# CONTENTS



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



**Appendices (Volume 4 of this EIA Report)**

# 12. HYDROLOGY, HYDROGEOLOGY, GEOLOGY AND SOILS

## 12.1 Introduction

12.1.1 This chapter considers the potential effects of the proposed Hurlie 400 kV substation on hydrology, hydrogeology, geology, soils and flood risk in relation to the construction and operation of the Proposed Development. The assessment includes potential effects on water quality, flood risk and drainage, groundwater abstractions, private water supplies, peat and groundwater dependent terrestrial ecosystems (GWDTE). Evaluation of the existing baseline environment has been made through a combination of desk-based study, field surveys, 2D modelling of the Burn of Day and consultation.

12.1.2 The chapter objectives with regards to the Proposed Development are as follows:

- Describe the existing baseline environment;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects (if required); and
- Assess the residual effects remaining following the implementation of mitigation (if required).

12.1.3 This chapter presents information relevant to the Proposed Development. It should be read in conjunction with **Chapter 3: Description of the Proposed Development (Volume 2)** of the EIA Report for full details of the Proposed Development.

12.1.4 This chapter should also be read alongside **Chapter 10: Ecology** due to interactions between both chapters in terms of the potential effects on water quality (and indirectly aquatic ecology) and GWDTE.

12.1.5 The assessment was undertaken by Kaya Consulting Limited. It has been prepared and overseen by experienced hydrologists, engineers and geologists, with appropriate memberships of the Chartered Institution of Water and Environmental Management (CIWEM) and the Institute of Civil Engineers (ICE) and considerable experience of Flood Risk Assessments (FRA) and EIA in the context of wind farm, grid and mixed-use developments in Scotland. Field surveys and data collection were undertaken by hydrologists with extensive experience in FRA and hydrology assessments. Further details can be found in **Chapter 2: EIA Report**.

12.1.6 The following terminology will be referred to throughout this chapter:

- Site: all land within the planning application (red line) boundary (**Figure 1.1: Site Location**);
- Proposed Development: The infrastructure including the platform, bays, control buildings, access tracks, drainage and landscape features and temporary construction compounds (see **Chapter 3: Description of the Proposed Development**);
- Study Area: The study area comprises the Site and watercourses and catchments upstream and downstream;
- Private Water Supply: In Scotland, private water supplies (PWS) are defined as those that are not provided by Scottish Water. It is the owner's responsibility to manage the supply and keep it safe. Private water supplies are regulated by local authorities. There are two types of private water supply (PWS), and the legislation relating to each is different. Larger PWS or those with a commercial activity are defined as 'regulated supplies'. Smaller PWS that only serve domestic properties are classified as 'exempt supplies'.

## 12.2 Scope of the Assessment

*Effects Assessed in Full*

12.2.1 This assessment presents the likely effects of construction and operation of the Proposed Development upon geological, hydrological and hydrogeological receptors as identified in the EIA Scoping Report and informed by review of desk-based information and field surveys, project design and embedded and applied mitigation.

12.2.2 The EIA Scoping process, baseline conditions and professional judgement has identified the following direct and cumulative effects for detailed assessment:

- Temporary (construction phase) pollution of surface watercourses, waterbodies, groundwater and subsequent impacts on the quality of PWS, where relevant buffers cannot be achieved;
- Effects during construction and operation on run-off rates and flood risk, where relevant buffers cannot be achieved;
- Effects during construction on quality and quantity of PWS abstractions reliant upon groundwater resources that have subsurface flows or hydraulic connectivity impacted adversely by construction;
- Potential for loss/disturbance/erosion of peat and carbon-rich soils during construction, although given the small areas of peat within the Site it is likely that peat can be avoided; and
- Cumulative effects during operation and construction.

12.2.3 With Embedded and Applied Mitigation many potential significant effects on the water environment can be avoided or reduced, including effects on water quality, run-off rates and flood risk to the downstream water environment. However potential significant effects could occur locally at areas where watercourse buffers have not been achieved (i.e. watercourse crossings) or at local PWS/groundwater abstractions where buffers cannot be achieved.

12.2.4 The assessment will be in line with Policy 22 of the National Planning Framework 4 (NPF4) and the requirements of Scottish Environment Protection Agency (SEPA) and Aberdeenshire Council, as outlined in their consultation responses (see **Table 12.1: Summary of Consultation** below). With reference to flood risk, the 200-year plus climate change return period event is considered when assessing and modelling flood risk areas.

*Effects Scoped Out*

12.2.5 On the basis of the desk based and field survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects, policy guidance or standards and feedback received from consultees, the following effects have been 'scoped out' of detailed assessment, as proposed in the EIA Scoping Report:

- Potential adverse effects on solid geology during construction and operation. There are no highly sensitive geological receptors such as geological SSSIs or highly productive underlying aquifers within the Proposed Development area. Any excavation for the Proposed Development will be localised with no significant adverse effects on bedrock geology predicted;
- Potential adverse effects on water quality, flood risk, PWS and groundwater abstractions during construction and operation if appropriate buffers from watercourses and sensitive receptors have been achieved. Embedded and Applied mitigation (described below) will mitigate potential effects on the water environment and reduce run-off from the Proposed Development to greenfield rates.

12.2.6 Potential effects on GWDTE, as no GWDTE were present within the Site. A hydrological survey of the potential GWDTE habitats identified in the ecology study area (refer to **Figure 10.3.2: Areas of Guidance-stated Potential Groundwater Dependency**) confirmed that the habitats are mainly surface water fed (e.g. from the Burn of Day or associated with forest drainage in the rides) and are not groundwater dependent and therefore are not GWDTE. There was very little evidence of any groundwater contribution at any of the locations.

*Study Area*

12.2.7 The study area for hydrology and hydrogeology comprises the Site and watercourses and catchments upstream and downstream, see **Figure 12.1: Hydrology and Hydrogeology Study Area**. The study area for geology, hydrogeology and soils comprises the area within the Site boundary. The search area for private water supplies comprises a 1 km buffer from the Site. Existing conditions of the study area are described in **Section 12.4: Baseline Conditions**.

## 12.3 Assessment Methodology

*Legislation, Policy and Guidance*

*Legislation*

12.3.1 This assessment is carried out in accordance with the principles contained within the following legislation:

- The Flood Risk Management (Scotland) Act 2009;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR);The Water Framework Directive (2000/60/EC) (WFD), and Water Environment and Water Services (Scotland) Act (WEWS Act) 2003;
- The Pollution Prevention and Control (Scotland) Regulations 2012;
- The Town and Country Planning Act (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations');
- The Scotland River Basin District (Standards) Directions 2014;
- The Scotland River Basin District (Status) Directions 2014
- The Public Water Supplies (Scotland) Regulations 2014;
- The European Drinking Water Directive (Council Directive 98/83/EC);
- The Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017;
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013; and
- The Waste Management Licensing (Scotland) Regulations 2011.

*Policies and Guidance*

12.3.2 The following policies and guidance have been considered:

- Scottish Government 2024 National Planning Framework (NPF) 4: Policy 22 (Flood Risk Management);
- Aberdeenshire Local Development Plan 2023 Policy C4 Flooding and Policy PR1 Protecting Important Resources;
- Aberdeenshire Council 2023 Buffer Strips - Planning advice PA2023-16, September 2023;

Aberdeenshire relevant policy/guidance re SUDS/FRA – check FRA;

- SEPA: Policy No. 19, Groundwater protection policy for Scotland, 2009;
- SEPA's Guidance for Pollution Prevention (GPPs), including:
  - GPP1: Understanding your environmental responsibilities – good environmental practices;
  - GPP2: Above ground oil storage tanks;
  - GPP4: Treatment and disposal of wastewater where there is no connection to the public foul sewer;
  - GPP5: Works and maintenance in or near water;
  - GPP6: Working at construction and demolition sites;
  - GPP8: Safe storage and disposal of used oils;
  - GPP21: Pollution incident response planning;
  - GPP22: Dealing with spills; and
  - GPP26: Safe storage – drums and intermediate bulk containers.
- Scottish Government Planning Advice Notes (PANs) and Guidance (including PAN 51 Planning, Environmental Protection and Regulation; PAN 1/2013 Environmental Impact Assessment, as amended; and PAN 79 Water and Drainage);
- Scottish Executive: River crossings & migratory fish: Design guidance, 2012;
- Scottish Water standards and policies, including Sewers for Scotland 3rd edition, 2015 and Water for Scotland 3rd edition, 2015;
- SEPA: Technical Flood Risk Guidance for Stakeholders, version 13 (SEPA, June 2022);
- SEPA: The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide v9.4, July 2024;

- SEPA: Position Statement to support the implementation of the Water Environment (Controlled Activities) (Scotland) Regulations 2011, WAT-PS-06-02: Culverting of Watercourses - Position Statement and Supporting Guidance, Version 2, June 2015;
- SEPA: Engineering in the Water Environment Good Practice Guide – River Crossings, WAT-SG-25, 2010;
- SEPA: Engineering in the Water Environment Good Practice Guide – Temporary Construction Methods, WAT-SG-29, 2009;
- SEPA: Controlled Activities Regulations (CAR) Flood Risk Standing Advice for Engineering, Discharge and Impoundment Activities;
- SEPA: Flood Risk Standing Advice, July 2024;
- SEPA: Sector Specific Guidance: Construction Sites, WAT-SG-75, 2021;
- SEPA: Special requirements for civil engineering contracts for the prevention of pollution, WAT-SG-31, 2006;
- SEPA: Land Use Planning System, SEPA Guidance Note 31 (LUPS-31): Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, 2017;
- SEPA: Flood Risk and Land Use Vulnerability Guidance, July 2024;
- SEPA: Climate change allowances for flood risk assessment in land use planning, version 5, August 2024;
- SEPA: SEPA's Triage Framework. Guidance for Planning Authorities and SEPA. December 2022;
- SEPA: Recommended Riparian Corridor Layer for use in Land Use Planning, July 2024;
- Forest Research: The UK Forestry Standard, 5th Edition, Forestry Commission, Scottish Forestry, Natural Resources Wales & Forest Service, 2023;
- CIRIA: The SuDS Manual (C753) 2015;
- CIRIA: Control of water pollution from construction Sites: Guidance for consultants and contractors (C532) 2001;
- CIRIA: Groundwater Control – design and practice (C515) 2016; and
- Scottish Government, Scottish Natural Heritage & SEPA (2017) Peatland Survey – Guidance on Developments on Peatland.

*Consultation*

12.3.3 In undertaking the assessment, consideration has been given to the consultation responses which has been undertaken as detailed in **Table 12.1: Summary of Consultation**.

**Table 12.1: Summary of Consultation**

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| Aberdeenshire Council<br>24 May 2024<br><br>It is noted that the council response contains comments from SEPA, NatureScot and the relevant council departments (including Flood Risk and Coastal Protection, Natural Environment, Environmental Health and Contaminated Land) | Pre-Application Consultation | Impact on Peat: The proposed site includes an area of Class 5 soils at the eastern boundary of the site at the Burn of Baulks. SEPA requested the results of the peat probing and a map showing the location of the pocket of peat are submitted alongside any future planning application. Any outline CEMP should ensure the peatland area remains undisturbed. If there is potential to improve the condition of this peatland area, for example with the removal of forestry and undertaking forest to bog restoration SEPA would welcome this being explored further. | The Phase 1 peat survey report and figures (**Appendix 12.3**) was also submitted with the Scoping Report. The Proposed Development avoids this peat area, and the outline CEMP will include a Draft Peat Management Plan (PMP) which notes that this small peatland area should remain undisturbed. |
| | | Waste Management: if forestry is present on the site, SEPA prefer a site layout which avoids large scale felling as this can result in large amounts of waste material and a peak in release of | Proposed felling and management are described in **Chapter 7: Forestry**. Forestry felling and removal will follow |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | nutrients which can affect local water quality. The submission must include a map with the boundaries of where felling will take place and a description of what is proposed for this timber. | the good practice guidance and legal requirements set out in Section 9 (Forests and Water) of the UK Forestry Standard (2023), Runoff management and pollution control during forestry removal will be in place to protect local water quality. |
| | | Private Water Supplies (PWS): A survey report is requested to show that the proposals would not adversely affect PWS on or near the proposed Site.<br>Within 1 km of the redline boundary SEPAs GIS shows PWS for Smiddy Cottage, Whitehill, Clachanshiels, Bossholes and Tentyhillock to the north and one at Fetteresso substation. Several minor watercourses within and adjacent to the site boundary appear to be the source for a number of surface water PWS within and outwith the site. | A PWS survey and assessment is included within this Chapter.<br>PWS questionnaires were sent to all remote properties within 1km of the redline boundary to find out more information on nearby PWS (e.g. source locations). This data was used to inform the baseline assessment. |
| | | Flood Risk: To fully consider flood risk to the site the applicant may need to submit a Flood Risk Assessment (FRA) which must consider flood risk from all sources.<br>New or upgraded crossings must be designed to accommodate the 0.5% Annual Exceedance Probability flows (with an appropriate allowance for climate change), or information provided to justify smaller structures. Provided watercourse crossings are designed to accommodate the 1 in 200 year event plus climate change and other infrastructure is located well away from watercourses, SEPA does not foresee, from current information, a need for detailed information on flood risk. | An initial flood risk assessment has been undertaken and is provided in **Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy**.<br>The Proposed Development avoids flood risk areas and all infrastructure is located outwith recommended buffers from watercourses. |
| | | Drainage: The Council's Flood Risk Team require a Drainage Impact Assessment/Drainage Statement, prepared in accordance with Council Guidelines. This should cover:<br>• all potential phases of the application;<br>• details of surface water soakaways (if used);<br>• attenuation calculations to show that on-site surface water drainage system has adequate storage capacity for a 30 year return period rainfall event;<br>• Prior to a controlled discharge, runoff should be controlled as a minimum to the pre-development runoff rate. The pre-development runoff rate should be confirmed and a reduction made for any areas not included in the drainage design; | The drainage design has been prepared in accordance with Council Guidance<br>The on-site surface water drainage system has adequate storage capacity for a 30 year return period rainfall event prior to a controlled discharge into a nearby watercourse, controlled as a minimum to the pre-development runoff rate (**Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy).** |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | • Soakaway or attenuation system construction details (including discharge control if necessary);<br>• A statement on how future maintenance of the proposed drainage system will be performed and confirmation of who will be responsible;<br>• Confirmation that any existing site or field drainage will be located and suitably altered, if indeed disturbed and;<br>All calculations must be approved and certified by a suitably qualified person. | |
| | | <u>GWDTE:</u> Roads, excavations and other works associated with developments can disrupt groundwater flow and negatively impact on GWDTE. The layout and design of the Proposed Development must avoid impacts on such areas. A National Vegetation Classification survey which includes the following information should be submitted:<br>• A map demonstrating all GWDTE outwith a 100 m radius of all excavations shallower than 1m and outwith 250 m of all excavations deeper than 1 m. The survey needs to extend beyond the site boundary where the distances require it.<br>• If the minimum buffers cannot be achieved, a detailed site specific qualitative and/or quantitative risk assessment will be required. | Ecology surveys identified three areas of *potential* GWDTE based on habitat surveys within the Site (see **Chapter 10, Figure 10.2.3: Areas of guidance-stated potential groundwater dependency**)<br>The potential GWDTEs were confirmed by hydrological assessment to be mainly surface water fed and are not ground water dependent. Therefore, they are not GWDTE and there are no GWDTEs within the Site. |
| | | <u>Protection of the water environment:</u> Aberdeenshire Council requires buffer strips adjacent to watercourses within development sites to protect the water environment. Further detail can be found in Aberdeenshire Council's (2023) Planning Advice on Buffer Strips document.<br>The Rivers Cowie and Carron are fishing rivers and early engagement with the Dee District Salmon Fisheries Board is encouraged.<br>SEPA notes that the indicative site layout appears to avoid direct impacts on the existing water features apart from one new watercourse crossing and possibly several upgrades to existing watercourse crossing on the existing access track. The final planning submission must include a map showing:<br>• All proposed temporary or permanent infrastructure overlain with all watercourses;<br>• A minimum buffer of 15m around each watercourse (including earthworks). If this minimum buffer cannot be achieved each breach must be numbered on a plan with an | A minimum buffer of 15m from most watercourses has been achieved for the Proposed Development and there is no development in flood risk areas, based on SEPA future flood maps. Due to gradient constraints, a 10m buffer was achieved between the new construction track and the upper reach of the Burn of Baulks. This is detailed in **Appendix 12.2: Watercourse Crossing and Buffer Assessment**<br>Watercourses and relevant buffers are shown in **Figure 12.1: Hydrology and Hydrogeology Study Area** with proposed temporary and permanent infrastructure. Proposed and existing watercourse crossings are also shown. |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | associated photograph of the location, dimensions of the watercourse and drawings of what is proposed in terms of engineering works. Measures should be put in place to protect any downstream sensitive receptors;<br>• A map showing each watercourse crossing and a schedule of each crossing and the proposed method of crossing/upgrading. SEPA would welcome the replacement of any existing closed culverts with open arch culverts/bridges where possible; and<br>• Water Environment Enhancement Opportunity: SEPA has mapped where riparian planting would be beneficial to watercourses and the Cowie Water has been identified as high priority. It would welcome the investigation into providing riparian planting along this watercourse in your biodiversity net gain opportunities for this proposal. | |
| Aberdeenshire Council<br>22 August 2024<br>11 September 2024 | Formal Scoping Consultation | The council note that full drainage details have not yet been provided and therefore re-iterated their per-application advice with regards to surface water drainage and flood risk (see above).<br>The council comment that a Drainage Impact Assessment is required and that a Flood Risk Assessment maybe required. | The drainage design has been prepared in accordance with council guidance<br>An initial flood risk assessment and outline drainage strategy is provided in **Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy**. |
| Aberdeenshire Council<br>11 September 2024 | Formal Scoping Consultation | The council request details of the proposed water supply that will be used to provide welfare provisions on Site during the construction phase (and possibly thereafter). | The temporary water supply for welfare facilities will be provided by a single borehole. |
| Aberdeenshire Council<br>21 September 2023 | Response to Data Request | The council provided a list of PWS that they have record of within 1km from the Proposed Development. They provided National Grid References (NGR) coordinates of the PWS properties and details of the source type (e.g. spring, borehole, well) and the source location (if known). | The PWS data was used to inform the baseline assessment. |
| NatureScot<br>6 September 2024 | Formal Scoping Consultation | NatureScot are content with the proposed scope of the survey and assessment. Of the issues relevant to NatureScot's remit, they agree with the issues to scoped out. | Noted. |
| SEPA<br>21 August 2024 | Formal Scoping Consultation | SEPA confirms, in relation to its interests, it has no objection to the topics identified to be Scoped in/Scoped-out, nor to the information proposed to be submitted in the future EIA Report. | Noted. |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| SEPA<br>12 October 2023 | Response to Data Request | SEPA provided a list of licenced abstractions within a 1km buffer of the Site. SEPA note that the National Grid References relate to the site location and not the actual abstraction location. SEPA also provided a link to download an Excel file with the licenced abstraction locations in latitude / longitude. | The licenced abstraction data was used to inform the baseline assessment. |
| SEPA<br>16 June 2023 | Pre-application Consultation | SEPA expect their Future Flood Maps to be used and climate change included in any flood risk assessment required in accordance with NPF4 Policy 22.<br>SEPA also note that any sources for Private Water Supplies (PWS) should be confirmed and considered in any future assessments.<br>Within the same consultation response SEPA also provide general scoping guidance for large infrastructure projects, which recommended a minimum buffer of 50 m from watercourses. SEPA guidance will be followed through the EIA process. | SEPA Future Flood Maps have been used in the assessment and the FRA includes the relevant uplift in flows and rainfall to account for climate change.<br>PWS surveys were undertaken to confirm PWS source locations.<br>Following further consultation with SEPA and later guidance from SEPA/Aberdeenshire Council (24 May 2024) (see above) a minimum buffer of 15 m around each watercourse (including earthworks) is now recommended. |
| Scottish Water<br>19 August 2024 | Formal Scoping Consultation | Scottish Water has no objection to this proposal.<br>Scottish Water note that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.<br>Scottish Water will not accept any surface water connections into our combined sewer system.<br>Scottish Water note that all developments that propose a connection to the public water or wastewater infrastructure are required to submit a Pre-Development Enquiry (PDE) Form. | The Proposed Development does not require a surface water connection into Scottish Water's combined sewer system.<br>Temporary water supply will remain as a single borehole. Wastewater would be linked into the nearest Scottish Water drainage system, or an appropriate onsite effluent treatment system will be used e.g. septic tank with reed beds. |
| Public Consultation 2024<br>PAC Events | Public Consultation | Many submissions raise concerns about the increased flood risk to Stonehaven as a result of the proposed substation at Hurlie. Respondents fear that the Proposed Development, including earthworks and forestry removal, could exacerbate existing flood issues, potentially leading to river pollution and affecting the safety and well-being of local residents. Concerns were raised regarding the history of flooding and landslips/landslides in the area, in particular reference to the 2020 train derailment.<br>Concerns regarding potential impacts to water quantity/quality of PWS were raised. | A flood risk assessment has been prepared (**Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy**). The Proposed Development is outwith the flood risk areas and has been designed such that it will not increase flood risk elsewhere. The findings of the flood risk assessment and drainage strategy is summarised in this chapter.<br>Run-off will be attenuated to greenfield rates through the use of the |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | | Sustainable Drainage Systems (SuDS) and there will be no enhanced risk of flooding to the railway through the construction or operation of the Proposed Development.<br>Effects on PWS have been considered in the assessment. |

*Desk Based Research and Data Sources*

12.3.4 The following data sources have informed the assessment:

- Ordnance Survey mapping at 1:25,000 and 1:50,000 scales;
- Aerial imagery of the Proposed Development location and surrounding area;
- British Geological Survey (BGS) online digital mapping at 1:50,000 and 1:625,000 scales;
- Scottish Soil mapping at 1:250,000 scale;
- NatureScot Carbon and Peatland 2016 mapping at 1:250,000 scale;
- The Flood Estimation Handbook (FEH) Web-service[1];
- SEPA future flood maps[2];
- SEPA water classification hub[3];
- Phase 2 DTM 1 m resolution topographic LiDAR data, downloaded from the Scottish Remote Sensing Portal;
- Ordnance Survey (OS) terrain 5 topographic data (5 m resolution);
- Scotland's Environment website and interactive map[4];
- NatureScot Site Link interactive map[5];
- Scottish Water asset plans[6];
- Private Water Supply data provided by Aberdeenshire Council; and
- Licenced abstraction data provided by SEPA.

*Field Survey*

12.3.5 The following field surveys were carried out to inform the assessment:

- 31 August & 1 September 2023 - Phase 1 peat and hydrology survey. Peat surveys were carried out following the Scottish Government, Scottish Natural Heritage & SEPA (2017) guidance7. Further details of the methodology are described in **Appendix 12.3: Peat Survey Report**. Hydrology surveys of watercourses within the Site were also undertaken. Weather conditions were warm with showers.
- 13 December 2023 - Hydrology survey to survey watercourses and water features. The weather was cold and dry.
- 15 November 2024 – Hydrology survey to ground-truth potential GWDTE habitats and to survey watercourse crossings of the access tracks. The weather was mild and sunny.

*Assessing Significance*

12.3.6 The predicted significance of the effect was determined through a standard method of assessment outlined in **Chapter 4: EIA Process and Methodology** and based on professional judgement, considering both sensitivity and

[1] https://fehweb.ceh.ac.uk/Map
[2] https://scottishepa.maps.arcgis.com/
[3] https://www.sepa.org.uk/data-visualisation/water-classification-hub/
[4] https://map.environment.gov.scot/sewebmap/
[5] https://sitelink.nature.scot/map
[6] Scottish Water GIS Extranet, viewed online
[7] Scottish Government, Scottish Natural Heritage & SEPA (2017) Peatland Survey - Guidance on Developments on Peatland

magnitude of change as detailed in **Table 12.2: Matrix for Determination of Significance of Effects**. Major and moderate effects are considered significant in the context of the EIA Regulations.

**Table 12.2: Matrix for Determination of Significance of Effects**

| Magnitude of Change | Sensitivity of Receptor / Receiving Environment to change | | | | |
|---|---|---|---|---|---|
| | | **High** | **Medium** | **Low** | **Negligible** |
| | **High** | Major | Major | Moderate | Negligible |
| | **Medium** | Major | Moderate | Minor | Negligible |
| | **Low** | Moderate | Minor | Minor | Negligible |
| | **Negligible** | Negligible | Negligible | Negligible | Negligible |

*Sensitivity*

12.3.7 Sensitivity has been determined on the basis of the following criteria outlined in **Table 12.3: Criteria to Assess the Sensitivity of Receptor.**

**Table 12.3: Criteria to Assess the Sensitivity of Receptor**

| Sensitivity of Receptor | Typical Indicators |
|---|---|
| High | Receptor is of national or international value (i.e., Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA), and RAMSAR).<br>Overall water quality classified by SEPA as high and salmonid spawning grounds present.<br>Abstractions for public water supply.<br>Groundwater classified under the WFD as 'good' or groundwater resource with numerous sensitive users/receptors.<br>The flooding of property (or public roads) that has been susceptible to flooding in the past.<br>Watercourse floodplain/hydrological feature that provides critical flood alleviation benefits.<br>Natural channel and of high morphological diversity.<br>Receptor supports GWTDE confirmed as highly groundwater dependent.<br>Class 1 or 2 priority peatland. |
| Medium | Receptor is of regional or local value (e.g. Local Nature Reserve).<br>Overall water quality classified by SEPA as good or moderate, salmonid species may be present, and may be locally important for fisheries.<br>Smaller watercourse lying upstream of larger river that is an SSSI, SAC SPA or RAMSAR. May be subject to improvement plans by SEPA.<br>Abstractions for private water supplies.<br>Groundwater resource with sensitive users/receptors.<br>Environmental equilibrium copes well with natural fluctuations but cannot absorb some changes greater than this without altering part of its present character.<br>The flooding of property (or public roads) that may be susceptible to flooding.<br>Watercourse/floodplain/hydrological feature that provide some flood alleviation benefits.<br>Semi-natural channel, with morphological diversity. May have some minor morphological constraints.<br>Receptor supports GWTDE confirmed as moderately groundwater dependent.<br>Unmodified active peatland.<br>Deeper peat (>1.0 m depth) unless minor area. |
| Low | Receptor is of low environmental importance (e.g., water quality classified by SEPA as bad or poor, fish sporadically present or restricted).<br>Not subject to water quality improvement plans by SEPA. |

| Sensitivity of Receptor | Typical Indicators |
|---|---|
| | Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character.<br>No abstractions for public or private water supplies.<br>No significant groundwater resource and no identified sensitive users/receptors.<br>No flooding of property or public roads.<br>Watercourse/floodplain/hydrological feature that provides minimal flood alleviation benefits.<br>Heavily engineered or artificially modified and may dry up during summer months.<br>No GWDTE confirmed as either moderately or highly groundwater dependent.<br>No or shallow peat (0.5 m to <1.0 m depth) and/or modified peat. |
| Negligible | Receptor is of low environmental importance (e.g., water quality classified by SEPA as bad or poor, fish sporadically present or restricted).<br>Not subject to water quality improvement plans by SEPA.<br>Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character.<br>No abstractions for public or private water supplies.<br>No groundwater resource and no identified sensitive users/receptors.<br>No flooding of property or public roads.<br>Watercourse/floodplain/hydrological feature that provides minimal flood alleviation benefits.<br>Heavily engineered or artificially modified and may dry up during summer months.<br>No GWDTE.<br>No peat present. |

*Magnitude*

12.3.8 The magnitude of change has been assessed based on the criteria outlined in **Table 12.4: Criteria for Estimating the Magnitude of Effect**. These criteria are based on professional judgement and experience of other similar studies.

**Table 12.4: Criteria for Estimating the Magnitude of Effect**

| Magnitude | Description/ Typical Example |
|---|---|
| High | Fundamental changes to the hydrology, water quality, geology, or hydrogeology (in terms of quantity, quality, and morphology).<br>A >10% change in average or >5% change in flood flows.<br>The extent of flood risk areas (as classified by NPF4 – i.e. land or built form with an annual probability of being flooded of greater than 0.5% including an appropriate allowance for future climate change) will be significantly increased.<br>Change that would render water supply unusable for longer than month.<br>Change resulting in total loss of feature or integrity of feature or use. |
| Medium | Material but non-fundamental changes to the hydrology, water quality, geology, or hydrogeology (in terms of quantity, quality, and morphology).<br>A >5% change in average and minimal change in flood flows. Extent of flood high risk areas will be moderately increased/or decreased.<br>Change that would render water supply unusable for days or weeks with no alternative. |
| Low | Detectable but non-material changes to the hydrology, water quality, geology, or hydrogeology (in terms of quantity, quality, and morphology).<br>A >1% change in average flows and no increase in flood flows.<br>Change that would render water supply unusable for short period (days) or for longer period if alternative supply put in place. |
| Negligible | No perceptible changes to the hydrology, water quality, geology, or hydrogeology (in terms of quantity, quality, and morphology).<br>A <1% change in average and no change in flood flows. |

| Magnitude | Description/ Typical Example |
|---|---|
| | No change in water supply or minor change (days) where alternative is put in place. |

*Assessment Assumptions and Limitations*

12.3.9 The Proposed Development will use existing forest roads through Fetteresso Forest for access during construction and operation. At the time of writing the EIA Report, there was no access to parts of Fetteresso Forest, hence several existing watercourse crossings on the forest roads could not be accessed. As a result, some data on the existing road crossings was desk-based. Locations that were not surveyed in the field are highlighted in **Appendix 12.2: Watercourse Crossing Assessment**. However, it is noted that there are no upgrades proposed to the existing forest road crossings.

12.3.10 It is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant environmental effects on hydrology, hydrogeology, geology and peat.

## 12.4 Baseline Conditions

*Summary of Baseline*

*Climate*

12.4.1 The average annual temperature in this area of northeast Scotland is between 5.5°C and 11.1°C (Met Office website[8]). The average annual rainfall on the Site is approximately 703 mm (FEH Web Service[9]).

*Topography*

12.4.2 The topography of the Site is shown in **Figure 12.1.2: Site Topography, Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy**, based on the 1m LiDAR data. The Proposed Development is situated approximately 6km west of Stonehaven on the steep, varied terrain carved out by the Cowie Water to the north and the Carron Water to the south and their tributaries. The Proposed Development is located near the top of the drainage divide between the two rivers. The existing forest road, which will be utilised for access to the Proposed Development, initially follows the contours around the Hill of Three Stones (291 m AOD), before crossing the steep-sided valley of the Cowie Water and winding its way up the slopes towards the proposed substation platform. Notable hills within, and adjacent to, the Site include the Hill of Trusta (321 m Above Ordnance Datum (AOD)); Hill of Quithel (251 m AOD) and Elf Hill (228 m AOD).

*Watercourses, Surface Water and Existing Site Drainage*

12.4.3 The Proposed Development is within the catchment of the Burn of Day (**Photo 12.1**), which flows from west to east approximately 50 m northeast of the proposed substation platform, as well as the Burn of Baulks, which is located approximately 120 m southeast of the proposed substation platform. The main watercourses flowing through the Site are tributaries of the Cowie Water to the north of the Site and tributaries to the Carron Water to the south of the Site which are crossed by proposed access roads. The proposed access using existing forest roads, which cross numerous tributaries of the Cowie Water, including the Black Burn, Burn of Day, West Dumer Burn, East Dumer Burn, Irish Burn and the Cowie Water itself. The access also crosses the Burn of Baulks, Burn of Elfhill and Whiting Burn which are tributaries of the Carron Water. Watercourses and waterbodies within and downstream of the Site are shown in **Figure 12.1: Hydrology and Hydrogeology Study Area**.

12.4.4 The northern and western parts of the Site along the existing forest road are located in the Cowie Water catchment while the southern part drains south-east towards the Carron Water catchment. Both rivers drain directly into the

[8] https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfn7kmx6u
[9] https://fehweb.ceh.ac.uk/Map

North Sea at Stonehaven. The substation is located on a spur which straddles both catchments, draining via the Burn of Day (a tributary of the Cowie Water) and the Burn of Baulks (a tributary of the Carron Water).

12.4.5 There are no surface water bodies, lochs or reservoirs within the Site.

12.4.6 A flow pathway analysis was undertaken using the LiDAR 1m DTM topographic data. The analysis was supplemented by observations made during field surveys to assess potential overland flow routes within the Site. As described above, the Site drains towards the Cowie Water and Carron Water catchments via numerous watercourses that dissect the Site. Catchment areas of the main watercourses are shown in **Figure 12.1: Hydrology and Hydrogeology Study Area.**

**Photo 12.1: Burn of Day close to the existing track crossing**

*Watercourse Crossings*

12.4.7 The Proposed Development will use existing forest tracks to avoid the need for new watercourse crossings. No new watercourse crossings are proposed. A land drain in the southwest of the Site may need a new crossing, as it will be crossed by a new construction haul track.

12.4.8 The Proposed Development will use 14 existing watercourse crossings on existing forest roads and will require one new crossing of a small drain, based on watercourses shown on Ordnance Survey mapping and field survey. Details of watercourse crossings are provided in **Appendix 12.2: Watercourse Crossing Assessment** with the locations shown on **Figure 12.1: Hydrology and Hydrogeology Study Area.**

12.4.9 There are a number of existing forest tracks within the Site, including the existing access for Fetteresso Forest, managed by Forestry Land Scotland (FLS). The existing track is accessed from the north via Slug Road as well as from the south via an unnamed road, turning off at Quithel. The Proposed Development will share the existing tracks created for the forestry plantation and will utilising the existing watercourse crossings. It is understood that the existing track will require some minor upgrades, but there are no upgrades to any existing watercourse crossings proposed. A new culvert crossing for the land drain will be put in to facilitate the new construction track in the southwest of the Site.

*Hydrology and Flood Risk*

12.4.10 The SEPA flood maps show the likely extent of flooding for high, medium, and low likelihood for fluvial (river), pluvial (surface water) and tidal flows. The SEPA Future Flood maps provide an indication of flood risk during the 200-year plus climate change event and are shown in **Figure 12.1: Hydrology and Hydrogeology Study Area.**

12.4.11 The SEPA future flood maps indicate that there are some small areas at risk of fluvial flooding within the Site. The areas identified are narrow and constrained along the banks of the Cowie Water. Most of the access track lies well above the river and is therefore not at risk of flooding. However, the point where the existing track crosses the Cowie Water (crossing ID6) is within the flood extent at the crossing location.

12.4.12 The SEPA future flood maps predict some areas at risk of pluvial (surface water) flooding, largely correlating to the low-lying areas around the watercourses. Some small areas that are associated with topographic lows are also present within the Site.

12.4.13 A flood risk assessment was undertaken using 2D modelling to define the conservative floodplain of the Burn of Day has been carried out to understand the extent of flood risk at and close to the Proposed Development to inform the layout. The flood risk assessment has been submitted with the EIAR (**Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy**) and the main findings are summarised below;

- The Burn of Day drains a small catchment of approximately 0.8 $km^2$ and is in its upper reaches within the Site. To assess flood risk a 2D mathematical model was developed using Flood Modeller Pro and the latest available LiDAR data to predict the 200-year + climate change floodplain close to the Proposed Development.
- A hydrological assessment was undertaken to estimate the design flows for the Burn of Day at the Site; the design flows used in the model are shown in **Table 12.5: Design Flow estimate for the Burn of Day**, with an appropriate allowance for climate change (see **Appendix 12.1** for details).

**Table 12.5: Design Flow estimate for the Burn of Day**

| Parameter | Burn of Day Peak 200-year plus climate change flows ($m^3/s$) | |
|---|---|---|
| | FEH Rainfall-Runoff Method | REFH2 Method |
| Peak Flow ($m^3/s$) | 3.8 | 4.0 |

- **Figure 12.1.3: 200-year + Climate Change Flood Map of the Burn of Day** shows the predicted 200-year plus climate change flood extent based on the 2D model. The results show flooding is largely confined within the channel of the Burn of Day. The FRA has been used to inform the Proposed Development design and the Proposed Development is sited outwith the predicted 200-year plus climate change flood risk area.

12.4.14 No hydraulic modelling of the Burn of Baulks was undertaken as the upper reaches of this watercourse are over 120 m southeast of the Proposed Development substation platform and over 6 m lower in elevation that the substation platform.

*Water Supplies, Discharges, Abstractions and Services*

12.4.15 Aberdeenshire Council was consulted in July 2023 and provided their database of private water supplies (PWS) within 1 km of the Site boundary. This data from the council indicated three PWS within 1 km of the Site. One PWS is the existing Fetteresso substation, which is located just outside the Site boundary, approximately 100 m south of the Proposed substation platform.

12.4.16 However, Aberdeenshire Council noted that their PWS data can be incomplete and requires verification. The council also note that the data generally provides the property location only and not locations of the PWS sources.

12.4.17 Therefore, PWS questionnaires were sent to 52 remote properties within 1 km of the Site redline boundary, including those identified by the Council. Data from both sources has shown there are no PWS within the Site itself, and seven within 1 km of the Site boundary, as shown in **Table 12.6: Private Water Supplies (PWS) within 1km of the Site**. A PWS questionnaire response from Smiddy Cottage and Clachanshiels Farm, Rickarton, indicate a groundwater well abstraction source approximately 490 m north of the Site boundary. Whitehill is supplied by two springs approximately 190 m north of the Site boundary. Further responses from Stonehouse Cottage, Rickarton and

Cuttiesoutar, Stonehaven indicate PWS abstraction sources along the Cowie Water and from a Well close to the Burn of Annamuick. Site surveys identified a PWS source offtake from a small unnamed watercourse approximately 30 m south of the access track. The locations of PWS sources and supplied properties with respect to the Proposed Development are shown in **Figure 12.1: Hydrology and Hydrogeology Study Area.**

**Table 12.6: Private Water Supplies (PWS) Sources within 1km of the Site Boundary[10]**

| PWS Name | Source Easting | Source Northing | Source Type | No of Properties Supplied | Supplied Property Names | Distance from Proposed infrastructure |
|---|---|---|---|---|---|---|
| Smiddy Cottage | 379938 | 787996 | Well (and Storage tank) | 2 | Smiddy Cottage<br>Clachanshiels Farm | The well is approximately 1.1 km northeast of the substation. |
| Whitehill | 380073<br>380508 | 787617<br>787419 | Two Spring sources | 1 | Whitehill | The well is located close to the property and is fed by two spring sources, both of which are over 900 m north of the substation. |
| Bossholes Farm | 380738<br>380480 | 788007<br>788251 | Spring/well<br>Surface Water – Cowie Water | 2 | Bossholes Farm properties | The PWS is supplied by two sources; one from the River Cowie over 1.6 km north of the substation and the other is a spring fed well which is approximately 1.5 km north of the substation. |
| Tillybreak | 378286 | 788380 | Surface Water – unnamed watercourse | 1 | Tillybreak | The PWS is a surface water abstraction from a small watercourse. The abstraction is approximately 30 m downstream (south) of the access track crossing. No upgrades are proposed at this crossing. |
| Fetteresso Substation | 378998 | 785885 | Rainfall-fed | 1 | Fetteresso Substation | 800 m southwest of proposed substation and 60 m north of access track |
| Stonehouse Cottage | 377057 | 787845 | Surface Water-Cowie Water | 1 | Stonehouse Cottage | The PWS is a surface water abstraction from the Cowie Water, approximately 350 m southeast of access track. |
| Cuttiesoutar | 379167 | 784558 | Well | 1 | Cuttiesoutar | Approximately 970m south of site boundary |

12.4.18 SEPA provided data on licenced abstractions within 1 km of the Site. Based on SEPA records, there are no abstractions within the site or within 1 km of the Site.

12.4.19 A review of the Scottish Water asset plans online does not show any pipework or infrastructure within the Site.

12.4.20 There are no Drinking Water Protected Areas (Surface) within the Site. The Proposed Development is located within a Drinking Water Protected Areas (DWPA) for groundwater, (as is the whole of Scotland).

*Water Quality and Protected Areas*

12.4.21 SEPA has characterised surface water quality status under the terms of the Water Framework Directive. Classification by SEPA considers water quality, hydromorphology, biological elements including fish, plant life and

[10] Data provided by Aberdeenshire Council and updated with PWS questionnaire responses

invertebrates, and specific pollutants known to be problematic. The classification grades through High, Good, Moderate, Poor, and Bad status. This provides a holistic assessment of ecological health. There is one waterbody within the Site which is large enough to be classified by SEPA:

- Cowie Water- Fetteresso Forest (Waterbody ID 23254) was classified as High in 2022; and
- The southern part of the Site drains towards the Carron Water (Waterbody ID: 23257) which was classified as Moderate in 2022.

*Geology and Soils*

12.4.22 The geology of the Site (**Figure 12.2: Solid and Superficial Geology**) is comprised mainly of Glen Lethnot Grit formation Psammites and also small areas of North Britain Siluro-Devonian Calc-Alkaline Dyke Suite microdiorites. The former are of sedimentary origin that have since been metamorphosed, the latter are igneous rocks of intrusive origins.

12.4.23 The superficial drift deposits are mainly comprised of the Banchory Till formation, sedimentary deposits of glaciogenic origins. These deposits are detrital, created by the action of ice and meltwater and are associated with glacial and interglacial periods during the Quaternary. There are also small areas of Alluvium, Peat and Hummock Glacial sedimentary deposits.

12.4.24 A review of National soil map of Scotland (**Figure 12.3: Soils**) shows that soil within the Proposed Development area is comprised mainly of peaty podzols. There is a small area of peat and mineral gleys close to the eastern Site boundary. The existing access tracks within the Site pass through a variety of soil types including peaty gleys, peaty podzols, mineral podzols, mineral gleys and alluvial soils.

*Peat*

12.4.25 The NatureScot (2016) Carbon and Peatland map shows the distribution of carbon and peatland classes in Scotland and gives a value to indicate the likely presence of carbon-rich soils, deep peat and priority peatland habitat at a coarse scale. A review of the NatureScot map indicates the following peat classes are found within the Site:

- Class 4 - Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils. Predominantly mineral soil with some peat soil. Indicative vegetation is heath with some peatland.
- Class 5 - Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat. Peat soil, with no peatland vegetation.

12.4.26 The majority of the Proposed Development area is comprised of Class 4 with a small area of Mineral Soil (Class 0) in the north and a small area (of Class 5 peat in the east. The spatial distribution of the NatureScot carbon and peatland classes at the Site is shown in **Figure 12.4: Carbon and Peatland**. The existing access tracks with the Site are mainly within areas of Class 4 or Class 0 (Mineral Soils), with two short sections of existing access track within a Class 5 area.

12.4.27 Phase 1 peat depth surveys were undertaken early during the initial phase of project development. The results of the peat survey were presented in the Scoping Report and are included again as **Figure 12.5: Probe Depths and Core Sample Locations.** The peat survey report (**Appendix 12.3: Peat Survey Report)** describes the results and methodology in detail**.**

12.4.28 The results of the Phase 1 peat survey found only a small, contained area (approximately 0.92 ha) of peat (with peat depths ranging from 0.5 m to 1.3 m) within the Site, concentrated in a valley in the south-eastern part of the Site boundary, see **Figure 12.5: Probe Depths and Core Sample Locations** and **Appendix 12.3**: **Peat Survey Report**. The majority of the Proposed Development area had probe depths of less than 0.5 m, which is not considered to be peat. Overall, from the combination of peat probe and core data, most of the Proposed Development area is comprised of mineral soils, with peaty material. Although there is some peaty material within these soils, the soil does not appear to be carbon-rich and is shallow. Local topography affects the peat distribution, with the areas of higher ground, hilltops and forested areas too well-drained to support the formation of peat. Local areas of deeper peat were located in topographical hollows such as along the line of the Burn of Baulks.

*Groundwater*

12.4.29 The groundwater body underlying the Site is the Portlethen (Waterbody ID 150625), in the Northeast Scotland sub basin district, was classified by SEPA as overall 'Good' in 2022.

12.4.30 Reference to the BGS 1:625k hydrogeological mapping indicates that the Proposed Development is underlain by a low productivity aquifer of the Southern Highland Group metamorphic rock, which is a Class 2C, low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Virtually all flow is within fractures and other discontinuities.

12.4.31 SEPA groundwater flood maps indicate that the site is not at risk of groundwater flooding.

12.4.32 A review of Ordnance Survey 1:10 K and 1:25 K mapping indicates that there are no wells and groundwater springs located within the Site.

*Groundwater Dependent Terrestrial Ecosystems (GWDTEs)*

12.4.33 Ecology surveys confirmed that no GWDTEs were identified in the ecology study area (see **Chapter 9: Ecology**); effects on GWDTE are scoped out of the assessment.

*Future Baseline in the Absence of the Proposed Development*

12.4.34 Without the Proposed Development, the main change to the future baseline would be as a result of climate change.

12.4.35 The national Planning Framework 4 (NPF4) notes *"Development proposals will be sited and designed to adapt to current and future risks from climate change"*.

*Implications of Climate Change for Baseline Conditions*

12.4.36 In summary, the projections highlight that in the 2060's summer and winter temperatures are likely to be greater than the current baseline, with winter rainfall increasing and summer rainfall decreasing. Increased rainfall will result in higher peak flows in the watercourses impacting the Site in future. In addition, there may be more drought periods in future summer months, with warmer, drier conditions predicted resulting in lower flows during summer and more sporadic, intense summer storm events.

12.4.37 SEPA (2024[11]) published guidance on climate change in Scotland which provides a regional based approach to estimate uplift in future river flows in Scotland. For large river catchments (over 50 $km^2$), the peak (200-year) design flow should be increased by 53% in the Tay River Basin to account for projected climate change increases to the year 2100. In addition, the peak rainfall intensity allowance for the Tay region of Scotland is 39% to the year 2100. Thus, this part of Scotland, which includes the Site, is likely to get wetter with higher peak flows in the watercourses in the future.

12.4.38 Site drainage will consider future estimates of increased precipitation and flows and will follow an adaptive approach, as per relevant guidance documents from SEPA and Aberdeenshire Council. The climate change uplifts recommend by SEPA (2024) were applied to hydrology predictions in the flood risk assessment (**Appendix 12.1: Flood Risk Assessment and Outline Drainage Strategy**) to model the 0.5% annual exceedance flows (200-year return period) + climate change floodplain. No new watercourse crossings are required for the Proposed Development.

*Sensitivity of Receptors*

12.4.39 The sensitivity of receptors has been assessed in **Table 12.7: Sensitivity of Receptors** using the criteria in **Table 12.3: Criteria to Assess the Sensitivity of Receptor**.

[11] SEPA (2024) Climate change allowances for flood risk assessment in land use planning, version 5, July 2024

**Table 12.7: Sensitivity of Receptors**

| Receptor | Sensitivity | Comment |
|---|---|---|
| Surface watercourses | Water quality<br>Cowie Water – High<br>Carron Water - Medium<br>Flood Risk - Low | The Proposed Development drains to the Cowie Water in the north and Carron Water in the south. The Cowie Water was classified by SEPA as High in 2022 and the Carron Water was classified by SEPA as Moderate in 2022.<br>There are small areas of flood risk associated with the Burn of Day and Burn of Baulks with the Proposed Development boundary, which provide some minor flood storage within the Site boundary. |
| PWS and groundwater abstractions | Medium | There are three PWS sources and groundwater abstractions within 250 m from the Site boundary and two abstractions within 1 km from the Site boundary.<br>There are however no PWS sources (surface water or groundwater) within 250 m of the proposed infrastructure and earthworks. |
| Groundwater | Medium | The Proposed Development is located within a DWPA for Groundwater (as is the whole of Scotland). The groundwater body underlying the Site is classified by SEPA as Good in 2022. The receptor supports four known groundwater abstractions. |
| Peat | Negligible | No peat present within the area proposed for development. The layout has fully avoided the small area of peat in the eastern part of the Site. |

## 12.5 Mitigation and Monitoring

*Embedded Mitigation*

12.5.1 Topic specific embedded mitigation (mitigation achieved through design) is outlined below.

- HG1 – The layout of the Proposed Development has been carefully considered to avoid any development in the 200-year + climate change floodplain of the Burn of Day. There is no proposed development, including SuDS within the 200-year + climate change floodplain (**Figure 12.1: Hydrology and Hydrogeology Study Area** and **Figure 12.1.3: 200-year + Climate Change Flood Map of the Burn of Day in Appendix 12.1**).
- HG2- Watercourses and waterbodies have been buffered by 15 m (where possible) as per Aberdeenshire Council/SEPA consultation response (**Table 12.1: Summary of Consultation**) to minimise any potential adverse effect on surface water quality and flood risk. Locations where the recommended buffers could not be met are assessed in **Appendix 12.2: Watercourse Crossing Assessment** and summarised in the Effects Assessment within this chapter.
- HG3- The substation drainage design follows sustainable drainage systems (SuDS) and the drainage channels, and ponds have been designed such that local hydrological patterns and surface water run-off flow rates will be attenuated to existing 'greenfield' rates. The permanent drainage of the substation has been designed in accordance with Aberdeenshire Council and SEPA requirements, with the SuDS designed to provide the appropriate attenuation and treatment of surface water runoff. An outline drainage strategy is provided in **Appendix 12.1: Flood Risk and Outline Drainage Strategy.** An outline Water Management Plan is also included in the Outline CEMP. The SuDS will drain to the Burn of Baulks and Burn of Day via outfall pipes restricted to the 2-year greenfield runoff rate.
- HG4- Surface water runoff from the catchment which drains towards the Proposed Development from the west will be captured and routed round the Proposed Development to the Burn of Day, southeast to Burn of Baulks or other suitable discharge or storage locations. This interception drainage will be part of the construction and permanent drainage design.
- HG5- The small area of peat in the eastern part of the site has been buffered and avoided. There is no infrastructure or groundworks (temporary or permanent) proposed within 65 m of the peat area. A peat management plan (PMP) will be included as part of the Construction Environmental Management Plan (CEMP).

- HG6- All excavations less than 1m deep will be located 100 m away from groundwater abstractions or PWS sources as per SEPA guidance[12]. Excavations greater than 1m depth will, where possible, be located at least 250 m away from groundwater abstraction or PWS sources.

*Applied Mitigation*

12.5.2 In addition to the Embedded mitigation, inherent in the design of the Proposed Development, the Applicant is committed to implementation of Applied Mitigation Measures which are an integral part of the project development and reflect best practice guidance and recognised industry standards, as well as the Applicant's experience of constructing substations. They would comprise a Construction Environmental Management Plan (CEMP) which would comprise, among other requirements, a suite of SSEN Transmission standard management plans and contractor authored documentation, which details general and site-specific measures which will be implemented to avoid or mitigate likely significant effects and which will be effected through planning conditions, construction contract wording or both. These plans and documentation will incorporate best practice guidance and recognised industry standards (e.g. SEPA guidance, including their Guidance for Pollution Prevention (GPPs), CIRIA SUDS Manual and control of water pollution guidance). Forestry felling and removal will follow the good practice guidance and legal requirements set out in Section 9 (Forests and Water) of the UK Forestry Standard (2023).

12.5.3 In addition, SSEN Transmission's GEMP, will capture all mitigation measures required in respect of hydrology, water quality and peat, as identified in the EIA Report and in order to comply with relevant legislation, which will be implemented during construction and operation of the Proposed Development. The Applied Mitigation will include SSEN Transmission's GEMP TG-NET-ENV-512 (Working in or Near Water), TG-NET-ENV-515 (Watercourse Crossings), TG-NET-ENV-519 (Forestry), TG-NET-ENV-518 (Private Water Supplies), TG-NET-ENV-523 (Bad Weather) and TG-NET-ENV-520 (Dust Management). The implementation and audit of the measures in the CEMP and GEMP will be overseen by an Environmental Clerk of Works (ECoW).

12.5.4 The contractor will be required, through contract conditions, to follow the SEPA's general binding rules (GBR) under the Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended (CAR Regulations). With respect to the current regulatory context, since the CAR Regulations came into force, CAR authorisation will be required in relation to a number of activities e.g. SuDS discharges to the burns. A Construction Site Licence (CSL) will also be required for the works under the CAR Regulations. The CSL will be obtained from SEPA in advance of the construction work to cover water run-off from construction sites. This will include a detailed Pollution Prevention Plan (PPP) to ensure that any discharges of water runoff from the Site to the water environment do not cause pollution. The PPP will be included in the CEMP.

12.5.5 The detailed CEMP will be developed and agreed with Aberdeenshire Council and SEPA as a pre-commencement condition. The contractors will also be required to prepare a Site Water Management and Pollution Prevention Plan, which will be prepared and agreed in advance of construction. This will contain a suite of water management and pollution prevention measures and will include the specific Applied Mitigation measures outlined in **Table 12.8**.

**Table 12.8: Applied Mitigation**

| Mitigation Measure | Project Stage/Timing | Responsibility |
|---|---|---|
| HG7 – Construction of SuDS to treat and attenuate surface runoff from new hardstanding and tracks; reduce sedimentation and erosion and reduce the risk of pollution and accidental spillage | Construction | Principal Contractor |
| HG8 - Appropriately sized culverts passing under the new access tracks within the Proposed Development that do not restrict flow and allow intercepted field drains and ephemeral streams/surface water flow pathways to pass under the tracks | Construction | Principal Contractor |

[12] SEPA (2017) Land Use Planning System, SEPA Guidance Note 31 (LUPS-31): Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems

| Mitigation Measure | Project Stage/Timing | Responsibility |
|---|---|---|
| HG9 - Interceptor drainage ditches on the upgradient side of all proposed infrastructure to intercept and divert 'clean' surface water runoff draining towards the construction areas. These will be treated and attenuated prior to discharge to the water environment. | Construction | Principal Contractor |
| HG10- Installation and maintenance of swales and track drains to intercept, collect and treat runoff from access tracks and hardstanding areas of the Site during construction and channel runoff to stilling ponds for sediment settling prior to discharge. | Construction | The Applicant and Principal Contractor |
| HG11 – The above measures will be included in the CEMP. The CEMP will also include a plan to monitor and plan the timing of works to avoid construction during periods of heavy rainfall and a plan to detail emergency procedures in the event of spillages or any other breach. | Construction | The Applicant and Principal Contractor |

*Further Survey Requirements and Monitoring*

12.5.6 No further survey or monitoring is proposed by the Applicant. The existing watercourse crossings on the access tracks will be inspected in advance of the works, however initial inspections by the Applicant have concluded that no upgrades to the existing crossings will be required. If this changes, the Applicant will maintain dialogue with SEPA such that the appropriate CAR authorisations can be obtained (if required).

## 12.6 Assessment of Likely Significant Effects - Construction

12.6.1 The assessment of effects identified above is based on the project description as outlined in **Chapter 3: Description of the Proposed Development**. Unless otherwise stated, potential effects identified are considered to be adverse.

*Predicted Construction Effects*

12.6.2 Activities that will occur during construction that can have an impact on the water environment include site clearance; use of heavy plant machinery; increase of hardstanding areas; associated earthworks/excavation/re-profiling and construction traffic on the access track.

12.6.3 During the initial design stage, elements of the Proposed Development were located to achieve a minimum 50 m from nearby watercourses, based on early guidance from SEPA (June 2023). Following later consultation with Aberdeenshire Council/ SEPA (May 2024) a 15 m minimum buffer from watercourses was recommended (**Table 12.1: Summary of Consultation**). Therefore, apart from the exceptions below, which are all mainly existing watercourse crossings, one new crossing and one watercourse buffer breach (labelled A-0 on **Figure 12.1: Hydrology and Hydrogeology Study Area** and described in detail in **Appendix 12.2**), all infrastructure is at least 15 m away from watercourses and water features.

- A- Existing track crossing of the Black Burn;
- B- Existing access track crosses unnamed watercourse;
- C- Existing access track crosses unnamed watercourse tributary to Cowie Water;
- D- Existing access track crosses unnamed drain;
- E- Existing access track crosses Irish Burn;
- F- Existing access track crosses East Dumer Burn;
- G- Existing access track crosses West Dumer Burn;
- H- Existing access track crosses the Cowie Water;
- I- Existing access track crosses the Whiting Burn;
- J- Existing access track crosses the Burn of Elfhill;
- K – Existing access track crosses Burn of Elfhill again (approximately 320 m downstream of crossing J);
- L – New proposed construction access track crosses a small land drain;

- M – Existing access track crosses the small land drain (approximately 300 m downstream of crossing L;
- N – Existing access track crosses the upper reach of the Burn of Baulks. A 10 m buffer from this watercourse and the proposed construction access track was able to be achieved; and
- O - Existing access track crosses Burn of Day.

*Effects during construction on surface and ground water quality and quantity (and private water supplies)*

12.6.4 The Embedded and Applied Mitigation described above will minimise any adverse effects on the water environment. However, localised effects at locations where relevant buffers cannot be met are assessed in detail in **Appendix 12.2: Watercourse Crossing Assessment**. The only location where watercourse buffers are not achieved are at the 14 existing crossings of the access track and the upper Burn of Baulks where a 10 m buffer only was able to be achieved for the temporary construction access track, described above and shown in **Figure 12.1: Hydrology and Hydrogeology Study Area**. No new watercourse crossings are required and there will be no works within the channels. One small land drain will require a new crossing (crossing L). The main potential effect will be from dust, sediment and hydrocarbons from construction plant and machinery entering the watercourses at crossing locations during the construction phase. With Applied Mitigation, including GEMPs which detail specific mitigation measures for dust control, working near water, watercourse crossings and working in bad weather, these effects will be reduced.

12.6.5 SEPA Future flood maps show flood risk areas at three crossing locations (A – Black Burn, H – Cowie Water and O – Burn of Day), with the floodplain at the Cowie Water ~70 m wide. There is an increased risk of construction related sediment/pollution entering the water environment during flood events and additional mitigation is recommended at these locations.

12.6.6 With the Embedded and Applied Mitigation measures described above in place, the magnitude of the effect of increased sediment/silt runoff causing a deterioration in surface water quality in watercourses within and downstream of the Site during construction is considered to be **low**, temporary and of short duration. The sensitivity of downstream receptors is **high** (Cowie Water catchment) and **medium** (Carron Water catchment), with respect to water quality, and the significance of the effect is considered to be **moderate** (Cowie Water) and **minor** (Carron Water).

12.6.7 Embedded and Applied Mitigation measures to minimise the risk of pollution and accidental spillage will minimise the likelihood and severity of such incidents happening, however, there is still a residual risk. The magnitude of effect of pollution of surface water and groundwater caused by the release of hydrocarbon pollution resulting from accidental oil or fuel leaks or spillages is considered to be unlikely, short duration and **low**. The sensitivity of the downstream water environment is **high**/**medium**; hence the significance of the effect is considered to be **moderate/minor**.

12.6.8 An assessment of PWS and groundwater abstractions was carried out based on SEPA Guidance[13] and professional experience. The SEPA guidance recommends all groundwater abstractions within a 250 m buffer zone of excavations deeper than 1 m and a 100 m buffer of excavations less than 1 m be identified and assessed in detail. There are no groundwater abstractions, including PWS sources within 250 m of the proposed infrastructure, including earthworks. The PWS source for the existing Fetteresso substation is over 800 m from the proposed infrastructure but is ~60 m north of the existing access track. The PWS source for Fetteresso is a rainfed source and will not be impacted by construction traffic on the access route. The PWS source abstractions for Tillybreak and Stonehouse Cottage are surface water abstractions taken from watercourses that are downstream of the existing access track. The source for Tillybreak is ~30 m downstream of the access track (crossing C) and the source of Stonehouse is ~500 m downstream of the crossings F, G and H on the East Dumer Burn, West Dumer Burn and Cowie Burn, respectively.

12.6.9 With the Embedded and Applied Mitigation measures described above in place, the magnitude of the effect of increased sediment/silt runoff causing a deterioration in surface water quality in watercourses downstream of the access track during construction is considered to be **low**, temporary and of short duration. The two PWS which rely

[13] SEPA (2017) Land Use Planning System, SEPA Guidance Note 31 (LUPS-31): Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems

on surface water abstraction downstream of the access track (Tillybreak and Stonehouse Cottage) are considered to be of medium sensitivity and the effect during construction is assessed to be **minor**. Site-specific additional mitigation at the crossing locations and monitoring will be put in place to reduce any impacts on PWS. The effect on the remaining PWS is **negligible**, as all groundwater PWS sources are well over 250 m away from proposed infrastructure.

*Effects during construction on runoff rates and flood risk*

12.6.10 In accordance with National Planning Framework 4 (NPF4), there should be no new development in flood risk areas. NPF4 defines a flood risk area as one that lies within the 200-year floodplain, including an appropriate allowance for future climate change. There is no proposed infrastructure within flood risk areas. A 15 m buffer from watercourses and surface water bodies has been achieved for most of the proposed infrastructure, apart from the exceptions described above and in **Appendix 12.2: Watercourse Crossing Assessment**.

12.6.11 The Embedded and Applied Mitigation described above includes construction SuDS, which will attenuate all construction runoff to existing greenfield rates. With Embedded and Applied Mitigation the magnitude of effect on runoff rates and flood risk during construction will be **negligible** resulting in an effect of **negligible** significance.

*Effects during construction on peat*

12.6.12 Phase 1 peat survey showed there was no peat present over the majority of the Proposed Development area, with only one small area of peat identified in the low lying area close to the Burn of Baulks in the east of the Site. Peat has been fully avoided within the design. Therefore, the magnitude of effect on peat is **negligible** and the significance of effect on peat is considered to be **negligible**. The Outline CEMP includes a commitment to avoid this area of peat during construction and this is also noted in the committed additional mitigation described below**.**

*Additional Mitigation*

12.6.13 Additional Mitigation measures are outlined in **Table 12.9: Committed Additional Mitigation Construction**.

**Table 12.9: Committed Additional Mitigation Construction**

| Mitigation Measure | Rationale | Project Stage/Timing | Responsibility |
|---|---|---|---|
| HG12 - Additional pollution control mitigation and SuDS (e.g. settlement ponds and silt fences) will be installed at the 14 existing watercourse crossings and one new crossing and between the temporary access track and the upper Burn of Baulks during construction to reduce the risk of sediment/silt runoff and spills to the water environment during construction. | Within watercourse buffers (at existing track crossings) | Construction | Principal Contractor. The site-specific additional mitigation will be detailed within the CEMP and monitored by the Ecology Clerk of Works during construction. |
| HG13 - Monitoring of the Tillybreak and Stonehouse Cottage PWS will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring would either be at the supplied property locations or the offtakes. If the water quality deteriorates during construction (e.g. discoloured, high sediment content, hydrocarbons) an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. The contractors will have a supply of bowsers ready to deploy to affected PWS, if required. | The PWS source offtakes are from watercourses downstream of the exiting access track that will be used during construction and there is a low risk of silt/sediment entering the watercourses. | Construction | Principal Contractor. The site-specific monitoring will be detailed within the CEMP and monitored by the Ecology Clerk of Works during construction. |
| HG14 – No construction materials will be placed within the flood risk area of the Burn of Day, Cowie Water or Black Burn (on the existing access track) during construction. | These crossing locations are at risk of overland flooding during | Construction | Principal Contractor |

| Mitigation Measure | Rationale | Project Stage/Timing | Responsibility |
|---|---|---|---|
| | extreme flood events. | | |
| HG15 – The contractor will sign up to SEPA's flood warning service and follow weather forecasts and warning in order to receive advance warning of flood events. Use of access tracks (if flooded) will cease during flood events. | These crossing locations are at risk of overland flooding during extreme flood events. | Construction | Principal Contractor |
| HG16- An exclusion zone will be established downslope (east) of the forestry track on the east side of the Proposed Development to prevent any construction works access to the area of peat around the Burn of Baulks | To avoid effects on the small area of peat. | Construction | Principal Contractor<br>The site specific additional mitigation will be detailed within the CEMP and monitored by the Ecology Clerk of Works during construction. |

*Residual Construction Effects*

12.6.14 With the Additional Mitigation described in **Table 12.9**: **Committed Additional Mitigation Construction** the magnitude of the effect on water quality to downstream watercourses and receptors is **negligible** resulting in a residual effect of **negligible** significance. The residual effect on runoff rates and flood risk is **negligible**. The residual effect on peat is **negligible**.

## 12.7 Assessment of Likely Significant Effects - Operation

*Predicted Operational Effects*

12.7.1 The potential operational impacts of the Proposed Development are associated with the permanent Site infrastructure, including the substation platform and access track and any required maintenance work during operation.

12.7.2 The assessment of operational effects considers that the pollution prevention controls, and permanent drainage installed during construction (i.e. Embedded and Applied Mitigation) will remain in place during operation.

12.7.3 During operation, the permanent SuDS will attenuate surface water runoff from the platform to existing greenfield rates and hence there will be no increase in surface water runoff rates. The Proposed Development is outwith the predicted 200-year plus climate change flood risk area. Therefore, there is not anticipated to be any increase in flood risk as a result of the Proposed Development and the magnitude of the effect on flood risk is considered to be **negligible** and thus is assessed to have an effect of **negligible** significance.

12.7.4 The permanent drainage system will also provide the appropriate levels of treatment during operation and with the buffers achieved from watercourses the magnitude of effect on water quality is considered to be **negligible**, resulting in an effect of **negligible** significance.

*Additional Mitigation*

12.7.5 There is no additional mitigation proposed during operation.

## 12.8 Assessment of Likely Cumulative In-Combination Effects

*Introduction*

12.8.1 Predicted adverse effects on hydrology arising from the construction and operation of the Proposed Development have the potential to contribute to cumulative effects and the EIA Regulations require that in-isolation effects are considered alongside predicted effects from other plans or projects.

12.8.2 **Table 12.10: Cumulative Assessment: Associated SSEN Transmission Developments** provides a cumulative assessment of the Proposed Development with the Associated SSEN Transmission Development defined in **Chapter 1: Introduction** and shown in **Figure 5.1: Cumulative Developments**.

12.8.3 **Tables 12.11: Cumulative Assessment: Other SSEN Transmission Developments** and **Table 12.12: Cumulative Assessment: Other Third Party Developments** provide a cumulative assessment of the Proposed Development with other reasonable, foreseeable SSEN Transmission and 3rd party developments as shown in **Figure 5.1: Cumulative Developments**.

**Table 12.10: Cumulative Assessment: Associated SSEN Transmission Development**

| | Construction | | Operation |
|---|---|---|---|
| **Project** | **Effects during construction on surface and ground water quality and quantity (and private water supplies)** | **Effect on runoff rates and flood risk** | **Effect on runoff rates and flood risk** |
| Kintore to Tealing 400 kV OHL | The Proposed Development does not have a significant effect upon water quality during the construction phase with the application of mitigation measures (See **Table 12.8: Applied Mitigation** and **Table 12.9: Committed Additional Mitigation Construction**).<br><br>The nature of the Kintore to Tealing 400 kV OHL project is such that only a small percentage of the project takes place within the catchments of the Cowie Water and Carron Water. Within this catchment area, construction work will be of a much shorter duration than for the Proposed Development and require a much smaller degree of earth works. Assuming that SSEN Transmission procedures, including the adoption of all management plans referenced in Paragraph 12.5.3, are employed for the construction of the Kintore to Tealing 400 kV, then with the information available at this stage, there is no likely significant cumulative effect. | The Proposed Development does not have a significant effect upon runoff rates and flood risk during the construction.<br><br>The nature of the Kintore to Tealing 400 kV OHL project is such that negligible hardstanding areas are required during the construction phase. There is therefore no likely cumulative significant effect. | The Proposed Development does not have a significant effect upon runoff rates and flood risk in the operational phase.<br><br>The nature of the Kintore to Tealing 400 kV OHL project within the catchments of the Cowie Water and Carron Water is not likely to cause significant effects upon runoff and flood risk due to the likely negligible additional hardstanding areas that are required. There is therefore no likely cumulative significant effect. |
| **Summary** | The nature of these transmission projects is such that they are unlikely to have significant effects upon hydrology and hydrogeology and given the information that is available at this stage, it is unlikely that there will be significant cumulative effects in the construction phase. | | The nature of these transmission projects is such that they are unlikely to have significant effects upon hydrology and hydrogeology and given the information that is available at this stage, it is unlikely that there will be significant cumulative effects in the operational phase. |

**Table 12.11: Cumulative Assessment: Other SSEN Transmission Developments**

| | Construction | | Operation |
|---|---|---|---|
| **Project** | **Effects during construction on surface and ground water quality and quantity (and private water supplies)** | **Effect on runoff rates and flood risk** | **Effect on runoff rates and flood risk** |
| Fetteresso 132 kV substation extension | The information available on this project does not identify any likely significant effects in isolation and it is therefore accordingly concluded that there is no likely significant cumulative effect. | | The information available on this project does not identify any likely significant effects in isolation and it is therefore accordingly concluded that there is no likely significant cumulative effect. |
| Network Rail Drumlithie | As above | | As above |
| Fiddes 132 kV replacement | As above | | As above |
| SSEN Transmission Offshore Grids Project | As above | | As above |
| Glendye Wind Farm Grid Connection | As above | | As above |

**Table 12.12: Cumulative Assessment: Other Third Party Developments**

| | Construction | | Operation |
|---|---|---|---|
| **Project** | **Effects during construction on surface and ground water quality and quantity (and private water supplies)** | **Effect on runoff rates and flood risk** | **Effect on runoff rates and flood risk** |
| Bowdun Offshore Wind Farm Onshore | The information available on this project does not identify any likely significant effects in isolation and it is therefore accordingly concluded that there is no likely significant cumulative effect. | | The information available on this project does not identify any likely significant effects in isolation and it is therefore accordingly concluded that there is no likely significant cumulative effect. |
| Craigneil Wind Farm | As above | | As above |
| Quithel | As above | | As above |

## 12.9 Summary of Significant Effects

12.9.1 There are no predicted significant (moderate or major) effects of the Hurlie 400 kV substation project on hydrology, hydrogeology, geology and soils. This is summarised in **Table 12.13: Summary of Significant Effects**.

12.9.2 Prior to additional mitigation, the effects during construction on hydrology, hydrogeology, geology and soils were assessed to be **moderate, minor** or **negligible**. With site-specific additional mitigation, the residual construction effects were assessed to be **negligible** for all receptors.

12.9.3 During operation, the effects were assessed to be **negligible**. No additional mitigation during operation was required. Cumulative effects were assessed to be **negligible**.

**Table 12.13: Summary of Significant Effects**

| Predicted Effects | Significance Prior to Additional Mitigation | Mitigation | Significance of Residual Effects Following Additional Mitigation |
|---|---|---|---|
| **Construction** | | | |
| Effect on water quality to downstream watercourses and receptors | Moderate (Cowie Water)<br><br>Minor (Carron Water) | Additional pollution control mitigation and SuDS (e.g. settlement ponds, silt fences) will be installed at the watercourse crossings and the upper burn of Baulks during construction to reduce the risk of sediment/silt runoff and spills to the water environment during construction.<br><br>No construction materials will be placed within the flood risk area of the Burn of Day, Cowie Water or Black Burn (on the existing access track) during construction.<br><br>The contractor will sign up to SEPA's flood warning service and follow weather forecasts and warning in order to receive advance warning of flood events. Use of access tracks (if flooded) will cease during flood events. | Negligible |
| Effects on PWS | Minor | Monitoring of the Tillybreak and Stonehouse Cottage PWS will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring would either be at the supplied property locations or the offtakes. If the water quality deteriorates during construction (e.g. discoloured, high sediment content, hydrocarbons) an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. The contractors will have a supply of bowsers ready to deploy to affected PWS, if required. | Negligible |
| Effects on runoff rates and flood risk | Negligible | No construction materials will be places within the flood risk area of the Burn of Day, Cowie Water or Black Burn during construction/upgrading of the access track/crossings. | Negligible |
| Effect on Peat | Negligible | Peat has been avoided in the detailed design. An exclusion zone will be established downslope (east) of the forestry track on the east side of the Proposed | Negligible |

| Predicted Effects | Significance Prior to Additional Mitigation | Mitigation | Significance of Residual Effects Following Additional Mitigation |
|---|---|---|---|
| | | Development to prevent any construction works access to the area of peat around the Burn of Baulks | |
| **Operation** | | | |
| Effect on runoff rates and flood risk | Negligible | None | Negligible |
| **Cumulative** | | | |
| None | N/A | N/A | N/A |