10 Hydrology and Hydrogeology

10. HYDROLOGY AND HYDROGEOLOGY

10.1. Introduction

10.1.1. Wardell Armstrong LLP (part of SLR) ('WA') were commissioned by Boralex Limited ('The Client') to undertake a hydrology and hydrogeology assessment in support for a proposed Battery Energy Storage System (BESS) facility and associated infrastructure (hereafter referred to as the 'Proposed Development') located in Lochluichart, Garve, National Grid Reference (NGR) NH 34167 63839. This chapter assesses the effect of the Proposed Development upon the water environment (hydrology and hydrogeology).

10.2. Legislation and Policy Content

Legislative Framework

Water Environment and Water Services (Scotland) Act 2003 (the 'WEWS Act')[1]

10.2.1. The assessment has taken into account the requirements of the Water Environment and Water Services (Scotland) Act 2003 (the 'WEWS Act'), which transposed the Water Framework Directive (WFD) (2000/60/EC)[2] and related European Union (EU) Directives (as outlined further below) into Scots law.

10.2.2. The WEWS Act aims to protect the water environment. Protection of the water environment relates to prevention of further deterioration and enhancing the status of aquatic ecosystems, promoting sustainable water use, reduction in pollution of groundwater, and contributing to mitigating the effects of floods and droughts. The WEWS Act also established river basin management planning. Under river basin management plans, key water bodies in each catchment are monitored and their baseline status recorded. These water bodies are also assigned target status and the progress to meeting these target statuses is reviewed.

10.2.3. The WEWS Act is supported by the Water Environment (Controlled Activities) (Scotland) Regulations 2011[3]. The Water Environment (Controlled Activities) (Scotland) Regulations 2011, commonly known as Controlled Activities Regulations (CAR), requires activities that may affect the water environment to be authorised by the Scottish Environment Protection

[1] Scottish Government (2003) Water Environment and Water Services (Scotland) Act 2003 [online]. Accessed March 2025. Available at: https://www.legislation.gov.uk/asp/2003/3/contents

[2] European Union (2000), Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [online]. Accessed June 2025. Available at: https://www.legislation.gov.uk/eudr/2000/60/contents

[3] Scottish Government (2011) The Water Environment (Controlled Activities) (Scotland) Regulations 2011 [online]. Accessed June 2025. Available at: https://www.legislation.gov.uk/ssi/2011/209/contents

Agency (SEPA). This includes discharges, disposal to land, abstractions, impoundments and engineering works.

10.2.4. The controlled activities are defined within the WEWS Act and are modified by CAR. Those activities relevant to this assessment are:

- Engineering activities in the vicinity of rivers, lochs and wetlands that are likely to have a significant adverse effect upon the water environment;
- Activities liable to cause pollution; and
- Any other activities that directly or indirectly are liable to cause significant adverse effect upon the wate environment.

10.2.5. The WEWS Act, along with CAR, and related legislation, implemented the requirements of the WFD, the Groundwater Directive (2006/118/EC)[4] and the Priority Substances Directive (2008/105/EC)[5] in Scots law.

The Water Framework Directive (2000/60/EC)2

10.2.6. The WFD as implemented by the WEWS Act and CAR required the United Kingdom to aim to reach good chemical and ecological status (often referred to as 'good WFD status') in inland and coastal waters. The WFD was designed to enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands, to promote sustainable water use, to reduce pollution of water and to ensure progressive reduction of groundwater pollution. The WFD established a strategic framework for managing the water environment and required a management plan for each river basin to be developed every six years. In Scotland, alongside the Scottish Ministers, the competent authority for securing compliance with the WFD requirements as implemented by the WEWS Act and CAR is SEPA.

The Groundwater Directive (2006/118/EC)[4]

10.2.7. The Groundwater Directive as implemented by the WEWS Act and CAR specified measures to prevent and control groundwater pollution such as providing criteria for the

[4] European Union (2014) Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the Protection of Groundwater against pollution and deterioration [online]. Accessed June 2025. Available at: https://eur-lex.europa.eu/eli/dir/2006/118/oj/eng

[5] European Union (2013) Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on Environmental Quality Standards in the field of Water Policy, amending and subsequently repealing Council Directive 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council [online]. Accessed June 2025. Available at: https://eur-lex.europa.eu/eli/dir/2008/105/oj/eng

assessment of good groundwater chemical status, for the identification and reversal of significant and sustained upward trends, and for defining a baseline status.

The Priority Substances Directive (2008/105/EC)

10.2.8. The Priority Substance Directive as implemented by the WEWS Act and CAR identified priority substances, set Environmental Quality Standards for the concentration of the priority substances in surface waterbodies, and required periodic review of the list of priority substances.

The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013

10.2.9. The Water Environment (Drinking Water Protect Areas) (Scotland) Order 2013 (WEDWPA Order 2013) identified waterbodies used for abstraction of drinking water as required by section 6(1) of the WEWS Act. By doing so it identified Drinking Water Protection Areas (DrWPAs), which include surface water and groundwater waterbodies.

Private Water Supplies (Scotland) Regulations 2006[6]

10.2.10. The Private Water Supplies (Scotland) Regulations 2006 identified private water supplies used for human consumption. Section 6 (1) of the Private Water Supplies (Scotland) Regulations 2006 states that a monitoring local authority shall classify all private water supplies used or to be used in its areas, estimating the volume of water provided by that supply in relation to the current year rather than by reference to the year prior to it. Section 7 (2) states that water used as a private water supply is not to contain any micro-organisms or parasites; or any substances at a concentration or value which would constitute a potential danger to human health.

Flood Risk Management (Scotland) Act 2009

10.2.11. The Flood Risk Management (Scotland) Act 2009 (FRM Act 2009). The FRM Act 2009 includes measures for a framework for co-ordination and co-operation between organisations involved in flood management and details additional responsibilities for SEPA, Scottish Water and local authorities in relation to flood management. The FRM Act 2009 also requires SEPA to provide an assessment of flood risk and measures to assist in the preparation of flood risk management plans.

[6] Scottish Government (2006). Private Water Supplies (Scotland) Regulations 2006. [online]. Accessed June 2025 2024. Available at: https://www.legislation.gov.uk/ssi/2006/209/contents/made

Planning Policy Framework

National Planning Framework 4[7]

10.2.12. National Planning Framework 4 (2024)[7] recognises the importance of the water environment within Policy 22 '*Flood Risk and Water Management'* and Policy 11 '*Energy'*. The intent of Policy 22 is "*to strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding*"; while one of the assessment criteria in Policy 11(e) relates to considering "*effects on hydrology, the water environment and flood risk*."

Scottish Government: Planning Advice Notes (2006)[8,9]

10.2.13. The Scottish Government have produced Planning Advice Notes (PANs), which provide advice on good practice and other relevant information. The following PANs relate to the water environment:

- PAN 79 – 'Water and Drainage',[8] acknowledges that provision of water and wastewater infrastructure is essential for communities, businesses and the environment. It notes that the effective interaction between the planning system, the water and wastewater infrastructure regime and environmental legislation requires effective participation by all stakeholders to enable appropriate development to proceed.
- PAN 51 – 'Planning, Environmental Protection and Regulation',[9] notes that planning authorities, environmental bodies and the regimes which protect people, and the environment have heavy responsibilities. A major task of this PAN has therefore been to acknowledge the complex nature of the environmental protection issues and seek to ensure that arrangements are in place which minimises the risks to public health and the environment.

Scottish Government: Flood Risk: Planning Advice (2015)[10]

10.2.14. The Flood Risk planning advice (2015) provides a summary of the FRM Act 2009 and Scottish Planning Policy, now replaced by NPF4, and plans and policies relating to the flood risk[10]. The plans and policies include National Flood Risk Assessment (published

[7] Scottish Government (2023) National Planning Framework 4 [online]. Accessed June 2025. Available at: https://www.gov.scot/publications/national-planning-framework-4/
[8] Scottish Government (2006). Planning Advice Note 79: water and drainage [online]. Accessed June 2025. Available at: https://www.gov.scot/publications/planning-advice-note-pan-79-water-drainage/
[9] Scottish Government (2006). Planning Advice Note 51: planning, environmental protection and regulation [online]. Accessed June 2025. Available at: https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/
[10] Scottish Government (2015). Flood Risk: Planning Advice. Accessed June 2025. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2015/06/flood-risk-planning-advice/documents/flood-risk-planning-advice-pdf/flood-risk-planning-advice-pdf/govscot%3Adocument/Flood%2Brisk%252C%2Bplanning%2Badvice.pdf

December 2011)[11], Flood Risk Management Strategies (published December 2015)[12]; Local Flood Risk Management Plans (Published June 2016)[13]; and the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013[14]. The Flood Risk planning advice provides guidance on planning authority consultations with SEPA with reference to SEPA Planning Authority protocol (Policy 41)[15] which contains principles to be followed by SEPA and planning authorities regarding advice and consultation on flood risk issues. The protocol requires planning authorities to screen development proposals for flood risk before they consult with SEPA.

Highland-Wide Local Development Plan (2012)[16]

10.2.15. The Highland-Wide Local Development Plan (LDP) was adopted on 5 April 2012 by the Highland Council and was constituted as the local development plan in law. It sets out the overarching spatial planning policy for the whole of the Highland Council area. The following policies set out in the Highland-Wide LDP relate to the water environment:

- Policy 28 – 'Suitable Development', Proposed Developments will be assessed on the extent to which they are compatible with public services provision (water and sewerage, drainage, roads, schools, electricity); impact on the following resources, including pollution and discharges, particularly within designated areas: habitats, freshwater systems, species, and marine systems; demonstrate sensitive siting and high quality design in keeping local character and historic and natural environment and in making use of appropriate materials; all development proposal must demonstrate compatibility with Sustainable Design Guide: Supplementary Guidance, which requires that all developments should conserve and enhance the character of the Highland area, use resource efficiently, minimise the environmental impact of the development, and enhance the viability of highland communities; where environmental and / or socio-economic impacts of a proposed development are likely to be significant by virtue of nature, size or location, the Council will require the

[11] SEPA (2018). National Flood Risk Assessment [online]. Accessed June 2025. Available at: https://informatics.sepa.org.uk/NFRA2018/

[12] SEPA (2015). Flood Risk Management Strategies [online]. Accessed June 2025. Available at: https://www2.sepa.org.uk/frmstrategies/

[13] SEPA (2016). Local Flood Risk Management Plans [online]. Accessed June 2025. Available at: https://www.sepa.org.uk/environment/water/flooding/local-frm-plans/

[14] UK Government (2025). The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013. Accessed June 2025. Available at: https://www.legislation.gov.uk/ssi/2013/155/contents

[15] SEPA (2016). Flood Risk Planning Advice [online]. Accessed June 2025. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2015/06/flood-risk-planning-advice/documents/flood-risk-planning-advice-pdf/flood-risk-planning-advice-pdf/govscot%3Adocument/Flood%2Brisk%252C%2Bplanning%2Badvice.pdf

[16] Highland Council (2012). Highland-Wide Local Development Plan [online]. Accessed June 2025. Available at: file:///C:/Users/bo'sullivan/Downloads/Highland_wide_Local_Development_Plan-1.pdf

preparation by developers of appropriate impact assessments. Developments that will have significant adverse effects will only be support if no reasonable alternatives exist.

- Policy 60 – 'Other Important Habitats and Article 10 Features', The Council will seek to safeguard the integrity of features of the landscape which are of major importance because of their linear and continuous structure or combination as habitat "stepping stones'' for the movement of wild fauna and flora; the Council will have regard to the value of the following Other Important Habitats, where not protected by nature conservation site designations (such as natural watercourses), in the assessment of any development proposals which may affect them either individually and / or cumulatively.
- Policy 63 – 'Water Environment', The Council will support proposals for development that do not compromise the objectives of the WFD (2000/60/EC), aimed at the protection and improvement of Scotland's water environment. In assessing proposals, the Council will take into account the River Basin Management Plan for the Scotland River Basin District and associated Area Management Plans and supporting information on opportunities for improvement and constraints.
- Policy 64 – 'Flood Risk', Development proposals should avoid areas susceptible to flooding and promote sustainable flood management. Development proposals within or bordering medium to high flood risk areas, will need to demonstrate compliance with Scottish Planning Policy (SPP) through the submission of suitable information which may take the form of a Flood Risk Assessment. Where flood management measures are required, natural methods such as restoration of floodplains, wetland and water bodies should be incorporated, or adequate justification should be provided as to why they are impractical.
- Policy 65 – 'Waste Water Treatment', A connection to the public sewer will be required, unless the applicant can demonstrate that the development is unable to connect to a public sewer for technical or economic reasons, and that the proposal is not likely to result in or add to significant environmental or health problems..
- Policy 66 – 'Surface Water Drainage', all proposed development must be drained by Sustainable Drainage Systems (SuDS) designed in accordance with the SuDS Manual (CIRIA C697) and, where appropriate, the Sewers for Scotland Manual 2nd Edition. Planning applications should be submitted with information in accordance with Flood Risk Planning Advice - Planning Advice Note 69. Each drainage scheme design must be accompanied by particulars of proposals for ensuring long-term maintenance of the scheme.
- Policy 72 – 'Pollution', Proposals that may result in significant pollution such as water will only be approved where a detailed assessment on the levels, character and transmission and receiving environment of the potential pollution is provide by the applicant to show how the pollution can be appropriately avoided and if necessary

mitigated. Where the Council applies conditions to deal with pollution these may include subsequent independent monitoring of pollution levels.

10.3. Assessment Methodology

Scope

10.3.1. The baseline study comprised two components: a desk-based study and a field study. The desk-based study examined the wider catchment surrounding the Site, as shown on Figures 10.1 and 10.2, i.e., layout, scale and presence of water related infrastructure, water management and water sensitive ecological areas. A field survey of the watercourses within and adjacent to the Site was undertaken on 21 March 2025. The field survey consisted of a walkover inspection focusing on geomorphological (landscape) and hydrological features, i.e., catchments and their boundaries, watercourse and waterbodies, evidence of fluvial (river) processes (erosion and deposition), hydroecology (e.g., springs and seepages) and topography.

10.3.2. The aims of the assessment are to:

- Establish the water environment baseline conditions;
- Prepare a Hydrological and Hydrogeological Conceptual Site Model (CSM);
- Identify water environment sensitive receptors;
- Identify potential likely impacts as a result of the Proposed Development, and arrive at a conclusion about the likely effect of these;
- Discuss embedded design mitigation and good industry practice, which would be implemented during construction, operation and decommission of the Proposed Development;
- Determine the scale of any potential effects, assuming design mitigation and good industry practice, by assessing the degree of sensitivity of the water environment receptors and the potential magnitude of change from baseline conditions; and
- Identify any residual effects and if required, provide specific mitigation measures.

Data Sources

Desk Study

10.3.3. The following sources of information were used to determine the effects of the Proposed Development on the water environment:

- British Geological Survey (BGS) geology (1:50,000 scale) and hydrogeology (1:625,000) mapping available from GeoIndex (Onshore) Website;[17]
- Ordnance Survey (1:25,000 scale) mapping;
- BGS Groundwater Vulnerability (Scotland) Map, Version 2;[18]
- SEPA's Flood Maps;[19]
- Data requestion from SEPA and Highland Council, including private water supplies (PrWS) and abstractions and discharges;
- SEPA's River Basin Management Plans[20]; and
- National Vegetation Classification (NVC) survey undertaken by Atmos Consulting and provided by Boralex.

Field Study

10.3.4. The 21 March 2025 field survey was undertaken by an experienced Hydrogeologist from WA. The survey consisted of:

- Identification of constraints on waterbodies and watercourses within and adjacent to the Site, such as discharges and water uses;
- Measurements of onsite hydrological features, such as channel width, bank height and depth of water;
- Review of surface drainage network on and adjacent to the Site; and
- A photographic record of the hydrological features observed.

Study Area

10.3.5. The hydrology and hydrogeology study area ranges in scale depending on the features described; the scale varies between the local (features within 250m of the Proposed Development) to the catchment scale. For water resource features such as abstractions and PrWS a 2km study area has been established as shown on Figure 10.2.

[17] British Geological Survey (2025) GeoIndex Onshore [online]. Accessed June 2025. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html
[18] British Geological Survey (2011) Groundwater Vulnerability (Scotland) GIS Dataset Version 2.
[19] Scottish Environment Protection Agency (2024) Flood Maps [online]. Accessed June 2025. Available at: https://map.sepa.org.uk/floodmap/map.htm
[20] SEPA (2025) River Basin Management Planning [online]. Accessed June 2025. Available at: https://www.sepa.org.uk/environment/water/river-basin-management-planning/

Consultation

10.3.6. Table 10.1 provides a summary of the consultation activities undertaken in support of the preparation of this chapter.

Table 10.1: Summary of Consultation Undertaken to Date

Organisation	Meeting Date and other forms of Consultation	Summary of Outcome of Discussion	How this has been Addressed
Highland Council	Pre-Application Advice for Major Developments issued 08 April 2025	The Applicant will be required to carry out an investigation to identify any Private Water Supplies, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption. An onsite survey will be required.	An onsite survey was conducted on 21 March 2025, which is discussed in Section 10.5 and photographically presented in Appendix 10.2. Mitigation measures have been discussed in Section 10.8.
		The requirement of a Flood Risk Assessment	As the Site is not situated within a high risk area of flooding. The need for a Flood Risk Assessment is not required. Sufficient mitigation measures regarding flooding are present in Section 10.8 with a Drainage Impact Assessment presented in Appendix 10.3.
		For SEPA's interest the confirmation that oversized bottomless structures that accommodate the 1 in 200-year event plus climate change would be used for the watercourse crossing.	Information regarding the watercourse crossing structure is presented in Figure 'Indicative Culvert Detail'. The culvert is to convey the 1 in 200 year event plus climate change.
		The proposals should demonstrate how impacts on local hydrology have been minimised and the Site layout designed to minimise watercourse crossings and avoid direct impacts on water features. Measures should be in place to protect any downstream sensitive receptors.	Mitigation measures missing the impacts on local hydrology and downstream receptors are discussed in Section 10.8.
		A Drainage Impact Assessment (DIA) for the development is required. Appropriate drainage is required to restrict runoff to pre-development rates and to minimise erosion to existing watercourses. The DIA should ensure that post development runoff rate is no greater than pre-development runoff rate (i.e. greenfield runoff) for all return periods up to the 1 in 200 year event including an allowance for climate change.	See Appendix 10.3 Drainage Impact Assessment.
		The Applicant should demonstrate, within the proposals submitted, any mitigation measures to manage the residual risk of overland flow/ pluvial flooding.	Mitigation measures regarding overland flow / pluvial flood are discussed in Section 10.8.
		Attenuation of any polluted firewater must be accommodated within the site's drainage design, together with details of access for testing ahead of tanker disposal of any polluted water from site. Storge is required to accommodate	Information regarding the management of polluted firewater is discussed in Section 10.8.
		Regarding Groundwater Dependent Terrestrial Ecosystems (GWDTE) discrepancies in habitat definition and ambiguity in correspondence with NVC types, SEPA does not accept the use of The UK Habitat Classification System (UKHab) as an alternative to NVC.	An NVC survey was conducted at the Site and has been discussed in Section 10.5.
Highland Council	Data request sent by email to Highland Council on 22 January 2025 regarding information on private water supply source type, source location, volumes and associated property name and coordinates.	Information on private water supply source type, source location, volumes and associated property name and coordinates was received on 10 March 2025.	Information on Private Water Supplies (PrWS) has been discussed in Section 10.5.
SEPA	Data request sent by email to SEPA on 22 January 2025 regarding information on consented surface water and groundwater discharges and abstractions.	Information on consented surface water and groundwater discharges and abstractions was received on 24/02/2025.	Information on Abstractions and Discharges has been discussed in Section 10.5.

10.4. Assessment Methodology

Receptor Sensitivity

10.4.1. The sensitivity of receptors to hydrological and hydrogeological impacts have been determined by refence to Table 10.2, which documents a hierarchy of factors relating to the water environment. Examples of the environment criteria contained in Table 10.2 include international designations; the status of watercourses and waterbodies; and SEPA guidance, along with the professional judgment of the assessment team. When a receptor meets multiple criteria or these is an absence of verified published data, the highest applicable sensitivity category is assigned to allow an assessment of the worst-case scenario.

Table 10.2: Criteria for Determining Receptor Sensitivity

Receptor Value / Sensitivity	Criteria	Typical Examples
Very High	Receptor has a high quality and rarity on a national or regional scale and limited potential for substitution. Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long-term or not possible.	• Abstractions for public water supply

Receptor Value / Sensitivity	Criteria	Typical Examples
High	Receptor has a high quality and rarity on a local scale and limited potential for substitution. Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly.	• Highly productive aquifer (according to BGS). • Groundwater providing a regionally important resource or supporting a site protected under EU and UK habitat legislation (e.g., water dependent ecological receptors (Groundwater Dependent Terrestrial Ecosystems, GWDTE)). • Protected under EU or UK habitat legislation (e.g., Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) or Ramsar Site)). • Designated Salmonid / Cyprinid Waters and/or fishery present. • Surface water providing a regionally important resource or supporting a site protected under EU and UK habitat legislation (e.g., water dependent ecological receptors). • Abstractions for non-potable use >10m^3/day (e.g., industry / process water, spray irrigation, river augmentation). Abstractions for PrWS. • Nationally and internationally designated sites where hydrology/hydrogeology is a key factor in designation (e.g., Ramsar / SSSI / SAC / Special Protection Areas (SPA) sites).

Receptor Value / Sensitivity	Criteria	Typical Examples
Medium	Receptor has a medium quality and rarity, local scale and limited potential for substitution/replacement or receptor with a low quality and rarity, regional or national scale and limited potential for substitution. Receptor is somewhat vulnerable to impacts that may arise from the project and/or has moderate to high recoverability.	• Moderately productive aquifers (according to BGS). • Water in peat deposits. • Watercourse with designated features. • Large lakes and non-potable reservoirs. • Abstractions for non-potable use <10m^3/day (e.g., industry / process water, spray irrigation, river augmentation). • Statutory designated sites where hydrology / hydrogeology is a key factor in designation (e.g., National Nature Reserves (NNR), Local Nature Reserves (LNR)).
Low	Receptor with a low quality and rarity, local scale and limited potential for substitution. Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability.	• Low productivity aquifers (according to the BGS). • Aquifers supporting potentially water dependent ecosystems e.g., Local Wildlife Sites (LWS) / wetlands. • Watercourse with no designated features. • Non-sensitive water resources (non WFD classified e.g., small lakes, ponds). • Man-made feature not in hydraulic continuity (e.g., canal). • Abstractions for industrial use (e.g., dust suppression / washing machinery). • Non-statutory designated sites where hydrology / hydrogeology is a key factor in designation (e.g., LWS).
Negligible	Attribute has a very low environmental importance and/or rarity on a local scale. Receptor is of negligible value, not vulnerable to impacts that may arise from the project and/or has high recoverability.	• Man-made feature with no ecological importance (e.g., land drains).

Magnitude of Change from Baseline Condition

10.4.2. Table 10.3 describes the guidance criteria used to assess the magnitude of change from the baseline condition that may result from the Proposed Development.

Table 10.3: Criteria to Assess Magnitude of Change from Baseline Condition

Magnitude of Change from Baseline	Description
High	Total loss of, or alteration to, the baseline resource such that post-development characteristics or quality would be fundamentally and irreversibly changed.
Medium	Loss of, or alteration to, the baseline resource such that post-development characteristics or quality would be partially changed.
Low	Small changes to the baseline resource, which are detectable, but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions.
Negligible	A very slight change to the baseline conditions, which is barely distinguishable, and approximate to the 'no change' situation.

Scale of Effect

10.4.3. The scale of effect is determined in relation to the sensitivity of the receptor and the potential magnitude of change from baseline conditions, using the matrix shown in Table 10.4. Effects can be neutral, beneficial or adverse; and minor, moderate or major; or negligible. Effects that have been determined to be major or moderate are considered to require additional mitigation measures to address them/ effects that are identified as minor or negligible are not considered to require further mitigation.

Table 10.4: Criteria to Determine Scale of Effects

Magnitude of Change from Baseline Condition	Receptor Sensitivity				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Assumptions and Limitations

10.4.4. There are no substantial limitations or assumptions that have affected the development of the baseline, and subsequently the assessment of this report.

10.5. Baseline Conditions

10.5.1. The Site is situated north of the A832 (road), approximately 0.3km north of Loch Luichart and 5.2km east of Garve in the Highlands, Scotland. The Site boundary is presented on Figure 10.1. The Site is approximately 19.0 hectares (ha) of land including a mixture of coniferous forestry plantation and natural woodland, with remote upland landscape, typical of the Highlands. In the surroundings of the Site, there are a few warehouse buildings used by the nearby shooting estate, whilst some of land close by is use for game shooting, target practice and the rearing of pheasants. Corriemoillie Substation is located immediately east of the Site.

10.5.2. The Site is relatively steep in the north, south and southeast (slope gradient > 14%), with the centre of the Site generally flatter (slope gradient between 10 and 12%).

Rainfall

10.5.3. Average rainfall has been obtained from the nearest Meteorological Office Climate Station to the Site located at Loch Glascarnoch,[21] approximately 12km northwest of the Site at NGR NH 27754 74263for the standard period of 1991 – 2020, as shown in Table 10.5. Table 10.5 presents the monthly and annual average rainfall for Loch Glascarnoch Meteorological Climate Station, the North of Scotland and the UK. The Site is on average wetter than the North of Scotland and the UK. Loch Glascarnoch average rainfall shows a distinct dry period between June and July, and a wet period between October and February.

Table 10.5: Average Rainfall for the Standard Period 1991 – 2020

Month	Loch Glascarnoch Average Rainfall (mm)	North Scotland Average Rainfall (mm)	UK Average Rainfall (mm)
January	225.71	200.57	121.48
February	170.14	159.66	96.15
March	152.53	140.68	85.07
April	101.98	101.90	71.71
May	101.85	95.98	70.96
June	86.77	92.77	77.19

[21] Met Office (2025) UK Climate Averages: Loch Glascarnoch [online]. Accessed June 2025. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages/gfk82ss23

Month	Loch Glascarnoch Average Rainfall (mm)	North Scotland Average Rainfall (mm)	UK Average Rainfall (mm)
July	83.37	101.28	82.46
August	111.92	122.41	93.75
September	132.93	136.83	90.90
October	187.83	180.28	122.52
November	187.03	176.76	123.34
December	200.88	192.35	127.16
Annual Total	1742.94	1701.37	1162.70

Surface Water

10.5.4. As shown on Figure 10.1 there are five unnamed mapped watercourses onsite, which all discharge into Loch Luichart. Western areas of the Site drain into two watercourses which are culverted under the A832 (road), by the Site entrance at NGR NH 33647 63454 and NH 33715 63441. The central areas of the Site drain into a watercourse which is culverted under the A832 (road) at NGR NH 34266 63430.The southeastern areas of the Site drain into an unnamed tributary of the Allt Coire Mhuilidh. The Allt Coire Mhuilidh also drains into Loch Luichart. The fifth mapped watercourse onsite is located to the north of Corriemoillie Substation within the far eastern area of the Site. This drain appears to be to be associated with the drainage and earthworks for the Corriemoillie Substation.

10.5.5. A hydrological site walkover survey was undertaken on 21 March 2025 to record the hydrological characteristics of the watercourses within the Site and study area. Figure 10.1 and Appendix 10.1 present the findings of the survey.

10.5.6. The furthest to the west unnamed mapped watercourse's headwaters begin at the high point to the north of the Site (NGR NH 33602 64815). The water drains down the watercourse into three ponds adjacent to the Site (see Photograph Sheet 01 in Appendix 10.1). The watercourse feeds the ponds by two channels. One channel (see Photograph Sheet 02 in Appendix 10.1) has bank heights of 0.08m and a width of 0.7m. A culvert beneath the track connects this channel to the pond. The other channel (see Photograph Sheet 03 in Appendix 10.1) freely flows across the track and features bank heights between 0.1-0.2m and a channel width of 0.8m.

10.5.7. The other unnamed mapped watercourse in the west of the Site crosses through the forest track within the Site boundary (see Photograph Sheet 04 in Appendix 10.1). The watercourse is culverted through the track and features bank heights between 0.5 to 0.7m and a channel width of 0.3m. Downstream of the Site, the watercourse is culverted under the A832 (see

Photograph Sheet 11 in Appendix 10.1) with bank heights between 0.06 to 0.07m and a channel width of 0.4m.

10.5.8. The central watercourse (Photograph Sheet 05 – 10 in Appendix 10.1) varies in size from upstream to downstream for the proposed watercourse crossing. Upstream of the proposed watercourse crossing, the unnamed unmapped watercourse features bank heights of 0.1m and a channel width of 0.06m (see Photograph Sheet 05 in Appendix 10.1). At the proposed watercourse crossing location, the unnamed watercourse has bank heights between 0.04 to 0.05m and channel width of 0.4m (see Photograph Sheet 07 in Appendix 10.1). Downstream of the proposed watercourse crossing, the watercourse bank heights become higher (up to 0.8m) and the width of the channel increases (to 1.0m) (see Photograph Sheet 09 in Appendix 10.1).

10.5.9. The unnamed mapped watercourse in the south of the Site (see Photograph Sheet 10 in Appendix 10.1) is relatively small with bank heights of 0.01m and channel width of 0.08m.

10.5.10. The Site is situated downslope of a forestry area and in an area that was formerly forestry. There are several unmapped forest drains around the Site area.

10.5.11. Loch Luichart drains eastwards into the River Conon at NGR NH 38754 57975 and subsequently into the Cromarty Firth at NGR NH 55474 57140.

10.5.12. Loch Luichart is located approximately 0.3km south from the Site. SEPA monitor Loch Luichart under the 'River Basin Management Plan'.[22] In 2023, SEPA classified the loch as having an overall good ecological potential WFD status, moderate overall ecology status, moderate hydromorphology and morphology status and good water quality.[23] The Allt Coire Mhuilidh is monitored by SEPA and is classified as having an overall moderate WFD status, moderate overall ecology status, moderate hydromorphology status, and good morphology status.[24]

Flood Risk

10.5.13. According to SEPA's flood map[25] the Site is not at risk of fluvial (river) or coastal flooding. The Site is not shown[25] to be at risk of groundwater flooding and the presence of clay containing glacial deposits would inhibit vertical movement of groundwater from the bedrock.

[22] Scottish Environment Protection Agency (2021) The River Basin Management Plan for Scotland 2021 – 2027 [online]. Accessed June 2025. Available at: https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf

[23] Scottish Environment Protection Agency (2025) Water Classification Hub: Loch Luichart [online]. Accessed June 2025. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/?page=Information_Sheet&WB=100131

[24] Scottish Environment Protection Agency (2025) Water Classification Hub: Allt Coire Mhuilidh [online]. Accessed June 2025. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/?page=Information_Sheet&WB=20198

[25] Scottish Environment Protection Agency (2025) Flood Map [online]. Accessed June 2025. Available at: https://map.sepa.org.uk/floodmap/map.htm

Where there are watercourses and depression in the topography, the flood map indication there is low to high risk[26] of pluvial (surface water flooding), however the location of the BESS is not shown to be in one of these areas. The only location where the Proposed Development intercepts an area at pluvial flood risk is at the access track watercourse crossing (Appendix 10.1 and Figure 10.1, Location 07). As discussed in Section 10.8, the watercourse crossing will be designed to convey the 1:200 year plus climate change flows and therefore would not increase the offsite flood risk.

Geology

Soils

10.5.14. According to the 1:250,000 National Soil Map of Scotland,[27] the soils found within the Site belong to the Arkaig Soil Association – peat gleyed podozols with dystrophic semi-confined peat with peaty gleys.

Made Ground

10.5.15. The BGS do not record any 'made ground' within the Site.[17] Review of OS mapping, aerial imagery and field observations show a forestry track within Site. Additionally, there are compound areas, which house farm sheds by the Site entrance with the A832 road. Immediately to the east and south of the Site, the Corriemoillie Substation is located.

Superficial Deposits

10.5.16. According to the BGS 1:50,000 scale map,[17], the Site is entirely underlain by Glacial Deposits (comprised of diamicton, gravel, sand and silt).

Bedrock Geology

10.5.17. According to the BGS 1:50,000 scale map,[17] , the Site is entirely underlain by the Crom Psammite Formation (psammite), a low-grade metamorphic rock of Proterozoic age. Approximately 30m north of the Site lies an area of Carn Chuinneag and Inchbae Augen Gneiss (granite, gneissose). There are no linear features that cross the Site but there is a fault, which runs on a north – south alignment approximately 170m west of the Site.

[26] High likelihood: A flood event is likely to occur in the defined area on average once in every ten years (1:10). Or a 10% chance of happening in any one year.
Medium likelihood: A flood event is likely to occur in the defined on average once in every two hundred years (1:200). Or a 0.5% chance of happening in any one year.
Low likelihood: A flood event is likely to occur in the defined area on average once in every thousand years (1:1000). Or a 0.1% chance of happening in any one year.

[27] The James Hutton Institute (2017) National soil map of Scotland [online]. Accessed June 2025. Available at: http://map.environment.gov.scot/Soil_maps/?layer=1#

Hydrogeology and Groundwater Quality

10.5.18. Groundwater vulnerability is the tendency and likelihood for general contaminants to move vertically through the unsaturated zone and reach the water table after introduction at the ground surface. According to the BGS,[18] the Site is located in an area with a groundwater vulnerability class of 4a, meaning groundwater is vulnerable to most pollutants not readily absorbed or transformed and may have low permeability soil; less likely to have clay present in superficial deposits,. It should be noted that the groundwater vulnerability dataset is at a scale of 1:100,000 and therefore may not represent local conditions.

10.5.19. A review of the BGS online hydrogeology mapping[28] indicates that the whole of the Site is underlain by a low productivity aquifer, which is described as "*small amounts of groundwater in near surface weathered zone and secondary features,.*"[28]

10.5.20. SEPA has delineated the groundwater beneath the Site as being a part of the Northern Highland Groundwater Catchment.[29] In 2023, the groundwater body was classified by SEPA under the WFD as having a good overall status.

Private Water Supplies

10.5.21. The Highland Council was contacted regarding PrWS (see Table 10.6). According to their response, there are 19 PrWS within 2km of the Site. None of the PrWS are located within the Site boundary or within 250m of the Proposed Development footprint, as shown on Figure 10.2.

10.5.22. Five of the PrWS have a groundwater source, whilst 11 have a surface water source, one for primary production (non-food) (PrWS 8), and two (PrWS 7 and PrWS 15) have an unknown source.

Table 10.6: Private Water Supplies within 2km of the Site

Figure 10.2 ID	Name	Source Type	NGR	Distance From the Site	Within 250m of the Proposed Development?
PrWS 1	PWS Corriemoille Substation	Surface Rainwater	NH 34788 63823	0.10km south	No
PrWS 2	Forest Hill	Primary Production (Non Food)	NH 33394 63608	0.17km west	No

[28] British Geological Survey (2018) GeoIndex Onshore: Hydrogeology 1:625,000 Scale Map [online]. Accessed June 2025. Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html
[29] Scottish Environment Protection Agency (2025) Water Classification Hub: Northern Highlands [online]. Accessed June 2025. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/?page=Information_Sheet&WB=150701

Figure 10.2 ID	Name	Source Type	NGR	Distance From the Site	Within 250m of the Proposed Development?
PrWS 3	PWS Forest Hill	Groundwater Borehole	NH 33379 63692	0.23km west	No
PrWS 4	PWS Lochluichart Estate	Groundwater Borehole	NH 33402 63906	0.25km northwest	No
PrWS 5	PWS Lochluichart	Surface Watercourse	NH 33229 63945	0.43km northwest	No
PrWS 6	PWS Corriemoillie – Glenview	Surface Watercourse	NH 35147 63589	0.45km southeast	No
PrWS 7	PWS Mossford Power Station	Surface – Loch	NH 33024 63279	0.59km southwest	No
PrWS 8	PWS Corriemoille Lodge	Groundwater Borehole	NH 35450 63852	0.62km east	No
PrWS 9	PWS Corriemoille Farm	Groundwater Spring	NH 35461 63843	0.62km east	No
PrWS 10	Corriemoille Farm	Unknown	NH 35461 63843	0.62km east	No
PrWS 11	3 – 4 Mossford	Surface – Loch	NH 32920 63125	0.75km southwest	No
PrWS 12	Corrie Cottage	Surface – Loch	NH 32877 63027	0.82km southwest	No
PrWS 13	2 Council Houses	Unknown	NH 32885 63033	0.82km southwest	No
PrWS 14	PWS Mossford Cottages	Surface Watercourse	NH 32707 63223	0.91km southwest	No
PrWS 15	PWS Corriemoillie – Tigh Tioram	Groundwater Borehole	NH 35917 63589	1.13km east	No
PrWS 16	PWS Lochluichart Tigh na Srutha	Surface Watercourse	NH 32465 62763	1.33km southwest	No
PrWS 17	PWS Lochluichart Station	Surface Watercourse	NH 32419 62734	1.33km southwest	No

Figure 10.2 ID	Name	Source Type	NGR	Distance From the Site	Within 250m of the Proposed Development?
PrWS 18	Railway Cottage	Surface Watercourse	NH 32378 62611	1.48km southwest	No
PrWS 19	Lochluicahrt Wind Farm Control Building	Surface Watercourse	NH 32662 65421	1.95km northwest	No

Abstractions and Discharges

10.5.23. SEPA was contacted regarding the presence of CAR licences within 2km of the Site. There are 12 CAR discharge registrations and no abstraction licenses within 2km of the Site. Details of the discharges are provided in Table 10.7 and locations are shown in Figure 10.2. The registered CAR discharges are related to either private or public wastewater discharges. All CAR discharges are downstream of the Site.

Table 10.7: CAR Licensed Discharges within 2km of the Site

Figure 10.2 ID	Authorisation No.	Licence Start Date	Activity	National Grid Reference	Distance From Site	Within 250m of the Proposed Development ?
D1	CAR/R/1018038	18/04/07	Sewage (Private) Primary	NH 33039 63268	0.4km southwest	No
D2	CAR/R/1021299	21/09/07	Sewage (Private) Primary	NH 32386 62631	1.3km southwest	No
D3	CAR/R/1055406	12/06/09	Sewage (Private) Primary	NH 33220 63389	1.2km southwest	No
D4	CAR/R/1076599	12/06/09	Sewage (Private) Primary	NH 32716 62805	1.0km southwest	No
D5	CAR/R/1076605	12/06/09	Sewage (Private) Primary	NH 33291 63550	0.09km west	No
D6	CAR/R/1076611	12/06/09	Sewage (Private) Primary	NH 33279 63281	0.3km southwest	No
D7	CAR/R/1076618	12/06/09	Sewage (Private) Primary	NH 33504 63418	0.07km south	No

Figure 10.2 ID	Authorisation No.	Licence Start Date	Activity	National Grid Reference	Distance From Site	Within 250m of the Proposed Development ?
D8	CAR/R/1077850	12/06/09	Sewage (Private) Primary	NH 33491 63387	0.1km south	No
D9	CAR/R/1078650	12/06/09	Sewage (Private) Primary	NH 32905 63052	0.7km southwest	No
D10	CAR/R/1079055	12/06/09	Sewage (Private) Primary	NH 31831 62749	1.7km southwest	No
D11	CAR/R/1112122	28/05/13	Sewage (Public) Primary	NH 32880 63030	0.7km southwest	No
D12	CAR/R/1112841	14/06/13	Sewage (Private) Primary	NH 35900 63580	1.4km east	No

Designations

10.5.24. The Site is not in a surface water DrWPA , Bathing Waters or Nitrate Vulnerable Zone.[30] Additionally, the Site is not located within a Shellfish Waters Protected Area.[31] The Site is entirely located within the Northern Highlands groundwater DrWPA.[30]

Hydro-ecological Designated Sites

10.5.25. Hydro-ecological designated areas include internationally, nationally and locally designated ecological areas where hydrology and hydrogeology is a key factor in their designation. Designation areas include, but are not limited to, Ramsar sites, SPAs, SACs, SSSIs, NNRs, and LNRs.[32]

10.5.26. As shown on the MAGIC website[32] there is one designed site within 2km of the Site; Glen Affric to Strathconon SPA is located approximately 1.6km south of the Site on the southern

[30] Scottish Government (2025) Scotland's Environment Map [online]. Accessed June 2025. Available at: https://map.environment.gov.scot/sewebmap/
[31] Marine Scotland (2025) maps.marine.gov.scot [online]. Accessed June 2025. Available at: https://marinescotland.atkinsgeospatial.com/nmpi/default.aspx?layers=70
[32] Magic Partnership (2025) Magic Interactive Map [online]. Accessed June 2025. Available at: https://magic.defra.gov.uk/MagicMap.aspx

shore of Loch Luichart. Glen Affric to Strathconon SPA is designated for its Golden Eagle population[33] and is therefore not considered a hydro-ecological designated site.

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

10.5.27. A National Vegetation Classification survey has been conducted at the Site. There is one possible GWDTE community onsite: M15 (including M15d) – *Erica tetralix* – *Sphagnum compactum* wet heath. The potential GWDTE is located in two locations onsite: the northeast corner of the BESS where it meets the proposed access track and to the north and west of the Corriemoillie Substation. M15 is said to have importance for biodiversity conservation in the lowland and upland environments of Scotland.[34]

10.5.28. At both M15 areas there are low points in the local topography, especially by Corriemoillie Substation where the earthworks of the substation appear to have substantially altered the local topography. At both locations, the soils comprise of peaty gleys, and the superficial deposits are glacial in origin which both contain clay and silts, known to inhibit water movement. Underlaying the glacial deposits is the Crom Psammite Formation bedrock aquifer, which is a low productivity aquifer, where if groundwater is present it tends to be held in fractures, fissures and faults. There are no mapped faults within or close to the two areas of M15. Both M15 areas are located close to mapped watercourses / drains. Therefore, it is likely that these communities are supported by precipitation, collected in low laying depressions, which is inhibited from percolating into the bedrock by the clay and silts of the soils and superficial deposits. The addition of nearby watercourses / drains is likely to provide a further source of water, particularly during times of high flow and bank overtopping.

10.5.29. This means that the two M15 areas are likely to be dependent on surface water with very limited potential for bedrock groundwater connection, and as such are not considered to be GWDTE.

10.6. Hydrological and Hydrogeological Conceptual Site Model

10.6.1. The Hydrological and Hydrogeological Conceptual Site Model (CSM) illustrates water movement pathways from the ground surface to the bedrock. The evolution of the conceptual relationship between potential sources, pathways, and receptors in the context of the water environment through the construction, operational and decommissioning phases of the Proposed Development is described in this section.

[33] NatureScot (2025) Glen Affric to Strathconon SPA [online]. Accessed June 2-25. Available at: https://sitelink.nature.scot/site/10233

[34] Scottish Environment Protection Agency (2025) Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems [online]. Accessed June 2025. Available at: https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.sepa.org.uk/media/a1yh0blq/guidance-on-assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx&ved=2ahUKEwi_x5me0baNAxUpUkEAHc6YMLgQFnoECAkQAQ&usg=AOvVaw0-IAusPlOz8PHXudIYTrX9

Description of Development

10.6.2. The Proposed Development would include the installation of a BESS facility with capacity of approximately 36MW and connect to the Corriemoillie Substation. It would include the following components:

- Approximately 55 x 20 ft containers at 3 m spacings;
- 36MW AC at either 2 or 4 hr layout;
- Switchgear building located to optimally take in the cable from the cable corridor;
- Associated electrical hardware;
- 2no. access gates as per National Fire Chiefs Council guidelines;
- Drainage including Sustainable Drainage Systems (SuDS) such as an attenuation basin;
- Access Track watercourse crossing
- 5m wide access tracks; and
- 10m turn radius for access.

Source

10.6.3. Water sources comprise:

Baseline

- Precipitation (predominantly rain and snowmelt) transferred by watercourses and stored by lochs;
- Water in peat / peaty gleyed soils;
- Water in Glacial Deposits across the Site; and
- Groundwater stored in the Crom Psammite Formation aquifer.

Construction, Operational and Decommissioning Phases

10.6.4. Potential sources of contamination that may result from the Proposed Development include:

- Concrete and cement leachate;
- Oil, lubricants, fuel and other chemicals;
- Release of sediment from peaty gleyed soil, Glacial Deposits and bedrock disturbances;

- Release of sediment from earthworks (e.g., construction of watercourse crossing);
- Water used for firefighting;
- Batteries; and
- Use of cement bound sand (CBS).

Pathway

10.6.5. The following pathways describe how water moves through the Site:

Baseline

- Runoff (above ground surface flow) flows across the Site from areas of high to low elevation in accordance with topography.
- Runoff in forest drains;
- Infiltration of precipitation into the peat / peaty gleyed soil;
- Infiltration into the Glacial Deposits or from continuity with the watercourses on site;
- Throughflow in the peat / peaty gleyed soil (where present). Throughflow typically flows down topographic gradient towards watercourses;
- Percolation from the peat / peaty gleyed soil, or glacial deposits; and
- Groundwater flow through the Crom Psammite Formation Aquifer, low productivity aquifer.

Construction, Operational and Decommissioning Phases

10.6.6. In addition to the baseline pathways, which may continue unaltered, the following water pathways have been identified that may be altered by the Proposed Development.

- The new sections of access track would be permeable with regular drains to retain flows across the Site;
- The removal of superficial deposits for BESS could result in a direct recharge to the underlying bedrock aquifers and may decrease the time for any contaminant laden water to reach the bedrock aquifer;
- The new watercourse crossing, without periodic maintenance may become blacked with debris potentially cause localised flooding;
- The construction of a new watercourse crossing could also cause risk of sedimentation to surface flows due to ground disturbances;

- Removal of trees is likely to release sediment, which when mobilised by runoff would be direct towards forest drains and downstream watercourses;
- During the operational phase, batteries contain battery acid, which if there is a containment failure, could be released into the water environment and cause pollution. If a battery fire were to occur this could result in airborne particulate matter, that if intercepted by spray from the boundary cooling system, could be mobilised in water and travel by runoff routes to downstream waterbodies and affect their water quality;
- The accidental release of firewater could travel by runoff routes to downstream waterbodies and affect their water quality; and
- The presence of impermeable surfaces and foundations for the BESS could affect local groundwater recharge and lead to an increase in local flooding.

Receptors

10.6.7. The following potential water receptors have been identified:

- Watercourses, drains and waterbodies receiving runoff from the Site (including unnamed watercourses, lochans and Loch Luichart)
- Water within the peat / peaty gleyed soils, Glacial Deposits and groundwater within the bedrock (Crom Psammite Formation Aquifer);
- PrWS 1 – 19 are not within 250m of the Proposed Development;
- M15 NVC communities are considered to be support by surface water not groundwater so are not considered to be GWDTE;
- There are no abstractions or discharges within 250m of the Proposed Development. and
- There are no hydro-ecological designated sites within 2km of the Site.

10.6.8. Table 10.8 summaries the potential receptors and the reasons for inclusion or exclusion from the detailed assessment. The water receptors identified within Table 10.8 that are not risk from the Proposed Development has been scoped out of the assessment and are not considered further.

Table 10.8: Summary of Receptors and Sensitivity

Receptor	Distance from the Site	Summary of Receptor characteristics	Receptor Sensitivity	Is this receptor scoped into the assessment?
Loch Luichart Catchment (including onsite and downstream watercourses)	The Site is within this catchment	Large Loch	Medium	Yes – Site is located within this catchment
Water in peat / peaty gleyed soil	Underlies the Site	Water in peat / peaty gleyed soil	Low	Yes – Underlines the Site
Water in Glacial Deposits	Underlies the Site	Water in Glacial Deposits	Low	Yes – Underlines the Site
Crom Psammite Formation Aquifer	Underlies the Site	Low Productivity Aquifer Groundwater DrWPA	Low	Yes – Underlines the Site
Glen Affric to Strathconon SPA	1.6km south	Designated for its Golden Eagle- not designated for a hydro-ecological reason	Not considered a water receptor	No - Not considered a water receptor
M15 NVC Community	Onsite	Supported by surface water	Not considered a water receptor for the purposes of this assessment	No - Not considered a GWDTE
PrWS 1 – 19	Located over 250m from the Proposed Development (none onsite)	Private Drinking Water Supply	High	No – Not located within 250m of the Proposed Development.

10.7. Potential Effects

Table 10.9 details the likely potential effects that may rise from the activities of the Proposed Development.

Table 10.9:Summary of Component Features and Potential Effects of the Proposed Development

Project Components	Activities	Potential Effects	Receptors	Comment / Observation
Construction Phase				
Construction of access track, watercourse crossing and underground cabling	Soil stripping and vegetation removal	Removal of vegetation reduces interception, and evapotranspiration rates and increases runoff.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The total area of the watercourse crossing and underground cabling compared to the associated catchments is low. Therefore, any change to interception and evapotranspiration rates are unlikely to substantially alter the runoff within the catchments.
	Use of access track	Increased sediment mobilisation and transport from road material through surface wash and percolation.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in Guidance for Pollution Prevention (GPP) GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact of releases of sediment laden water into the water environment.
	Placement of aggregates	Disruption to lateral flow (throughflow in soil and runoff) from placement of aggregate	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The total area of the watercourse crossing and underground cabling compared to the associated catchments is low. Therefore, any change to lateral flow across the Site is unlikely to substantially alter the lateral flow within the catchments.
	Use of machinery	Pollution from spills or leakage of fuel and oil from use of machinery	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.
	Use of cement bound sand	Pollution from spills or leakage of highly alkaline water that has come into contact with cement bound sand	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.
Fence installation	Excavation	Release of sediment from excavations into the water environment	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact of releases of sediment laden water into the water environment.
	Use of cement products	Pollution from spills or leakage of highly alkaline water that has come into contact with cement	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.
Construction of BESS, built structures, storage containers and water tanks	Soil stripping and vegetation removal	Removal of vegetation reduces interception, and evapotranspiration rates and increases runoff	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The total area of the BESS compared to the associated catchments is low. Therefore, any change to interception and evapotranspiration rates are unlikely to substantially alter the runoff within the catchments.
	Construction of foundations	Increased impermeable area may lead to increased runoff and shorter rainfall-runoff response time	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The area of impermeable foundations compared to the associated surface water catchments and aquifer areas is low. Therefore, there is low potential for the foundations to substantially alter the overall lateral flow and hydraulic connectivity at the catchment scale.

Project Components	Activities	Potential Effects	Receptors	Comment / Observation
		Impermeable underground structure that may disrupt disconnect the hydraulic connectivity of the groundwater in the surrounding area	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The foundations of the Proposed Development may cause localised diversion in subsurface flow pathways within the superficial deposits but would not substantially alter the overall flow direction within the superficial deposits from high to low elevations and towards watercourses.
	Use of machinery	Pollution from spills or leakage of concrete or equivalent and fuel and oil from use of machinery.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.
Operational Phase				
Maintenance	Use of motorised vehicles (when access needed for maintenance works)	Pollution from spills and leaks of fuel, oil, and chemicals from vehicles and maintenance works.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.
	Use of access track	Increased sediment mobilisation and transport from road material through surface wash and percolation	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact of releases of sediment laden water into the water environment.
BESS and impermeable surfaces	Presence of Substation and impermeable surfaces	Reduction in recharge to the underlying aquifer therefore locally reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The foundations of the Proposed Development may cause localised changes to groundwater levels. However, the overall area of the Proposed Development is low and would not substantially alter the runoff rates or groundwater levels in the catchment area.
	Breach of BESS battery acid containment systems	Pollution from battery acid may result in degradation in water quality and harm to aquatic life.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The Proposed Development will be fitted with an alarm system in case of potential leaks which may affect water quality. Pollution Prevention Management Plan will be included to ensure plan is set out in case of breach.
	Battery fire	Pollution from airborne particulate matter as a result of a battery fire becoming mobilised in runoff and reaching waterbodies, resulting in degradation in water quality and harm to aquatic life.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	The Proposed Development design includes an attenuation basin that would intercept contaminated runoff. Contaminated water from the attenuation basin can be pumped out and disposed of at a suitably licenced faciality. The attenuation basin provides 1,519 m^3 of rainwater / firewater storage. Discharge from the attenuation basin will be controlled by a remote automatic shut off facility to prevent contaminated firewater entering the watercourse. Discharge will be limited to greenfield runoff rate of 12l/s.
Replacement of individual energy storage units	Use of machinery and use of concrete or equivalent	Pollution from spills or leakage of concrete or equivalent and fuel and oil from use of machinery.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.

Project Components	Activities	Potential Effects	Receptors	Comment / Observation
Watercourse Crossing	Long term use of access track watercourse crossing	Disruption / blockage of watercourse flow from watercourse crossing leading to flooding.	Loch Luichart Catchment	Maintenance plan include periodic visual monitoring
Decommissioning Phase				
Decommission of Principle Features and Restoration	Removal of principle features e.g., BESS, cabling, hardstanding	Decrease in impermeable area and obstructions to baseline flow pathways leading to pre-development runoff conditions and pre-development rainfall-runoff response time.	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	No further comments
	Re-vegetation	Re-vegetation may lead to pre-development interception and evapotranspiration rates and pre-development runoff conditions	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	No further comments
	Backfilling	Reinstatement of soil profile may lead to pre-development infiltration rates and to pre-development runoff conditions	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	No further comments
	Use of machinery	Pollution from spills or leakage of fuel and oil from use of machinery	Loch Luichart Catchment Water in peat / peaty gleyed soil Water in Glacial Deposits Crom Psammite Formation Aquifer	Good industry practice such as pollution prevention measures detailed in in GPP1 and GPP21 (see Section 10.8) would reduce the risk and the overall impact if a spill or leakage were to occur.

10.8. Mitigation Measures

Construction

10.8.1. The Proposed Development will be undertaken in-line with the current guidance and codes of best practice. The following documents provide details of good practice industry guidance, which is intended to prevent adverse environmental effects during construction. The measures detailed in the guidance documents will limit the potential for disturbance or contamination of water resources, and will be adopted:

- CIRIA 811: Environmental Good Practice on Site Guide (5th Edition);
- CIRIA C750: Groundwater control: design and practice (2nd Edition);
- CIRIA C753: Sustainable Urban Drainage Systems Manual;
- CIRIA C532: Control of Water Pollution from Construction Sites;
- GPP1: Understanding tour Environmental Responsibilities – Good Environmental Practices;
- GPP2: Above Ground Oil Storage Tanks;
- GPP4: Treatment and disposal of wastewater where there is no connection to public foul sewer;
- GPP5: Works and Maintenance In or Near Water;
- GPP6: Working at Constructions and Demolition Sites;
- GPP8: Safe Storage and Disposal of Used Oils;
- GP13: Vehicle Washing and Cleaning;
- GPP21: Pollution Incident Response Planning;
- GPP26: Safe Storage – drums and intermediate bulk containers;
- SEPA WAT-SG-23 Good Practice Guide – Bank Protection;
- SEPA WAT-SG-25 Good Practice Guide – River Crossings;
- SEPA WAT-SG-26 Good Practice Guide – Sediment Management
- SEPA WAT-SG-29 Good Practice Guide – Construction Methods
- SEPA WAT-PS-10-01 Assigning Groundwater Assessment Criteria for Pollution Inputs; and

- Forestry Commission UK Forestry standard (5th Edition): 'The governments approach to sustainable forestry' 2023.

10.8.2. The CEMP will incorporate the principles of good practice, legislation, regulations and guidance. With respect to protection of water resources, the CEMP will provide practical measures to avoid and minimise the effects of the Proposed Development on ground and surface waters, as well as providing emergency preparedness and corrective actions together with measures for monitoring, recording, and disseminating information. An CEMP will be prepared for the Proposed Development.

10.8.3. The principles of the water related components of the CEMP include the following, where possible:

- Construction design to minimise disruption to the natural flow regime. Watercourses etc., will be avoided as far as possible in the Proposed Development layout;
- A number of measures will be adopted to prevent and control the release of sediment. Surface water will be directed across vegetated zones, or through mesh fencing, to capture sediment, as appropriate. Alternatives, such as sediment traps or settlement lagoons, may also be considered if the quantity of sediment laden water is anticipated to be large. . The CEMP will specify maintenance measures to ensure that sediment control measures, drains and potholes would be regularly inspected and cleared/infilled/repaired;
- All fuel, oils and other polluting substances would be securely stored in suitably bunded containers on impermeable surfaces in accordance with GPP2 and GPP8. The total quantity and range of potential pollutants to be used onsite is anticipated to be small. Static machinery and plant will, where practicable, have integral drip trays of 110% of the capacity of the fuel tank. The use of biodegradable oils and lubricants will also be used, where practicable. All plant, vehicles and machinery will be inspected regularly for leaks. Refuelling would be undertaken in a designated refuelling area;
- Confirmation, detailed design and survey of watercourse crossings required to facilitate access to the Proposed Development will be required prior to construction. SEPA will be consulted on the level of authorisation for engineering works in the water environment and appropriate permissions will be sought;
- Pollution incident response plans will be prepared for incorporation into the CEMP and will identify the type and location of onsite resources (e.g., spill kits, absorbent materials, oil booms etc.) available for the control of accidental releases of pollution and other environmental incidents. These resources will be available to contractors at all times of operation. Cement/concrete mixes will be calculated to ensure that sufficient quantities are supplied (without needing to dispose of any excess), and that the cement/sand mix ratio will be monitored for consistency and suitability. Any cement/concrete leachates will

be contained and prevented from release into watercourses to prevent an alkaline water impact upon aquatic ecology;

- Micrositing of infrastructure away from the sensitive habitats will be undertaken where possible;
- Groundwater and surface water drainage arrangements for construction elements will be in line with the principles of sustainable drainage systems (SuDS) by incorporating appropriate attenuation and treatment. This approach will be in line with the SuDS Manual (C753) published by CIRIA and the CAR Practical Guide (2024);
- The time any excavation is open will be kept to a minimum to avoid ingress and removal of water;
- Temporary cutoff drains will be installed to prevent surface water and shallow throughflow entering excavations. Treated water would be discharged downstream of the excavation and encouraged to infiltrate into the ground mimicking natural flow patterns;
- Drainage or pumping from excavations will be minimised through appropriate design such as the use of temporary cutoff drains and minimising the construction period;
- Runoff and any water pumped from excavations in proximity to sensitive habitats will be discharged near to the excavation thereby retaining natural flow patterns and utilising the natural treatment potential of existing vegetation. Infiltration of flows will be encouraged (e.g., use of swales) and the concentration of flows at the discharge point(s) will be avoided to prevent scouring;
- Excavations will be reinstated as soon as practicable once construction works are complete and will ensure that natural hydrological conditions are restored as far as possible;
- All new and upgraded access tracks will be constructed with a suitable camber and will have a permeable, granular surface;
- Where the access tracks are oriented parallel to the dominant flow direction, transverse drains will be constructed, where appropriate, in the surface of the access track to convey runoff into adjacent drainage ditches. This would help prevent the tracks from acting as a preferential flow path for surface runoff;
- Where access tracks are oriented perpendicular to the dominant flow direction the trackside drainage will include a lateral drainage channel cut along the uphill side of the track to intercept the natural runoff and shallow throughflow and this will be conducted under the track at regular intervals through cross drainage pipes. The trackside drains will be broad and shallow with moderate gradients to prevent scouring. Flows from this drainage will be treated by filtration through check dams and settlement at sumps;

- Where appropriate, swales will be used along the access tracks to hold water temporarily and to encourage infiltration/discharge into the ground locally. Check dams will be placed regularly along the swales to reduce flow velocities and maximise infiltration;
- During the operational phase, any drains associated with access tracks will be inspected periodically and cleaned out as necessary;
- Pouring of concrete for turbine bases will take place within well shuttered pours to prevent egress of concrete from the pour area; and
- Pouring of concrete or cement bound sand during adverse weather conditions will be avoided, where possible.

Operational Phase

10.8.4. Mitigation of effects upon flow rates and volumes of watercourse within the surface water catchments would be achieved through design of a suitable surface water drainage scheme for the Proposed Development, which would take into account climate change (1 in 200 year plus climate change).

10.8.5. To reduce the potential increase in flood risk posed by the Proposed Development to areas downstream of the Site, it is proposed sustainably manage and disperse surface water runoff within the Proposed Development, with no discharge offsite. Sufficient attenuation will be provided within the Site for 1 in 200-year plus climate change storm event, including appropriate allowance for climate change.

10.8.6. An onsite attenuation basin will be constructed to hold 1285m^2 of rainwater / firewater. The basin will be lined to prevent firewater contamination of groundwater. Additionally, the attenuation basin control chamber will be controlled by a remote automatic shut off facility to prevent contaminated firewater entering the watercourse. Discharge from the attenuation basin will be limited to greenfield runoff rate of 12l/s.

10.8.7. The existing watercourse to be culverted and will have a culvert that conveys 1 in 200 year plus climate change flows. See Figure ‘Indicative Culvert Detail’.

10.8.8. All outfalls and drain outlets will include erosion / scour protection measures to prevent degradation of channels and increase in sedimentation.

Decommissioning Phase

10.8.9. Decommissioning Phase mitigation, which will be secured through planning conditions, will be similar to the construction phase mitigation. A Decommissioning Environmental Management Plan (DEMP) will be prepared and adhered to. The contents of the DEMP would be similar to the CEMP.

10.9. Effect Appraisal

10.9.1. The implementation of good practice incorporated in the design of the Proposed Development and through the CEMP either avoids or minimises the potential effects set out in Table 10.9. As a result of the described mitigation, the magnitude of change from the baseline conditions caused by the potential effects has been assessed from negligible (for change relating to the hydrological and hydrogeological flow regime) to low (for those effects which may cause pollution and a degradation in water quality). This is due to the implementation of measures such as pollution incident response plans, sediment runoff containment and treatment, and the use of SuDS.

10.9.2. Table 10.10 presents the effect appraisal that may arise from the components of the Proposed Development, which has considered the magnitude of change from baseline with the embedded mitigation (as described in Section 10.8) in place.

Table 10.10: Summary of Appraisal of Effects with Embedded Mitigation

Project Component	Activities	Potential Effects	Nature of Effect	Receptors Affected	Sensitivity of Receptor	Magnitude of Change from Baseline	Scale of Effect
Construction Phase							
Construction of access tack, watercourse crossing and underground cabling	Soil stripping and vegetation removal	Removal of vegetation reduces interception, and evapotranspiration rates and increases runoff	Long-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Use of access track	Increased sediment mobilisation and transport from road material through surface wash and percolation	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Placement of aggregates	Disruption to lateral flow (throughflow in soil and runoff) from placement of aggregate	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Use of machinery	Pollution from spills or leakage of fuel and oil from use of machinery	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
	Use of cement bound sand	Pollution from spills or leakage of highly alkaline water that has come into contact with cement bound sand	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
Fence installation	Excavation	Release of sediment from excavations into the water environment	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Use of cement products	Pollution from spills or leakage of highly alkaline water that has come into contact with cement	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
Construction of BESS, built structures, storage containers and water tanks	Soil stripping and vegetation removal	Removal of vegetation reduces interception, and evapotranspiration rates and increases runoff	Long-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Construction of foundations	Increased impermeable area may lead to increased runoff and shorter rainfall-runoff response time	Long-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible

Project Component	Activities	Potential Effects	Nature of Effect	Receptors Affected	Sensitivity of Receptor	Magnitude of Change from Baseline	Scale of Effect
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
		Impermeable underground structure that may disrupt disconnect the hydraulic connectivity of the groundwater in the surrounding area	Long-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Use of machinery	Pollution from spills or leakage of concrete or equivalent and fuel and oil from use of machinery.	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
Operational Phase							
Maintenance	Use of motorised vehicles (when access needed for maintenance works)	Pollution from spills and leaks of fuel, oil, and chemicals from vehicles and maintenance works.	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
	Use of access track	Increased sediment mobilisation and transport from road material through surface wash and percolation	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
BESS and impermeable surfaces	Presence of Substation and impermeable surfaces	Reduction in recharge to the underlying aquifer therefore locally reducing groundwater levels. This will also increase runoff to surface water drains/ponds and may lead to flooding.	Long-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Breach of BESS battery acid containment systems	Pollution from battery acid may result in degradation in water quality and harm to aquatic life.	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
	Battery fire	Pollution from airborne particulate matter as a result of a battery fire becoming mobilised in runoff and reaching waterbodies, resulting in degradation in water quality and harm to aquatic life.	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
Replacement of individual energy storage units	Use of machinery and use of concrete or equivalent	Pollution from spills or leakage of concrete or equivalent and fuel and oil from use of machinery.	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Medium	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible
Watercourse Crossing	Long term use of access track	Disruption / blockage of watercourse flow from watercourse crossing leading to flooding.	Long-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Negligible	Negligible

Project Component	Activities	Potential Effects	Nature of Effect	Receptors Affected	Sensitivity of Receptor	Magnitude of Change from Baseline	Scale of Effect
	watercourse crossing						
Decommissioning Phase							
Decommission of Principle Features and Restoration	Removal of principle features e.g., BESS, cabling, hardstanding	Decrease in impermeable area and obstructions to baseline flow pathways leading to pre-development runoff conditions and pre-development rainfall-runoff response time.	Long-term, irreversible, neutral and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Re-vegetation	Re-vegetation may lead to pre-development interception and evapotranspiration rates and pre-development runoff conditions	Long-term, irreversible, neutral and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Backfilling	Reinstatement of soil profile may lead to pre-development infiltration rates and to pre-development runoff conditions	Long-term, irreversible, neutral and local	Loch Luichart Catchment	Medium	Negligible	Negligible
				Water in peat / peaty gleyed soil	Low	Negligible	Negligible
				Water in Glacial Deposits	Low	Negligible	Negligible
				Crom Psammite Formation Aquifer	Low	Negligible	Negligible
	Use of Machinery	Pollution from spills or leakage of fuel and oil from use of machinery	Short-term, reversible, adverse and local	Loch Luichart Catchment	Medium	Low	Minor
				Water in peat / peaty gleyed soil	Low	Low	Negligible
				Water in Glacial Deposits	Low	Low	Negligible
				Crom Psammite Formation Aquifer	Low	Low	Negligible

10.10. Additional Mitigation

10.10.1. As demonstrated in Table 10.10, all effects were no greater than minor adverse as a consequence of the Proposed Development. Therefore, no additional mitigation is required beyond those measures already considered in the assessment, such as the Proposed Development design, use of SuDS and good practice included in the CEMP.

10.11. Residual Effects

10.11.1. As demonstrated in Table 10.10, all effects were no greater than minor adverse, as a consequence of the Proposed Development, and there is no requirement for additional mitigation. Therefore, no residual effects.

10.12. Summary

10.12.1. There are five unnamed mapped watercourses onsite, which all discharge into Loch Luichart. The Site is located on Glacial deposits that are underlain by the Crom Psammite Formation (a low productivity aquifer). The Site is located in an area with a groundwater vulnerability class of 4a, meaning the Site may have low permeability soil and less likely to have clay present in superficial deposits. The groundwater is said to be vulnerable to those pollutants not readily absorbed or transformed. The Site is not in Bathing Waters or Nitrate Vulnerable Zone. Additionally, the Site is not located within a Shellfish Waters Protected Area. The Site is entirely located within the Northern Highlands groundwater Drinking Water Protection Zone. There are no private water supplies located within 250m of the Proposed Development. Additionally, there are no abstractions or discharges within 250m of the Proposed Development.

10.12.2. Potential effects on the water environment are those which may change the hydrological and hydrogeological flow regime, and those which may cause pollution and a degradation in water quality.

10.12.3. Mitigation measures, such as avoidance of hydrologically sensitive areas and flood zones where possible, have been incorporated into eh design of the Proposed Development. The key principles of the water related components in the CEMP for the Proposed Development include the careful design and control of sediment and potential pollutants. The CEMP will draw upon good industry guidance and best practice measures. The assessment has assumed that the implementation if good industry and best practice measures, such as pollution prevention plan and sediment management measures, would avoid the likelihood of potentially impactful effects occurring.

10.12.4. The assessment found that, with appropriate mitigation in place, the scale of potential effects was no greater than minor adverse.