Novar 1 Wind Farm Repowering

Chapter 9 - Hydrology, Hydrogeology and Soils

September 2026



9. Hydrology, Hydrogeology and Soils

9.1 Executive Summary

9.1.1 This chapter considers the likely significant effects on Hydrology, Hydrogeology and Soils associated with the decommissioning of the Novar 1 Wind Farm, and construction, operation and decommissioning of the proposed repowered wind farm. No likely significant effects are anticipated to arise during decommissioning of the repowered wind farm that would be materially different from, or exceed, those assessed for the construction phase.

9.1.2 This chapter considers effects on water quality (including both surface water and groundwater bodies), flood risk, water resources (private and public water supplies), Groundwater Dependent Terrestrial Ecosystems (GWDTE), and the potential for effects on carbon rich soils and deep peat, including potential for peat landslide effects.

9.1.3 The assessment is informed by hydrological surveying carried out by Ramboll in June 2024, and peat depth surveys undertaken by Ramboll and Fluid Environmental Consulting Limited between May 2024 and November 2025.

9.1.4 The hydrological assessment identified the presence of several watercourses within the Site, which are tributaries of Loch Glass, the River Glass and the Alness River.

9.1.5 Aquifers underlying the Site are found to be of Low and Moderate productivity. Furthermore, through the hydrological assessment and consultation with Scottish Water, it has identified that the Site is located within two drinking water catchments, in which a Scottish Water Abstraction is located.

9.1.6 Consultation with The Highland Council (THC) and the landowner has confirmed the location of two Private Water Supply (PWS) sources within a 250 m buffer of the Site. Qualitative risk assessment of these locations has confirmed that as the potential impacts to groundwater abstractions are Low or Unimportant, no further risk assessment is required in line with Scottish Environmental Protection Agency (SEPA) guidance.

9.1.7 Peat surveys were carried out at the Site including peat depth probing and coring. A combined total of 1,971 peat depth probes were taken across the Site with the majority concentrated in areas of development activity.

9.1.8 The peat depth survey results indicate that 65.6 % of the Site comprises shallow (up to 1 m depth) or no peat. The maximum peat depth recorded was 3.55 m. The mean peat depth recorded during the surveys was 0.73 m. For this reason, it has not been possible to avoid all areas of deep peat (defined as soil with peat >1 m) in the siting of the repowered wind farm, but where feasible, areas of deeper peat have been avoided.

9.1.9 The peatland at the Site was found to be predominantly modified or actively eroding with evidence of drainage, grazing, peat erosion, and peat cuttings. Smaller areas of near natural peatland were identified which have been avoided

9.1.10 Based on the design of the Site (including the siting of the Proposed Development at a suitable buffer from watercourses, minimising the number of proposed watercourse crossings and locating development away from deeper peat locations where practicable), the implementation of best practice measures during the decommissioning of the Novar 1 Wind Farm and the construction, operation and decommissioning phases of the proposed repowered wind farm and the implementation of mitigation measures summarised in **Section 9.8** of this chapter, no significant effects to the water environment or to peat resources are predicted.

9.2 Introduction

9.2.1 This chapter considers the likely significant effects on the hydrology, hydrogeology and soils associated with the decommissioning of the Novar 1 Wind Farm, and the construction, operation and decommissioning of the proposed repowered wind farm.

9.2.2 The specific objectives of the chapter are to:

- Describe the existing hydrological and geological baseline context and cumulative context;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

9.2.3 The hydrological assessment has been carried out by Jo Thorp and the geological assessment has been undertaken by Jeff Turner, who both work for Ramboll. A statement outlining their competence and experience is included in **Chapter 1: Introduction (EIAR Volume 2)**.

9.2.4 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
  - Figure 9.1: Surface Water Features;
  - Figure 9.2: Drinking Water Protected Areas Water Resources;
  - Figure 9.3: 625K Superficial Geology;
  - Figure 9.4: 625K Bedrock Geology;
  - Figure 9.5: 625K Hydrogeology;
  - Figure 9.6: NVC GWDTE Classification;
  - Figure 9.7: GWDTE Assessment;
  - Figure 9.8: Peat Depths;
  - Figure 9.9: SNH Carbon and Peatland Map 2016 Extract; and
  - Figure 9.10: Proposed Borrow Pit Location.
- Volume 4: Technical Appendices
  - Technical Appendix 9.1: Assessment Methodology;
  - Technical Appendix 9.2: Watercourse Crossing Assessment;
  - Technical Appendix 9.3: Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment;
  - Technical Appendix 9.4: Private Water Supply Risk Assessment;
  - Technical Appendix 9.5: Peat Depth Survey Results;
  - Technical Appendix 9.6: Outline Peat Management Plan;
  - Technical Appendix 9.7: Peat Landslide Hazard Risk Assessment; and
  - Technical Appendix 9.8: Borrow Pit Assessment

9.2.5 Figures and technical appendices are referenced in the text where relevant.

9.3 Legislation, Policy and Guidance

9.3.1 The hydrology, hydrogeology and soils assessment has been undertaken within the context of relevant legislative instruments, planning policies, and guidance documents, and these are summarised below.

Legislation and Policy

- The Town and Country Planning (Scotland) Act[1];
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations[2];
- Water Environment and Water Services (Scotland) Act[3];
- The Water Environment (Controlled Activities) (Scotland) Regulations[4];
- The Water Environment (Miscellaneous) (Scotland) Regulations 2017[5];
- Flood Risk Management (Scotland) Act 2009[6];
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017[7];
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015[8];
- The Public Water Supplies (Scotland) Regulations 2014[9];
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013[10];
- Directive 2009/147/EC of the European Parliament and of the Council[11] - Conservation of Wild Birds;
- Council Directive 92/43/EEC[12] - Conservation of Natural Habitats and of Wild Flora and Fauna;
- Scottish Planning Policy (SPP)[13]; and
- National Planning Framework 4 (NPF4)[14].

Technical Standards and Guidance

- GPP1 1[15]: Understanding your environmental responsibilities - good environmental practices (June 2021);

[1] The Town and Country Planning (Scotland) Act (1997). Available at: https://www.legislation.gov.uk/ukpga/1997/8/contents. [Accessed December 2025].

[2] The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations (2017). Available at: https://www.legislation.gov.uk/ssi/2017/102/contents. [Accessed December 2025]

[3] The Water Environment and Water Services (Scotland) Act (2020). Available at: https://www.legislation.gov.uk/asp/2003/3/contents. [Accessed December 2025]

[4] The Water Environment (Controlled Activities) (Scotland) Regulations (2011). Available at: https://www.legislation.gov.uk/ssi/2011/209/contents. [Accessed December 2025]

[5] Scottish Government (2017) The Water Environment (Miscellaneous) (Scotland) Regulations 2017. Available at: http://www.legislation.gov.uk/ssi/2017/389/contents/made

[6] Scottish Government (2009) Flood Risk Management (Scotland) Act 2009. Available at: http://www.legislation.gov.uk/asp/2009/6/contents

[7] Scottish Government (2017) the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Available at: https://www.legislation.gov.uk/ssi/2017/282/note/made

[8] Scottish Government (2015) the Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015. Available at: https://www.legislation.gov.uk/ssi/2015/346/contents

[9] Scottish Government (2017) The Public Water Supplies (Scotland) Regulations 2014 (as amended). Available at: https://www.legislation.gov.uk/sdsi/2014/9780111024782/contents

[10] Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at: http://www.legislation.gov.uk/ssi/2013/29/introduction/made

[11] Directive 2009/147/EC of the European Parliament and of the Council (2020). Available at: https://www.legislation.gov.uk/eudr/2009/147/contents. [Accessed December 2025].

[12] Council Directive 92/43/EEC (2020). Available at: https://www.legislation.gov.uk/eudr/1992/43/contents. [Accessed December 2025].

[13] Scottish Planning Policy (2014). Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/.[Accessed December 2025].

[14] National Planning Policy 4 (2023). Available at: https://www.gov.scot/publications/national-planning-framework-4/. [Accessed December 2025].

[15] Currently, review and replacement of Pollution Prevention Guidelines (PPGs) with Guidance for Pollution Prevention (GPPs). Current PPGs and GPPs are available online: guidance-for-pollution-prevention-1-2022-update.pdf

- GPP 2[16]: Above ground oil storage tanks (January 2021);
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (June 2021);
- GPP 5: Works and maintenance in or near water (February 2018);
- PPG 6[17]: Working at construction and demolition sites (April 2023);
- GPP 13: Vehicle washing and cleaning (June 2021);
- GPP 21: Pollution incident response planning (June 2021);
- GPP 22: Incident response - dealing with spills (October 2018);
- PAN 79: Water and Drainage (September 2006);
- LUPS-GU4[18]: Planning guidance on on-shore wind farm developments (2025);
- LUPS-DP-GU2a: Development Plan Guidance on Flood Risk (July 2018);
- LUPS-GU19: Planning advice on wastewater drainage (2011);
- LUPS-GU31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (August 2024);
- WAT-G-025 EASR Guidance: Engineering: Activity Guide: Instream and In-loch structures;
- WAT-G-028 EASR Guidance: Engineering: Activity Guide: In the vicinity, beyond the vicinity and affecting wetlands;
- WAT-G-030 EASR Guidance: Engineering: Meeting Good Practice;
- WAT-G-034 EASR Guidance: Construction works and silt/pollution mitigation;
- WAT-SG-25: Good Practice Guide - River Crossings (November 2010);
- Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4th Edition)[19];
- Scottish Government (2012) River Crossings and Migratory Fish[20];
- The Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (April 2017) (Second Edition)[21];
- Highland-wide Local Development Plan (April 2012) (HwLDP)[22], Update under current assessment;
- Inner Moray Firth Local Development Plan (July 2015)[23];

[16] Guidance for Pollution Prevention: Above Ground Oil Storage Tanks (2021). Available at: https://www.netregs.org.uk/media/1890/guidance-for-pollution-prevention-2-2022-update.pdf. [Accessed December 2025]

[17] Guidance provided in recent GPPs will be followed and take precedent over information provided in PPG 6, which was withdrawn on 14th December 2015, where there is overlap in the provision of advice. For example, guidance on the storage of handling of oils /fuels in GPP 2 will take precedent over guidance provided in Section 5 (Oil use, storage and refuelling) of PPG 6. Available at: gpp6-working-on-construction-and-demolition-sites.pdf

[18] SEPA Guidance and Advice Notes. Available at: guidance-for-pollution-prevention-13-2022-update-v2.pdf

[19] Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4th Edition). Available T: https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction [Accessed December 2025]

[20] http://www.scotland.gov.uk/Topics/marine/science/Publications/publicationslatest/rivercrossings

[21] Proposed Electricity Generation Developments: Peat Landslide Hazard Best Practice Guide (2017). Available at: https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/. [Accessed December 2025].

[22] Highland-wide Local Development Plan (2012). Available at: https://www.highland.gov.uk/info/178/development_plans/199/highland-wide_local_development_plan. [Accessed December 2025]

[23] Inner Moray Firth Local Development Plan (2024). Available at: https://www.highland.gov.uk/info/178/development_plans/202/inner_moray_firth_local_development_plan. [Accessed December 2025]

- Onshore Wind Energy Supplementary Guidance (September 2016)[24];
- Highland Renewable Energy Strategy (May 2006)[25];
- Scottish Government, SNH, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland[26];
- SNH (2016) Carbon and Peatland Map[27];
- The Scottish Government (2009), The Scottish Soil Framework;
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741);
- Scottish Renewables and SEPA (2012). Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste[28]; and
- SEPA (2011). Restoration Techniques Using Peat Spoil from Construction Works[29].

9.4 Assessment Methodology

Overview

9.4.1 The hydrology, hydrogeology and soils methodology is detailed in **Technical Appendix 9.1: Assessment Methodology (EIAR Volume 4)** and follows the principles set out in the legislation and policies provided above.

9.4.2 The assessment is presented with reference to specific 'areas' of the Site within the application boundary. These areas comprise the Turbine Array and Access Route, as described in **Chapter 3: Site Description and the Proposed Development (EIAR Volume 2)**.

9.4.3 Effects considered to be significant for the purposes of the EIA Regulations are those classified as being 'Major' or 'Moderate'.

Scope of Assessment

EIA Scoping Opinion

9.4.4 An EIA Scoping Report (presented in **Technical Appendix 1.3 Scoping Report (EIAR Volume 4)**) was submitted to the ECU on 23rd January 2025 with a formal request for a Scoping Opinion on the proposed scope of the EIA and assessment methodologies. The ECU subsequently issued their Scoping Opinion on the proposed scope and methodology of the topics for assessment within the EIA on 23rd May 2025. A copy of ECU's Scoping Opinion is provided in **Technical Appendix 1.4 Scoping Opinion (EIAR Volume 4)**.

9.4.5 A summary of the key points raised in ECU's Scoping Opinion, relevant to hydrology, hydrogeology and soils, are presented in Table 9.1, including a response as to where the comments have been addressed.

[24] Onshore Wind Energy Supplementary Guidance (2016). Available at: https://www.highland.gov.uk/downloads/download/165/onshore_wind_energy_supplementary_guidance. [Accessed December 2025]

[25] Highland Renewable Energy Strategy (2006). Available at: https://www.highland.gov.uk/downloads/file/1009/highland_renewable_energy_strategy_may_2006. [Accessed December 2025]

[26] Scottish Government, Scottish Natural Heritage, SEPA. (2017). Peatland Survey. Guidance on Developments on Peatland, online version only.

[27] Scottish Natural Heritage. (2016). Carbon and Peatland 2016 Map (Carbon and peatland 2016 map | Scotland's soils) http://map.environment.gov.scot/soil_maps/ .

[28] Scottish Renewables and SEPA (2012). Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

[29] SEPA (2011). Restoration Techniques Using Peat Spoil from Construction Works.

Table 9.1: Summary of ECU Scoping Opinion Comments	
Summary of Comment	**Response or location within the EIAR where comments have been addressed**
ECU - Where there is a demonstrable requirement for peat landslide hazard and risk assessment (PLHRA), the assessment should be undertaken as part of the EIA process.	A PLHRA has been prepared and is provided in **Technical Appendix 9.7 (EIAR Volume 4)**.
NatureScot – In regard to priority peatland habitats, including blanket bogs any impacts to these habitats are minimised through appropriate mitigation measures, details of which should be provided within the EIA Report.	Potential effects on peat soils are assessed in **Section 9.7**, Peat depth surveying to establish baseline conditions is presented in **Technical Appendix 9.5 (EIAR Volume 4)** and an Outline Peat Management Plan is presented in **Technical Appendix 9.6 (EIAR Volume 4)**. Further assessment of the potential for impacts on peatland habitats is provided in **Chapter 7 Ecology (EIAR Volume 2)**.
Scottish Water – The Proposed Development is located within two drinking water catchments, where a Scottish Water abstraction is located. It is important that during construction, drainage is not directed out of the catchment. Care should be taken in regard to water quality during construction.	The Proposed Development would not lead to surface water being directed out of the Drinking Water Protected Area (DWPA) catchments identified on the Site. Measures for the protection of water quality are set out in Section 9.6 of this chapter. Measures to prevent water pollution would be implemented through a Construction Environmental Management Plan (CEMP) and compliance with Environmental Authorisations Scotland Regulations (EASR).
Scottish Water – For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will not accept any surface water connections into our combined sewer system.	No discharge to surface water sewers is anticipated.
Scottish Water – The EIA report should include details of any relevant mitigation measures in relation to any Scottish Water assets that may be significantly impacted by the development.	No significant impacts to Scottish Water assets have been identified through the EIAR.
SEPA – To avoid any delay and potential objection, the EIA submission must contain a series of scale drawings of sensitivities, for example peat depth, peat condition, Groundwater Dependent Terrestrial Ecosystems (GWDTE), proximity to watercourses, overlain with the Proposed Development.	All mapping is provided as indicated in Section 9.2 of this chapter (**Figures 9.1** to **9.12 (EIAR Volume 3a)**)

Additional Engagement

9.4.6 A summary of engagement undertaken outwith the scoping process, is presented in Table 9.2, including a response as to where the comments have been addressed.

Table 9.2 Summary of Additional Engagement				
Consultee	**Date**	**Format**	**Summary of comment**	**Response or location with EIAR where comments are addressed**
SEPA	19th December 2025	Email Correspondence	Consultation with SEPA was undertaken to seek agreement that GWDTE could be scoped out of the EIAR. A hydrological assessment of potential GWDTEs was submitted to support this request.	SEPA did not reply but in their response to the Gatecheck Report they confirmed that "*We recently had a request to review GWDTE information for the site. The report indicates that the habitats in question are not considered sensitive to alterations in groundwater flows and we therefore have no comment to make, as per our guidance*". In response, a GWDTE assessment has been prepared and is presented in **Technical Appendix 9.3 (EIAR Volume 4)**.

Potential Impacts Scoped In

9.4.7 The scope of this chapter is set out in Table 9.3. and has been informed by consultation responses detailed in Tables 9.1 and 9.2.

Table 9.3: Impacts Considered within the Assessment			
Impact	**Phase***		
	C	*O/M*	*D*
Hydrogeology & Private Water Supply	Yes	Yes	Yes
Surface Water & Watercourse Crossings	Yes	Yes	Yes
Private Water Supplies	Yes	Yes	Yes
Potential for loss/disturbance to peat and carbon rich soils	Yes	No	No
Potential for peat landslide effects	Yes	No	No

**C=construction, O=operation and maintenance and D=decommissioning.*

9.4.8 This chapter considers the effects of the Proposed Development on:

- Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution;
- Water resources, impacts on flow regimes and the geomorphological characteristics of watercourses from proposed watercourse crossings;

- The potential for impacts of the Proposed Development on hydrology or hydrogeology to lead to secondary effects on Groundwater Dependent Terrestrial Ecosystems (GWDTE). It is noted, however, that biodiversity effects (e.g. on sensitive habitats) are captured in **Chapter 7: Ecology (EIAR Volume 2)**; and
- The potential for effects on carbon rich soils and deep peat, including potential for peat landslide effects.

9.4.9 The chapter assesses the cumulative effects arising from the addition of the Proposed Development to other developments, which are the subject of a valid planning application. Operational, under construction and consented developments are considered as part of the baseline. Developments close to the end of their operational life are included as part of the baseline to present a 'worst case scenario'.

9.4.10 Potential cumulative construction and operation effects with regard to geology and soils have been scoped out of the assessment on the basis that no potential for significant cumulative effects have been identified and given the current condition of the peat and soils at the Site. It is also considered that the Site is not hydraulically connected or influenced by the cumulative developments identified in **Chapter 2: EIA Methodology and Scope (EIAR Volume 2)**.

9.4.11 The assessment is based on the Proposed Development as described in **Chapter 3: Site Description and Proposed Development (EIAR Volume 2)** and takes account of the proposed environmental control measures in the Outline Construction Environmental Management Plan (**Technical Appendix 3.1, EIAR Volume 4**).

Potential Impacts Scoped Out

9.4.12 The assessment focusses on likely significant effects and as such impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with the reasoning for this are presented in Table 9.4.

Table 9.4: Impacts Scoped Out of the Assessment

Impact	Reasoning
Flood Risk	The Proposed Development would be located outside of areas shown by SEPA Flood Risk maps to be at risk of flooding from rivers and that surface water flood risks would be accounted for during detailed drainage design. All crossings of watercourses would be designed to accommodate the 1 in 200 (0.5%) annual probability flood including allowance for climate change.
GWDTE	The hydrogeological assessment of potential GWDTEs concludes that all of the areas identified by the ecological assessment of National Vegetation Community (NVC) communities as potential GWDTEs are considered to have a low likelihood of groundwater dependency. Consequently, these areas are considered to be of a low sensitivity in the context of the Proposed Development and therefore GWDTE is not covered in this chapter, but a separate assessment is provided in **Technical Appendix 9.3: Groundwater Dependent Terrestrial Ecosystem Assessment (EIAR Volume 4)**
Potential effects on geological designations and geological assets	The Proposed Development is not likely to result in likely significant impacts on designated geological resource given the distance to the nearest receptor (>1 km), therefore this has been scoped out of the assessment.

Table 9.4: Impacts Scoped Out of the Assessment	
Impact	**Reasoning**
Potential effects from contaminated land/soils	The potential impacts associated with historical contamination have been scoped out as no likely significant contaminative land uses were identified.

Method of Baseline Characterisation

Extent of the Study Area

9.4.13 The Study Area for the desktop assessment of hydrology, hydrogeology and soils includes the Site and land within a 2 km radius, as well as receptors with downstream connectivity with the Proposed Development.

9.4.14 Field surveys were carried out at the Site and where any potentially sensitive receptors were identified within hydrological connection to the Proposed Development.

9.4.15 The Study Area, in respect of potential impacts on geology, peat and carbon rich soils, considers land within the Site.

Desk Study

9.4.16 The methodology for baseline characterisation is set out as follows:

- Describe surface water hydrology, including watercourses, springs and lochs and lochans;
- Identify existing catchment pressures;
- Identify private drinking water abstractions and PWS within the Study Area;
- Identify GWDTE habitats;
- Identify any flood risks;
- Describe the hydromorphological conditions of watercourses; and
- Collect soil, geological and hydrogeological information.

Field Survey

HYDROLOGICAL SURVEY

9.4.17 Site surveying was conducted by Ramboll in June 2024. The purpose of the Site walkover was to:

- Assess the general hydrological condition of the Site;
- Characterise watercourses within the field Study Area such that proposed watercourse crossing points could be assessed; and
- Assess hydrological conditions at potential GWDTE locations.

9.4.18 The survey consisted of visual inspection and geolocated surveying of watercourses. Where potentially groundwater dependent vegetation communities were identified by ecological surveying (**Technical Appendix 9.3: Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment (EIAR Volume 4)**). Site-specific review was conducted to identify visual evidence of groundwater emergence, association of habitats to surface water features, evidence of connection to upslope surface water runoff and the presence of deep peat in association with habitats. No alterations in baseline hydrological or hydrogeological conditions are known to have occurred since 2024 and therefore the findings of surveying remain valid.

9.4.19 NVC surveying to identify potential groundwater dependent vegetation communities was carried out by Ramboll in June 2024. Further details of the methodology for NVC surveying of habitats are provided in **Chapter 7: Ecology (EIAR Volume 2)**.

PEAT SURVEY

9.4.20 Peat surveys were undertaken at the Site to understand the baseline peat conditions and potential constraints, and to inform the design of the Proposed Development to minimise, as far as practicable, the potential direct and indirect effects on peat and carbon rich soils.

9.4.21 The surveys were undertaken by Ramboll and Fluid Environmental Consulting Limited on the following dates:

- Stage 1 peat probing was completed in May 2024; and
- Stage 2 peat probing and coring was completed in June 2025 with an additional Stage 2 survey undertaken in November 2025 following design refinement.

9.4.22 Surveys followed relevant good practice guidance published at the time of the surveys with regard to surveying for developments on peatland[26,28].

9.4.23 The Stage 1 survey is a preliminary, low-density survey and was carried out on a 100 m grid across the Study Area within areas of likely peatland. The probing was carried out using collapsible avalanche probes, allowing for probing in excess of 6 m (although such depths were not reached). This peat depth data, along with other environmental and engineering constraints, were used to inform the early layout of the repowered wind farm.

9.4.24 The survey points and field data were collected using a handheld Trimble GPS unit. Peat depth data was modelled using Inverse Distance Weighted (IDW) interpolation in GIS software, and a depth model generated using incremented peat depth categories.

9.4.25 The high-density probing during the Stage 2 survey was carried out along the Access Route/ Internal Tracks, and at the planned turbine, hardstanding area, and other infrastructure locations, known at the time of the survey. This included a 50 m micrositing zone around each turbine location. Micrositing between 50 m and 100 m can be undertaken based on the Stage 1 data and supplemented by ground investigation post consent. This was carried out using collapsible avalanche probes, and data collected using a handheld Trimble GPS unit.

9.4.26 Peat cores were taken using a Russian auger, with a sample volume of 0.5 litres (l), and a number of field tests and observations were undertaken. The records taken included:

- Depth of acrotelm;
- Degree of humification to establish amorphous, intermediate, fibrous and content;
- Degree of humification using the Von Post classification;
- Fine fibre content, based on scale of F0 (none) to F3 (very high);
- Coarse fibre content, based on scale of R0 (none) to R3 (very high);
- Water content, based on scale of B1 (dry) to B5 (very wet); and
- Substrate underlying the peat where this was possible.

9.4.27 A peat depth probe was taken adjacent to the core location, and cores were photographed.

9.4.28 Samples were also sent for laboratory analysis to test for pH, total organic carbon and moisture content.

9.4.29 Further information on the survey methodology is included in **Technical Appendix 9.5: Peat Depth Survey Report (EIAR Volume 4)**.

PEAT LANDSLIDE HAZARD RISK ASSESSMENT

9.4.30 A Peat Landslide Hazard Risk Assessment (PLHRA) was undertaken by Ramboll in 2026 which has been used to inform the assessment. The PLHRA was undertaken in accordance with the methodologies set out within Scottish Government guidance[30] and the results included in **Technical Appendix 9.7 (EIAR Volume 4)**.

BORROW PIT ASSESSMENT

9.4.31 A borrow pit assessment was undertaken by Ramboll to provide an estimate of the suitability of the rock available for use as part of the Proposed Development, areas and volumes, and restoration requirements. It should be noted that the assessment was undertaken using desk top information supplemented by incidental information gathered in the field during the peat depth surveys. No ground investigation was undertaken to inform the assessment. Further information on the methodology and the results is included in **Technical Appendix 9.8: Borrow Pit Assessment (EIAR Volume 4)**.

Method of Assessment

Overview

9.4.32 Detailed information on the assessment methodology, including criteria for assessing sensitivity of receptors, magnitude of change and cumulative effects, as well as overall significance criteria, is provided in **Technical Appendix 9.1: Assessment Methodology (EIAR Volume 4).**

Limitations and Assumptions

9.4.33 This assessment refers to, and uses, publicly available data sources and relies upon the accuracy of this data.

9.4.34 At this stage, the final quantities required to construct the Proposed Development are estimates, and the final extent and estimate of material to be won and reused, such as peat and soils at the borrow pit area would be confirmed following completion of an intrusive ground investigation exercise which would be undertaken after the Proposed Development is consented.

9.4.35 The assessment also relies on an assumption that the schedule of good practice measures set out in this chapter is implemented through the CEMP and Outline Peat Management Plan (OPMP). These documents would be continually reviewed and updated as required to incorporate further mitigation if required, following the implementation of these good practice measures.

9.4.36 A micrositing allowance of 100 m is proposed. While the final location of infrastructure may vary within this tolerance, any such changes would remain within the parameters assessed in the EIAR and would not give rise to materially different environmental effects. Therefore, the conclusions of this assessment would remain unchanged.

9.5 Baseline Conditions

9.5.1 Published information consulted to determine baseline conditions are outlined in Table 9.5 below:

[30] Scottish Government. (2017). Proposed Electricity Generation Developments: Peat Landslide Hazard Best Practice Guide. Available at https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/

Table 9.5: Baseline Information Sources	
Topic	**Sources of Information**
Topography	• Aerial Photography[31] • 5 m contour data derived from Ordnance Survey (OS) Digital Terrain Model (DTM) data[32] • 1:25,000 OS Raster Data[32]
Designated Nature Conservation Sites	• SNHi Sitelink website[33]
Solid and Superficial Geology	• British Geological Survey Digital Data provided at BGS online viewer[34] • BGS Borehole Records[34]
Soils and Peat	• SNH Carbon and Peatland Map (2016)[35] • BGS 1:50,000 and 1:625,000 geological maps (superficial and bedrock)[34]
Surface Water Hydrology	• 1:10,000 OS Raster Data[32] • 1:25,000 OS Raster Data[32] • OS Open Rivers[36]
Flooding	• Indicative River and Coastal Flood Map (SEPA)[37]
Water Quality	• SEPA, Water Classification Hub[38]
Water Resources	• Private water supply information provided by Highland Council Environmental Health Department • DWPAs in the Scotland River Basin District (RBD) maps[39]. • 1:10,000 OS Raster Data[32] • 1:25,000 OS Raster Data[32]
Hydrogeology	• BGS 1:50,000 and 1:625,000 geological maps (superficial and bedrock)[34] • BGS Groundwater Vulnerability Maps[34] • BGS 1:625,000 hydrogeological map of the UK[34] • The River Basin Management Plan for Scotland 2021 – 2027[40]

Current Baseline

Hydrology

9.5.2 The majority of the Turbine Array and the northwestern party of the Access Route is located within the River Alness catchment (SEPA ID 20156), including all proposed turbine locations apart from Turbine 7. The River Alness is assessed as being of Good overall condition under the Water Framework Directive (WFD) classification system.

[31] Google Earth Imagery, Bing Maps

[32] Under license acquired from Ordnance Survey

[33] SNHi Sitelink. Available at: https://sitelink.nature.scot/map [Accessed December 2025]

[34] BGS Onshore GeoIndex. Available at: www.bgs.ac.uk [Accessed December 2025]

[35] National Soil Map of Scotland. Available at: https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/ [Accessed December 2025]

[36] OS Open Rivers. Available at: https://osdatahub.os.uk/ [Accessed December 2025]

[37] SEPA Flood Maps. Available at: www.sepa.org.uk [Accessed December 2025]

[38] SEPA, Water Classification Hub. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/ [Accessed December 2025]

[39] Drinking Water Protected Areas (DWPAs) in the Scotland River Basin District (RBD) maps. Available at: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/ [Accessed December 2025].

[40] The River Basin Management Plan for Scotland 2021 – 2027 (2021). Available at: https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf. [Accessed December 2025]

9.5.3 The southern part of the Site, including the Access Route to the Main Vehicular Access Point, are within the River Glass catchment (SEPA ID 20161) including the location of Turbine 7. The River Glass is assessed as being of overall Moderate condition under the WFD classification system.

9.5.4 Areas in the northeast of the Site including areas of the existing Novar 1 Wind Farm, are located within the Loch Glass catchment. Loch Glass (SEPA ID 100115) is assessed as being of good overall condition under the WFD classification system.

9.5.5 Larger tributaries of the River Glass and River Alness include:

- Allt Torran an Tairneanaich (the upper catchment of which is within the centre of the Turbine Array);
- Allt Srath nan Gleann (the catchment of which is within the north of the Turbine Array);
- Allt na Seasgaich (crossed by the proposed northern Internal Track);
- Alt na Moine (crossed by the Access Route);
- Allt Bad na Glaice (crossed by the Access Route); and
- Allt Chadha Mhoir (crossed by the Access Route).

9.5.6 Multiple unnamed watercourses are present on the Site, including watercourses which are crossed by existing infrastructure in the form of circular culverts.

Flood Risk

9.5.7 SEPA Flood Risk mapping indicates that there is minimal risk of fluvial flooding to the majority of the Site (a less than 1 in 1,000 (0.1%) annual chance of flooding). Areas assessed by SEPA to be at an increased chance of flooding from rivers, are limited to the immediately vicinity of the watercourses located on Site.

9.5.8 Areas of the southern Access Route are assessed by SEPA to be at an increased chance of river flooding, at the locations of the multiple watercourse crossings along its length, and the Srath nan Gleann and Allt na Seasgaich which flow northwards from the Turbine Array. Existing tracks are served by a number of existing watercourse crossings which would reduce the risk of flooding, and which are not represented in SEPA national-scale mapping.

9.5.9 SEPA mapping identifies some limited areas of elevated surface water flood risk on the Site. Generally, the Site is at a very low risk of surface water flooding (less than a 1 in 1,000 (0.1%) annual probability).

9.5.10 Flood risk associated with the unnamed watercourse that discharges into Loch Glass, appears to be confined to the main channel and immediate surrounding area. Small areas of Low risk of flooding are expected to impact the Access Route, however the areas of highest risk are associated with land off-Site, towards Loch Glass.

9.5.11 As with the watercourses in the southern region of the Turbine Array the Allt Torran an Tairneanaich and Allt Srath nan Gleann are shown to have a limited area of flood risk associated with them.

GWDTE

9.5.12 NVC habitat surveying carried out by Ramboll has confirmed that areas of the Site are classified as potentially GWDTE as detailed in **Chapter 7: Ecology (EIAR Volume 2)**. Therefore, further hydrological assessment has been carried out by Ramboll to determine the actual likelihood of groundwater dependency and the sensitivity of such habitats. Hydrological assessment of potential impacts of the Proposed Development on GWDTE is provided in **Technical Appendix 9.3: Groundwater Dependent Terrestrial Ecosystem Assessment (EIAR Volume 4)**.

Water Resources

9.5.13 According to BGS 1:625k hydrogeological mapping, the western part of the Site is underlain by two Low productivity aquifers, comprising of the Loch Eil Group and the Glenfinnian Group. Both these groups are characterised as having small amounts of groundwater in near surface weathered zone and secondary fractures.

9.5.14 The central and eastern regions of the Site are underlain by another two aquifers of the Lower Old Red Sandstone Formation and Middle Old Red Sandstone Formation (Undifferentiated). Both formations are classified by the BGS as Moderately productivity aquifers. The Middle Old Red Sandstone (Undifferentiated) is characterised by Sandstones, in places flaggy, with siltstones, mudstones and conglomerates and interbedded lavas, locally yields small amounts of groundwater. Whereas the Lower Old Red Sandstone Formation is characterised as being a locally important multi-layered aquifer.

9.5.15 A total of forty-two (42) PWS end users are recorded within a 5 km radius of the Site, of which five (5) are located within 250 m of the Site.

9.5.16 Further enquiries with the Site landowner has been undertaken to confirm the locations of PWS source locations. Two (2) PWS sources were identified which lie within 250 m of the Site. PWS1 is understood to supply three (3) properties (the Lagvoulin Cottages). PWS2 serves one property, West End cottage. West End Cottage is located approximately 1.6 km south of the source location and the route of piped supply is likely to cross two existing Internal Tracks, which are within the Site and would be upgraded as part of the Proposed Development. Although PWS 3 is outwith a 250 m buffer of the Site, it is downslope of the Access Route and therefore in potential hydrological connectivity to the Site.

9.5.17 These sources and end users are summarised in Table 9.6 below.

Table 9.6: Private Water Supply Abstraction Sources

PWS Reference	PWS Category	Source Type	Grid Reference		PWS Name	Closest Distance to the Site
			X	Y		
PWS1	Domestic	Spring	259978	867851	1 Lagvoulin Cottages	100 m west
PWS1	Domestic	Spring	259978	867851	2 Lagvoulin Cottages	100 m west
PWS1	Domestic	Spring	259978	867851	3 Lagvoulin Cottages	100 m west
PWS2	Domestic	Spring	256165	869182	Westend Cottage	77 m northwest
PWS3	Domestic	Spring	255703	870443	Tigh na Craig	515 m southwest

9.5.18 Further details of PWS locations are provided in **Technical Appendix 9.4: PWS Assessment (EIAR Volume 4)**.

9.5.19 A review of Scottish Water mapping has confirmed that there are two Scottish Water drinking water catchments designated as Surface Water Drinking Water Protected Areas (DWPAs) within the Site. The catchment of Loch Glass in the northwest of the Site and the catchment of the River Glass in the southeast of the Site, are classified as Surface water DWPAs.

Geology and Soils Desk Top Baseline

9.5.20 According to the BGS 'Geology Viewer' website (1:625,000), the superficial deposits underlying the Turbine Array predominantly comprises of peat, with the western parts of the Access Route also being included within this region. The majority of the Access Route within the central and eastern parts of the Site is underlain by Till and Morainic Deposits – Diamicton, Sand and Gravel. The remaining areas are either underlain by Glaciofluvial Deposits – gravel, sand and silt, or contain no information regarding superficial deposit composition. This is shown on **Figure 9.3 (EIAR Volume 3a)**.

9.5.21 The underlying bedrock across most of the western part of the Site is mapped as the Tarvie Psammite Formation – Psammite, with various bands of Ben Wyvis Pelite Formation – Pelite and Semipelite. The western area of the Access Route also consists of bedrock geology associated with the Tarvie Pssamite Formation, however towards the eastern regions, more variations occurs, with the Ousdale Arkose Formation – Breccia and Sandstone, Braemore Mudstone Formation – Sandstone, Cnoc Fyrish Conglomerate Formation – Conglomerate and Sandstone, and Raddery Sandstone Formation – Sandstone, all present. This is shown on **Figure 9.4 (EIAR Volume 3a)**.

9.5.22 A review of the SNH Carbon and Peatland Map (2016) confirms that the Site is predominantly overlain by 'Class 1 Peat'. An extract of the Carbon and Peatland Map in relation to the Site is shown on **Figure 9.9 (EIAR Volume 3a)**. Class 1 peat is designated as being '*nationally important carbon rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value*'. Smaller areas of Class 5 peat are also shown in the centre and south of the Site, which are described as 'peat soils'.

9.5.23 No nationally important environmental designations specifically for peat or geological conservation are located at the Site. No Local Geodiversity Sites are located within the Site.

9.5.24 A review of aerial imagery and OS mapping indicates that drainage and erosion features are present within the Site. This was confirmed during the Site surveys. No mining features or historic contaminative land uses were identified within the Site based on British Geological Survey (BGS) and Coal Authority information[41].

Peat Depth and Characteristics

9.5.25 Findings of the peat depth surveys are presented in **Technical Appendix 9.5 (EIAR Volume 4)**. In summary, a total of 314 peat depth probes were taken during the Stage 1 peat survey and 1,657 peat probes during Stage 2 surveys. This resulted in a combined peat depth dataset of 1,971 probes.

9.5.26 The findings of the Stage 1 site-wide low-density peat probing, along with Stage 2 targeted high-density probing and coring surveys found that approximately half of the Site be underlain by areas where either no peat is present or, where organic soils are present are shallow in depth.

9.5.27 In accordance with the Peatland Survey Guidance, peat soil is defined as organic soil exceeding 0.5 m in thickness and containing greater than 60 % organic matter; organic layers of less than or equal to 0.5 m are therefore classified as organo-mineral soils rather than peat.

9.5.28 The definition for deep peat used in this chapter comprises areas of soil with a peat layer more than 1 m deep in line with the Joint Nature Conservation Committee (JNCC) report 'Towards an assessment of the state of UK Peatlands'[42].

[41] https://datamine-cauk.hub.arcgis.com/

[42] Joint Nature Conservation Committee, 2011. Towards an assessment of the state of UK Peatlands, JNCC report No. 445 187_jncc445.pdf

9.5.29 Based on this definition, 52 % of samples recorded organic layers of <0.5 m depth or were absent of peat. This includes areas where existing track is present and where peat has already been excavated. The peat depth survey results for the Site are summarised as follows:

- 697 no. samples (35.4%) located on land with no peat present;
- 321 no. samples (16.3%) located on land with >0.0 m and ≤0.5 m depth of peat or organo-mineral soil;
- 273 no. samples (13.9%) located on land with >0.5 m and ≤1.0 m depth of peat;
- 321 no. samples (16.3%) located on land with >1.0 m and ≤1.5 m depth of peat;
- 243 no. samples (12.3%) located on land with >1.5 m and ≤2.0 m depth of peat;
- 88 no. samples (4.5%) located on land with >2.0 m and ≤2.5 m depth of peat;
- 24 no. samples (1.2%) located on land with >2.5 m and ≤3.0 m depth of peat; and
- 3 no. samples (0.2%) located on land with >3.0 m and ≤4.0 m depth of peat.

9.5.30 The maximum peat depth recorded was 3.55 m. The mean peat depth recorded during the surveys was 0.73 m.

9.5.31 The peat probe depth and interpolated contours are shown on **Figure 9.8 (EIAR Volume 3a)**. Sections of existing Internal Track have been used where possible, which reduces the sections of new track required in areas of deep peat. The turbines and associated areas of hardstanding have been sited where possible to avoid the areas of deepest peat within the Site. However, it has not been possible to site them in areas where no peat or only shallow depths of peat are present due to other environmental and technical constraints. With the exception of the location of Turbine 1 and the hardstanding for Turbine 6, where the mean peat depths were recorded to be 1.73 m and 1.59 m respectively, all of the new permanent infrastructure is sited in areas where the mean peat depth is less than 1.5 m.

9.5.32 The peat across the Site is generally fibrous and intermediate in nature (as opposed to amorphous), with the majority of the peat core samples found to have a low to moderate fine fibre content (F1-F2) and a variable course fibre content (R1-3).

9.5.33 The water content of the peat across the peat core samples was recorded to be variable from moderately dry (B2) to wet (B4). This is consistent with the potential high degree of modification to the peatland through artificial drainage which has caused drying, oxidation, and erosion of peat and carbon-rich soils, which has likely increased carbon release.

9.5.34 All of the peat core samples scored between H5 and H6 on the Von Post scale indicating the peat sampled to be moderately decomposed.

PEAT GEOMORPHOLOGY AND CONDITION

9.5.35 Digital and aerial photography and DTM Lidar data was used to interpret and map geomorphological features within the Site. This interpretation and the resulting geomorphological map, as shown in **Technical Appendix 9.7 (EIAR Volume 4)**, were subsequently verified during a Site walkover and survey undertaken by an experienced peatland geotechnical engineer in June 2024, April 2025, and August 2025.

9.5.36 The Site topography is generally undulating, moderately shallow rising ground from the southeast to the northwest across the Site at elevations of between 200 m to 350 m Above Ordnance Datum (AOD) at the summit of Outer Law Hill. Black Hill is located within the southern part of the Site with steep rising ground to its summit at 385 m. The Site predominantly comprises open moorland.

9.5.37 The desk study review found there were no published articles, evidence from historical mapping or landowner accounts of land slips within the Site. Some evidence of peat instability was identified during the surveys, with features including haggs, groughs, and

other areas of peat erosion noted. Several localised areas of peat flushes were recorded across the Site which displayed basal erosion of peat due to surface water run-off. It is considered that these areas are classed as modified. No major instability features, evidence of incipient instability or past landslides were noted. The lack of visible evidence of instability features during the Site walkovers is consistent with the findings of the desk study.

9.5.38 Peatland condition at the Site based on observations from the peat and ecological surveys (**Chapter 7: Ecology (EIAR Volume 2)**), using the criteria set out in NatureScot guidance[43], indicates that the majority of the Site is comprised of 'modified' and 'drained' peat, reflective of the degraded blanket bog habitat, land use and drainage. Within this, there are areas of actively areas of erosion. These areas of 'near-natural' peatland are located around Turbines 1 and 4.

9.5.39 The Site is generally Low or Very Low risk with regards to peat slide risk. For areas where Moderate risk has been identified, mitigation has been applied to reduce the risk to Low or Very Low, as discussed in **Technical Appendix 9.7 (EIAR Volume 4)**.

9.5.40 It is estimated that the borrow pit would generate approximately 96,000 m^3 stone for use as part of the Proposed Development, in the construction of Internal Track and areas of hardstanding. It is estimated that approximately 1,673 m^3 of peat and peaty soils would be excavated from borrow pits, dependent on the findings of ground investigation (based on the average peat depth at those locations). Peat excavation is also required for other elements of the Proposed Development, including turbine foundations, areas of hardstanding, Internal Tracks, the substation, and construction compounds, with the total estimated peat excavation volumes reported within the Outline Peat Management Plan **Technical Appendix 9.6 (EIAR Volume 4)**.

Future Baseline

9.5.41 There is potential for climate change to impact on future baseline conditions. Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside slightly higher average temperatures.

9.5.42 This suggests that there may be greater pressures on water resources and rain-fed habitats in summer months in the future. However, summer storms are predicted to be of greater intensity. Therefore, peak fluvial flows associated with extreme storm events may also increase in volume and velocity. Climate change factors have been taken into account when considering the potential for significant effects.

9.5.43 In the absence of the Proposed Development, it is assumed that the existing peat and carbon rich soils present would be subject to existing land use factors, such as drainage, which has the potential to result in modification to peat. The Study Area is noted to have been modified by these existing factors. However, it is also assumed that in the absence of the Proposed Development there would be no requirement to excavate peat and carbon rich soils.

Summary of Sensitive Receptors

9.5.44 A summary of the receptors considered likely to be affected by the Proposed Development and therefore scoped into the assessment are set out in Table 9.7**,** together with their associated sensitivity.

[43] NatureScot (n.d.). Peatland Condition Assessment Key Points. [online] Available at: https://www.nature.scot/sites/default/files/2023-02/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf

Table 9.7: Summary of Sensitive Receptors		
Receptor	**Sensitivity**	**Justification**
Watercourse and surface water features	High	Watercourses crossing the Site, Access Route and adjacent to the Site are considered to be of high sensitivity based on the water quality and hydrological characteristics.
Public and private water supplies	High	There is the potential for construction activity to result in alteration to hydrological and hydrogeological conditions, which could lead to impacts on water supplies.
Soils and peat	Low (locally medium and high)	Peatland and carbon rich soils are sensitive receptors. These habitat types are included in Annex 1 of the EC Habitats Directive[44], are sensitive to environmental change, and are of regional importance. Peatlands which are classified as Class 1 on the NatureScot Carbon and Peatland Map are of national importance. Across the Site, ground conditions comprise a mosaic of mineral soils, organo-mineral soils with shallow organic layers (< 0.5 m depth), areas of shallow peat (≥ 0.5 m and < 1 m) and localised areas of deep peat (≥ 1 m), as shown on the peat depth survey results presented in **Technical Appendix 9.5 (EIAR Volume 4)**. The definitions of shallow and deep peat used for this assessment align with those used by the Soil Survey of Scotland[45]. Where carbon rich soil and deep peat with high conservation value are present (i.e. near natural condition and greater than 1.0 m in depth), these areas are **High** sensitivity. Areas of peat with average depths between 0.5 m and 1.0 m in mostly near natural condition, or peat between 1.0 m and 2.0 m in depth that is drained, eroded or otherwise modified, are **Medium** sensitivity. However, the majority of the Site has no peat or peat <1 m in depth which is degraded by drainage, erosion or other forms of modification and is therefore considered to be of **Low** sensitivity. Overall, on balance, the Site is of **Low** sensitivity, with local pockets of **Medium** and **High** sensitivity peat.

9.6 Embedded Mitigation

9.6.1 Embedded mitigation is inherent within the project design and comprises measures that have influenced the location and design of the Proposed Development. Embedded mitigation would be secured through the description of the Proposed Development as part of a planning consent and is described in the design evolution narrative (refer to **Chapter 3: Site Description and Proposed Development** and **Chapter 4: Design Evolution and Alternatives (EIAR Volume 2)**. Embedded mitigation includes standard measures that are mandated by legislative requirements or best practices and would be required regardless of the outcomes of any EIA.

[44] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)

[45] Lilly, A. (2023). Origins of the Soil Survey of Scotland 50 cm threshold to define a Peat soil. The James Hutton Institute. Available at: https://sefari.scot/sites/default/files/documents/Origin%20of%2050%20cm%20Threshold%20for%20Defining%20Peat%20on%20Soil%20Maps%20of%20Scotland.pdf

9.6.2 As the embedded mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures have been implemented.

9.6.3 The following design principles (i.e., embedded mitigation measures) have been incorporated into the Proposed Development layout:

- In line with SEPA standing advice and the Scoping Opinion, a 50 m buffer has been applied around watercourses within which the placement of infrastructure (with the exception of watercourse crossings) has been avoided. The exception to this are two locations which are specifically identified below in paragraph 9.6.4;
- The design process aimed, as far as practicable, to avoid watercourses, areas of deeper peatland, blanket bog and wet modified bog, and potential high GWDTEs for the location of turbines and other infrastructure; and
- The design process aimed to re-use as much of the existing infrastructure where practicable to avoid excavation and disturbance of peat and carbon rich soils.

9.6.4 Standard mitigation measures of relevance to hydrology, hydrogeology, geology and soils include:

- During decommissioning of the existing Novar 1 Wind Farm, any sections of redundant Internal Access Track would be restored in accordance with the Proposed Development description in **Chapter 3: Site Description and the Proposed Development (EIAR Volume 2)**;
- Where crane pads cannot be incorporated into the design of the repowered wind farm they would be removed and the land restored. Existing turbine concrete foundations would remain in situ, although broken out to a minimum of 0.5 m below the existing ground levels to allow reinstatement of the land, where this is feasible. The recovery depths would be based on intrusive site investigation, construction records and the approved restoration design;
- The Proposed Development has been subject to numerous design iterations in response to constraints identified as part of the baseline studies, intended to reduce environmental effects;
- The design of the Proposed Development has been set out such that the number of watercourse crossings would be minimised. Design of new watercourse crossings would maintain hydraulic connectivity and allow the free passage of fish and other wildlife beneath. Watercourse crossings would also be of sufficient size so as not to restrict or concentrate flows downstream and to convey flows during periods of heavy rainfall (e.g., 1 in 200-year event plus climate change allowance). Design measures to be implemented at watercourse crossings are detailed in **Technical Appendix 9.2: Watercourse Crossing Assessment (EIAR Volume 4)**;
- Turbine locations are situated outside of Scottish Water DWPA catchments and the length of new Internal Track within the DWPA has been reduced as far as practical. Site drainage would ensure that surface water runoff would not be conveyed across watersheds on the Site or directed out of the DWPAs;
- There are two locations at which development is proposed within 50 m of a watercourse, but at locations which are not watercourse crossings:
  - Approximately 1.4 km of existing Internal Track to the north and northeast of Meall an Tuiric which would be upgraded. At its nearest point the upgraded Internal Track would be approximately 17 m from Allt Bad na Glaice. At this location the route of

the existing Internal Track has been maintained to minimise the need for new infrastructure; and

- The proposed temporary construction compound close to the Main Vehicular Access Point. At its nearest point the platform of the proposed temporary construction compound is approximately 26 m east of a forestry drain and 32 m south of an unnamed pond. The proposed temporary construction compound would be located on an area that has been cleared of forestry and on which ground clearance and earthworks have previously been carried out.

- Details of construction phase Sustainable Drainage Systems (SuDS) would be included in the CEMP and a Pollution Prevention Plan (PPP) would be prepared, to provide a suitable surface water management and a sequential treatment approach. These measures would mitigate potential adverse impacts on the hydrology of the Site and surrounding areas during the construction phase of the Proposed Development. Measures would ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased. Surface water runoff would be managed using SuDS designed to prevent the release of sediment and pollutants to controlled waters by incorporating features such as settlement ponds, sediment traps and filtration measures where needed and to be specified within the CEMP;
- Specifications for SuDS would be developed at the detailed design stage following completion of micrositing and finalisation of the track alignments. Drainage design would be subject to approval by the Lead Local Flood Authority (LLFA) and would be prepared in accordance with SEPA guidance and the most recent edition of the SuDS Manual;
- A Site maintenance programme would be developed for all SuDS and drainage assets to be installed at the construction stage to ensure that the function and benefit provided by the asset remains for the lifetime of the repowered wind farm;
- Construction works associated with the substation would be carried out under supervision of the Environmental Clerk of Works (EnvCoW). Details regarding mitigation for containment of potential contaminants would be included within the PPP and would include self-contained treatment features to be included within a SuDS strategy at the detailed design stage of the Proposed Development.

9.6.5 Best practice measures for the management of construction activities are set out in the OPMP (Technical Appendix 9.6: Outline Peat Management Plan (EIAR Volume 4)) and PLHRA (Technical Appendix 9.7: Peat Landslide Hazard Risk Assessment (EIAR Volume 4)). A detailed CEMP and PMP would be prepared by the appointed Principal Contractor prior to the commencement of construction.

9.6.6 A summary of the embedded mitigation considered for the Hydrology, Hydrogeology and Soils assessment is set out in Table 9.8.

Table 9.8: Summary of Embedded Mitigation

ID	Phase*	Description	Purpose of Mitigation
Embedded Mitigation			
GS01 HH01	PC/C	Preparation of a DCEMP to include best working practice to be employed at the Site, particularly with respect to works on or near watercourses and measures for the control of pollution (including sediment laden water) at the Site. The DCEMP would include construction methods and environmental protection measures applying	Mechanism for implementation of best working practice in relation to the water environment and

Table 9.8: Summary of Embedded Mitigation			
ID	**Phase***	**Description**	**Purpose of Mitigation**
		best practice guidance as set out in applicable SEPA Guidance for Pollution Prevention (GPPs). Implementation of these measures during all aspects of the construction phase would ensure construction activity would not cause adverse effects to sensitive receptors. The detailed DCEMP would be prepared by the Principal Contractor prior to the commencement of construction, and submitted to THC for approval, in consultation with SEPA.	management of peat/carbon rich soils.
HH02	PC/C	The appointed Contractor would compile a PPP which would include details of proposals for the storage and handling of potentially contaminative materials, construction phase SuDS, construction Site plans and proposed drainage management measures. The PPP would form part of the DCEMP and be submitted to THC for approved in consultation with SEPA.	To ensure water quality is maintained and prevent the release of pollutants to the water environment
HH03	PC	Storage of potentially contaminative materials at least 50 m from watercourses. Fuels, oils or chemicals stored on-Site would be located over an impervious base and in accordance with the EASR. Petrol interceptors and spill kits would be utilised where there is the potential for chemical spillage. The measure would form part of the PPP and therefore DCEMP to be submitted to THC for approval in consultation with SEPA.	To ensure water quality is maintained and prevent the release of pollutants to the water environment.
HH04	PC	Implementation of construction phase SuDS to provide a surface water management and treatment drain. Measures would ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased. To form part of the DCEMP which would be submitted to THC for approval in consultation with SEPA.	Maintain water quality and ensure pre-development runoff rates.
HH05	C	The installation of SuDS measures would be supervised by the Environmental Clerk of Works (EnvCoW).	Maintain water quality and ensure pre-development runoff rates.
HH06	PC	Any requirement for monitoring water quality within watercourses downstream of the Proposed Development would be approved by THC in consultation with SEPA and procedures for this would be detailed in the DCEMP.	Monitor effectiveness of mitigation with regards to water quality.
HH07 GS05	D	At the time of decommissioning, a DEMP would be prepared and implemented by an appointed Contractor to the extent that the infrastructure is fully or partially decommissioned. It is likely that a DEMP would include mitigation measures implemented during the construction phase for the protection of the water environment and	Ensure the protection of the water and soils environment during the decommissioning phase.

Table 9.8: Summary of Embedded Mitigation			
ID	**Phase***	**Description**	**Purpose of Mitigation**
		peat/carbon rich soils. DEMP to be submitted to THC for approval in consultation with SEPA.	
GS02	PC	An outline PMP is provided in **Technical Appendix 9.6 (EIAR Volume 4)**. The appointed Contractor would prepare a detailed PMP prior to the commencement of construction. The PMP would include operational mitigation measures as appropriate. The PMP would be submitted to THC for approval in consultation with SEPA.	Mechanism for implementation of best working practices in relation to peat and soils.
GS03	C	Standard mitigation measures for managing peat slide risk are detailed in **Technical Appendix 9.7 (EIAR Volume 4)**. These measures would be included in the detailed PMP (refer to GS02).	To manage the risk of peat land slide at the Site.
GS04	C	Micrositing tolerances to be used in the event of encountering unexpected pockets of deep peat. All micrositing to be supervised by a EnvCoW or suitably appropriately experienced engineer.	To reduce as far as practicable the potential for loss/disturbance to peat and carbon rich soils.

**PC=Pre-construction, C=construction, O=operation and maintenance and D=decommissioning.*

Design Mitigation

Construction Phase Mitigation

9.6.7 The removal of existing turbine foundations would be carried out to a minimum depth of 0.5 m below existing ground levels, reducing the potential for dewatering to be required. Procedures for the removal of Internal Tracks and crane pads/foundations would be set out in a CEMP which would include measures to ensure surface water runoff from the decommissioning area is suitably managed. Measures could include the use of cut off drains, attenuation ponds and silt fences. Following the reinstatement of ground conditions, measures to treat runoff would remain in situ until vegetation is reestablished or alternative means (such as the use of geotextiles) are put in place to prevent the release of any sediment laden runoff.

9.6.8 Details of construction phase SuDS would be included in the PPP and a CEMP which would be prepared by the appointed contractor. SuDS would incorporate a surface water management and treatment train that would mitigate potential adverse impacts on the hydrology of the Site and surrounding areas during the construction phase. Measures would ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased. A full SuDS solution would be developed prior to the commencement of construction. Construction Site plans and proposed drainage measures would form a PPP that would be compiled by the Principal Contractor.

9.6.9 At the limited number of locations where the Access Route or Internal Tracks are required to cross a watercourse, or where other infrastructure is necessary within 50 m of a surface watercourse, either as described in this chapter or as identified by the EnvCoW, the installation of SuDS measures would be supervised by the EnvCoW during the construction phase of works. Any requirement for monitoring of water quality within watercourses downstream of the Site would be agreed with SEPA. Procedures for this would be detailed in the CEMP.

9.6.10 The two locations where works are proposed within 50 m of a watercourse would be specifically identified within the CEMP. These locations relate to the upgrading of an existing Internal Track and the installation of a construction compound on ground which is already cleared and worked, and work is proposed at these locations to minimise disturbance of currently undeveloped land. Measures that would be overseen by an EnvCoW at these locations could include:

- The installation of silt fences at the downslope extent of works;
- The installation of SuDS measures to prevent the uncontrolled release of sediment laden water from areas on which construction is being carried out (in line with other locations);
- Existing cut of ditches upslope of the existing track would remain in situ and cross drains would be extended to take account of the widening of the Internal Track. This would ensure the continued conveyance of clean surface water runoff to downslope areas (in line with construction methodology for all areas of track upgrades); and
- Works would remain outside of a 15 m buffer from watercourses and waterbodies in line with the SEPA Recommended Riparian Buffer.

9.6.11 Therefore, while development at these locations would be within 50 m of a watercourse or waterbody and would be specifically identified in a CEMP, standard best practice measures would be implemented at these locations prior to the commencement of construction.

Operation Phase Mitigation

9.6.12 A Site maintenance programme for Site plant and infrastructure, including SuDS measures, would be implemented by the Principal Contractor.

9.6.13 A maintenance schedule would be developed for all SuDS and drainage assets installed at the construction stage to ensure that the function and benefit provided by the asset remains for the lifetime of the repowered wind farm.

Decommissioning Phase Mitigation

9.6.14 It is anticipated that at the time of decommissioning, a Decommissioning Environmental Management Plan (DEMP) would be implemented by an appointed contractor to the extent that infrastructure is fully or partially decommissioned. Should full decommissioning of the Site be carried out following the lifespan of the repowered wind farm, the Site would be returned to 'the same' or 'a better' condition such that natural drainage conditions would be replicated, as far as practicably possible based on the intended land use.

9.7 Assessment of Likely Effects

Decommissioning of Novar 1 Wind Farm

Wind Turbine Dismantling

9.7.1 There is the potential impact on receiving soils, groundwater and watercourse quality through the release of contaminated water and stored chemicals used on-Site during decommissioning works. A specialist team would perform this task, which includes draining oil from components like gearboxes and removing hydraulic systems, lubricants, and coolants from each turbine nacelle.

9.7.2 While deeper foundations would remain in-situ, decommissioning of the Novar 1 Wind Farm would require the breaking up and removal of concrete structures and reinforcement (e.g. turbine bases or buildings); the excavation and removal of crushed rock, geotextile or geogrid reinforcement materials; lifting and removal of cables and the dismantling and laying down of turbine components prior to removal. Subsequently, there is the potential

for decommissioning activity to impair the condition of hydrological and hydrogeological resources on and downstream of the Turbine Array.

9.7.3 Measures to ensure the protection of the water environment would be set out in a CEMP and PPP and this impact would only be temporary and limited to the decommissioning phase. Once the associated infrastructure has been removed, conditions would be restored to 'as-before' conditions as far as practical.

The Electrical Substation

9.7.4 There is the potential impact on receiving soils, groundwater and watercourse quality through the release of contaminated water and stored chemicals used on-Site during decommissioning works. The appointed contractor would tap the main transformers and drain all dielectric oil and transfer it into sealed IBCs (Intermediate Bulk Containers) to be transferred to a suitable waste management facility. If polychlorinated biphenyls (PCBs) are found to be present, in the oil, it would be classed as highly regulated hazardous waste and would be sent for specialist high-temperature incineration. UPS batteries would be disconnected, removed from their racks, and palletised for specialist recycling. Management of potentially contaminative materials would be managed through a PPP which would be prepared by the appointed contractor.

9.7.5 Once the associated infrastructure has been removed, soil testing, particularly around the former locations of the transformers, would be undertaken and any contaminated soils would be excavated and safely disposed of. The ground would then be graded and prepared for the construction of the new substation compound at the same location.

On-Site Cabling

9.7.6 As the decommissioning phase would involve the removal of some underground cables, there is the potential impact on surface water flow route, groundwater and watercourse quality and wider environmental disruption.

9.7.7 This impact would only be temporary and limited to the decommissioning phase. Once the associated infrastructure has been removed, conditions would be restored to 'as-before' conditions as far as practical.

9.7.8 On this basis, there is **not likely to be any significant effects** during the decommissioning phase of the Novar 1 Wind Farm.

Construction of Repowered Wind Farm

Alteration to Surface Water Flows and Runoff

9.7.9 There is the potential for an adverse impact on runoff volumes and rates and fluvial morphology through the alteration of drainage patterns which would be mitigated through the implementation of best practice measures as outlined and set out in the CEMP. The design of watercourse crossings and drainage features associated with infrastructure would be in line with the Controlled Activities Regulations (CAR) and set out in a Construction Site License in consultation with SEPA and THC. Where encroachment to within a 50 m buffer from watercourses has been identified, additional mitigation measures have been set out to further reduce the potential magnitude of alteration to surface water flows and runoff to none. The sensitivity of receiving watercourses is High. Taking in to account embedded mitigation and the implementation of best practice construction measures to be detailed in a CEMP that would be prepared by the Principal Contractor, the magnitude of impact would be small and therefore have the potential to result in a Minor adverse and **not significant** effect. Potential minor effects during the construction phase would be short term and reversible.

Sedimentation and Increased Erosion Rates

9.7.10 There is the potential for adverse impact on water quality and fluvial morphology associated with sediment-laden runoff and impacts on bank integrity. This has been taken into account in the design of the Proposed Development through the implementation of a suitable buffer to watercourses from areas in which infrastructure is proposed. Furthermore, SuDS design would ensure the capture of any additional sediment load that could be released in the construction phase. Where a section of Internal Track is proposed within a 50 m buffer of a watercourse, the implementation of additional sediment control measures would be overseen by the EnvCoW, who would also carry out daily inspection of sediment control measures and the watercourse. The sensitivity of watercourses is High. Taking embedded mitigation into account and the implementation of best practice construction measures to be detailed in a CEMP that would be prepared by the Principal Contractor, the magnitude of impact would be small and therefore have the potential to result in a Minor adverse and **not significant** effect. Potential minor effects during the construction phase would be short term and reversible.

Upgrades to Watercourse Crossings

9.7.11 Upgrades to the existing watercourse crossings would be needed to improve the quality and condition of the existing culverts. As such there is the likelihood of environmental disruption in the area and an increase of sediment leaching into the watercourse.

9.7.12 The upgraded crossings would be modelled to accommodate the 1 in 200 years plus climate change event and all associated upgrade works would be undertaken following best practice procedures and conditions would be returned to 'as before' conditions once construction works have ceased. The likely level of EASR authorisation required for crossings and standard design principles are set out in **Technical Appendix 9.2: Watercourse Crossing Assessment (EIAR Volume 4)**. An appointed contractor would be responsible for obtaining applicable permits for engineering, prior to the commencement of construction. The sensitivity of watercourses is High. Taking in to account embedded mitigation and the implementation of best practice construction measures to be detailed in a CEMP that would be prepared by the Principal Contractor, the magnitude of impact would be small and therefore have the potential to result in a Minor adverse and **not significant** effect. Potential minor effects during the construction phase would be short term and reversible.

Chemical Pollution

9.7.13 There is the potential to impact on receiving soils, groundwater and watercourse quality through the release of contaminated water and stored chemicals used on-Site during construction works. There could be potential effects on water quality and indirect effects on aquatic ecology. However, pollution prevention measures would be implemented through the CEMP and the PPP to prevent the release of pollutants to the water environment. In the unlikely event of an accidental release of potentially contaminative material, clean up procedures set out in the CEMP would be followed and SEPA would be notified of any release of pollutants to controlled waters. The sensitivity of watercourses is High. Taking in to account embedded mitigation and the implementation of best practice construction measures to be detailed in a CEMP and a PPP that would be prepared by the Principal Contractor, the magnitude of impact would be small and therefore have the potential to result in a Minor adverse and **not significant** effect. Potential minor effects during the construction phase would be short term and reversible.

Private Water Supplies

9.7.14 There is the potential for construction activities to lead to an alteration in the quality or quantity of water abstracted for PWS. All proposed turbine locations and the borrow pit search area is located outwith a 250 m buffer from PWS locations and therefore outside of

an area within which SEPA would require that assessment of potential hydrogeological assessment would be required (for excavations deeper than 1 m).

9.7.15 Further detail of assessment of PWS locations is provided in **Technical Appendix 9.4: Private Water Supply Assessment (EIAR Volume 4)** and has been carried out in line with SEPA guidance[46]. At two locations, PWS sources (springs) have been identified within 250 m of the existing Access Route/Internal Track that would be upgraded for the Proposed Development. No requirement for cut or fill works has been identified at these locations and dewatering would not be required for Internal Track upgrading works. While shallow excavations may be required for sub-surfacing of the upgraded track, it is considered unlikely that excavations would exceed 1 m in depth. At one of these locations (PWS2), the abstraction source is located approximately 77 m upslope of the proposed upgrade. PWS 1 is located approximately 100 m west of the nearest area of proposed upgrade works and is therefore at the margin of the extent at which SEPA consider shallow excavations could impact groundwater abstractions. On the basis of the scale of development activity at locations within 250 m of PWS and the buffer maintained to PWS sources, the potential impacts to groundwater abstractions are Low or Unimportant, on the basis of SEPA's matrix to be considered when assessing the potential impacts of development on groundwater abstractions.

9.7.16 As the potential impacts to groundwater abstractions are Low or Unimportant, no further risk assessment is required in line with SEPA guidance, and the magnitude of impact would be small and therefore have the potential to result in a minor adverse and **not significant** effect.

Potential for loss/disturbance to peat and carbon rich soils

9.7.17 The Proposed Development has the potential to effect peat and carbon rich soils during the construction phase through changes that could occur due to:

- Compaction of soils/peat from vehicles and infrastructure;
- Potential for increased erosion of peat soils through disturbance, either through direct disturbance or localised drying caused by infrastructure;
- Potential for peat slide caused by the construction of infrastructure which could affect human and environmental receptors (particularly those areas of Internal Track identified as having moderate risk); and
- Loss of peatland habitats and carbon rich soils through excavations for infrastructure including turbines, substation and Internal Tracks.

9.7.18 On the basis of peat surveying carried out at the Study Area, a design strategy has been implemented such that much of the area where development is proposed has either no peat present or has a shallow organic layer present in the soil (<0.5 m depth). These areas are considered as organo-mineral soils. Some localised areas have peat up 1.5 m in depth, however in general, these areas are also highly modified and are assessed to be of low sensitivity. The impact on these areas is of small magnitude on the basis that the impact is highly localised and would not have any material effect on the integrity of peatland habitats. In the absence of further specific mitigation, the effects are negligible and **not significant**.

9.7.19 While consideration has been given in the design process to avoid locating infrastructure over areas of deep peat where practicable, it has not been possible to completely avoid impacts. This is as a result of the need to take a holistic view of a wide range of technical and environmental constraints, including technical reasons such as the need to orientate areas of hardstanding and tracks optimally taking account of topography to minimise cut

[46] SEPA, 2024. Guidance on Assessing the Impacts of Development on Groundwater Abstractions. https://www.sepa.org.uk/media/mfzpnjwb/guidance-on-assessing-the-impacts-of-developments-on-groundwater-abstractions.docx

and fill requirements and avoiding features such as watercourses for example, and also the presence of other environmental constraints such as heritage, landscape and ecology/ ornithology receptors. Where it has not been possible to avoid impacts, it has been assumed that industry standard construction techniques and methodologies can be used to reduce the disturbance of peat and carbon rich soils, including micro-siting within defined tolerances, and reduced excavation. Where impacts are identified on areas of peat considered to be of medium or high sensitivity, the impacts are of small magnitude on the basis that the impacts are highly localised and represent a very small (<5 %) proportion of the peat resource within the Survey Area. On this basis, the effects would be minor adverse and **not significant**.

Operation of Proposed Wind Farm

Alteration to Surface Water Flows and Runoff

9.7.20 There is the potential for hardstanding surfaces and compacted tracks and infrastructure to lead to increased rates of surface runoff, in turn leading to the potential for increased risk of surface erosion and downstream flood risk; however, the Proposed Development would incorporate a drainage design using SuDS principles in accordance with The SuDS Manual (C753) 2015[47]. Taking into account embedded mitigation by design and the implementation of a SuDS maintenance plan (which would be submitted to THC for approval under planning condition), the magnitude of impact would be small and therefore have the potential to result in a minor adverse and **not significant** effect.

Sedimentation and Increased Erosion

9.7.21 There is the potential that alteration of runoff volumes and rates could alter fluvial morphology during the operational phase or lead to increased erosion rates (increasing sediment loads) if surface water runoff from impermeable areas is not appropriately managed. The potential risk of the release of sediment from the activities relating to the operational phase of the Proposed Development is substantially lower than during construction because of the decreased levels of ground disturbance and the reinstatement of vegetation following the construction phase. Taking in to account embedded mitigation by design and the implementation of a SuDS maintenance plan (which would be submitted to THC for approval under planning condition), the magnitude of impact would be small and therefore have the potential to result in a minor adverse and **not significant** effect.

Chemical Pollution

9.7.22 Maintenance and repair of turbines and the electrical substation would be required during the operational phase, which could involve the operation of plant at the Proposed Development and the handling of potentially contaminative materials (such as insulating or lubricating oils). There is the potential for the release of small volumes of fuel from plant or for the accidental release of contaminative materials transported onto the Site for maintenance. Taking into account the implementation of best practice management of materials handling on the Site and planning for the unlikely event of the accidental release of fuels or oils during maintenance, the magnitude of impact would be small and therefore have the potential to result in a minor and **not significant** effect.

Decommissioning of Repowered Wind Farm

9.7.23 It is anticipated that at the time of decommissioning, a DEMP would be implemented by the appointed Contractor to the extent that infrastructure is fully or partially decommissioned. Should full decommissioning of the Site be carried out following the lifespan of the Proposed Development, the Site would be returned to 'the same' or 'a better' condition such that

[47] URL: https://www.susdrain.org/resources/SuDS_Manual. html [Accessed December 2025]

natural drainage conditions would be replicated, as far as practicably possible based on the intended land use.

9.7.24 While the risks to geology and soils and hydrology are similar to those identified during the construction phase, decommissioning could require the breaking up and removal of concrete structures and reinforcement (e.g. turbine bases, transformers substations or buildings); the excavation and removal of crushed rock, geotextile or geogrid reinforcement materials; lifting and removal of cables and the dismantling and laying down of turbine components prior to removal.

9.7.25 During the decommissioning phase there is the potential for construction activity to impair the condition of hydrological and hydrogeological resources on and downstream of the Turbine Array. NatureScot commissioned research[48] identifies potential risks to the ground and surface water environment; these may include the potential for:

- Bank instability and increased erosion leading to effects on the quality of aquatic habitats and ecology;
- Establishing rapid drainage paths leading to the potential for increased pollution extent;
- The drainage of water dependent habitats;
- Sedimentation and pollution from suspended materials leading to effects on fisheries and protected habitats/species;
- Spills of fuels and oils from vehicles, turbine gearboxes and transformers leading to effects on fisheries and protected habitats/species; and
- Soil compaction leading to increased runoff and erosion potential leading to effects on fisheries and protected habitats/species.

9.7.26 Taking in to account the implementation of best practice construction measures to be detailed in a Decommissioning Environmental Management Plan (DEMP) and PPP that would be prepared by the Principal Contractor during the decommissioning phase, the magnitude of impact would be small and therefore have the potential to result in a minor adverse and **not significant effect**.

Potential Cumulative Effects

9.7.27 The potential for cumulative effects to occur have been assessed based on:

- The potential hydrological connection of other developments, which are the subject of a valid planning application;
- The potential for concurrent phases of construction with other developments with the potential for hydrological connection to the Turbine Array; and
- Applicable planning conditions with regards to the potential impact of other developments on the water environment.

9.7.28 The following cumulative developments have been taken into account in assessing the potential for cumulative effects from the hydrological interaction with the Proposed Development:

- Spittal to Loch Buidhe to Beauly 400 kV OHL Connection: in-planning, 500 m east of the Site (crosses Access Route);
- Ceislein Wind Farn: in-planning, 11 turbines, 1 km west of the site;
- Abhainn Dubh Wind Farm: in-planning, 9 turbines, 3 km south of the Site;

[48] NatureScot, 2026. Guidance - Decommissioning and Restoration Plans for wind farms. Version 2. Available online: https://www.nature.scot/doc/guidance-decommissioning-and-restoration-plans-wind-farms-february-2016

- Strathrory Wind Farm: approved, 7 turbines, 10 km northeast of the Site;
- Kirkan Wind Farm: approved, 17 turbines, 17 km west of the Site;
- Lochluichart Wind Farm extension: operational, 17 turbines, 20 km west of the Site; and
- Lochluichart Wind Farm extension II: approved, 5 turbines, 20 km west of the Site.

Potential Cumulative Construction Effects

9.7.29 Potential cumulative environmental impacts to water resources have been assessed where concurrent proposed wind farm sites or construction activity may be in hydrological connection with the Proposed Development, or water resource receptors.

9.7.30 The proposed Spittal to Loch Buidhe to Beauly 400 kV OHL Connection is located approximately 500 m east of the Proposed Development. The OHL route is adjacent to the Access Route to the east of the Turbine Array and crosses the Access Route at two locations. The OHL route to the west of the Proposed Development is within the catchment of Allt Leacach (which flows to Allt na Seasgaich). Turbine 9 of the proposed repowered wind farm, the easternmost construction compound and the Access Route would be situated within at the upper extent of the Allt Leacach catchment (in the west of the catchment) and there is potential for hydrological connection between the two schemes. However, Turbine 9 and the construction compound (at the location of an existing turbine) are 1 km west of Allt Leacach and the substation (at the location of the existing control building) is approximately 380 m west of Allt na Seasgaich. The Access Route is approximately 250 m west of Allt Leacach and follows the path of an existing access track. Therefore, due to the limited scale of the Proposed Development within the shared catchment of Allt Leacach, the distance from the watercourse and the implementation of embedded mitigation at both development sites (were construction concurrent), any cumulative effects would be of a small magnitude. Additionally, due to the limited productivity of the underlying aquifers in the area (Low to Moderate productivity) there is assessed to be a Low chance of cumulative hydrogeological effects.

9.7.31 The proposed Ceislein Wind Farm is located approximately 1 km east of the Turbine Array and directly to the east of an Internal Track. The proposed Ceislein Wind Farm turbine locations are within the catchment of Allt Leacach. Due to the limited scale of the Proposed Development within the shared catchment of Allt Leacach, the distance from the watercourse and the implementation of embedded mitigation at both development sites (were construction to be undertaken concurrently), any cumulative effects would be of a small magnitude. Additionally, due to the limited productivity of the underlying aquifers in the area (Low to Moderate productivity) there is assessed to be a Low chance of cumulative hydrogeological effects.

9.7.32 For the Abhainn Dubh Wind Farm, it can be concluded that due to the distance to the Site and the limited productivity of the underlying aquifers in the area (Low to Moderate productivity) there is assessed to be a Low risk of cumulative hydrogeological effects on the water environment.

9.7.33 All the developments considered above would be subject to the same planning and regulatory requirements as the Proposed Development, with regards to protection of the water environment. At each site this would include management of construction activities under an authorisation by SEPA and the implementation of construction environmental management procedures. There is a very low likelihood of cumulative impacts during the construction phase of the Proposed Development. The potential magnitude of cumulative impacts during the construction phase would be small and therefore have the potential to result in a Minor and **not significant** effect.

Potential Cumulative Operational Effects

9.7.34 The potential for impacts on the water environment is significantly lower during the operational phase of the Proposed Development and cumulative schemes assessed above. At all cumulative schemes, drainage design for the implementation of SuDS measures would prevent alteration of runoff rates and hydrological conditions in the surrounding area. Additionally, pollution prevention measures would be implemented for the management of any potentially deleterious materials. There would be no cumulative impact on the water environment as a result of the potential interaction of the Proposed Development with operational wind farms.

Potential Cumulative Decommissioning Effects

9.7.35 All the developments considered above would be subject to the same planning and regulatory requirements as the Proposed Development regarding the protection of the water environment. At each site, this would include the management of decommissioning activities under an authorisation by SEPA and the implementation of environmental management procedures. There is a very low likelihood of cumulative impacts during the decommissioning phase of the Proposed Development. The potential magnitude of cumulative impacts during the decommissioning phase would be small and therefore likely to result in a Minor and **not significant** effect.

9.8 Additional Mitigation and Enhancement Measures

Design Mitigation

9.8.1 The Proposed Development has been subject to a number of design iterations and evolution in response to constraints identified as part of the baseline studies, intended to reduce environmental effects. As such, no additional design mitigation is anticipated to be required.

9.8.2 The design of the Proposed Development has been set out such that the number of watercourse crossings would be minimised. Design of new watercourse crossings would maintain hydraulic connectivity and allow the free passage of fish and other wildlife beneath. Watercourse crossings would also be of sufficient size so as not to restrict or concentrate flows downstream and to convey flows during periods of heavy rainfall (e.g., 1 in 200-year event plus climate change allowance).

Construction Phase Mitigation

9.8.3 The **PLHRA (Technical Appendix 9.7, EIAR Volume 4)** identified that micrositing of infrastructure following additional post-consent ground investigation and detailed design, is to be undertaken to reduce the risk of potential landslide effects, and where micrositing is not practicable, then excavation of the peat to remove the potential risk would be required.

9.8.4 In relation to effects on peat and carbon rich soils, in line with the principles of the mitigation hierarchy under National Planning Framework 4[14], further specific mitigation is proposed. This specific mitigation aims to further reduce non-significant effects on peat and carbon rich soils and provide offsetting (reinstatement) of peatland that would be disturbed by the Proposed Development through implementation of a detailed PMP and enhancement of some of the currently degraded peatland habitats present on the Site as set out in **Chapter 7: Ecology (EIAR Volume 2)**.

9.8.5 The mitigation approach for the Proposed Development uses a combination of reuse and restoration which has formed the peat management strategy as described in the outline PMP (**Technical Appendix 9.6 in EIAR Volume 4**).

9.8.6 The primary reuse strategy for excavated peat at the Proposed Development is to reinstate temporary construction areas, including borrow pit, and to restore peat within permanent

infrastructure locations e.g. turbine foundations/areas of hardstanding, as set out in Table 9.6.2 of the outline PMP (**Technical Appendix 9.6 in EIAR Volume 4**).

9.8.7 At this stage it is estimated that the Proposed Development would result in the excavation of approximately 60,358 m^3 of peat including peaty/organo-mineral soils (comprising approximately 33,511 m^3 acrotelmic peat and 26,847 m^3 of catotelmic peat).

9.8.8 Potential reinstatement opportunities for excavated peat, comprising temporary infrastructure reinstatement, and borrow pit restoration are estimated to be 56,466 m^3, which demonstrates that most of the excavated peat can be reused for reinstatement opportunities.

9.8.9 It is also noted that excavated peat could be reused for the restoration and enhancement of habitats at the Site for example the infilling of artificial drainage channels and erosion features and gullies. The Outline Biodiversity Enhancement and Management Plan (OBEMP) (**Technical Appendix 7.4 in EIAR Volume 4**) outlines that 135.7 ha of peatland habitat would be restored within the Site. In addition, 12 ha for peatland restoration may also be available either within land controlled by Novar Estates, or at another appropriate location subject to the outcome of ongoing landowner engagement. In combination, this would achieve a 1:10 lost/restoration of bog habitats and enhancement of 10% of the baseline, as recommended by NatureScot.

9.8.10 At the limited number of locations where an Internal Track is required to cross a watercourse, or where other infrastructure is necessary within 50 m of a surface watercourse, either as described in this chapter or as identified by the EnvCoW, the installation of SuDS measures would be supervised by the EnvCoW during the construction phase of works. Any requirement for monitoring of water quality within watercourses downstream of the Proposed Development would be agreed with SEPA. Procedures for this would be detailed in the CEMP and these locations would be specifically identified by the contractor.

Operation Phase Mitigation

9.8.11 A site maintenance programme for Site plant and infrastructure would be implemented by the Principal Contractor.

9.8.12 A maintenance schedule would be developed for all SuDS and drainage assets installed at construction stage to ensure that the function and benefit provided by the asset remains for the lifetime of the Proposed Development.

Decommissioning Phase Mitigation

9.8.13 No additional mitigation is expected to be required during the decommissioning of the repowered wind farm.

9.9 Significant Residual Effects

Decommissioning of Novar 1 Wind Farm

9.9.1 No significant residual impacts to the hydrological, hydrogeological and geological environment are anticipated during the decommissioning phase of the existing Novar 1 Wind Farm.

Construction of Proposed Development

9.9.2 No significant residual effects to the hydrology, hydrogeology and soils are anticipated during the construction phase of the repowered wind farm.

Operation of Proposed Development

9.9.3 No significant residual effects to the hydrology, hydrogeology and soils are anticipated during the operational phase of the repowered wind farm.

Decommissioning of the Proposed Development

9.9.4 No significant residual effects to the hydrology, hydrogeology and soils are anticipated during the decommissioning phase of the repowered wind farm.

Cumulative Effects

9.9.5 No significant residual impacts to the aforementioned cumulative schemes and their associated water environment are anticipated during the construction, operation or decommissioning phases.

9.10 Monitoring

9.10.1 Assessment of the potential impacts to hydrology, hydrogeology and soils has shown that based on the implementation of embedded mitigation and best practice working measures, no significant effects are anticipated during decommissioning of the existing Novar 1 Wind Farm or the construction, operation or decommissioning of the repowered wind farm. Therefore, no surface water or groundwater monitoring is proposed.