Development is classified as mostly Class 5, with some areas Class 4.

<sup>24</sup> Card Geotechnics Limited (2021) LT91 Fort Augustus to Skye OHL Reinforcement – Section 4: Geotechnical Interpretative Report. Revision 0.

### Groundwater Levels and Quality

6.4.155 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients that encourage formation of surface water runoff;
- glacial till and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the underlying bedrock (where not weathered or fractured) generally displays a low or negligible permeability that limits groundwater recharge.

6.4.156 This is witnessed by the high density of surface watercourses shown on **Figure V2-6.1** and which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

6.4.157 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography and flow locally towards the nearest watercourse or loch.

6.4.158 All of Scotland's groundwater bodies have been designated as DWPA's 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.

6.4.159 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. The Proposed Development is located within the Northern Highland groundwater body (SEPA ID: 150701) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).

6.4.160 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area.

### Groundwater Dependent Terrestrial Ecosystems

6.4.161 In accordance with SEPA guidance and their Scoping Response an assessment of GWDTE has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan and has been used to inform the assessment of the GWDTE. **Figure V2-6.4** (Maps 13 – 17) shows the distribution of potential GWDTE.

6.4.162 **Appendix V2-6.4** shows that areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2-6.4** and **Volume 2, Chapter 4: Ecology**.

### Hydrology

6.4.163 In the west of the Section the OHL lies within surface water catchments that drain to the west and the coast at Kyle Rea (which is also known as Loch Alsh). The principal catchments are associated with the Glenmore River, the Abhainn a Ghlinne Bhig and its tributary the Allt Ghleann Aoidhdailean, which rises to Bealach Aoidhdailean,

6.4.164 East of the bealach the surface watercourses drain to the east and Loch Hourn (a sea loch) and Loch Cuaich. In the east of the section the principal water catchments include Allt an Tomain Odhair, tributaries of Loch Hourn, Lochourn River, and tributaries of Loch Cuaich (Loch Cuaich discharges to Loch Garry, east of this section and is part of the larger River Ness catchment).



6.4.165 The only Drinking Water Protected Area (DWPA) within the study area of Section 4 is located around Loch a Mhuilinn, a tributary of the Glen More River. The location and extent of the DWPA is shown on **Figure V2-6.1** (Map 14).

6.4.166 The risk the Proposed Development poses to DWPAs has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3** and confirms which DWPAs are potentially at risk from the Proposed Development and required safeguards to protect these water sources.

6.4.167 Scottish Water advised that the DWPA supplies Glenelg Water Treatment Works and that the Proposed Development “*is likely to present a medium to high risk to water quality given the location of the work in the catchment*”. Scottish Water also advised that “*we would welcome consideration of the precautions specific to protecting drinking water in peatland areas and any opportunities for peat restoration*”.

#### Surface Water Quality

6.4.168 Water quality in all the above mentioned water bodies except Loch a’ Mhuilinn is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table V2-6.14** provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle) within Section 4. Loch Cuaich and the Lochourn River are designated as heavily modified water bodies on account of physical alterations that cannot be addressed without a significant impact on water storage for hydroelectricity generation.

6.4.169 Smaller watercourses within the study area are not monitored by SEPA.

**Table V2-6.14: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
Loch Alsh (200352)	Good	Good	N/A	High	None
Glenmore River (20429)	Good	Good	Good	Good	None
Abhainn a Ghlinne Bhig (20428)	Good	Good	Good	Good	None
River Arnisdale (20427)	Good	Good	Good	High	None
Loch Hourn (200106)	Good	Good	High	High	None
Lochourn River (20426)	Bad ecological potential	Bad	Good	Bad	Water abstraction due to hydroelectricity generation
Loch Cuaich (100186)	Good ecological potential	Bad	High	Bad	Barrier to fish migration

#### Fisheries

6.4.170 Fisheries within most of this Section are managed by the Skye and Lochalsh Rivers Trust, however fisheries within the Loch Cuaich catchment are managed by the Ness District Salmon Fisheries Board (NDSFB) and Ness and Beaully Fisheries Trust. Fishery interests are discussed within **Volume 2, Chapter 4: Ecology**.



### Watercourse Crossings

6.4.171 The Proposed Development has sought to utilise existing tracks and access routes wherever possible. Section 4, however, is remote and notwithstanding this new permanent watercourse crossings and existing crossings on tracks which are scheduled to be upgraded, will be required. The locations of the proposed permanent crossings are shown on **Figure V2-6.1** (Maps 13 – 17) and a schedule of these crossings points, which includes photographs and dimensions of each crossing, is shown in **Appendix V2.6.2**.

### Flood Risk

6.4.172 A summary of the potential sources of flooding within Section 4 and a review of the potential risk posed by each source is presented in **Table V2-6.15**.

**Table V2-6.15: Potential Sources of Flood Risk within Section 4**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	SEPA flood mapping confirms that the Proposed Development is remote from areas at risk from tidal or coastal flooding except at Kinloch Hourn, where the proposed OHL route is approximately 280m from an area with High Likelihood of coastal flooding. Coastal flooding is not considered a development constraint.
River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are generally local and do not extend far from the watercourses or lochs.  Areas of high risk of flooding are located along the following watercourses channels which are crossed by the Proposed Development: Glenmore River, Loch a' Mhuilinn, Abhainn a Ghlinne Bhig, River Arnisdale, Allt a' Choire Reidh, Allt Coire Sgoireadail, Lochourn River, Caolie Water, Allt Coire nan Eiricheallach, Allt a Mheill. Again, with appropriate design, this is not considered a development constraint.
Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are associated with small topographic lows. Surface water flooding is not considered to be a design constraint and potential effects can be mitigated by good design.
Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant groundwater.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area and no artificial drainage systems are recorded.

Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates no risks related to reservoir breach scenarios near the Proposed Development.
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#### Private Water Supplies and Authorised Sites

6.4.173 As part of this assessment, a data request was made to THC (November 2020) who provided details of PWS sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database<sup>25</sup>. In addition, a programme of site investigation has been undertaken to confirm the location of PWS sources and location of DWPA abstraction points.

6.4.174 Further consultation was also undertaken with Scottish Water who confirmed (22nd March 2022) that the east of this section lies within the Loch Ness water supply catchment area. Water in this catchment supplies Invermoriston Water Treatment Works. Scottish Water confirmed that the Ness catchment is large and the Proposed Development is sufficiently distant from the intake that the Proposed Development is likely to be a low risk to the abstraction, but that water quality protection measures will need to be implemented to ensure the public water source is not impaired.

6.4.175 Confirmed PWS locations and DWPA extents within the study area are shown on **Figure V2-6.1** (Maps 13 – 17).

6.4.176 The risk the Proposed Development poses to PWSs and DWPAs has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3**, review of which confirms PWS sources that are at potential at risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.

6.4.177 SEPA Controlled Activity Regulation (CAR) authorisations were obtained from SEPA environmental database. Those recorded in the study area and are shown on **Figure V2-6.1** (Maps 13 – 17). SEPA was not able to provide details of the authorisations at the time of reporting. It is noted that the following CAR authorisations are related to hydro schemes: Elricheallach (NGR 99810 03430) and Glenmore (NGR 84180 20060), the former being downstream of the Proposed Development. The Proposed Development will not alter existing surface water flow paths and catchments and therefore the yield of these hydro schemes is not considered at risk.

#### Summary of Sensitive Water Environment Receptors

6.4.178 **Table V2-6.16** outlines the receptors identified as part of the baseline study within Section 4, and their sensitivity based upon the criteria contained in **Appendix V2-6.1**.

**Table V2-6.16: Sensitivity of Receptors within Section 4**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	High	Cosag Sallow Carr SSSI is located 800m from the Proposed Development.
Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as High.
Surface water	High	The majority of surface water watercourses have been classified by SEPA with an overall status of Good and one of the catchments has been designated as DWPA.

<sup>25</sup> Scottish Government (2021) Private Water Supplies within the Highland Council Area, available <https://data.gov.uk/dataset/6e78286f-2014-4a2c-aefa-c1379b9f7199/private-water-supplies-within-the-highland-council-area> [Accessed February - June 2022]

		Scottish Water has also confirmed that the east of the section lies within the Ness surface water public abstraction supply catchment.
Flooding	Medium	Minor floodplains have been identified adjacent to the larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	High	It has been confirmed that the Proposed Development crosses and lies within the catchment of a DWPA. Properties have been identified to be served by a PWS that are downgradient of the Proposed Development.
Licensed sites	Not Sensitive	No licensed activities which are considered at risk are recorded within 1 km of the Proposed Development.

### Section 5: Loch Cuaich to Invergarry

6.4.179 Section 5 is located to the north of Loch Cuaich<sup>26</sup>, the River Garry and Loch Garry. The section is located between Loch Cuaich Dam in the west and which is centred on National Grid Reference (NGR) NH 06992 02484 to a new sealing end compound near Loch Lundie, located at NH 29669 02617, in the east.

6.4.180 Ground elevations generally decrease southwards towards the lochs. Elevations range from between approximately 240 m AOD to the west of this section near the Loch Cuaich Dam to 140 m AOD at the proposed sealing end compound to the east of this section (at the boundary with Section 6). Elevations decrease to approximately 90 m AOD along the northern banks of Loch Garry.

#### Designations

6.4.181 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Maps 18 – 20), indicates that the following designations are located within the 1 km study area:

- Quoich Spillway SSSI and GCR site. A 5.52 ha site designated for excellent exposures of the Quoich Granite Gneiss and its contact with the Moine meta-sedimentary rocks, located immediately east of the Loch Cuaich Dam. The SSSI and GCR is not water dependent and is discussed in **Volume 2, Chapter 7: Geology and Soils Environment**, and not considered further in this Chapter.
- Western Inverness-shire Lochs SSSI and SPA. A 2,968 ha site which comprises eight freshwater lochs including Loch Garry and Loch Lundie, designated for breeding black throated divers and common scoters breeding habitats. Loch Lundie is located upstream of the Proposed Development and is therefore not considered to be hydraulically connected to Section 5 of the Proposed Development and impacts to the loch are not considered further in this Chapter (see **Volume 2, Chapter 5: Ornithology**). Loch Garry is located within the same hydrological catchment as the Proposed Development and impacts to the SSSI and SAC associated with Loch Garry are assessed in this Chapter.
- Garry Falls SSSI. A 1.83 ha site designated as a good example of upland mixed ash woodland and supports a rich bryophyte assemblage. The SSSI is located within the same hydrological catchment as the Proposed Development and impacts to the SSSI are assessed.

#### Geology and Soils

6.4.182 A comprehensive description of the geology and soils for this section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.

6.4.183 In summary, the Proposed Development and study area is underlain by psammites with igneous intrusions overlain by superficial deposits of hummocky glacial deposits (comprising till, sand and gravel) with localised areas of peat. Discrete areas of alluvium are recorded adjacent to larger watercourses and lochs. The soils within the study area generally comprise peaty podzols to the east and brown soils to the west.

6.4.184 The published mapping has been confirmed by a programme of site inspection and investigation. CGL oversaw an investigation programme at 90 tower locations within Section 5 of the project which included boreholes which were advanced to between 6.0 m and 12.0 m below ground level, and a series of trial pits completed where depth to bedrock was less than 3. Samples of the soils and geology encountered were taken for material and strength testing and will be used to inform the design of the proposed tower foundations. In summary, CGL<sup>27</sup> report:

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<sup>26</sup> Loch Cuiach and Loch Quoich are used interchangeably in published data sources.

<sup>27</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 5 Quoich to Invergarry: Ground Investigation Report.

“... superficial strata across the route vary depending on physical characteristics of the proposed tower location and the proximity to physical features (e.g., plateaus, rivers etc). There is little spatial association between different superficial deposits. There is also little variation in the bedrock deposits across Section 5. The predominant geological unit is the Loch Eil Group, which is present between Loch Quioch dam and Invergarry. Igneous intrusions are encountered regularly along the 22km stretch of the proposed route, with varying lithologies of the West Highland Granite Gneiss Intrusion and lithologies of the Argyll and Northern Highlands Granitic Suite”.

### Hydrogeology

#### Aquifer Characteristics and Groundwater Vulnerability

6.4.185 An extract of the Aquifer Productivity and Hydrogeological Map of Scotland mapping are presented in **Figure V2-6.2a** and **Figure V2-6.2b** respectively. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.186 The glacial and peat superficial deposits are not considered an important aquifer. Small amounts of groundwater may be present within the sand and gravel horizons of the glacial superficial deposits; however groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement. Alluvium has a greater propensity to store and allow groundwater movement and groundwater in this unit is likely to be shallow and in hydraulic conductivity with the adjacent watercourses and lochs.

6.4.187 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium) are mapped with potential moderate to high productivity.

6.4.188 **Figure V2-6.2b** shows that the bedrock deposits beneath this section of the Proposed Development are mapped as impermeable rock and characterised as generally without groundwater except at shallow depth and a low productivity aquifer. **Figure V2-6.2a** confirms the low and very low productivity of the bedrock. Groundwater resources in the bedrock are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by intergranular and fracture flow mechanisms.

6.4.189 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer, and with respect to the Proposed Development shows that groundwater, by virtue of its shallow depth (see below), has a vulnerability of Class 4a, 4b and 5.

#### Groundwater Levels and Quality

6.4.190 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients that encourage formation of surface water runoff;
- glacial till and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the underlying bedrock (where not weathered or fractured) generally displays a low or negligible permeability that limit groundwater recharge.

6.4.191 This is witnessed by the high density of surface watercourses shown on **Figure V2-6.1** (Maps 18 – 20) and which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

6.4.192 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography and flow generally southwards towards the lochs.

- 6.4.193 All of Scotland's groundwater bodies have been designated as DWPA's 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.
- 6.4.194 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. The Proposed Development, within Section 5, is located within the Northern Highland groundwater body (SEPA ID: 150701) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).
- 6.4.195 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area for Section 5.

#### Groundwater Dependent Terrestrial Ecosystems

- 6.4.196 In accordance with SEPA guidance and their Scoping Response an assessment of Groundwater Dependent Terrestrial Ecosystems (GWDTE) has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan which has been used to inform the assessment of GWDTE. **Figure V2-6.4** (Maps 18 – 20) shows the distribution of potential GWDTE.
- 6.4.197 **Appendix V2-6.4** shows areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2-6.4** and **Volume 2, Chapter 4: Ecology**.

#### Hydrology

- 6.4.198 This section of the Proposed Development is located within the surface water catchment of the River Garry, which is in turn part of the larger River Ness catchment. The River Garry flows generally eastwards to the south of the Proposed Development before discharging into Loch Oich approximately 3 km southeast of this section.
- 6.4.199 The Proposed Development crosses numerous tributaries of the River Garry including the Aldernaig Burn and Garbh Allt, the catchments of which are designated as DWPA's. The Aldernaig Burn is located within the eastern extent of the section near the proposed sealing end compound whilst the Garbh Allt is located within the centre of the section near the hamlet of Inchlaggan. An unnamed tributary of the River Garry near Collie Mhorgil is also designated as a DWPA, located within the eastern extent of the section approximately 3 km east of Loch Quoich Dam.
- 6.4.200 The risk the Proposed Development poses to DWPA's has been considered as part of this assessment and is presented as **Appendix V2.6.3** and confirms which DWPA's are potentially at risk from the Proposed Development and required safeguards to protect these water sources.

#### Surface Water Quality

- 6.4.201 Water quality in Loch Cuaich, River Garry, Loch Garry and Aldernaig Burn is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table V2-6.17** provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle) within Section 5. All the watercourses monitored are designated as heavily modified water bodies, due to hydroelectricity generation in the area. Smaller watercourses within the study area are not monitored by SEPA.

**Table V2-6.17: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
Loch Quoich (100186)	Good ecological potential	Bad	High	Bad	Barrier to fish migration.
River Garry – Loch Poulary to Loch Quoich (20256)	Poor ecological potential	Poor	-	Moderate	Unknown pressure on water animals and plants.
River Garry – Loch Garry to Loch Poulary	Good ecological potential	Moderate	Good	Moderate	None
Loch Garry (100190)	Good ecological potential	Poor	Good	Poor	None
Aldernaig Burn (23643)	Moderate	Moderate	-	Good	Unknown pressure on water animals and plants.

#### Fisheries

6.4.202 Fisheries within the River Ness catchment are managed by the NDSFB and Ness and Beaully Fisheries Trust. The River Garry is an important salmon fishery. Fishery interests are discussed within **Volume 2, Chapter 4: Ecology**.

#### Watercourse Crossings

6.4.203 The Proposed Development seeks to utilise existing tracks and access routes wherever possible. Notwithstanding there are new permanent watercourse crossings and existing crossings on tracks which are scheduled to be upgraded. There are no proposed HDD locations in this section. The locations of these permanent crossings are shown on **Figure V2-6.1** and a schedule of these crossings, which includes photographs and dimensions of each crossing, is shown in **Appendix V2.6.2**.

#### Flood Risk

6.4.204 A summary of the potential sources of flooding within Section 5 and a review of the potential risk posed by each source is presented in **Table V2-6.18**.

**Table V2-6.18: Potential Sources of Flood Risk within Section 5**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	The Proposed Development is remote from the coast and situated at an elevation above 90 m AOD. SEPA flood mapping confirms the Proposed Development is not at risk from tidal or coastal flooding.
River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are



		generally local and do not extend far from the watercourses or lochs. Areas of high risk of flooding are located along the following watercourses which crossed by the Proposed Development; Allt a'Ghobhainn, Garbh Allt, Allt a'Choirainn, Allt a'Bhiora, Allt Daingean, Allt Achaidh Luachraich, Allt a'Bhainne and Aldernaig Burn.
Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are likely to be associated with small topographic lows. Surface water flooding is not considered to be a design constraint.
Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant quantities of groundwater.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area absent of artificial drainage systems.
Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates two breach scenarios have been recorded along the River Garry downstream of Loch Cuaich Dam, associated with a breach from Cuaich reservoir (reference number RES/R/1128018 and RES/R/1128018). In general the modelled flood extents do not encroach to the Proposed Development and given the safeguards afforded by the Reservoirs Act the risk of such an event occurring is very low. Therefore flooding from this source is not considered further.

#### Private Water Supplies and Authorised Sites

6.4.205 As part of this assessment, a data request was made to THC (November 2020) who provided details of PWS sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database<sup>28</sup>. In addition to these data sources, a programme of site investigation has been undertaken to confirm the location of PWS sources and the location of DWPA abstraction points.

6.4.206 Further consultation was also undertaken with Scottish Water who confirmed (22<sup>nd</sup> March 2022) that Section 5 of the Proposed Development lies within the Loch Ness water supply catchment area. Water in this catchment supplies Invermoriston Water Treatment Works. Scottish Water confirmed that the Ness catchment is large and the Proposed Development is sufficiently distant from the intake that the Proposed Development is likely to be a low risk to the abstraction, but that water quality protection measures will need to be implemented to ensure the public water source is not impaired.

6.4.207 Confirmed PWS locations and DWPA extents within the study area are shown on **Figure V2-6.1**.

<sup>28</sup> Scottish Government (2021) Private Water Supplies within the Highland Council Area, available <https://data.gov.uk/dataset/6e78286f-2014-4a2c-aefa-c1379b9f7199/private-water-supplies-within-the-highland-council-area> [Accessed February - June 2022]

6.4.208 The risk the Proposed Development poses to PWSs and DWPA's has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3**, review of which confirms PWS sources that are at potential at risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.

6.4.209 SEPA CAR authorisations were obtained from SEPA environmental database. Those recorded in the study area and are shown on **Figure V2-6.1** (Maps 18 – 20). SEPA was not able to provide details of the authorisations at the time of reporting. With reference to the Quoich to Aberchalder 132 kV Woodpole Overhead Line application, SEPA were able to provide details of the CAR authorisations held at that time, and it was noted that the majority were for either engineering works or the disposal of sewage.

#### Summary of Sensitive Water Environment Receptors

6.4.210 **Table V2-6.19** outlines the receptors identified as part of the baseline study within Section 5, and their sensitivity based upon the criteria contained in **Appendix V2-6.1**.

**Table V2-6.19: Sensitivity of Receptors within Section 5**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	High	Western Inverness-shire Lochs SSSI and SPA, with reference to Loch Garry, and Garry Falls SSSI are located downstream of the Proposed Development.
Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as High.
Surface water	High	The majority of surface water watercourses have been classified by SEPA as Good ecological potential and several of the catchments have been designated as DWPA. Scottish Water has also confirmed that the Proposed Development lies within the Ness surface water public abstraction supply catchment.
Flooding	Medium	Minor floodplains have been identified adjacent to the larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	High	It has been confirmed that the Proposed Development crosses and lies within the catchments of DWPA's. Properties have been identified to be served by a PWS that are downgradient of the Proposed Development.
Licensed sites	Not Sensitive	No licensed activities which are considered at risk are recorded within 1 km of the Proposed Development.

*Section 6: Invergarry to Fort Augustus*

6.4.211 Section 6 is located between Invergarry and Fort Augustus, between a new sealing end compound near Loch Lundie (which is assessed in Section 5), which is centred on National Grid Reference (NGR) NH 29669 02617, in the west, to the existing Fort Augustus Substation, located at NH 35635 08353, in the east.

6.4.212 Ground elevations generally decrease south-eastwards towards Loch Oich and the River Oich. Elevations range from between approximately 220 m Above Ordnance Datum (AOD) within the centre of the Proposed Development near Lon Mor to 50 m AOD at the existing Fort Augustus Substation.

Designations

6.4.213 Review of the NatureScot SiteLink, as shown on **Figure V2-6.1** (Map 21), indicates that the following designated site is located within the 1 km study area:

- Western Inverness-shire Lochs SSSI and SPA. A 2,968 ha site which comprises eight freshwater lochs including Loch Lundie, designated for breeding black throated divers and common scoters breeding habitats. Loch Lundie is located within the same hydrological catchment of the Proposed Development and therefore impacts to the SSSI and SPA associated with Loch Lundie are considered in this Chapter. Potential ornithological impacts are assessed in **Volume 2, Chapter 5: Ornithology**.

Geology and Soils

6.4.214 A comprehensive description of the geology and soils for this section of the Proposed Development is provided in **Volume 2, Chapter 7: Geology and Soils Environment**.

6.4.215 The Proposed Development and surrounding area are underlain by psammites to south and granitic gneissose to the north, overlain by superficial deposits of hummocky glacial deposits (comprising till, sand, and gravel) with localised areas of peat. Glaciofluvial and alluvium deposits are noted near the existing Fort Augustus Substation and the larger watercourses including the River Oich. The soils within the study area generally comprise peaty podzols to the south and mineral podzols to the north.

6.4.216 The published mapping has been confirmed by a programme of site inspection.

6.4.217 CGL oversaw an investigation programme that comprised of 81 trial pit locations and 15 boreholes advanced at proposed the cable sealing end compound (Section 5) and along the underground cable route (including at proposed HDD locations) (Section 6). At HDD locations, boreholes were drilled either side of the watercourse. In summary, the CGL report<sup>29</sup>:

*“As expected, superficial strata across the route vary depending on physical characteristics of the proposed investigation location and the proximity to physical features (e.g., plateaus, rivers etc). There is little spatial association between different superficial deposits. There is also little variation in the bedrock deposits across Section 6. The predominant geological unit is the Loch Eil Group which is present between Invergarry and Auchterawe Substation”.*

6.4.218 Details of the extent and distribution of peat are given in **Appendix V2-7.2** which presents the results of a comprehensive peat depth probing campaign.

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<sup>29</sup> Card Geotechnics Limited (2022) LT91 Fort Augustus to Skye OHL Reinforcement – Section 6: Geotechnical Interpretative Report. Revision 0.

## Hydrogeology

### Aquifer Characteristics and Groundwater Vulnerability

6.4.219 An extract of the Aquifer Productivity and Hydrogeological Map of Scotland mapping are presented in **Figure V2-6.2a** and **Figure V2-6.2b** respectively. Groundwater Vulnerability mapping is shown as **Figure V2-6.3**.

6.4.220 The glacial and peat superficial deposits are not considered an important aquifer. Small amounts of groundwater may be present within the sand and gravel horizons of the hummocky glacial superficial deposits; however, groundwater yields are likely to be low given limited lateral and vertical extent of these horizons. Peat is characterised by a low bulk permeability, and does not, therefore readily permit water movement. Alluvium and glaciofluvial deposits have a greater propensity to store and allow groundwater movement and groundwater in this unit is likely to be shallow and in hydraulic conductivity with the adjacent watercourses and lochs.

6.4.221 This is confirmed by the superficial mapping shown on **Figure V2-6.3** which illustrates that the superficial deposits underlying the Proposed Development are not classed as significant aquifers and only small discrete areas (which generally correspond to alluvium) are mapped with potential moderate to high productivity.

6.4.222 **Figure V2-6.2b** shows that the bedrock deposits beneath Section 6 of the Proposed Development are mapped as impermeable rock and characterised as generally without groundwater except at shallow depth. **Figure V2-6.3a** confirms the low and very low productivity of the bedrock. Groundwater resources in the bedrock are therefore limited and are likely to be restricted to near surface weathered zones and secondary fractures. Where present, groundwater movement will occur by fracture flow mechanisms.

6.4.223 Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being the most vulnerable. Review of **Figure V2-6.3** shows that the potential groundwater vulnerability in the uppermost aquifer, and with respect to the Proposed Development shows that groundwater, by virtue of its shallow depth (see below), has a vulnerability of Class 4a.

### Groundwater levels and quality

6.4.224 Baseline factors that inhibit groundwater recharge regionally include the following:

- steep topographic gradients that encourage formation of surface water runoff;
- glacial till and peat limit infiltration of rainwater as a result of their characteristic low bulk permeability; and
- the underlying bedrock (where not weathered or fractured) generally displays a low or negligible permeability that limit groundwater recharge.

6.4.225 This is witnessed by the high density of surface watercourses shown on **Figure V2-6.1** and which confirm that the majority of incident rainfall forms surface water runoff locally and regionally.

6.4.226 Groundwater flow in both the bedrock and superficial deposits is likely to follow the local topography and flow south-eastwards towards Loch Oich and River Oich.

6.4.227 All of Scotland's groundwater bodies have been designated as DWPA's 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.

6.4.228 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. The Proposed Development, within Section 6, is located within the Northern Highland groundwater body (SEPA ID: 150701) which is designated with an overall classification of Good with no pressures identified in 2020 (which is the latest reporting cycle).

6.4.229 It is understood that SEPA do not maintain any groundwater level or quality monitoring locations within the study area for Section 6.

#### Groundwater Dependent Terrestrial Ecosystems

6.4.230 In accordance with SEPA guidance and their Scoping Response an assessment of Groundwater Dependent Terrestrial Ecosystems (GWDTE) has been undertaken and is presented as **Appendix V2-6.4**. A summary of the habitat surveys completed is provided in **Volume 2, Chapter 4: Ecology** along with a detailed National Vegetation Classification (NVC) habitat plan and has been used to inform the assessment of the GWDTE. **Figure V2-6.4** (Map 21) shows the distribution of potential GWDTE.

6.4.231 **Appendix V2-6.4** shows that areas of potential GWDTE are sustained by rainfall and water logging of soils, rather than by groundwater. Buffers to areas of potential GWDTE specified in SEPA guidance therefore do not apply, but safeguards to maintain these habitats, and the source of water to these habitats will need to be maintained during construction and operation of the Proposed Development. Examples of appropriate safeguards and techniques are given in **Appendix V2-6.4** and **Volume 2, Chapter 4: Ecology**.

#### Hydrology

6.4.232 This Section of the Proposed Development is located within two principal surface water catchments: the River Garry in the west and the River Oich in the east. Both are part of the larger River Ness catchment.

6.4.233 The Aldernaig Burn is a tributary of the River Garry and drains much of the west of the Section. Its catchment is designated as a Drinking Water Protected Area (DWPA). Loch Lundie (which is a component of West Inverness-shire Lochs SSSI) is also located in the Aldernaig Burn catchment

6.4.234 The location and extent of the DWPA is shown on **Figure V2-6.1** (Map 21). The risk the Proposed Development poses to the DWPA has been considered as part of this assessment and is presented in Confidential **Appendix V2-6.3** and confirms which DWPAs are potentially at risk from the Proposed Development and required safeguards to protect these water sources.

6.4.235 Much of the east part of Section 6 is drained by the surface water catchment of the Invervigar Burn which is a tributary of the River Oich.

#### Surface Water Quality

6.4.236 Water quality in the Aldernaig Burn, River Garry, Invervigar Burn, River Oich and Loch Oich is monitored by SEPA and classified annually in accordance with the requirements of the WFD. **Table V2-6.20** provides summary details of the SEPA classifications reported in 2020 (the latest reporting cycle) within Section 6. The watercourses/features are classified with an overall status of Moderate to High.

6.4.237 Smaller watercourses within the study area are not monitored by SEPA.

**Table V2-6.20: SEPA Surface Water Classification (2020)**

Watercourse (SEPA ID)	Overall Status	Overall Ecology	Physico-Chemical Status	Hydromorphology	Pressure
River Garry (20254)	Good	Moderate	Good	Moderate	Heavily modified as a result of hydroelectricity generation.

Aldernaig Burn (23643)	Moderate	Moderate	-	Good	Unknown pressure on water animals and plants.
Invervigar Burn (20293)	High	High	High	High	None
River Oich (20253)	Good	Good	-	Good	None
Loch Oich (100188)	Good	Good	High	Good	None

#### Fisheries

6.4.238 Fisheries within the River Ness catchment are managed by the NDSFB and Ness and Beaully Fisheries Trust. Fishery interests are discussed within **Volume 2, Chapter 4: Ecology**.

#### Watercourse Crossings

6.4.239 The Proposed Development design has sought to utilise existing tracks and access routes wherever possible. In Section 6, no new permanent tracks or permanent watercourse crossings are required.

6.4.240 There are proposed HDD locations where the proposed underground cables would be installed below watercourses. The locations of these permanent crossings are shown on **Figure V2-6.1** (Map 21) and a schedule of these crossings points, which includes photographs and dimensions of each crossing, is shown in Confidential **Appendix V2-6.3**.

#### Flood risk

6.4.241 A summary of the potential sources of flooding within Section 6 and a review of the potential risk posed by each source is presented in **Table V2-6.21**.

**Table V2-6.21: Potential Sources of Flood Risk within Section 6**

Potential Source	Potential Flood Risk to the Proposed Development	Justification
Coastal flooding	No	The Proposed Development is remote from the coast and situated at an elevation above 50 m AOD. SEPA flood mapping confirms the Proposed Development is not at risk from tidal or coastal flooding.
River flooding	Yes (localised)	SEPA mapping has identified that the floodplain extents associated with watercourses crossed by the Proposed Development are generally local and do not extend far from the watercourses or lochs. Areas of high risk of flooding are located along the following watercourses which crossed by the Proposed Development; Aldernaig Burn and Allt Dail a'Chuirn (a tributary of the Invervigar Burn). A larger area of flooding (out width of the watercourse channel is noted) associated with the Allt Dail a'Chuirn (a headwater tributary of the Invervigar Burn), including the proposed HDD crossing (WX6.1). The other

		proposed HDD crossings are not noted within an area at risk of fluvial flooding. Localised flooding from this source will, therefore, have to be considered and mitigated as part of the development design.
Surface water flooding	No	SEPA flood maps indicate that the majority of the Proposed Development is not at risk from surface water flooding, however, small discrete areas of flooding are shown which are associated with watercourse channels and small topographic lows. Surface water flooding is not considered to be a design constraint and potential effects can be mitigated by good design.
Groundwater flooding	No	The SEPA groundwater flood map illustrates that the Proposed Development is not considered at risk from potential groundwater flooding. This concurs with the desk-based assessment which has shown that there is little potential for significant groundwater.
Flood Defence Breach (Failure)	No	The Proposed Development is remote from any flood defences.
Flooding from artificial drainage systems	No	The Proposed Development is located within a remote area absent of artificial drainage systems.
Flooding due to infrastructure failure	No	SEPA has produced reservoir inundation maps for those sites currently regulated under the Reservoirs Act 1975. Review of these maps indicates five breach scenarios have been recorded along Loch Oich and River Oich downstream of the Proposed Development, associated with breaches from Quoich Reservoir, Loch Lundie, Invergarry Reservoir, and Loch Oich.  In general the modelled flood extents do not encroach to the Proposed Development and given the safeguards afforded by the Reservoirs Act the risk of such an event occurring is very low. Therefore flooding from this source is not considered further.

#### Private Water Supplies and Authorised Sites

6.4.242 As part of this assessment, a data request was made to THC (November 2020) who provided details of PWS sources. This has been supplemented with the most recent PWS data available on the Scottish Government spatial database<sup>30</sup>. In addition, a programme of site investigation has been undertaken to confirm the location of PWS sources and location of DWPA abstraction points.

6.4.243 Further consultation was also undertaken with Scottish Water who confirmed (22<sup>nd</sup> March 2022) that this section of the Proposed Development lies within the Loch Ness water supply catchment area. Water in this catchment supplies Invermoriston Water Treatment Works. Scottish Water confirmed that the Ness catchment is large and the Proposed Development is sufficiently distant from the intake that the Proposed Development is likely to be a low risk to the abstraction, but that water quality protection measures will need to be implemented to ensure the public water source is not impaired.

6.4.244 Confirmed PWS locations and DWPA extents within the study area are shown on **Figure V2-6.1** (Map 21).

<sup>30</sup> Scottish Government (2021) Private Water Supplies within the Highland Council Area, available <https://data.gov.uk/dataset/6e78286f-2014-4a2c-aefa-c1379b9f7199/private-water-supplies-within-the-highland-council-area> [Accessed February - June 2022]



6.4.245 The risk the Proposed Development poses to PWSs and DWPA's has been considered as part of this assessment and is presented as **Appendix V2.6.3**, review of which confirms PWS sources that are at potential at risk from the Proposed Development and the safeguards that will be required at these locations to confirm the integrity and quality of the water supplies.

6.4.246 SEPA CAR authorisations were obtained from SEPA environmental database. Those recorded in the study area, the majority of which are located near the existing Fort Augustus Substation, are shown on **Figure V2-6.1** (Map 21). SEPA was not able to provide details of the authorisations at the time of reporting. Two CAR authorisations are noted associated with the Loch Lundie Reservoir (RES/R/1128062) and Glen Buck Hydro Scheme (CAR/L/1112395). It is likely that the licenced activity at Loch Lundie is a water abstraction or impoundment authorisation (or a complex licence which regulates both). Glen Buck Hydro Scheme is within a different catchment to the Proposed Development.

#### Summary of Sensitive Water Environment Receptors

6.4.247 **Table V2-6.22** outlines the receptors identified as part of the baseline study within Section 6, and their sensitivity based upon the criteria contained in **Appendix V2-6.1**.

**Table V2-6.22: Sensitivity of Receptors within Section 6**

Receptor	Sensitivity	Reason for Sensitivity
Statutory Designated Sites	High	Western Inverness-shire Lochs SSSI and SPA, with reference to Loch Lundie, is located downstream of the Proposed Development.
Groundwater	High	Groundwater has been classified by SEPA as Good and vulnerability is classified as High.
Surface water	High	The majority of surface water watercourses have been classified by SEPA as Good and the Aldernaig Burn catchment have been designated as a DWPA. Scottish Water has also confirmed that the Proposed Development lies within the Ness surface water public abstraction supply catchment.
Flooding	Medium	Minor floodplains have been identified adjacent to the larger watercourses crossed by the Proposed Development.
Drinking Water Protected Areas and Private Water Supplies	High	It has been confirmed that the Proposed Development crosses and lies within the catchment of a DWPA. Properties have been identified to be served by a PWS that are downgradient of the Proposed Development.
Licensed sites	Not Sensitive	SEPA was not able to provide details of licenced sites to inform this assessment. It is noted that there is a licenced activity at Loch Lundie, which might be regulated water abstraction. Loch Lundie has been identified as a high sensitivity receptor above and is not assessed again.

## 6.5 Future Baseline

6.5.1 Due to proposed consent in perpetuity, the temporal scope requires consideration for climate change to alter future baseline conditions. Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside slightly higher average temperatures. This suggests that there may 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, in summer and winter, may also increase in volume and velocity.

## 6.6 Embedded Mitigation and Mitigation by Design

6.6.1 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 proposed alignment and associated infrastructure. This process has included, for example, citing infrastructure generally in areas that avoid ecologically and hydrologically sensitive areas, other than where these are unavoidable such as crossing of watercourses and extensive areas of peat. 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.

6.6.2 A description of all elements of the Proposed Development is given in **Volume 1, Chapter 3: Project Description**. Embedded mitigation and mitigation by design relevant to the water environment is presented below.

### *Good Practice Measures*

6.6.3 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.

6.6.4 The Proposed Development will be in accordance with good practice guidance, including UK and Scottish guidance on good practice for construction projects detailed earlier in this Chapter (see paragraphs 6.3.15 – 6.3.17).

6.6.5 In addition, SSEN 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 V1-3.5**. The Proposed Development would be constructed in accordance with these plans.

### *Construction and Environmental Management Plan (CEMP)*

6.6.6 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.

6.6.7 The CEMP will also outline measures to ensure that the works minimise the risk to groundwater, surface water, private water supplies, DWPAs, and licensed water uses.

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

- measures to protect and safeguard private water supplies, DWPAs, and associated distribution pipework;
- 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 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 will be located remote from any sensitive surface water receptors or private water supplies and will be constructed to manage surface water run-off in accordance with best practice;
- any water contaminated with silt or chemicals will not be discharged directly or indirectly to a watercourse without prior treatment; and
- water for temporary site welfare facilities will be brought to site, and foul water will be collected in a tank and collected for offsite disposal at an appropriately licensed facility.

6.6.9 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.

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

6.6.11 Further, Scottish Water best practice guidance for construction and land management practices in DWPA's will be adhered to and included in the CEMP<sup>31</sup>.

#### *Environmental Clerk of Works*

6.6.12 To ensure all reasonable precautions are taken to avoid negative effects on the water environment, a suitably qualified Environmental Clerk of Works (ECoW) will be appointed prior to the commencement of construction to advise the Applicant and the Principal Contractor on all ecological and hydrological matters. The ECoW will be required to be present onsite during the construction phase and will 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.

6.6.13 With respect to the water environment, the ECoW would also have responsibility to ensure water flow paths and quality to water dependant habitat are sustained during all phases of the Proposed Development (see **Appendix V2-6.4**).

6.6.14 The ECoW would be retained to oversee habitat restoration works throughout the Proposed Development, providing advice where necessary, as set out in **Volume 1, Appendix V1-3.7: Outline Restoration Plan**.

#### *Buffer to Water Features*

6.6.15 As part of the Proposed Development design a buffer of at least 20 m has been applied to watercourses and water features such as lochs and ponds. This has been achieved for the vast majority of the Proposed Development.

6.6.16 The relatively short span between wooden poles presents an engineering constraint, and in Section 0 there are instances where poles are located within 20 m of water features. Construction of wooden poles does not involve substantial earthworks or earthworks of a long duration and thus the potential for an adverse impact on the water environment is low. The base of the poles are also water compatible. These characteristics are considered in the impact assessment that follows.

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<sup>31</sup> <https://www.scottishwater.co.uk/Help-and-Resources/Document-Hub/Key-Publications/Sustainable-Land-Management>

- 6.6.17 There are limited instances, again as a consequence of engineering constraints, where proposed towers are located within 20 m of a water feature. The Limit of Deviation which forms part of the Proposed Development would be used to micro-site towers on the most suitable ground conditions and in areas where there is least potential to impair water resources during construction of a tower. The preferred location would be determined on site in consultation with the project ECoW.
- 6.6.18 Towers which are located within the 20 m buffer to water features include:
- Section 3: BF43;
  - Section 4: BF90, 136, 138, 144, 160, 172, 174, 175, 179, 180, 232 and 238; and
  - Section 5: BF261, 292, 295 and 333.
- 6.6.19 As a result of constraints including landscape impacts and engineering feasibility, it has been necessary to locate the proposed underground cable in the Abhainn Torra-mhichaig valley, in Section 2, within 20 m of the watercourse. As above, a Limit of Deviation is proposed and this would be used by the project ECoW to micro-site the cable works in this location on the most suitable ground conditions and in areas where there is least potential to impair water resources during construction. It is noted that following cable construction works surface ground conditions would be restored.
- 6.6.20 It is recognised that when works are undertaken close to water and within the 20 m buffer, there is a need for increased monitoring and management of construction, dismantling and restoration works. Specific drainage management plans, method statements, monitoring and pollution incident response plans relevant to the works at these locations are required and need to be agreed with statutory consultees, including SEPA.
- 6.6.21 The potential increased risk to water features occurs during the construction phase of the project. During the operational phase, and following restoration of the construction works, there is no increased risk. The risk is therefore temporal and not for the life of the Proposed Development..
- 6.6.22 Examples of the additional safeguards that would be deployed at these locations and included in the management plans, subject to agreement with consultees, include, but are not limited to the following:
- location specific drainage, pollution prevention and incident response plans (e.g. for each tower location in the 20 m buffer and where works are potentially within 20 m of the Abhainn Torra-mhichaig watercourse);
  - increased induction and training for staff highlighting sensitivities;
  - a wet weather working protocol and provision to cease works during prolonged rainfall or periods of high runoff (pluvial or fluvial);
  - reduction in extent of working area to minimise the potential to disturb ground;
  - reduction in the length of cable trench open at any one time and a commitment to progressively restore the trench;
  - additional passive water quality control measures, such as temporary water diversion ditches, silt fences and silt traps to control and treat runoff from working areas;
  - daily inspection of works and watercourses and full-time supervision of construction, restoration and dismantling works;
  - deployment of real-time water quality monitoring telemetry with predetermined water quality trigger levels based on baseline water quality data (e.g. for pH, dissolved oxygen and electrical conductivity);
  - documentation that clearly identifies responsibilities and actions and contact details should a pollution event be recorded.
- 6.6.23 The above is considered in the impact assessment that follows.

*Water Quality Monitoring (PWS, DWPA and Designated Sites)*

- 6.6.24 It has been confirmed that the east of Section 4, and Sections 5 and 6 of the Proposed Development are located within Scottish Water's Ness surface water catchment area and that the Proposed Development crosses several DWPAs, and also that there are PWS sources which are dependent on either surface or groundwater within the study area.
- 6.6.25 Water quality monitoring before and during the construction phase would be undertaken of water sources which have been identified as potentially at risk from the Proposed Development (as set out in Confidential **Appendix V2-6.3**) without implementation of best practice measures.
- 6.6.26 The monitoring would be used to ensure that the quality and/or quantity of water to these sources is not significantly impacted. Monitoring would be carried out at a specified frequency (depending upon the construction phase) on these catchments. An example monitoring protocol is given in Confidential **Appendix V2-6.3**.
- 6.6.27 As detailed in Confidential **Appendix V2-6.3** it is expected that a water monitoring programme proportionate to the risk posed to a PWS source or DWPA area is adopted, with more monitoring (e.g. increased frequency and parameter suite) used at locations where the risk to a water source is greater.
- 6.6.28 This monitoring would continue throughout the construction phase and immediately post construction when works are undertaken near a water source. 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 detailed design (Scottish Water, SEPA, THC and Skye and Lochalsh Rivers Trust and NDSFB would be consulted on the plan) and would be contained within the CEMP.
- 6.6.29 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.
- 6.6.30 The following water dependent designated sites have been identified as being in hydraulic continuity with the Proposed Development:
- Section 1: Sligachan Peatlands SAC and Sligachan SSSI are water dependant and located downstream of the Section 1 of the Proposed Development;
  - Section 3: Mointeach Lochain Dubha SSSI and SAC and Kinloch and Kyleakin SSSI and SAC;
  - Section 4: Cosag Sallow Carr SSSI;
  - Section 5: Loch Garry which is a component part of Western Inverness-shire Lochs SSSI and SPA, and Garry Falls SSSI; and
  - Section 6: Loch Lundie which is a component part of Western Inverness-shire Lochs SSSI and SPA.
- 6.6.31 Water quality monitoring before and during the construction phase would be undertaken, to ensure that the tributaries of the main channels that discharge to these designated sites have no significant water quality and/or quantity impacts. Monitoring would be carried out at a specified frequency (depending upon the construction phase) on these catchments, and, like the PWS and DWPA monitoring programme, would be agreed with statutory consultees including THC, NatureScot and SEPA.
- 6.6.32 As noted above (Buffer to Water Features) additional water quality monitoring would be undertaken at specific locations where works are proposed within or close to the projects 20 m water buffer.

### *Pollution Risk*

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

- refuelling would take place at least 50 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 PPG4;
- areas would be designated for washout of vehicles which are a minimum distance of 50 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 cable trenches and 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*

6.6.34 Good practice measures for the management of erosion and sedimentation would include the following:

- all stockpiled materials would be located out with a 50m buffer from watercourses;
- water would be prevented as far as possible, from entering excavations such as cable trenches and foundations through the use of appropriate cut-off drainage;
- where the above is not possible, water would pass through silt/sediment traps to remove silt prior to discharge into the surrounding drainage system;
- clean and dirty water onsite 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 construction personnel, ECoW, 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*

6.6.35 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 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;
- onsite 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;
- appropriate drainage would attenuate runoff rates and reduce runoff volumes to ensure minimal effect upon flood risk; and
- where necessary, check dams would be used within cable trenches in order to prevent trenches developing into preferential flow pathways.

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

6.6.37 Management of flood risk and at proposed HDD locations is discussed below (see Permanent Watercourse Crossings).

#### *Water Abstraction*

6.6.38 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.

6.6.39 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.

#### *Permanent Watercourse Crossings (inc. HDD Crossings)*

6.6.40 Good practice in relation to new water crossings involves the following aspects:

- the design of the watercourse crossings would be agreed with SEPA prior to construction and be regulated in accordance with CAR;
- the appropriate crossing type would be identified from SEPA's good practice guidance and would take into account any ecological and hydrological constraints; and
- the crossing would be sized and designed so as to minimise effect upon flood risk (sized to accommodate at least the 200 year flow).

6.6.41 No works are proposed to existing watercourse crossings associated with existing access tracks. Should it become apparent, as part of the detailed design stage of the project, that an existing crossing needs to be replaced, then the principles identified above for new crossings would be used.

6.6.42 Good practice in relation to HDD water crossings includes the following:

- the design of the works would be informed by site investigation to ensure an appropriate drilling technique is specified;
- the works would be undertaken by a suitably experience contractor and be supervised by the site ECoW;
- it will be necessary to develop launch and landing pads for the HDD works which would be developed and managed in accordance with the pollution and erosion, and sedimentation best practice discussed above;
- the works would be agreed with SEPA prior to construction and be regulated in accordance with CAR;

- the works would be undertaken in accordance with a method statement agreed with SEPA and include monitoring the volume of any drilling fluids used, such as bentonite, to ensure no loss of drilling fluid;
- the HDD launch and landing pads would be set sufficiently far from the watercourse so that the banks of the watercourse being crossed are not disturbed by the proposed works;
- a flood response plan would be developed and then implemented during the works, so that works can cease and be made safe in the event of extreme rainfall and flood levels; and
- an emergency incident response plan would be prepared and deployed if required during the works.

#### *Installation of Underground Cables and Joint Bays*

- 6.6.43 Underground cable ducts would be installed progressively. The length of time the cable trench would remain open would be minimised. The cable trench would be opened using a tracked excavator. Arisings from the trench would be temporarily stored adjacent to the trench ready for use to restore the trench.
- 6.6.44 Arisings would be stored so that the potential for erosion and sedimentation is minimised (see above). Silt fences, cut-off drains and temporary cover of the stockpiles will be deployed as directed by the ECoW.
- 6.6.45 Vegetation turves would be stored separately to the spoil arisings. Once the cable has been installed in the cable trench arisings would be used to restore the trench and backfilled in the same order that the material was excavated from the trench. Turves would then be replaced on the backfilled trench.
- 6.6.46 If directed by the ECoW, low permeability barriers would be installed in the trench to prevent the trench forming a preferential water flow path. Where ground conditions are saturated a geotextile wrap would be used within the trench to ensure there is no loss of the sand cable surround to adjacent ground.
- 6.6.47 Where required localised temporary pumping of water from the cable trench would be undertaken to maintain safe working conditions and to facilitate cable duct installation. Pumping arrangements would be agreed and supervised by the site ECoW. Pumping would cease once the cable duct has been installed.
- 6.6.48 Following completion of installation of a cable duct a cable team will install (pull) the cables through the ducts. Safeguards used to control pollution, runoff, erosion and sedimentation presented above would be deployed as required.

#### *Temporary Access Tracks*

- 6.6.49 In general, proposed construction site access would be taken via the existing public road network and would make use of existing forest and estate tracks as far as practicable, upgraded as required.
- 6.6.50 The majority of access will be achieved through upgrade of existing and installation of new tracks. Floating stone road construction may be installed in sensitive areas such as over deeper areas of peat and also within parts of the Kinloch and Kyleakin Hills SAC / SSSI. 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<sup>32</sup>.
- 6.6.51 Fording will 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 will only be used where limited traffic is expected and impacts on the bed and crossing point generally will be monitored with appropriate mitigation being implemented if required.
- 6.6.52 For watercourse crossings less than 2 m wide CAR General Binding Rules will be adhered to. Bog mats, or similar, would be positioned across the water course to enable access, where necessary, side rails will be

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<sup>32</sup> Constructed Tracks in the Scottish Uplands. Scottish Natural Heritage, September 2015.



installed with silt mitigation at either end and across if required to ensure that silt impacts from vehicles crossing are controlled at all times. Crossings will be cleaned at the end of the day if required.

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

#### *Dismantling the Existing Overhead Transmission Line*

6.6.54 To dismantle the existing OHL, access to each pole or tower location would be required. In the majority of cases, this would require access by tracked vehicles to each pole or tower location. Existing access tracks would be utilised as far as practicable.

6.6.55 In more remote areas, including near Kyleakin, within the Kinloch and Kyleakin Hills SAC, and near Kinloch Hourn and Loch Coire Shubh, removal by helicopter is proposed.

6.6.56 Measures detailed above for the control and prevention of pollution, erosion and sedimentation apply to the use of tracks and helicopters during the proposed dismantling works.

6.6.57 Wood pole foundations are made up of the poles themselves plus some additional steel and timber below ground level. The extraction method for these is to dig down, remove the poles and backfill.

6.6.58 For steel lattice tower locations where an excavator can achieve access, the foundations would be removed to below ground level. For towers where steel needs to be removed via helicopter it is proposed that these would be left in place with the steel cut just above the concrete, where deemed safe to do so. The option exists to fly in material to cover remaining foundation material.

6.6.59 Removal of conductors from the existing OHL would be undertaken with minimum disturbance to watercourses. Where conductors need to be pulled across watercourses, this operation would be undertaken swiftly and with minimum disturbance to riparian habitats or stream beds.

6.6.60 All dismantling works would be supervised by the project ECoW.

#### *OHL Wood Pole Construction*

6.6.61 The following measures are proposed to mitigate the effects of wood pole foundation construction on the water environment:

- poles 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 possible, poles would not be located within 30 m of waterbodies or within 10 m of other watercourses;
- wherever possible, poles would be located out with floodplains to reduce potential effects on flooding;
- where excavations for poles 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 ECoW;
- no dewatering discharge would be permitted directly adjacent to watercourses;
- unless directed otherwise by the site ECoW, dewatering discharge would drain across buffer areas of vegetation (e.g. grassland, heather) of at least 20 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 watercourse;
- the requirement for dewatering would be minimised in all locations by timely and efficient excavation of the foundation void and subsequent backfilling;



- excavated soils would be used to restore each foundation and be placed in the order they were removed from the foundation;
- turves would be used to dress the restored foundations; and
- all procedures for dewatering would be agreed by the Principal Contractor with SEPA, THC and NatureScot in the CEMP.

#### *Steel Lattice Tower Foundation Construction*

6.6.62 The following measures are proposed to mitigate the effects of steel lattice tower foundation construction on hydrology:

- tower foundations would be located and excavated wherever possible in the driest locations with well consolidated superficial geology. Wetland areas, areas of deep peat and a standoff of 30 m to waterbodies and 10 m to watercourses would be adhered to wherever possible;
- wherever possible, towers would be located out with floodplains 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 ECoW;
- no dewatering discharge would be permitted directly adjacent to watercourses;
- unless directed otherwise by the site ECoW, dewatering discharge would drain across buffer areas of vegetation (e.g. grassland, heather) of at least 20 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 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;
- 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 in 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*

6.6.63 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;

#### *Forest Felling*

6.6.64 Felling required to establish the OHL and an appropriate Operational Corridor would be undertaken in accordance with best practice guidance published by Forestry and Land Scotland and overseen by the project ECoW.

### **6.7 Assessment of Likely Significant Effects**

6.7.1 The assessment of effects is based on the Proposed Development description outlined in **Volume 1, Chapter 3: Project Description** and is structured as follows:

- construction effects of the Proposed Development (which includes dismantling effects associated with the existing OHL); and
- operational effects of the Proposed Development.

#### *Potential Construction Impacts*

6.7.2 Potential construction impacts on hydrology and the aquatic environment have been considered for the different phases of the proposed project (construction, operation and dismantling). The impacts 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.

6.7.3 The impacts of dismantling of the existing 132 kV OHL are less than those reported for construction of the new line and are of a shorter duration and are less intrusive. As a worst case, the proposed dismantling works are considered with the potential construction impacts.

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

- 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, water dependent habitat and water supplies;
- increased flood risk to areas downstream of the site through increased surface water runoff; and
- potential pollution impacts and adverse effect to private water supplies and DWPAAs.

#### Surface Water and Groundwater Quality

6.7.5 As stated above, the Proposed Development would be undertaken in accordance with the Applicant's GEMPs and relevant technical guidance, PPG/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 would be prepared by the Principal Contractor and include a groundwater and surface water quality management plan.

6.7.6 A commitment has also been made to prepare detailed drainage management plans for the few locations of the Proposed Development that are within 20 m of a water feature. These plans would be agreed with statutory consultees, including SEPA, prior to works in these areas commencing, and be used to safeguard surface and groundwater quality.

- 6.7.7 The above measures would significantly reduce the likelihood of pollutants, including suspended solids, being discharged to nearby watercourses or groundwater.
- 6.7.8 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 habitat, DWPA's and PWS sources.
- 6.7.9 Surface water and groundwater are considered highly sensitive receptors. The Proposed Development and proposed safeguards embedded in the development design reduce the magnitude of potential impact to negligible, during the construction phase. The significance of effect is therefore assessed as low to negligible. No additional mitigation, over and above confirmatory monitoring, is therefore required.

#### Surface and Groundwater Flow

- 6.7.10 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 will 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 PWS sources and water dependent habitat would be maintained.
- 6.7.11 Again, a commitment has also been made to prepare detailed drainage management plans for the few locations of the Proposed Development that are within 20 m of a water feature. These plans would be agreed with statutory consultees, including SEPA, prior to works in these areas commencing and will be used to safeguard existing surface water and groundwater flow paths.
- 6.7.12 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. No additional mitigation, over and above confirmatory monitoring, is required.

#### Flood Risk

- 6.7.13 Areas of flood risk are considered to have a medium sensitivity. As part of the detailed site design the Principal Contractor will prepare a detailed construction method statement which will have regard to areas of known and potential flood risk. This will ensure no new permanent features which are sensitive to flooding are located within the floodplain.
- 6.7.14 It is proposed that access to the Proposed Development will use existing tracks and watercourse crossings wherever possible. Where permanent new access tracks or watercourse crossings cannot be avoided, the following measures will be implemented to protect surface water and groundwater quality as well as to mitigate a potential increase in flood risk:
- silt traps / check dams will be used to capture suspended solids generated during construction; and
  - construction will be carried out in accordance with appropriate SEPA and CIRIA guidance.
- 6.7.15 The design and capacity of the watercourse crossings would be agreed by the Principal Contractor in consultation with SEPA as part of the detailed design.
- 6.7.16 Similarly, a commitment has been made to prepare detailed drainage management plans for the few locations of the Proposed Development that are within 20 m of a water feature. These plans would be agreed with statutory consultees, including SEPA, prior to works in these areas commencing and will be used to ensure no increase in flood risk.

6.7.17 With these safeguards the magnitude of potential impact is assessed as negligible and the resultant significance of effect is assessed as negligible. No additional mitigation is required.

#### Private Water Supplies and DWPAs

6.7.18 The baseline assessment has confirmed that properties locally maintain private water supplies and that some of the water sources lie close to or downstream of the Proposed Development. Micro-siting, and good practice techniques that prevent pollution of surface water and maintain the integrity of the distribution pipework, will be required to safeguard these private water supplies.

6.7.19 The Proposed Development also crosses surface water catchments which are designated as DWPAs. The east of Section 4, Section 5 and Section 6 lies within the Ness surface water catchment a public water supply drinking water catchment.

6.7.20 The Ness water supply catchment, DWPAs and PWS sources are considered highly sensitive receptors. It is proposed therefore that prior to construction, as part of the detailed design stage of the project, a public water supply, DWPA and PWS monitoring and protection strategy is prepared and agreed with Scottish Water, THC and SEPA.

6.7.21 A detailed assessment of the DWPA's and PWS sources is presented in Confidential **Appendix V2-6.3**, and DWPAs and PWS sources identified at risk from the Proposed Development are identified.

6.7.22 With the best practice construction techniques to protect surface water and groundwater receptors outlined above, in combination with the proposed public water, DWPA and PWS monitoring programme (an example is included in Confidential **Appendix V2-6.3**), the magnitude of potential impact is assessed as negligible and the resultant significance of effect is assessed as negligible. No additional mitigation is required.

#### Designated Sites within Hydraulic Connection to the Proposed Development

6.7.23 The baseline assessment has confirmed that the qualifying interests of the following designated sites could be impaired by the Proposed Development without safeguards:

- Section 1: Sligachan Peatlands SAC and Sligachan SSSI are water dependant and located downstream of the Section 1 of the Proposed Development;
- Section 3: Mointeach Lochain Dubha SSSI and SAC and Kinloch and Kyleakin SSSI and SAC;
- Section 4: Cosag Sallow Carr SSSI;
- Section 5: Loch Garry which is a component part of Western Inverness-shire Lochs SSSI and SPA, and Garry Falls SSSI; and
- Section 6: Loch Lundie which is a component part of Western Inverness-shire Lochs SSSI and SPA.

6.7.24 The controls which would be adopted in accordance with best practice would ensure that the potential impact on designated sites is negligible and thus the significance of effect is negligible. No additional mitigation, over and above water quality monitoring, is required.

#### *Potential Operation Impacts*

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

6.7.26 During 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.

6.7.27 Should any maintenance be required onsite which would involve construction activities method statements would be developed and used which will adopt the best practices agreed with regulators as part of the construction phase CEMP, or where required refer to the detailed drainage plans agreed with consultees where works are within 20 m of a water feature.

#### Surface Water and Groundwater Quality

6.7.28 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 onsite for routine maintenance.

6.7.29 Any maintenance activities would be undertaken using the same controls agreed with statutory consultees and deployed during the construction phase, including 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.

6.7.30 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.

6.7.31 The Applicant is committed to delivering a Habitat Management Plan for the Proposed Development, details of which will be provided and agreed upon with relevant consultees post submission of the application and prior to construction commencing, secured by a condition of consent.

6.7.32 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 on surface water and groundwater. No further or additional mitigation, therefore, is required.

#### Surface and Groundwater Flow

6.7.33 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. 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.

6.7.34 Should any non-routine maintenance be required at the sections of track crossing wet areas (defined visually onsite 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 at watercourse crossings/adjacent to the water environment may require approval from SEPA under the CAR (depending upon the nature of the activity).

6.7.35 The likelihood, magnitude and duration of works which have the potential to impact 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. No mitigation is, therefore, required.

#### Flood Risk

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

6.7.37 In accordance with the Applicants GEMP's 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.

6.7.38 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. No mitigation is therefore required.

#### Private Water Supplies and DWPA's

6.7.39 Given the controls and assessment presented above, no significant impact on surface water or groundwater quality or flow is anticipated during the operational phase of the development. Accordingly, the potential significance of effect on PWS sources and DWPA's is assessed as negligible. No additional mitigation is therefore required.

#### Designated Sites within Hydraulic Connection to the Proposed Development

6.7.40 The controls which would be adopted at site during the operational phase, and which are in accordance with best practice, will safeguard surface water and groundwater quality, surface water and groundwater flows, and mitigate flood risk. They would ensure that the potential impact on designated sites identified in hydraulic continuity with the Proposed Development is negligible and thus the significance of effect is negligible.

6.7.41 No additional mitigation is required.

### **6.8 Mitigation**

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

### **6.9 Residual Effects**

6.9.1 No significant residual effects on surface water or groundwater receptors including designated water dependent sites, GWDTE, PWS sources and DWPA's are predicted during the construction and operation of the Proposed Development, nor associated with dismantling of the existing OHL.

### **6.10 Summary of Effects**

6.10.1 A summary of assessed effects and identified mitigation measures required to reduce the potential effects to acceptable levels are identified in **Table V2-6.23**.

**Table V2-6.23: Summary of Effects and Proposed Mitigation Measures**

Potential Effect	Proposed Mitigation / Enhancements	Resultant Significance of Effect
Construction Phase (inc. dismantling the existing OHL)		
Alteration of surface water or groundwater flow Impairment of surface water or groundwater quality Increase in flood risk Impairment of PWS and DWPA supplies Adverse effect on water dependent designated sites	Mitigation by design Good practice construction techniques Confirmatory water quality monitoring Location specific drainage and pollution prevention plans from works within 20 m of a water feature	Negligible
Operational Phase		
No additional effects or mitigation / enhancement identified.		