

Environmental Impact Assessment (EIA) Report

LT384 Tealing to Westfield Overhead Line (OHL) 400 kV Upgrade

November 2024



VOLUME 2: CHAPTER 13 – HYDROLOGY, HYDROGEOLOGY AND GEOLOGY

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13. HYDROLOGY, HYDROGEOLOGY AND GEOLOGY

13.1 Introduction

13.1.1 This chapter of the EIA Report identifies and assesses the potential impacts and effects of the Proposed Development on the water environment and geology during construction, operation and maintenance. Further, the approach to mitigating potential effects during all phases have been described with reference to good practice guidance and design, which is described later.

13.1.2 The Proposed Development will not have a fixed operational life. The effects associated with the construction phase are considered to be representative of worst-case decommissioning effects and, therefore, no separate environmental assessment of decommissioning is necessary.

13.1.3 As indicated in the Scoping Report, soils have been scoped out of the EIA Report due to the absence of viable soil receptors. Furthermore, it is unlikely that contaminated land will be a significant constraint to the Proposed Development, or that the nature of the proposed works would result in significant environmental effects to contamination. As a result, this topic has been scoped out of the EIA Report. Further details can be found in the Scoping Report and are not mentioned further in this EIA Report.

13.1.4 For this assessment the water environment includes the water quality of surface water features, fluvial hydromorphology of watercourses and the geomorphology of lochs/ lochans, and quality, flows and levels of groundwater features. Where there are water dependent ecosystems, these are also considered in this assessment when determining the importance of water features. The sensitive hydrological and hydrogeological receptors are also considered and any key environmental designations in the areas surrounding the Proposed Development.

13.1.5 There is interaction between environmental topics and therefore this chapter should be read in conjunction with Chapter 8: Ecology (Volume 2).

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

- Figure 13.1 Surface Water Receptors (Volume 3);
- Figure 13.2 Groundwater Receptors (Volume 3);
- Figure 13.3a Superficial Geology (Volume 3);
- Figure 13.3b Bedrock Geology (Volume 3);
- Figure 13.4 Geology Designated Sites (Volume 3);
- Appendix 13.1 Groundwater WFD Classifications (Volume 4);
- Appendix 13.2 Surface WFD Classifications (Volume 4);
- Appendix 13.3 Photo Log (Volume 4);
- Appendix 13.4 PWS Assessment (Volume 4); and
- Appendix 13.5 Zetica Pre-Desk Study Assessment for Unexploded Ordnance (UXO) (Volume 4).

13.2 Legislation and Policy

13.2.1 Legislation, planning policy and guidance relevant to this assessment and pertinent to the Proposed Development is outlined in this section (please note that regulations transferring powers from the European Union to the United Kingdom authorities are not listed).

Legislation

13.2.2 The following national legislation is relevant to the Proposed Development and will be considered as part of this assessment:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) ('the CAR Regulations')¹;
- Water Environment Water Services ('the WEWS Act') (Scotland) Act 2003²;
- Environmental Liability (Scotland) Regulations 2009³;
- Pollution Prevention and Control (Scotland) Regulations 2012 (PPC)⁴;
- The Climate Change (Scotland) Act 2009⁵;
- Contaminated Land (Scotland) Regulations (2005)⁶;
- The Environmental Protection (Duty of Care) (Scotland) Regulations (2014)⁷;
- The Construction (Design and Management) Regulations (2015)⁸;
- Nature Conservation (Scotland) Act (2004)⁹;
- Town & Country Planning (Scotland) Act (1997) as amended¹⁰;
- Environmental Protection Act (1990) (as amended) and Part 2A The Contaminated Land Regime (2006)¹¹;
- Scotland's Zero Waste Plan (2010)¹²;
- Scottish Energy Strategy (2017)¹³; and,
- Electricity Act (1989)¹⁴.

Planning Policy

13.2.3 The application for consent for the Proposed Development will be made to and determined by the Scottish Ministers in accordance with the provisions of Section 37 of the Electricity Act (1989)¹⁴. Deemed planning permission will also be sought under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 (as amended)¹⁰. There are legal, policy and advice documents which are material considerations to the decision-

¹ Scottish Parliament, (2011) The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) ('the CAR Regulations'). (online) Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made> [Accessed: July 2024]

² Scottish Parliament (2003) Water Environment Water Services ('the WEWS Act') (Scotland) Act 2003. (online) Available at: <https://www.legislation.gov.uk/asp/2003/3/contents> [Accessed: July 2024]

³ Scottish parliament (2009) Environmental Liability (Scotland) Regulations 2009. Available at: <https://www.legislation.gov.uk/ssi/2009/266/contents/made> [Accessed: July 2024]

⁴ Scottish Parliament (2012). Pollution Prevention and Control (Scotland) Regulations 2012 (PPC). Available at: <https://www.legislation.gov.uk/ssi/2012/360/contents/made> [Accessed: July 2024]

⁵ Scottish Parliament (2009) Climate Change (Scotland) Act 2009. (online) Available at <https://www.legislation.gov.uk/asp/2009/12/contents> [Accessed: July 2024]

⁶ The Contaminated Land (Scotland) Regulations 2005 (legislation.gov.uk)

⁷ The Environmental Protection (Duty of Care) (Scotland) Regulations 2014 (legislation.gov.uk)

⁸ The Construction (Design and Management) Regulations 2015 (legislation.gov.uk)

⁹ Nature Conservation (Scotland) Act 2004 (legislation.gov.uk)

¹⁰ Town and Country Planning (Scotland) Act 1997 (legislation.gov.uk)

¹¹ Determining Liability - Environmental Protection Act 1990 - Part IIA Contaminated Land: statutory guidance edition 2 - gov.scot (www.gov.scot)

¹² gov.scot (2010) Scotland's Zero Waste Plan 2010 (online) Available at: <https://www.gov.scot/publications/scotlands-zero-waste-plan/> [Accessed: July 2024]

¹³ gov.scot (2017) Scottish Energy Strategy 2017. (online) Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2017/12/scottish-energy-strategy-future-energy-scotland-9781788515276/documents/00529523-pdf/00529523-pdf/govscot%3Adocument/00529523.pdf> [Accessed: July 2024]

¹⁴ Scottish Parliament (1989) Electricity Act 1989 (online). Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed July 2024]

making process, covering relevant legislation, national and local planning policy, and advice notes / supplementary guidance, and these are described in the following sections.

National Planning Framework 4 (NPF 4)

13.2.4 The National Planning Framework 4 (NPF 4)¹⁵ sets out the Scottish Government spatial development principles, regional priorities, national developments and national planning policy, covering six spatial principles which aim to deliver sustainable places, liveable places and productive places.

13.2.5 Policy 11 within NPF 4 states that project design and mitigation should address any effects on hydrology, the water environment and flood risk.

13.2.6 Policy 9 within NPF 4 states that “*where land is known or suspected to be unstable or contaminated, development proposals will demonstrate that the land is, or can be made, safe and suitable for the proposed new use.*”

Planning Advice Notes and Specific Advice Sheets

13.2.7 Planning Advice Notes (PANs) and Specific Advice Sheets set out detailed advice from the Scottish Government in relation to a number of planning issues. Those relevant to the Proposed Development include (Table 13-1):

Table 13-1 Planning Advice Notes and Specific Advice Sheets

Planning Advice Notes and Specific Advice Sheets	Key Requirements relating to the Water Environment and Geology	The Proposed Development
Planning and waste management ¹⁶ . Water and drainage ¹⁷ .	State that there should be environmental protection considerations to mitigate any potential effects on the water environment.	Mitigation measures are outlined within Section 13.7 of the chapter.

River Basin Management Plan

13.2.8 The River Basin Management Plan (RBMP)¹⁸ sets out a range of actions to address impacts to the water environment. The RBMP outlines actions for public bodies and land managers and is produced by Scottish Environment Protection Agency (SEPA) on behalf of the Scottish Government. The Proposed Development is within the RBMP. In summary, the RBMP provides the following:

- The conditions of the water environment;
- Pressures which could or are impacting the water environment; and,
- Actions to address any impacts.

¹⁵ The Scottish Government. (2023) National Planning Framework 4. (online) Available at: <https://www.gov.scot/publications/national-planning-framework-4/> [Accessed: July 2024]

¹⁶ The Scottish Government (2015). Planning and waste management advice. (online) Available at: <https://www.gov.scot/publications/planning-and-waste-management-advice/> [Accessed: July 2024]

¹⁷ The Scottish Government (2006) PAN 79 Water and Drainage. (online) Available at: <https://www.gov.scot/publications/planning-advice-note-pan-79-water-drainage/> [Accessed: July 2024]

¹⁸ SEPA (2021) The River Basin Management Plan for Scotland 2021 – 2027. (online) Available at: <https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf> [Accessed: July 2024]

Local Planning Policy – Fife Council

13.2.9 The Fife Local Development Plan (Fife LDP)¹⁹ sets out the policies and proposals for the development and use of land across Fife. The latest version of the Fife LDP was adopted by Fife Council in September 2017. The policies in the Fife LDP and supplementary guidance are used to determine planning applications and give guidance to communities and investors on where development can take place. The following policies are applicable to the Proposed Development (Table 13-2).

Table 13-2 List of water environment and geology related policies outlined in Fife LDP

Policy Number	Description
Policy 9: Green Belt	Development in the green belt will only be supported in certain circumstances, including where it <i>“is for intensification of established uses”</i> .
Policy 12: Flooding and the Water Environment	<i>“To minimise or avoid a detrimental impact on ecological quality of the water environment, development proposals should demonstrate that they are designed and managed in a manner that will, whenever possible, leave ecological quality of the water environment in its natural state for example, avoiding engineering activities such as culverts, bridges, watercourse diversions, bank modifications or dams... In order to meet WFD objectives, the council will encourage opportunities to improve and protect the status of water bodies and wetlands and developments which improve the ecological quality of the water environment will be supported.”</i>
Policy 13: Natural Environment and Access	Fife’s environmental assets are maintained and enhanced; Green networks are developed across Fife; Biodiversity in the wider environment is enhanced and pressure on ecosystems reduced enabling them to more easily respond to change. Fife’s natural environment is enjoyed by residents and visitors. <i>“Development proposals will only be supported where they protect or enhance natural heritage assets including:</i> <ul style="list-style-type: none"> • <i>designated sites of international and national importance, including... SSSI [geology and geomorphological sites]; and</i> • <i>designated sites of local importance, including... Regionally Important Geological Sites [(RIGS)]”.</i>
Policy 15: Minerals	<i>“Minerals that are, or may be, of economic or conservation value will be protected from development which could prevent or jeopardise their extraction. Prior extraction of minerals should be facilitated and encouraged for any substantial new development sites, in line with national policy, with the aim of preventing sterilisation of minerals... Proposals for mineral working will be supported if they will result in the restoration of previously worked areas where the earlier restoration has not been completed to a high standard, or which have left a legacy of ground instability. Extensions to existing quarries will be preferred to establishing new quarries.”</i>

Local Planning Policy – Angus Council

13.2.10 The Angus LDP²⁰ was formally adopted in September 2016 and provides guidance for local planning developments and sets out the councils view on how the area should be developed. In December 2022 an Action Programme was published to provide an overview of the policy development work and activity since 2020, but is

¹⁹Fife Council (2017) Local development plan (FIFEplan) (online) Available at: <https://www.fife.gov.uk/kb/docs/articles/planning-and-building2/planning/development-plan-and-planning-guidance/local-development-plan-fifeplan> [Accessed: July 2024]

²⁰ Angus Council (2016) Local Development Plan (online) Available at: https://www.angus.gov.uk/media/angus_local_development_plan_adopted_september_2016 [Accessed: July 2024]

not an update to the Angus LDP itself. The following policies are applicable to the Proposed Development (Table 13-3).

Table 13-3 List of water environment and geology related policies outlined in Angus LPD

Policy Number	Description
Policy PV14 Water Quality	<i>“Development proposals which do not maintain or enhance the water environment will not be supported. Mitigation measures must be agreed with SEPA and Angus Council. Development proposals must not pollute surface or underground water including water supply catchment areas due to discharge, leachates or disturbance of contaminated land.”</i>
Policy PV17 Waste Management Facilities	<i>“Development proposals adjacent to existing or proposed waste management facilities should not directly or indirectly compromise the present or future operation of the facility Impacts on the natural and built environment, amenity, landscape character, visual amenity, air quality, water quality, groundwater resources, site access, traffic movements, road capacity and road safety are acceptable or could be satisfactorily mitigated through planning conditions or planning agreement”</i>
Policy PV19: Minerals	Angus Council will protect existing mineral resources within Angus which are of economic and/or conservation value from other forms of development.
Policy PV20: Soils and Geodiversity	<i>“Development proposals affecting deep peat or carbon rich soils will not be allowed unless there is an overwhelming social or economic need that cannot be met elsewhere. Where peat and carbon rich soils are present, applicants should assess the likely effects of development proposals on carbon dioxide emissions. All development proposals will incorporate measures to manage, protect and reinstate valuable soils, groundwater and soil biodiversity during construction.”</i>

Local Planning Policy – Perth and Kinross Council

13.2.11 The Perth and Kinross LDP²¹ was formally adopted on 29th November 2019 and provides guidance for local planning, for future development in the council area, and provides the basis for determining planning applications. The LDP also provides guidance on what development will or will not be allowed and where. The following policies are applicable to the Proposed Development (Table 13-4).

Table 13-4 List of water environment and geology related policies outlined in Perth and Kinross LDP

Policy Number	Description
Policy 35: Electricity Transmission Infrastructure	<i>“Proposals for electricity transmission infrastructure (including lines, towers/poles, substations, transformers, switches and other plant) will be supported. In locations that are sensitive, mitigation may help address concerns and should be considered as a part of the preparation of proposals”</i>
Policy 38A: International Nature Conservation Sites	<i>“Development which could have a significant effect on a site designated or proposed under the Habitats or Birds Directive (Special Areas of Conservation and Special Protection Areas) or Ramsar site, will only be permitted where: (a) an appropriate assessment has demonstrated that it will not adversely affect the integrity of the site; or (b) there are no alternative solutions; and (c) there are imperative reasons of overriding public interest, including those of social or economic nature; and (d) compensatory measures are provided to ensure that the overall coherence of the Natura network is protected”</i>
Policy 38B: National Designations	<i>“Development which would affect a National Park, National Scenic Area, Site of Special Scientific Interest or National Nature Reserve, will only be permitted where the Council as Planning Authority is satisfied that: (a) the proposed development will not adversely affect the integrity of the area or the qualities for which it has been designated; or (b) any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance”</i>

²¹ Perth & Kinross Council (2019) Local Development Plan (online). Available at: <https://www.pkc.gov.uk/article/15042/Adopted-Development-Plan>
 [Accessed: July 2024]

Policy Number	Description
Policy 38C: Local Designations	<p><i>“Development which would affect an area designated by the Council as being of local conservation or geological interest will not normally be permitted, except where the Council as Planning Authority is satisfied that:</i></p> <p><i>(a) the objectives of designation and the overall integrity of the designated area would not be compromised; or</i></p> <p><i>(b) any locally significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social and economic benefits.”</i></p>
Policy 48: Minerals and Other Extractive Activities - Safeguarding	<p><i>“The Local Development Plan will safeguard all workable mineral resources which are of economic or conservation value and ensure that these are not sterilised by other development. Planning permission will not be granted for development which would sterilise mineral deposits of economic value unless:</i></p> <p><i>(a) there is an overriding need for the development and prior extraction of the mineral cannot reasonably be undertaken; or</i></p> <p><i>(b) extraction of the mineral is unlikely to be practicable or environmentally acceptable.”</i></p>
Policy 51: Soils	<p><i>“The Council is also committed to ensuring that development avoids disturbance to, and the loss of, carbon rich soils, including peatland, which are of value as carbon stores. Commercial extraction of peat will only be permitted in areas suffering historic, significant damage through human activity and where the conservation value is low and restoration is impossible.</i></p> <p><i>Reference should be made to the Carbon and Peatland Maps available on the Scottish Soils website. Development will only be permitted on areas of carbon-rich soils, including peatland, where it has been clearly demonstrated that there is no viable alternative, or where the economic and social benefits of the development would outweigh any potential detrimental effect on the environment. The presence of any carbon rich soils, including peatland, will be required to be validated through the undertaking of appropriate field surveys.”</i></p>
Policy 53A: Water Environment	<p><i>“Proposals for development which do not accord with the Scotland River Basin Management Plan will not be permitted unless the development is judged by the Council to be of significant specified benefit to society and/or the wider environment. The only situation where culverting for land gain may be permissible is where a development is of overriding public interest. A minimum buffer between a development and a watercourse should be applied in keeping with the Flood Risk Supplementary Guidance.”</i></p>
Policy 53B: Foul Drainage	<p><i>“Foul drainage from all developments within and close to settlements that have public sewerage systems will require connection to the public sewer. In settlements where there is little or no public sewerage system, a private system may be permitted provided it does not have an adverse effect on the natural and built environment, surrounding uses and amenity of the area. For a private system to be acceptable it must comply with the Scottish Building Standards Agency Technical Handbooks and applicants should also demonstrate suitable maintenance arrangements will be put in place for communal systems.”</i></p>
Policy 53D: Reinstatement of Natural Watercourses	<p><i>“The Council will not support development over an existing culvert or the culverting of watercourses as part of a new development unless there is no practical alternative. Where deemed necessary it will be essential to provide adequate access for maintenance.”</i></p>

13.3 Consultation Undertaken to Date

13.3.1 Table 13-5 lists the relevant consultee responses from the Scoping Opinion (issued 18th September 2024).

Table 13-5 Summary of consultation through Scoping Opinion

Consultee	Key Issue	Action Taken
Scottish Water	<p>There are a number of critical assets along the whole of the route covering water and wastewater that will need to be identified, with particular consideration given to access roads and pipe line crossings. If necessary, local Scottish Water Personnel may be able to visit the site to offer advice. All of Scottish Water's processes, standards and policies in relation to dealing with asset conflicts must be complied with. In the event that asset conflicts are identified then early contact should be made with the Highway Authorities and Utilities Committee (HAUC). All detailed design proposals relating to the protection of Scottish Water's assets should be submitted to the HAUC for review and written acceptance. Works should not take place on site without prior written acceptance by Scottish Water.</p> <p>The Proposed Development falls within a drinking water catchment where Scottish water abstraction is located. Scottish water abstractions are designated as Drinking Water Protected areas and the overhead powerlines pass through multiple sources. These include the River Tay, Knowhead and Newton of Lathrisk Boreholes which travel straight to supply and Arnott Reservoir which is a compensation reservoir but can augment Lomond Hills Water Treatment Works. Scottish Water have produced a list of precautions that should be adhered to in order to safeguard Scottish Waters activities in the area surrounding the Proposed Development. Scottish Water are required to ensure that any activity within the catchment does not affect the ability of Scottish Water to meet its regulatory requirements. Scottish Water has provided a detailed list of specific precautions for drinking water protection and in relation to the sensitivities of land use surrounding the Proposed Development. Site specific risks and mitigations measures should be addressed and implemented.</p>	<p>The EIA addresses the groundwater bodies and surface water bodies that have been highlighted by Scottish Water. In addition, suitable mitigation has been reported upon and assessed in this report.</p>
SEPA	<p>SEPA have produced a list of precautions that must be considered in relation to the activities that may impact the natural environment. To summarise, SEPA have requested no land draining, infrastructure (permanent or temporary) or storage of materials to take place on any future flood extents such as those of the Huntly Burn (and tributaries of), southwest of Inchtute, surrounding Grange, Pow of Errol, River Tay and River Earn. Where towers must be located in these areas, a flood risk assessment must be produced. Areas at risk of geomorphological change have been highlighted and buffer zones must be applied to watercourses.</p> <p>The following watercourses have been identified as high or medium priority for riparian planting and should be considered for BNG proposals; Dronley Burn (medium), Lundie Burn (high), Invergowie Burn (medium), Huntly Burn (medium), Grange Pow (medium), River Tay (medium) and River Earn (medium).</p> <p>SEPA has highlighted a number of Private Water Supply (PWS) in the area to the south of the River Tay and expect further assessment of these should any excavation be proposed within the prescribed buffer zone. SEPA also raised comments on the potential for risk of greater levels of run-off rates compared to pre-existing levels.</p>	<p>Assessment of the sensitivity and condition of all watercourses near and surrounding the Proposed Development, particularly those identified as medium and high priority by SEPA.</p> <p>A PWS assessment has been conducted for sources in and surrounding the Proposed Development.</p>
Office for Nuclear Regulation	<p>The Office for Nuclear Regulation makes no comment on the Proposed Development as it does not lie within a consultation zone around a GB nuclear site and is currently not of concern for the Proposed Development.</p>	<p>No further actions to be taken.</p>
Perth and Kinross Council	<p>To determine if any geological designated sites within the study area.</p> <p><i>Response from Council:</i></p> <p><i>"There are no registered Part IIA sites within the proposed development site. We do not hold any additional geological-related information for this area."</i></p>	<p>No further actions to be taken.</p>

Consultee	Key Issue	Action Taken
Fife Council	To determine if any geological designated sites within the study area. <i>Response from Council:</i> "No information held."	No further actions to be taken.
Angus Council	To determine if any geological designated sites within the study area. <i>Response from Council:</i> No response received yet. Angus Council did not contribute to Scoping Opinion.	No further actions to be taken.

13.4 Assessment Methodology and Significance Criteria

Extent of the Study Area

13.4.1 The Proposed Development is approximately 37 km in length from the existing Tealing substation (NO 39967 36972) to Westfield (NO 22787 14273). The Proposed Development is within the council areas of Angus, Perth and Kinross, and Fife.

13.4.2 For the purposes of this impact assessment, a 1 km study area around the Proposed Development has been selected for hydrology, hydrogeology and geology. However, the Limit of Deviation will be the principle focus for both the water environment walkovers and assessment. The baseline also considers downstream attributes beyond the Limit of Deviation as water quality impacts can sometimes propagate along watercourses. The distance downstream is usually determined by the nature of the risk, rate of conveyance, dilution and dispersion potential.

13.4.3 The study area and Limit of Deviation are determined by the location of the Proposed Development and construction works and access routes. Detailed information on this is available in Chapter 3: Project Description (Volume 2).

Method of Baseline Data Collation

13.4.4 A summary of baseline conditions for the Proposed Development and study area is presented in Section 13.5. This involved using a range of sources to identify and characterise the area.

13.4.5 The following sources have been used to inform the baseline upon which the effects have been assessed:

- Online Ordnance Survey (OS) digital maps²²;
- Met Office website²³;
- SEPA website²⁴;
- Standing Waters Database²⁵;
- Scotland's Aquaculture website²⁶;
- Scotland's Environment website²⁷;

²² Ordnance Survey (2024) Digital Maps. (online) Available at: <https://www.ordnancesurvey.co.uk/> [Accessed: June 2024]

²³ Meteorological Office website. (online). Available at: <https://www.metoffice.gov.uk/public/weather/climate/gfhyzsz9> [Accessed: June 2024]

²⁴ SEPA website. (online) Available at: <https://www.sepa.org.uk/> [Accessed: June 2024]

²⁵ SNH (2024) Standing Waters Database. (online) Available at: http://gateway.snh.gov.uk/pls/apex_cagdb2/f?p=111:1000 [Accessed: June 2024]

²⁶ Gov.uk (2024) Scotland's Aquaculture website. (online) Available at: <http://aquaculture.scotland.gov.uk/> [Accessed: June 2024]

²⁷ Gov.uk (2024) Scotland's Environment website. (online) Available at: <https://www.environment.gov.scot/maps/scotlands-environment-map/> [Accessed: June 2024]

- National River Flow Archives website²⁸;
- British Geological Society (BGS) website²⁹;
- BGS Geoindex Onshore website³⁰
- NatureScot³¹;
- Scotland's aquifers and groundwater bodies³²;
- UK centre for Ecology and Hydrology³³;
- Scotland's Environment map³⁴;
- The Coal Authority (CA)³⁵;
- Historic Environment Scotland (HES)³⁶;
- Zetica UXO Map³⁷;
- Zetica Pre-Desk Study Assessment (PDSA) for UXO (contained within Appendix 13.5 (Volume 4));
- Zetica UXO ASTI Scheme Desk Study and Constraints Assessment³⁸
- UK Radon Map³⁹;
- SEPA data request for (Received on the 20th March 2024):
 - Surface water and groundwater quality;
 - Surface water and groundwater discharges;
 - Pollution events;
 - Surface water monitoring stations; and
 - Ecology surveys;
- PWS data from Angus Council (Received 23rd February 2024);
- PWS data from Fife Council (Received 15th February 2024);
- PWS data from Perth and Kinross Council (Received 18th January 2024); and,
- data on geological sites from Perth and Kinross Council (Received 10th July 2024) and Fife Council (Received 18th July 2024).

13.4.6 A walkover of the study area was conducted on 28th May 2024. The survey was carried out by a team of surveyors consisting of a hydrogeologist and a flood risk consultant. The purpose of the survey was to identify and

²⁸ National River Flow Archive website. (online). Available at: <https://nrfa.ceh.ac.uk/data/station/info/6001> [Accessed: June 2024]

²⁹ British Geological Survey (BGS) online mapping. (online) Available at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> [Accessed: June 2024]

³⁰ British Geological Survey (2024) Geoindex Onshore. (online) Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.32839230.1298671740.1719419218-2096687190.1719419218 [Accessed: June 2024]

³¹ NatureScot website (online). Available at: <https://www.nature.scot/> [Accessed: June 2024]

³² British Geological Survey (2024) Scotland's aquifers and Groundwater Bodies (online) Available at: <https://www2.bgs.ac.uk/groundwater/waterResources/ScotlandsAquifers.html> [Accessed: June 2024]

³³ UK Centre for Ecology and Hydrology (2024) National River Flow Archive. (online) Available at: <https://nrfa.ceh.ac.uk/rainfall-statistics> [Accessed: June 2024]

³⁴ Gov.scot (2024) Scotland's Environment Map. (online) Available at: <https://www.environment.gov.scot/maps/scotlands-environment-map/> [Accessed: June 2024]

³⁵ British Geological Society (2024) Interactive Map Viewer (online): Available at: <https://mapapps2.bgs.ac.uk/coalauthority/home.html> [Accessed: June 2024]

³⁶ Historic Environment Scotland (2024) Designations Map Search (online) Available at: <https://hesportal.maps.arcgis.com/apps/Viewer/index.html?appid=18d2608ac1284066ba3927312710d16d> [Accessed: June 2024]

³⁷ Zetica UXO (2024) Risk Map (online) Available at: <https://zeticauxo.com/guidance/risk-maps/> [Accessed: June 2024]

³⁸ Zetica UXO (2023) ASTI Scheme UXO Desk Study & Constraints Assessment.

³⁹ UKradon (2024) UK maps of radon (online) Available at: <https://www.ukradon.org/information/ukmaps> Accessed June 2024

characterise surface and groundwater receptors, consider flow pathways from source to receptors, and make general observations about the character of the landscape and other relevant features that may influence the sensitivity and importance of water features.

13.4.7 The general methodology used to assess the effect of the Proposed Development on the hydrology, hydrogeology and geology receptors and the surrounding area is as follows:

- Desktop study to obtain baseline and historical data;
- Consultation with Perth and Kinross Council, Fife Council, Angus Council and landowners to identify water abstractions and PWS;
- Identification of the potential effects of the Proposed Development on sensitive receptors, taking account of the Applicant's General Environmental Management Plans ; and,
- Identification of options for the mitigation of potential effects, taking account of additional mitigation measures.

Source-Pathway-Receptor Approach

13.4.8 The qualitative assessment of potential likely significant effects during the construction and operational phases of the Proposed Development has been based on a source-pathway-receptor approach. For an impact on the water environment to exist, the following is required:

- An impact source or cause of effect (such as a structure over a watercourse, the release of polluting chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or the loss or damage to all or part of a water feature, cuttings / excavations and associated dewatering activities capable of causing temporary or permanent changes to groundwater level or flow pattern and quality (as in the case of groundwater));
- A receptor that is sensitive to that impact (i.e., water features and the services they support) that could potentially be affected; and,
- A pathway by which the two are linked (i.e., all three elements must be present before a potential impact linkage can be realised).

13.4.9 The first stage in applying the source-pathway-receptor approach is to identify the causes or sources of potential impact from a development. The sources have been identified through a review of the details of the Proposed Development, including the size and nature of the Proposed Development, potential construction methodologies and timescales, etc.

13.4.10 The next step in the approach is to undertake a review of the potential receptors; that is, the water environment receptors themselves that have the potential to be affected. Water features, including their attributes, have been identified through desk study and site surveys as described later.

13.4.11 The last stage of the approach is to determine if there is a viable exposure pathway or a 'mechanism' linking the source to the receptor. This is determined in the context of local conditions relative to water receptors within the Line of Deviation and surrounding environs, such as topography, geology, climatic conditions, land use and the nature of the impact (e.g., the mobility of a liquid pollutant or the proximity to works that may physically impact a water feature or be a source of water pollution).

Determining Magnitude of Impact and Sensitivity of Receptors

- 13.4.12 The assessment of effect significance outlined within the below sections is consistent with the terminology and criteria outlined within Chapter 5: EIA Approach and Methodology (Volume 2).
- 13.4.13 The sensitivity of receptors, or importance, of the potentially affected water environment features has been established on the basis of a four-point scale, using the criteria presented in Table 13-6 which has been modified from Design Manual for Roads and Bridges (DMRB) LA 113 Road drainage⁴⁰ and the water environment to include hydromorphology.
- 13.4.14 The sensitivity of receptors, or importance, of the potentially affected geology features has been established on the basis of a five point scale, using the criteria presented in Table 13-6 which has been modified from DMRB LA 113 Road drainage and the water environment, and DMRB LA 109 Geology and Soils⁴¹.
- 13.4.15 The magnitude of adverse or beneficial impacts has been determined by the four-point scale presented in Table 13-7 taking DMRB LA 113 Road drainage and the water environment, and DMRB LA 109 Geology and Soils into account⁴⁰.
- 13.4.16 The significance of effects has been determined using the matrix presented in Table 13-8. The assessment has considered the magnitude of impacts and the sensitivity of the resources/ receptors that could be affected to classify the effect. After using the matrix to determine the effect, professional judgement will be used to determine the residual significance.

⁴⁰ Highways England (2020) Design Manual for Roads and Bridges LA 113 Road Drainage and the Water Environment.

⁴¹ Highways England (2020) Design Manual for Roads and Bridges LA 109 Geology and Soils.

Table 13-6 Sensitivity of Receptor

Sensitivity	Groundwater	Surface Water	Hydromorphology	Geology
Very High	<p>Principal aquifer providing a regionally important resource and/ or supporting a site protected under International and UK legislation Ecology and Nature Conservation</p> <p>Groundwater locally supports Groundwater Dependent Terrestrial Ecosystems (GWDTE).</p>	<p>Watercourse having a WFD classification shown in a RBMP and Q951 $\geq 1.0 \text{ m}^3/\text{s}$</p> <p>The Proposed Development site protected / designated under International or UK habitat legislation (SAC, SPA, SSSI, Water Protection Zone (WPZ), Ramsar site.</p> <p>International Designated Salmonid / Cyprinid fishery.</p> <p>Species protected by international legislation.</p>	<p>Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.</p>	<p>Geology: very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, SSSIs and Geological Conservation Review (GCR) sites where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such.</p> <p>Peat: Receptor contains Class 1 or 2 priority peatland and soils directly support a designated site (e.g., SAC, SPA, RAMSAR, SSSI, etc.)</p>
High	<p>Principal aquifer providing locally important resource or supporting river ecosystem and/ or supporting sensitive habitats of national importance.</p> <p>Groundwater supports a GWDTE.</p>	<p>Watercourse having a WFD classification shown in a RBMP and Q95 $\text{m}^3/\text{s} < 1.0 \text{ m}^3/\text{s}$.</p> <p>Major Cyprinid Fishery.</p> <p>Species protected under International or UK legislation Ecology and Nature Conservation.</p>	<p>Conforms closely to natural, unaltered state and will often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/ or indirect channel, floodplain, bank modifications and/ or catchment development pressures.</p>	<p>Geology: rare and of national importance with little potential for replacement (e.g. geological SSSI, Areas of Special Scientific Interest (ASSI), National Nature Reserves (NNR)). Geology meeting national designation citation criteria which is not designated as such.</p> <p>Peat: Receptor contains Class 1 or 2 priority peatland.</p>
Medium	<p>Aquifer providing water for agricultural or industrial use with limited connection to surface water.</p> <p>Secondary Aquifer.</p> <p>Groundwater of limited value because its quality does not allow potable or other quality sensitive uses.</p>	<p>WFD not having a WFD classification shown in a RBMP and Q95 $> 0.001 \text{ m}^3/\text{s}$.</p>	<p>Shows signs of previous alteration and/ or minor flow/ water level regulation but still retains some natural features or may be recovering towards conditions indicative of the higher category.</p>	<p>Geology: of regional importance with limited potential for replacement (e.g. RIGS / Local Geological / Geomorphological Sites (LGS)). Geology meeting regional designation citation criteria which is not designated as such.</p> <p>Peat: Receptor contains Class 3 or 5 peatland areas, or other areas identified as being carbon rich or peaty soils from sources out with the 2016 Carbon and Peatland Map. Or soils supporting non-statutory designated sites (e.g. Local Nature Reserves (LNR))</p>

Sensitivity	Groundwater	Surface Water	Hydromorphology	Geology
Low	Unproductive Strata	Watercourses not having a WFD classification shown in a RBMP and Q95 ≤ 0.001 m ³ /s.	Substantially modified by past land use, previous engineering works or flow/ water level regulation. Watercourses likely to possess an artificial cross-section (e.g. trapezoidal) and will probably be deficient in bedforms and bankside vegetation. Watercourses may also be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water resources use. Could be impacted by navigation, with associated high degree of flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches will fall into this category.	Geology: of local importance / interest with potential for replacement (e.g. non designated geological exposures, former quarry's / mining sites). Peat: Receptor contains Class 4 soils with areas unlikely to be associated with peat or carbon rich soils. Unlikely to include carbon-rich soils.
Negligible	No Change	No Change	No Change	Of little local interest / no change

Table 13-7 Magnitude of impact

Impact	Criteria
Major Adverse	Results in a loss of attribute and/ or quality and integrity of the attribute. Long term or permanent loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements; likely to cause exceedance of statutory objectives and/or breaches of legislation.
Moderate Adverse	Results in impact on integrity of attribute, or loss of part of attribute. Partial loss of resource, potentially adversely affecting integrity; partial loss of or damage to key characteristics, features or elements with/without exceedance of statutory objectives or with/without breaches of legislation.
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability. Reversible or minor loss of, or alteration to, one (or potentially more) key characteristics, features or elements; some measurable change in attributes, quality or vulnerability.
Negligible	Results in impact on attribute, but of insufficient magnitude to affect the use or integrity. Impact of insufficient magnitude to affect the overall use/integrity; very minor or no loss or detrimental alteration to one or more characteristics, features or elements.

Significance of Effect

13.4.17 The significance of effects has been determined using the matrix presented in Table 13-8. Effects classed as moderate or greater are considered 'Significant'.

Table 13-8 Matrix for assessment of significance

Magnitude of Impact	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Major	Major	Major	Moderate	Moderate	Minor
Moderate	Major	Moderate	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Limitations and Assumptions

13.4.18 The EIA Report process enables informed decision-making based on the best possible information about the environmental implications of a development being made available. However, it is common for there to be some uncertainty as to the exact scale and nature of the environmental impacts predicted. At the time of writing, the exact locations of the towers which are due for foundation upgrading was not known. The main limitations to the assessment of environmental impacts are associated with the gaps in construction specific design. Hence, reasonable assumptions have been made to account for this. Where there is uncertainty of design, reasonable worst-case assumptions have been made, e.g., it may be necessary to carry out foundation improvements on all of the towers. Further detail is provided in Chapter 3: Project Description (Volume 2).

13.4.19 The assessment is based on data available from online sources and a literature search. For many water bodies in the study area there was no long-term water quality or hydrological data. For others the data that was available was limited or obtained some time ago (and thus may not be wholly representative of current conditions). No digital bathymetry or water depth-storage data was provided and therefore the potential effects from the Proposed

Development on water quality, hydrology and hydrogeology has been assessed qualitatively and based on background information and certain assumptions defined in the impact assessment section.

13.4.20 The PWS data was supplied by Perth and Kinross Council, Fife Council and Angus Council. The data collected from councils does not clarify whether the coordinates correlate to the property served by the PWS or the actual PWS location. For the purposes of this assessment, it has been assumed that the coordinates received from the councils correspond to the location of the PWS. It is possible that there are unknown PWS.

13.4.21 This chapter should be read in light of the legislation, statutory requirements and/or industry good practice applicable at the time of the assessment being undertaken. Any subsequent changes in this legislation, guidance or design may necessitate the findings to be reassessed in the light of these circumstances.

13.4.22 Baseline conditions for the geology in relation to the Proposed Development has been established from a variety of sources, based on maps available online at the time of writing this chapter, including NatureScot, and BGS. Furthermore, correspondence has been received from Perth and Kinross Council and Fife Council to confirm they do not hold data regarding geologically designated sites within the study area.

13.4.23 It is assumed that the design, construction, and completed stages of the Proposed Development will satisfy minimum environmental standards, consistent with the contemporary legislation, practice, and knowledge applicable at the time of the assessment. Any subsequent changes in this legislation, guidance or design may necessitate the findings to be reassessed in the light of these circumstances.

13.4.24 It is understood that ground investigation is occurring across the Proposed Development to inform the detailed design. However, this was not available at the time of writing this chapter.

13.5 Baseline Conditions

Study Area Topography, Land Use and Climate

13.5.1 The study area is defined by a 1 km buffer zone surrounding the path of the OHL. This passes through the council regions of Perth and Kinross, Fife and Angus. The study area is gently sloping and low-lying except for the northern and western edges which drain the southern flank of the Sidlaw Hills. The southern end of the Proposed Development protrudes into the Ochil Hills in Perth and Kinross Council, with elevations reaching 284 m Above Ordnance Datum (AOD). The bedrock is predominantly Devonian sandstone mostly overlain by superficial deposits and is detailed further in Paragraphs 13.5.6 to 13.5.9. The study area is characterised by low lying arable land and estuarine environments. The study area ranges from sea level to a maximum elevation of 284 m AOD in the south of the study area by Lumbennie Hill. The study area passes through sections of residential areas, across bodies of water and forested areas.

13.5.2 The total monthly rainfall is recorded at Eden at Strathmiglo, located approximately 2.5 miles from the study area⁴² and is displayed below in Chart 13-1. The study area follows the general UK trend of summer lows and winter highs. Standard Annual Average Rainfall (SAAR) for the period 1961-1990 is 931 mm per year at Eden at Strathmiglo.

⁴² National River Flow Archive (2024) Station Data for 14009 - Eden at Strathmiglo (online) Available at: <https://nrfa.ceh.ac.uk/data/station/spatial/14009> [Accessed: June 2024]

13.5.3 The days of rainfall above 1 mm is also recorded by the Met Office⁴³. Leuchars Station located approximately 17 km southeast from the Proposed Development is the closest station. Chart 13-1 shows the rainfall data from Leuchars Station in 2023. October, November, December and January have the highest amount of rainfall, while generally rainfall is lowest during spring months.

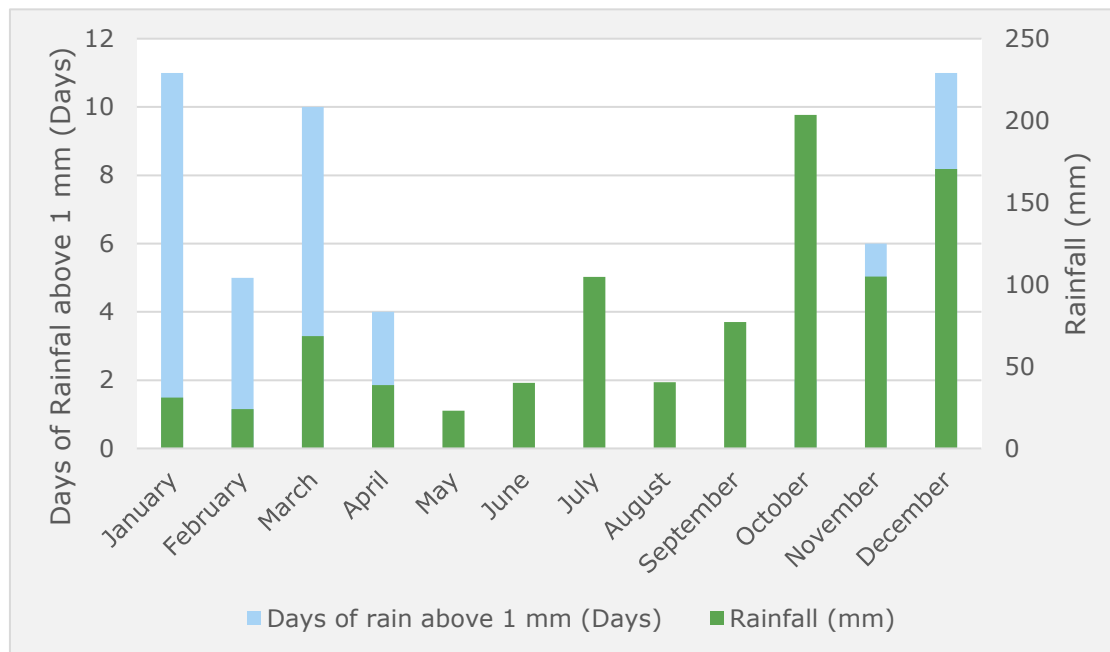


Chart 13-1 Rainfall (mm) and days of rainfall above 1 mm at Leuchars Station throughout 2023

Geology

13.5.4 Made Ground is not recorded on the BGS GeoIndex; however, this is likely to be encountered in areas associated with developments adjacent to the Proposed Development (e.g., existing farm dwellings, roads and railways), and former infilled quarries.

13.5.5 According to BGS mapping, the superficial geology across the study area comprises the following (with BGS lithological descriptions available on BGS GeoIndex²⁹):

- Till-diamicton dominates the northern area of the Proposed Development (approximately Towers 137 to 182) and the study area. It can be also encountered in the central and southern areas of the Proposed Development and the study area, potentially beneath the Raised Tidal Flat Deposits and Raised Marine Deposits (described below), with occasionally outcrops in these areas. Till comprises deposits of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape;
- Outcrops of Raised Tidal Flat Deposits dominate the north of the central area of the Proposed Development (approximately Towers 121 to 137) and the study area; and around the River Tay (approximately Towers 84 to 95). These may also be present beneath the Raised Marine Deposits (described below). Raised Tidal Flat Deposits comprise silt, clay and fine-grained sand with lenses of gravel;
- Outcrops of raised marine deposits dominate the central area of the Proposed Development (approximately Towers 95 to 121) and the study area, and also south of the River Tay (approximately Towers 80 to 84). Raised Marine Deposits have variable lithology comprising gravel (shingle), sand, silt and clay; commonly charged with organic debris (plant and shell);

⁴³ Met Office. (2024) Historic Station Data (online) Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/historic-station-data> [Accessed: June 2024]

- Outcrops of glaciofluvial ice contact deposits are present in some areas in the north and south of the Proposed Development and the study area. Glaciofluvial Ice Contact Deposits consist of stratified sand and gravel and interbedded diamicton deposited by meltwater and ice;
- Sporadic areas of alluvium (clay, silt, sand and gravel) are present within the north-eastern and north-western areas of the Proposed Development and within 1 km north of the Proposed Development.;
- Superficial deposits are largely absent in the southern-most area of the study area (approximately Towers 66 to 80), other than occasional till deposits; and,
- Located outwith the Proposed Development, but within the study area are two very small areas of peat approximately 150 m east and south-east of Tower 144.

13.5.6 BGS mapping indicates the bedrock geology in the north of the study area and surrounding area as follows:

- Mainly Dundee Flagstone Formation of sandstone, siltstone and mudstone (Arbuthnott-Garvock Group);
- Additionally, there are some localised areas of:
 - Midland Valley Siluro- Devonian Mafic Intrusion Suite – Microdiorite, Porphyritic;
 - Midland Valley Siluro-Devonian Mafic Intrusion Suite – Microgabbro; and,
 - Midland Valley Siluro -Devonian Felsic Intrusion Suite – Felsite;
- In the 1 km study area, there is also:
 - Ochil Volcanic Formation – Andesite, Hypersthene (Arbuthnott-Garvock Group) is present at approximately 250 m north-west of the study area;
 - Ochil Volcanic Formation – Andesite and Basalt present at approximately 700 m north-east and 500 m north-west of the study area; and,
 - North Britain Siluro Devonian Calc- Alkaline Dyke Suite – Microdiorite, Porphyritic is present at approximate distances of 730 m north-west and 1 km north-east of the study area.

13.5.7 The central area of the study area and surrounding area comprises:

- Mainly Glenvale Sandstone (Stratheden Group);
- Additionally, there are some localised areas of:
 - Midland Valley Siluro- Devonian Mafic Intrusion Suite – Microdiorite, Porphyritic;
 - Dundee Flagstone formation of sandstone, siltstone and mudstone (Arbuthnott-Garvock Group);
 - Central Scotland Late Carboniferous Tholeiitic Dyke Swarm- Basalt (North Britain Late Carboniferous Tholeiitic Suite);
 - Central Scotland Late Carboniferous Tholeiitic Dyke Swarm - Quartz-Microgabbro (North Britain Late Carboniferous Tholeiitic Suite); and,
 - North Britain Siluro-Devonian Calc-Alkaline Dyke Suite – Felsite (Caledonian Supersuite).
- In the 1 km study area, there is also:
 - an area of Ochil Volcanic Formation – Basalt approximately 650 m west of the centre of the study area.

13.5.8 The south of the Proposed Development and surrounding area comprises:

- Mainly Glenvale Sandstone Formation (Stratheden Group);
- Additionally, there are some localised areas (in the southern-most extent) of:

- Ochil Volcanic Formation – Conglomerate (Arbuthnott-Garvock Group); and,
- Ochil Volcanic Formation Andesite, Pyroxene (Arbuthnott-Garvock Group)
- In the 1 km study area, there is also:
 - an area of Kinnesswood Formation-Sandstone (Inverclyde Group) approximately 100 m south-east of the Proposed Development;
 - an area of Ballagan Formation of Mudstone and Siltstone (Inverclyde Group) approximately 250 m south-east of the Proposed Development; and,
 - an area of Midland Valley Siluro -Devonian Felsic Intrusion Suite- Felsite (Caledonian Supersuite) approximately 570 m to the extreme south-west of the Proposed Development.

13.5.9 Figure 13.3a and 13.3b show respectively the superficial and bedrock geology for the study area. Multiple inferred faults of unknown displacement are shown across the majority of the study area.

Radon

13.5.10 The UK Radon Map indicates the north and centre of the Proposed Development and surrounding areas as the main locations where radon potential is at or above the National Radiological Protection Board (NRPB) action level. The percentage of homes within this range are 3-5% with some lower and higher areas of less than 1% and 10-30%, respectively. The centre of the Proposed Development also comprises areas with radon potential of 1-3%. The south of the Proposed Development comprises mainly areas of radon potential with less than 1% and 5-10% of homes. An area with a maximum radon potential of 10-30% is indicated within the south of the Proposed Development.

13.5.11 Given that no buildings are proposed as part of the Proposed Development, risk from radon gas within occupied buildings is not discussed further. No further consideration of radon protection measures has been provided.

Zetica

13.5.12 According to the UXO Zetica Map, the Proposed Development and surrounding area are in an area of Low risk (an 'area indicated as having 15 bombs per 1000 acres or less').

13.5.13 A Zetica UXO PDSA was obtained and is contained within Appendix 13.5 (Volume 4). This identified some World War 1 Strategic Targets, World War 2 Military Activity, Strategic Sites, Bombing Decoys and Bombing Sites within a 5 km study area. This PDSA recommends that a detailed desk study is commissioned to assess, and potentially zone, the UXO hazard level at the Proposed Development.

13.5.14 The UXO Desk Study and Constraints Assessment and associated maps⁴⁴ identify numerous Moderate and High risk UXO areas along the wider ASTI route, predominantly associated with existing military training installations. The report recommends that these areas are avoided, or if unable to be avoided, then risk mitigation measures should be implemented for groundworks within these areas. Whilst the majority of the features identified are further north of the Proposed Development, there are a couple of features within the study area of the Proposed Development (namely RAF Tealing and other Barracks and Camps).

Coal Authority

13.5.15 According to the Coal Authority mapping, the study area is not located within a Coal Authority Reporting Area and no mine entries have been recorded.

⁴⁴ Zetica UXO (2023) ASTI Scheme UXO Desk Study & Constraints Assessment.

Quarries and Mineral Resources

13.5.16 According to BGS Onshore Geindex, there are a number of non-coal mines / quarries located within a 250 m radius of the Proposed Development, the status of these is recorded as 'ceased'. Mine / quarry entries in relation to Muirloch (NO 30948 34589), Balruddery Farm (NO 30575 33160) and Colzie Hill (NO 22635 14425) are located immediately in the vicinity of the Proposed Development.

13.5.17 A review of the BGS Mineral Occurrences layer indicates no significant mineral occurrences are recorded within the study area. Further review of the mineral layers of the BGS indicates no potentially significant minerals are present within the study area. No minor resources are recorded by the BGS to be present within the study area.

13.5.18 Based on the above, no mining or mineral receptors have been identified within the study area.

Soils and Peat

13.5.19 The National Soil Map of Scotland⁴⁵ indicates that the study area are predominately underlain by soils comprising brown earth and mineral gleys. Locally, in the north and towards the southern extent of the study area, alluvial soils and humus-iron podzols are recorded. The soils identified by the National Soil Map of Scotland variously underlying the study area are generally not recorded as being peat or carbon rich. Based on this source it is unlikely peat will be identified within the footprint of the Proposed Development.

13.5.20 The 2016 Carbon and Peatland map⁴⁶ indicates the entire study area to be underlain by mineral soils with no peat or carbon rich soils identified.

Geology Related Designated Sites

13.5.21 The Proposed Development does not cross any GCR or Geological SSSI sites. However, there are two geological sites within a 1 km radius of the Proposed Development:

- Pitlowie GCR and SSSI: 25.66 Ha (Quaternary), 1 km north-west of the southern extent (nearest tower is 104); and,
- Inchcoonans Clay Pit GCR and SSSI: 1.11 Ha (Quaternary), 600 m south of the central area (nearest tower is 113).

13.5.22 Pitlowie is important for a sequence of Flandrian peat and estuarine deposits which occur in part of a system of gullies formed during the Late Devensian. It forms part of a network of sites that provide evidence for Flandrian relative sea-level change in eastern Scotland.

13.5.23 Inchcoonans Clay Pit is an important reference site for the Errol beds, a sequence of fossiliferous estuarine sediments deposited largely in eastern Scotland as the Late Devensian ice-sheet melted. They provide important evidence for the high-arctic nature of the marine environment during the early part of the Late glacial.

13.5.24 The geology designated sites are shown on Figure 13.4 (Volume 3).

⁴⁵ Scotland's Environment, (2024) National Soil Map of Scotland (online) Available at: https://map.environment.gov.scot/Soil_maps/?layer=1 [Accessed: June 2024]

⁴⁶ Scotland's Environment (2016) Carbon and Peatland Map (online). https://map.environment.gov.scot/Soil_maps/?layer=1 [Accessed: June 2024]

Hydrogeology

- 13.5.25 According to the Hydrogeology 625k digital map⁴⁷ found on BGS Geoindex (herein 'Hydrogeological Map'), four aquifers have been identified in the study area. The groundwater receptors are shown in Figure 13.2 (Volume 3).
- 13.5.26 The most significant aquifer is the Stratheden Group, which is classed as a 1B moderately productive aquifer with significant intergranular flow. The aquifer is comprised of sandstone, partly pebbly with subordinate siltstone and mudstone and produce moderate amounts of groundwater. The Stratheden Group underlies most of the Proposed Development.
- 13.5.27 Unnamed Silurian to Devonian volcanic extrusive rocks cover significant reaches of the Proposed Development. This bedrock is classified as a class 2C low productivity aquifer, where flow is virtually all through fractures and other discontinuities. Intergranular flow is not significant and permeability is generally very low except where weathering has occurred near the surface of where flow is concentrate in fracture zones. Rare springs can produce yields of 2 L/s.
- 13.5.28 The Inverclyde group underlies the Proposed Development for small reaches. This is a moderately productive 2B aquifer where flow is virtually all through fractures and other discontinuities. The aquifer is multi-layered and so exhibits differing hydraulic properties with depth, which may be of concern for pollutants which can enter the aquifer through fracture flow from the Proposed Development.
- 13.5.29 The final aquifer found within the study area is the Arbuthnott-Garvock Group. It consists of siltstones mudstones, conglomerates and interbedded lavas. It is classed as a moderately productive aquifer which locally yields moderate amounts of groundwater. Significant flow can occur through fractures and other discontinuities in the bedrock.
- 13.5.30 The Arbuthnott Garvock Group, Stratheden Group and the Arbuthnott-Garnock Group are a part of the Lower Old Red Sandstone Aquifer. Table 13-9 displays the aquifer properties. The Old Red Sandstone aquifers are typically well cemented, with relatively low intergranular porosity and permeability. Baseline groundwater chemistry is described as generally oxitic⁴⁸ moderately mineralised and dominated by Ca(Mg) HCO₃.
- 13.5.31 The unnamed Silurian to Devonian volcanic extrusive rocks are part of the Silurian-Ordovician Aquifer. This aquifer has not been widely studied. Therefore, there isn't as much information on the aquifer properties (see Table 13-9). In general, the groundwater flows within fractures and tends to be within the shallow weathered zone.

Table 13-9 Aquifer Properties

Aquifer	Groups	Porosity (%)	Hydraulic Conductivity (m/d)	Transmissivity (m ² /d)	Specific Capacity (m ³ /d/m)	Storativity	Operational Yield (m ³ /d)
Lower Old Red Sandstone	Stratheden, Inverclyde and Arbuthnott-Garvock	~10	0.01-2	50-150	40-100	~0.0001	200-400

⁴⁷ British Geological Society (2024) Hydrogeology 625k digital map (online) Available at: <https://www.bgs.ac.uk/datasets/hydrogeology-625k/> [Accessed: June 2024]

⁴⁸ Contains Oxygen

Aquifer	Groups	Porosity (%)	Hydraulic Conductivity (m/d)	Transmissivity (m ² /d)	Specific Capacity (m ³ /d/m)	Storativity	Operational Yield (m ³ /d)
Silurian-Ordovician	Silurian to Devonian volcanic extrusive rocks	Unknown	Unknown	Unknown	Unknown	Unknown	26-52

13.5.32 Where quaternary sands and gravels are found in significant thicknesses as superficial deposits, they may act as locally important aquifers with significant yields. The exposed shallow nature of the groundwater at these locations may place groundwater at risk from diffuse and point-source pollution. Flow would likely follow topographic influences with influence from the underlying bedrock evidenced by a number of springs and sinks in the study area that have been identified by OS⁴⁹ and GIS⁵⁰ maps.

13.5.33 BGS Borehole records indicate that groundwater levels are relatively shallow throughout the study area, between 0.75 m bdat (BGS ID 651303, 1974) and 6.1 m bdat (BGS ID 20236115, 1993). More recent records of groundwater level from borehole data have not been found or are not publicly available. As the groundwater levels are shallow, there may be an increased risk from diffuse and point-source pollution.

13.5.34 Groundwater fed springs may only be activated during periods of prolonged or intense rainfall when the water table is much higher. The same may apply to sinks to which streams flow only following significant precipitation events. However, as this information is not known, all possible sources and sinks of groundwater should be treated as permanent features which are vulnerable to the effects of the Proposed Development.

13.5.35 An assessment of online sources and ecological survey conducted throughout the study area has identified that there are no groundwater dependent terrestrial ecosystems in the study area.

WFD Groundwater Bodies

13.5.36 SEPA has identified eight groundwater bodies underlying the Proposed Development as WFD water bodies. Table 13-10 summarises the groundwater bodies identified. All have a Good overall status apart from Auchtermuchty and The Carse Coastal waterbody. See Appendix 13.1 (Volume 4) for the WFD breakdown.

Table 13-10 Summary of the Groundwater Bodies (Groundwater Drinking Protected Zones) found in the study area

Name	ID	Area	Overall Status	Aquifer Typology
Auchtermuchty	150579	99 km ²	Poor	Igneous volcanic
Glenfarg	150527	58.5 km ²	Good	Igneous volcanic
Bridge of Earn	150510	49.3 km ²	Good	Old Red Sandstone
Starthearn Sand and Gravel	150811	112.8 km ²	Good	Superficial aquifer

⁴⁹ Ordnance Survey (2024) OS Maps (online) Available at: <https://explore.osmaps.com/?lat=56.320918&lon=-3.207561&zoom=13.4186&style=Standard&type=2d> [Accessed: July 2024]

⁵⁰ ArcGis (n.d) Available at:

https://aecom.maps.arcgis.com/sharing/oauth2/authorize?client_id=arcgisonline&response_type=code&state=%7B%22portalUrl%22%3A%22https%3A%2F%2Faecom.maps.arcgis.com%22%2C%22uid%22%3A%22Qil0XpD2r1V89wG5ZoA3xIXbeR2BBIL-apvvK4c8pTE%22%7D&expiration=20160&locale=en-US&redirect_uri=https%3A%2F%2Faecom.maps.arcgis.com%2Fapps%2Fmapviewer%2Findex.html%3Flayers%3Da1538532124e4a7ebdbf01a44352fd9&redirectToUserOrgUrl=true&code_challenge=BxiA9AuN1SS3IE4Xaph05jy5_NbOb4a1faolEUcnTUg&code_challenge_method=S256 [Accessed: July 2024]

Name	ID	Area	Overall Status	Aquifer Typology
Perth	150583	105.3 km ²	Good	Old red sandstone south
The Carse Coastal	150796	65.31 km ²	Poor	Superficial aquifers
Dundee	150624	169.4 km ²	Good	Old Red Sandstone South
Sidlaw Hills	150601	129 km ²	Good	Old Red Sandstone South

13.5.37 All of Scotland's groundwater bodies have been designated as Drinking Water Protected Areas. The different protected areas within the study area are in association with the underlying aquifers. Table 13-10 is the groundwater bodies which are also the designations for Drinking Water Protected Areas (Ground). These are all found within the Sub Basin District Tay and have a risk assessment classification of Green. The Drinking water protected Area (DWPA) (groundwater) dataset represent the individual groundwater bodies in Scotland. These have been identified by the SEPA in line with the requirements of the Water Environment (Drinking Water Protected Area) (Scotland) Order 2013⁵¹. See Appendix 13.1 (Volume 4) for further details.

Surface Water

13.5.38 Surface water features and their attributes within the study area are described in this section. The surface water receptors are shown in Figure 13.1 (Volume 3). There are three river basin districts in Scotland. The study area falls into the Scotland River Basin District, the largest river basin district which covers most of Scotland. It was created via the Water Environment and Water Services (Scotland) Act 2003 (Designation of Scotland River Basin District) Order 2003 ("Scotland RBD designation order") and covers an area of 113971 km². The wider district is divided into a number of main river basins, of which the study area passes through six river basins.

13.5.39 For the purposes of this assessment, WFD watercourses within 2 km of the Proposed Development have been identified to account for the potential for water quality impacts to propagate along the watercourse and impact sensitive and/or protected watercourses. Ordinary watercourses, unnamed watercourses and drains have been identified within 200 m of the Proposed Development to account for reasonable risk on water quality to ordinary watercourses. Water features have been identified by a review of online Ordnance Survey maps and aerial imagery. Further detail of all WFD watercourses in the study area can be found in Appendix 13.2 (Volume 4).

13.5.40 As set out in Table 13-11, there are five catchments that the Proposed Development crosses. This includes the River Eden catchment (315 km², ID:50), Earn Coastal (102 km², ID:47), Perth Coastal (101 km², ID:45), Dundee Coastal (316 km², ID:43) and Dighty Water (129 km², ID:44).

Table 13-11 Summary of the Catchments and surface water bodies in the study area

Catchment	Water Feature
River Eden	Trig to Tryne (TW1)
	Unnamed watercourse (TW2 and TW3)
Earn Coastal	Unnamed watercourse (TW4, TW5, TW6)
	Netly Burn (TW7)

⁵¹ While EU Directives ceased to have legal effect following Brexit, national legislation including the 2013 Order had incorporated and given effect to the WFD so that its provisions were effectively assimilated. As the term WFD remains used by SEPA and other agencies it is used in this Report.

Catchment	Water Feature
	River Earn (TW8)
	River Tay (TW9)
Perth Coastal	Unnamed watercourse (TW10, TW11, TW12)
	Broadlie Burn (TW13)
Dundee Coastal	Pow of Errol (TW15)
	Grange Pow (TW17)
	Inchmatrine Pow (TW22)
	Erskine Pow (TW23)
	Huntly Burn (TW29)
	Dron Burn (TW33)
	Blacklaw Burn (TW35)
	Balruddery Burn (TW36)
	Piperdam Burn (TW38)
	Unnamed watercourse (TW14, TW16, TW18, TW19, TW20, TW21, TW24, TW25, TW26, TW27, TW28, TW30, TW31, TW32, TW34, TW37)
Dighty Water	Lundie Burn (TW39, TW40)
	Dronley Burn (TW41)
	Unnamed watercourse (TW42, TW44, TW46)
	Fallaws Burn (TW43)
	Fithie Burn (TW45)

13.5.41 The River Earn is a WFD classified watercourse which is 34 km in length. During the site walkover it was observed to be slow moving with a mixture of agricultural fields and forestry on its banks. There was no evidence of pollution or contamination at the water feature (Photo 13-1). According to the national river flow archive⁵² the River Earn has a Q95 flow of 2.918 m³/s at Earn at Forteviot Bridge Station (NO044183).

13.5.42 The River Tay was also observed during the site walkover. The River Tay is a large WFD river and is tidally influenced. During the site walkover it was observed (during low tide) to have a silty / sand bed with reeds and grass growing on the banks. There was also some pebbles and cobbles deposited on the bank edge (Photo 13-2).

13.5.43 Pow of Errol flows alongside Tower 115. The river is characterised by large amounts of vegetation on the riverbank (See Appendix 13.3 (Volume 4) for photos). No evidence of contamination or pollution.

13.5.44 Grange Pow is sourced from the convergence of a number of field drains. During the site walkover, it was observed to have clear water with a silty bed. The banks are heavily vegetated with shrubbery and grass. No evidence of contamination or pollution.

⁵² National River Flow Archive (2024) 16004- Earn at Forteviot Bridge (online) Available at: <https://nrfa.ceh.ac.uk/data/station/info/16004> [Accessed: July 2024]

13.5.45 Knapp / Huntly Burn was observed to have clear water with no evidence of pollution. It has grass and shrubbery growing along the banks edge, with no signs of erosion. It is approximately 22 km in length and sourced from Rossie Lake and has a number of connecting drainage ditches. It eventually flows into the River Tay.

13.5.46 Invergowrie Burn (or herein 'Piperdam Burn'), is sourced from Piperdam Loch at NO 30172 3464. During the site walkover, it was observed to be heavily modified with modified banks. The watercourse had been straightened. Along the fields, the water feature was heavily vegetated. No evidence of contamination or pollution.

13.5.47 Dighty Water is approximately 21 km in length and is sourced from the convergence of Coupar Burn and Burrelton Burn. During the site walkover, it was observed that Dighty Water was very clear with green vegetation/ reeds on the riverbed. The bed was a mixture of bedrock and loose gravel, boulders and pebbles. According to the National River low Archive (NRFA) Dighty Water has a Q95 of 0.25 m³/s at Balmossie Mill (NO476325).

13.5.48 Fithie Burn sourced at approximately NO 36375 38634 and flows into the Dighty Water at NO 45277 32451. The burn had clear water with no submerged / floating macrophytes. There was vegetation to the sides of the banks of the river. The riverbed was dominated by silt and sediment with small amount of pebbles and cobbles (Photo 13-3). The nearby agricultural field drains, which flowed in the Fithie Burn, appeared to be modified and heavily vegetated.



Photo 13-1 River Earn taken on 29 May 2024 at NO 19467 18089 facing northwest



Photo 13-2 River Tay taken on 29 May at low tide at NO 18428 20001 (left upstream and right downstream)



Photo 13-3 [left] Fithie Burn at NO 39457 37118 facing west taken on the 28th of May [right] tributary of Fithie Burn taken at NO 39478 37483 facing west



Photo 13-4 Dighty Water at NO 33597 35400 looking west taken on 28 May



Photo 13-5 Grange Pow taken at NO 25021 26122 facing south on 29 May 2024

13.5.49 There are also a number of named and unnamed surface watercourses that are within proximity of the Proposed Development. Many of these are artificial drainage ditches that are in association with the agricultural land use and are not monitored by the WFD requirements.

13.5.50 The surface water bodies identified within the study that have been classified by SEPA's river classifications are summarised in Table 13-12. More photographs of water features can also be found in Appendix 13.3 (Volume 4).

13.5.51 The WFD requires each surface water body to be classified in terms of its ecological and chemical quality. Many of the water bodies in the study area, particularly the drainage ditches have been identified as heavily modified by WFD, meaning they have had physical alteration by human activity from their natural state, which has substantially changed the surface water body character. For the water bodies not designated as heavily modified or artificial, the ecological quality is described in terms of ecological status. The elements used to assess ecological status are⁵³:

- biological quality elements (water plants and animals);
- chemical and physiochemical elements (e.g. oxygen and nutrient levels); and,
- hydromorphological quality elements (water flows and levels, the condition of beds, banks and shores and the continuity of river for fish migration).

13.5.52 There are a number of surface water points monitored by SEPA for compliance with the WFD. These are mainly along the rivers that give an overall river classification which considers the ecological and chemical status. The main pressures on the surface watercourses are due to agricultural land drainage pressures and activities from urban land use.

13.5.53 In general, all the WFD surface water bodies have been given a Moderate or Good classification, apart from Fithie Burn which has a Poor Classification (See Appendix 13.2 (Volume 4) for more details).

Table 13-12 Summary of the WFD surface water bodies in the study area

Name	WFD ID	Length	Overall Status
River Earn	6800	34 km	Good
River Tay	6498	31 km	Moderate
Pow of Errol	6401	13 km	Moderate
Grange Pow	6402	10 km	Moderate
Huntly Burn	6404	22 km	Good
Invergowrie Burn	6405	11 km	Moderate
Dighty Water	6001	21 km	Moderate
Dronley Burn	6007	6 km	Good
Fithie Burn	6004	14 km	Poor

13.5.54 Table 13-13 summarises the water features within the study area.

⁵³ Scottish Government (2014) Assessing Scotland's water environment: use of environmental standards, condition limits and classification schemes (online) Available at: <https://www.gov.scot/publications/implementing-water-environment-water-services-scotland-act-2003-assessing-scotlands/pages/4/> [Accessed: July 2024]

Table 13-13 Surface Water bodies found in the study area

Water Feature	ID label	NGR	Description summary	Direction and distance from tower	Scoped in/ out
Trig to Tryne	TW1	NO 21731 15541	Drainage ditch draining southwest away from the study area sinking underground and eventually surfacing to join Glassart Burn (TW48).	Stream is found flowing alongside the OHL and crossing the OHL at NO 21819 15432.	Scoped In Proximity to works and potential access crossing watercourse.
Unnamed watercourse	TW2	NO 21514 15599	Drainage ditch flowing southwest away from the study area, eventually flowing to join Glassart Burn (TW48).	Sourced 176 m from the OHL and flows away from the study area.	Scoped In Proximity to works.
Unnamed watercourse	TW3	NO 21448 15860	Short reaches of streams that flow eastwards and drain towards an unnamed surface water pond eventually joining Lochmill Loch.	All within 100 m of the OHL, with the closest source 38 m from the OHL to the east, with streams crossing the OHL at NO 21482 15809 and NO 21448 15860.	Scoped In Proximity to works.
Unnamed watercourse	TW4	NO 20653 16734	Drainage ditch that passes through the study area for 321 m flowing towards the south.	180 m downgradient from Tower 77, 71 m upgradient from Tower 78.	Scoped In Proximity to works.
Unnamed watercourse	TW5	NO 20387 16771	Drainage ditch/stream that feeds from the south and runs northwards through the study area, eventually joining Netly Burn (TW7). Sections of the ditch appear to be culverted beneath building associated with farming practises.	Crosses beneath the OHL at NO 20387 16771, NO 19638 17384 and NO 19430 17647 and flows for a total distance of 1.4 km.	Scoped In Proximity to works and significant distance passing through the study area as well as connection to major watercourse.
Unnamed watercourse	TW6	NO 19810 17169	Short stretch of drainage ditch/stream that flows south-west and joins a larger network of agricultural drainage ditches which eventually flow into Netly Burn (TW7).	Flows for 131 m across the study area towards the south-west. The stream passes beneath the OHL at NO 19810 17169.	Scoped In Proximity to works.
Netly Burn	TW7	NO 19178 18022	Netly burn catches the run off of many drainage ditches in proximity to the study area including TW6. It then feeds into the River Earn (TW8) This means it is directly feeding run off from land activities to the River Tay (in which the River Earn drains) and may be at risk to increased sensitivities from water environment activities.	Netly Burn drains into the River Earn at NO 19194 18036 at the western edge of the study area. 94 m north of the nearest Tower.	Scoped In Proximity to works.

Water Feature	ID label	NGR	Description summary	Direction and distance from tower	Scoped in/ out
River Earn	TW8	NO 19174 18112	The River Earn is a large river draining the land in the Perth and Kinross, the main stream is approximately 33.2 km in length. It eventually drains into the River Tay (TW9). The OHL passes across the width of the River Earn. WFD classified as a heavily modified water body with issues pertaining to the agricultural land drainage. It has an overall good ecological potential.	The OHL passes above the River Earn for a stretch of 200 m. Towers sit on the banks of either side of the River Earn.	Scoped In Major water body throughout the study area with WFD status.
River Tay	TW9	NO 18674 19497	The River Tay is the largest river in the study area draining the Perth and Kinross catchment. The main stream is 31.5 km in length. The river Tay is a WFD and SAC water body and has an overall classification of moderate.	The OHL passes above the River Tay for a stretch of 409 m. Towers sit on the banks of either side of the river.	Scoped In Major river with WFD status and proximity to works.
Unnamed watercourse	TW10	NO 19480 20201	Unnamed water ditch with no drainage to other watercourses. Drainage ditch runs in a north-west orientation to the OHL.	The OHL passes directly above the drainage ditch at location NO 19480 20201. 2 m from nearest tower.	Scoped In Proximity to works.
Unnamed watercourse	TW11	NO 20110 20627	Unnamed drainage ditch associated with surrounding agricultural land use.	Stretches for 154 m throughout the study area in a westerly direction. Eastern edge 30 m from OHL and 55 m from nearest tower.	Scoped In Proximity to works.
Unnamed watercourses	TW12	NO 21475 22095	Series of connected unnamed drainage ditch associated with surrounding agricultural land use. Eventually draining into Broadlie Burn (TW13).	OHL passes over ditch at NO 21532 22032. 77 m from nearest tower.	Scoped In Proximity to works.
Broadlie Burn	TW13	NO 21678 22273	Named drainage ditch connected to a series of other unnamed ditches to the south of Broadlie Burn classed as TW12. Flows southwards to the Cairnie Pow and eventually joining the River Tay.	The OHL passes above Broadlie Burn at NO 21764 22285 and is 16 m from the nearest tower.	Scoped In Proximity to works.
Unnamed watercourse	TW14	NO 23024 23526	Drainage ditch flowing north-west that joins Pitroddie Burn.	OHL passes directly above the drainage ditch and is 15 m from the nearest tower.	Scoped In Proximity to works.
Pow of Errol	TW15	NO 24552 24260	Watercourse with a number of branches in close proximity to the study area. Extends for a total distance of 342 m throughout the study area. WFD status water body with moderate ecological potential. Classified as a heavily modified water body with problems associated with the agricultural land drainage.	OHL passes directly above the drainage ditch and is 15 m from the nearest tower.	Scoped In WFD status and proximity to works.

Water Feature	ID label	NGR	Description summary	Direction and distance from tower	Scoped in/ out
Unnamed watercourse	TW16	NO 24616 24859	Drainage ditch flows southwards to join Pow of Errol (TW15).	OHL passes directly above the drainage ditch and nearest tower is 147 m to the north.	Scoped In Proximity to works
Grange Pow	TW17	NO 25209 25809	Small surface water stream draining the Dundee coastal catchment area and eventually flowing into the River Tay estuary area. WFD status of moderate ecological potential, a heavily modified water body with issues relating to the agricultural land drainage.	OHL passes directly above the ditch and is 10 m from the nearest tower to the west.	Scoped In WFD status and proximity to works.
Unnamed watercourse	TW18	NO 25853 26028	Found on the edge of the boundary for the study area and flows southwards to join the Grange Pow (TW17).	75 m south of the nearest tower.	Scoped In Proximity to works.
Unnamed watercourse	TW19, TW20, TW21	NO 26048 26281 NO 26386 26514 NO 26671 26677	Series of connecting drainage ditches that capture run off from the surrounding agricultural land. Flow northeast to join TW22. Total distance of drainage ditches is equal to 1.2 km.	Watercourses are all found within 75 m of their nearest tower and the OHL passes directly above the watercourses three times.	Scoped In Proximity to works.
Inchmatrine Pow	TW22	NO 26888 26927	A small surface stream that captures the runoff from TW19, TW20 and TW21. It flows in a southerly direction towards Bogmill Pow.	75 m southwest from the nearest tower.	Scoped In Proximity of works.
Erskine Pow	TW23	NO 27056 26980	Large network of drainage ditches that drains to the River Tay (TW9) via Bogmill Pow.	92 m east of closest tower. OHL passes directly above.	Scope In Proximity to works.
Unnamed watercourse	TW24 TW25 TW26	NO 27347 27199 NO 27901 27589	One drainage ditch surrounding agricultural fields which crosses over the OHL in three locations. Connected to TW23 and TW27. Drains to the River Tay (TW9).	All within 267 m from the nearest tower.	Scoped In Proximity to works.

Water Feature	ID label	NGR	Description summary	Direction and distance from tower	Scoped in/ out
		NO 28016 27663			
Unnamed watercourse	TW27	NO 28230 27827	Drainage ditch connected to TW26. Eventually draining southwards to the River Tay (TW9).	187 m to the nearest tower. OHL crosses TW27.	Scoped In Proximity to works.
Unnamed Watercourse	TW28	NO 29017 28364 NO 29335 28584 NO 29540 28774	Drainage ditch surrounding agricultural land use that passes beneath the OHL three times. Flows in a north-east direction to join Huntly Burn (TW29).	Three towers are found within 70 m of the watercourse.	Scoped In Proximity to works.
Huntly Burn	TW29	NO 29621 28894	WFD water body within the Dundee coastal catchment. Fed from Rossie Lake and a number of connecting drainage ditches. Drains to the River Tay (TW9). WFD status of good ecological potential, a heavily modified water body with issues relating to the agricultural land drainage.	145 m to the nearest tower. OHL passes directly above the Huntly Burn near junction with TW28.	Scoped In Proximity to works and WFD status.
Unnamed watercourse	TW30	NO 29906 29189 NO 30003 29341	Drainage ditch from surrounding agricultural land use. OHL does not pass directly above TW30. Drains to Huntly Burn (TW29).	40 m east of the nearest tower.	Scoped In Proximity to works
Unnamed watercourse	TW31	NO 30104 29571	OHL passes above at NO 30104 29571. Drainage ditch from surrounding agricultural land use.	108 m south of the nearest tower.	Scoped In Proximity to works.
Unnamed watercourse	TW32	NO 30658 31236	Drainage ditch from surrounding agricultural land use. OHL does not pass directly above TW32. Drains to River Tay (TW9) over 3 km downstream.	165 m to nearest tower.	Scoped In Proximity to works.

Water Feature	ID label	NGR	Description summary	Direction and distance from tower	Scoped in/ out
Dron Burn	TW33	NO 30594 32313	Passes beneath OHL at NO 30594 32313. Drains to River Tay (TW9).	Nearest tower is 105 m directly to the south of Dron Burn.	Scoped In Proximity to works.
Unnamed watercourse	TW34	NO 30584 32579	Passes beneath OHL at NO 30584 32579.	Nearest tower is 40 m to the south of TW34	Scoped In Proximity to works
Blacklaw Burn	TW35	NO 30577 33230	Passes beneath the OHL at NO 30577 33230. Captures run off from agricultural land use and Sidlaw Hills which is further upstream. Flows into Balruddery Burn (TW36).	Nearest tower is 50 m to the east of Blacklaw Burn.	Scoped In Proximity to works.
Balruddery Burn	TW36	NO 30677 33103	Flows on from Blacklaw Burn (TW35). Does not pass directly beneath OHL. Eventually flows to River Tay (TW9).	Nearest tower is 103 m meters to the south-east.	Scoped In Proximity to works.
Unnamed watercourse	TW37	NO 30770 33882	Drainage ditch from surrounding agricultural land use. Not connected to any other surface water bodies. OHL passes above at NO 30770 33882.	Nearest tower is 105 m meters to the north.	Scoped In Proximity to works.
Piperdam Burn	TW38	NO 30965 34553	Piperdam is fed by Piperdam Loch, approximately 500 m upstream. Flows to join Fowlis Burn and eventually the River Tay (TW9). OHL passes above Piperdam Burn at NO 30965 34553.	Satellite imagery shows nearest tower flows directly next to Piperdam (within <10 m).	Scoped In Proximity to works.
Lundie Burn	TW39 and TW40	NO 32021 35272 and NO 32189 35356	Drainage ditch from surrounding agricultural land use with a total length of 4.66 km, of which 588 m passes through the study area. Lundie Burn passes directly beneath the OHL at NO 32021 35272.	TW39 is 183 m south west of the nearest tower. TW40 is a tributary of Lundie Burn and lies directly beneath a tower at NO 32189 35356.	Scoped In Proximity to works and WFD status.
Dronley Burn	TW41	NO 33768 36138	Fed from Clushmill Burn and captures run off from Auchterhouse Burn also. Drainage ditches associated with the surrounding agricultural land use. Passes directly beneath the OHL at NO 33768 36138. WFD status of good ecological potential, a heavily modified water body with issues relating to the agricultural land drainage.	187 m to the east of the nearest tower.	Scoped In WFD status.

Water Feature	ID label	NGR	Description summary	Direction and distance from tower	Scoped in/ out
Unnamed watercourse	TW42	NO 32189 35356	Found on the edge of a forested area, captures run off from forest area to the west and agricultural land use to the east.	145 m west of the nearest tower.	Scoped In Proximity to works.
Fallaws Burn	TW43	NO 35935 37135	Drainage ditches associated with the surrounding agricultural land use. Total distance of 825 m throughout the study area. Passes beneath the OHL at NO 36584 37126.	The nearest tower is 115 m to the east.	Scoped In Proximity to works.
Unnamed watercourse	TW44	NO 36667 37174	Drainage ditches associated with the surrounding agricultural land use. Total distance of 768 m throughout the study area crossing beneath the OHL at NO 36602 37140, NO 36809 37163 and NO 37176 37211.	Nearest tower is 61 m west from watercourse.	Scoped In Proximity to works.
Fithie Burn	TW45	NO 38604 37390	WFD watercourse associated with small streams and drainage ditches of the surrounding agricultural land use. Flows in a south-east direction to the Firth of Tay. WFD status of poor ecological potential, a heavily modified water body with issues relating to the agricultural land drainage.	Nearest tower is 20 m to the north.	Scoped In Proximity to works and WFD status.
Unnamed watercourse	TW46	NO 39379 37343	Drainage ditches associated with the surrounding agricultural land use. Passes beneath the OHL at NO 39379 37343.	Nearest tower is 164 m to the south-east.	Scoped In Proximity to works.
Dighty Water	TW47	NO 34696 35165	WFD waterbody which is sourced from Dighty Burn at NO 34696 35165. It flows into the Firth of Tay at NO 48557 31704.	Nearest towers are 1.28 km to the north-west.	Scoped Out No identifiable pathway.
Glassart Burn	TW48	NO 22400 13805	WFD waterbody with a classification of poor. Flows into the River Eden at NO 25738 10159.	Nearest tower is 678 m north-west.	Scoped Out No identifiable pathway.

Water Quality

13.5.55 Observational and laboratory chemistry results from SEPA were received on the 20th March 2024. The data shows chemistry from 2019 to 2024. Eight locations were monitored for a variety of determinands which give a detailed analysis of the water quality at these locations.

13.5.56 A summary of the results and average environmental quality standards (EQS) are shown below, and in Table 13-14 and Table 13-15:

- Each location has a similar overall chemistry. Waters are neutral to alkaline with the pH ranges between 8.6 and 7.26, with an average pH of 7.9;
- The Electrical Conductivity ranges between 775 $\mu\text{S}/\text{cm}$ and 308 $\mu\text{S}/\text{cm}$ with an average value of 523 $\mu\text{S}/\text{cm}$;
- Nitrate (as N) is considerably higher at Taypack Potatoes, Tothill Farm and Errol Farm sampling locations. Likely due to the practises associated with farming land use; and
- Ammoniacal Nitrogen was low with a detected range of 0.017 to 0.168 mg/L as N.

13.5.57 The water samples collected are well representative of the spatial distribution of the study area and the varying land use. As a whole, the data indicates that the water quality is generally good, with potential point sources of determinants that may be of concern in isolated areas such as sulphates and nitrates often associated with farming land practise

Table 13-14 Summary of the main surface water quality parameters taken from the locations of water sampling between 2019 and 2024 (SEPA monitoring points).

Determinand	Units	Cairnie Pow at Bridge on Track from Priorlands House (S1)			Cairnie Pow From Inchyra Road Bridge (U/S Side) (S2)			Dronley Burn 40 m U/S Dighty Water (S3)			Grange Pow at Aithmuir Bridge (S4)			Environmental Quality Standard (EQS) ⁵⁴
		Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max	
Alkalinity (as CaCO ₃)	mg/l	138.75	118.00	149.00	149.25	118.00	166.00	99.96	88.90	121.00	149.71	123.00	168.00	
Ammoniacal Nitrogen (as N)	mg/l	0.10	0.05	0.15	0.06	0.03	0.09	0.02	0.02	0.04	0.09	0.04	0.17	
Biochemical Oxygen Demand - ATU suppressed	mg/l	1.22	0.88	1.40	1.02	0.69	1.30	1.45	0.83	2.90	1.26	0.63	2.10	
Chloride	mg/l	35.10	26.30	42.00	32.65	25.80	37.30	25.39	20.80	38.10	28.21	22.50	44.90	250000
Electrical conductivity (25°C)	µS/cm	458.50	373.00	513.00	453.00	372.00	504.00	333.44	308.00	379.00	428.50	369.00	520.00	
Nitrate (as N)	mg/l	4.41	3.76	5.34	3.50	2.91	4.10	6.11	4.72	7.54	2.54	1.89	3.55	
Nitrite (as N)	mg/l	0.05	0.02	0.08	0.03	0.02	0.05	0.01	0.01	0.02	0.02	0.01	0.05	
Nonionised ammonia (as N)	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Oxygen - dissolved	mg/l	9.37	9.06	9.88	8.98	8.40	9.45	12.22	10.90	13.20	11.31	8.35	14.60	
pH	pH Units	7.90	7.76	8.00	7.92	7.64	8.06	8.20	7.94	8.60	7.90	7.26	8.30	

⁵⁴ SEPA (2020) Environmental Quality Standards (online). Available at: <https://www.sepa.org.uk/media/152957/wat-sg-53-environmental-quality-standards-for-discharges-to-surface-waters.pdf> [Accessed: July 2024]

Determinand	Units	Cairnie Pow at Bridge on Track from Priorlands House (S1)			Cairnie Pow From Inchyra Road Bridge (U/S Side) (S2)			Dronley Burn 40 m U/S Dighty Water (S3)			Grange Pow at Aithmuir Bridge (S4)			Environmental Quality Standard (EQS) ⁵⁴
		Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max	
Reactive Phosphorus (as P)	mg/l	0.37	0.09	0.76	0.07	0.06	0.09	0.01	0.01	0.02	0.07	0.04	0.10	
Sample Temperature	°C	13.08	12.70	13.20	12.63	12.20	13.10	9.56	4.10	16.00	8.44	0.10	13.40	
Total Oxidised Nitrogen (as N)	mg/l	4.47	3.82	5.42	3.53	2.94	4.13	6.12	4.73	7.55	2.56	1.92	3.57	

Table 13-15 Summary of the main groundwater quality parameters taken from the locations of water sampling between 2019 and 2024.

Determinand	Units	Branston Farm Produce BH, Abernethy, Perthshire (G1)			Mains of Errol Farm (G2)			Taypack Potatoes, Abs from BH, Moncure, Perth (G3)			Tofthill Farm, Abs, from BH, Glencarse, Perth (G4)			Environmental Quality Standard (EQS) 56
		Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max	
Alkalinity (as CaCO ₃)	mg/l	120.67	116.00	125.00	177.09	166.00	189.00	177.31	161.00	187.00	173.50	168.00	181.00	
Aluminium	mg/l	33.57	11.00	78.70	23.93	14.80	37.20	11.26	11.00	12.80	23.40	23.40	23.40	15
Ammoniacal Nitrogen (as N)	mg/l	0.03	0.02	0.06	0.02	0.02	0.02	0.06	0.03	0.08	0.02	0.02	0.02	
Arsenic	mg/l	2.00	2.00	2.00	2.27	2.23	2.31	5.20	4.92	5.73	4.79	4.79	4.79	50
Biochemical Oxygen Demand - ATU suppressed	mg/l	No data	No data	No data	1.90	1.90	1.90	No data	No data	No data	No data	No data	No data	
Cadmium	mg/l	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	NA

Determinand	Units	Branston Farm Produce BH, Abernethy, Perthshire (G1)			Mains of Errol Farm (G2)			Taypack Potatoes, Abs from BH, Moncure, Perth (G3)			Tofthill Farm, Abs, from BH, Glencarse, Perth (G4)			Environmental Quality Standard (EQS) 56
		Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max	
Calcium	mg/l	47.40	46.10	49.30	56.67	56.40	57.10	88.47	82.80	93.40	66.80	66.80	66.80	
Chloride	mg/l	17.53	16.70	18.30	28.84	24.10	31.60	86.52	78.80	95.90	52.68	27.70	69.70	250000
Chromium	mg/l	1.02	0.95	1.10	0.62	0.62	0.64	1.54	1.43	1.61	0.88	0.88	0.88	NA
Copper	mg/l	6.85	2.46	13.00	0.65	0.40	1.01	0.84	0.54	1.92	0.76	0.76	0.76	1
Electrical conductivity (25°C)	µS/cm	346.17	340.00	354.00	592.27	558.00	623.00	741.54	700.00	767.00	692.50	585.00	775.00	
Iron	mg/l	0.07	0.01	0.11	0.03	0.02	0.04	0.01	0.01	0.01	0.06	0.06	0.06	1000
Lead	mg/l	1.06	0.35	2.13	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	1.2
Magnesium	mg/l	8.62	8.42	8.99	32.37	32.10	32.80	19.67	18.40	20.70	28.10	28.10	28.10	
Manganese	mg/l	0.02	0.01	0.04	0.01	0.01	0.01	0.06	0.05	0.06	0.01	0.01	0.01	123
MCPA	mg/l	9.00	9.00	9.00	No data	No data	No data	9.00	9.00	9.00	No data	No data	No data	12 (pH<7) 80 (pH>7)
MCPB	mg/l	6.00	6.00	6.00	No data	No data	No data	6.00	6.00	6.00	No data	No data	No data	
Nickel	mg/l	0.47	0.35	0.72	0.35	0.35	0.35	1.93	1.78	2.06	0.65	0.65	0.65	4
Nitrate (as N)	mg/l	5.44	5.16	5.60	10.40	7.27	14.20	9.78	9.22	11.00	13.70	13.10	14.30	
Nitrite (as N)	mg/l	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
Oxygen - dissolved	mg/l	No data	No data	No data	12.50	12.50	12.50	No data	No data	No data	12.90	12.90	12.90	
pH	pH units	7.86	7.46	8.17	8.04	7.85	8.17	7.70	7.28	7.99	7.70	7.30	8.11	
Potassium	mg/l	1.37	1.22	1.65	3.63	3.60	3.66	7.93	7.51	8.29	1.87	1.87	1.87	

Determinand	Units	Branston Farm Produce BH, Abernethy, Perthshire (G1)			Mains of Errol Farm (G2)			Taypack Potatoes, Abs from BH, Moncure, Perth (G3)			Tofthill Farm, Abs, from BH, Glencarse, Perth (G4)			Environmental Quality Standard (EQS) 56
		Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max	
Reactive Phosphorus (as P)	mg/l	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.02	
Sample Temperature	°C	No data	No data	No data	6.90	6.90	6.90	No data	No data	No data	6.00	6.00	6.00	
Sodium	mg/l	11.93	11.70	12.20	19.67	19.50	19.90	27.96	26.20	29.30	23.30	23.30	23.30	
Sulphate (as SO ₄)	mg/l	11.57	11.40	11.70	48.51	22.00	75.90	24.06	22.40	24.90	47.70	44.30	50.50	400000
Total Oxidised Nitrogen (as N)	mg/l	5.44	5.17	5.60	10.41	7.28	14.20	9.79	9.23	11.00	13.70	13.10	14.30	
Total Phosphorus (as P)	mg/l	No data	No data	No data	0.02	0.02	0.02	No data	No data	No data	No data	No data	No data	
Vanadium	mg/l	3.36	3.36	3.37	4.78	4.51	5.00	2.88	2.82	3.01	2.35	2.35	2.35	20
Zinc	mg/l	25.21	9.72	49.50	8.35	3.28	17.90	3.98	1.14	11.20	1.10	1.10	1.10	10.9

Private Water Supplies

13.5.58 A PWS assessment can be found within Appendix 13.4 (Volume 4).

13.5.59 PWS data was received from the Perth and Kinross Council on 17th January 2024, Fife Council on the 7th February 2024 and Angus Council on 23rd February 2024 and so only represent the PWS that were recorded at that time. There are 31 PWS within 1 km of the Proposed Development.

13.5.60 The data collected from Perth and Kinross Council and Fife Council does not clarify whether the coordinates correlate to the property served by the PWS or the actual PWS location. For the purposes of the assessment, it was assumed that the coordinates received from the councils correspond to the location of the PWS.

13.5.61 The PWS are sourced from groundwater springs, boreholes, wells, or surface watercourse, with single PWS serving up to 420 properties. Appendix 13.4 (Volume 4) identifies seven PWS within 250 m of the Proposed Development as summarised in Table 13-16.

Table 13-16 Private Water Supplies within 250 m of the Proposed Development

ID	Property Name	Easting	Northing	Distance to works (m)	Source	Number of Properties it serves
TW-PWS1	Ferryfield House Supply	319500	718000	6	Unknown	2.5
TW-PWS2	Muircroft	331667	734756	51	Spring	5
TW-PWS3	Jamesfield Borehole Supply	320159	717314	119	Groundwater Borehole	62
TW-PWS4	Abernethy SSE Supply	320191	717160	124	Unknown	0
TW-PWS5	Wester Greenside Supply	320400	716700	126	Groundwater Spring	10
TW-PWS6	Balgonie Farm Spring Supply	320760	716536	5	Surface Watercourse	16
TW-PWS7	Wester Clunie Supply	320700	716400	188	Groundwater Spring	16

Public Water Supplies

13.5.62 Within 1 km of the Proposed Development there are 688 CAR licenses recorded (sourced from SEPA). The authorisation activities for these are primarily listed as sewage, agriculture, and sewage treatment works. From these, the 38 CAR licenses which are within 200 m of the Proposed Development are scoped in. These are shown below in Table 13-17.

13.5.63 CAR Licences include the activities of discharge, diffuse pollution, abstractions, engineering works in inland waters and groundwater activities.

Table 13-17 CAR Licences

Authorisation No	NGR	Authorisation Activity	Distance from works (m)
CAR/L/1188697	NO 40075 37220	Null	131
CAR/R/1013509	NO 30130 29950	Sewage (Private) Primary	183
CAR/R/1018723	NO 30707 33124	Sewage (Private) Secondary	147
CAR/R/1023256	NO 30724 30528	Sewage (Private) Secondary	161
CAR/R/1030590	NO 30528 31115	Sewage (Private) Primary	68
CAR/R/1034385	NO 30717 30454	Sewage (Private) Primary	157
CAR/R/1040808	NO 30141 29958	Sewage (Private) Primary	180
CAR/R/1043363	NO 24882 25223	Sewage (Private) Primary	197
CAR/R/1047988	NO 21351 21933	Sewage (Private) Primary	48
CAR/R/1048687	NO 18501 18697	Sewage (Private) Primary	160
CAR/R/1052032	NO 30386 33246	Sewage (Private) Primary	181
CAR/R/1054076	NO 20603 20989	Sewage (Private) Primary	124
CAR/R/1055425	NO 27115 27214	Sewage (Private) Primary	147
CAR/R/1055838	NO 30432 30161	Sewage (Private) Primary	53
CAR/R/1057493	NO 20617 20975	Sewage (Private) Primary	106
CAR/R/1066902	NO 27024 27170	Sewage (Private) Primary	162
CAR/R/1079380	NO 24896 25441	Sewage (Private) Primary	181
CAR/R/1088496	NO 20300 16920	Sewage (Private) Secondary	112
CAR/R/1094143	NO 21217 21919	Sewage (Private) Primary	129
CAR/R/1094145	NO 21225 21890	Sewage (Private) Primary	100
CAR/R/1100721	NO 19886 16952	Sewage (Private) Primary	67
CAR/R/1126413	NO 30740 30430	Sewage (Private) Primary	184
CAR/R/1158161	NO 20297 20872	Sewage (Private) Primary	174
CAR/R/1158348	NO 20759 21315	Sewage (Private) Primary	59
CAR/R/1159539	NO 30390 30220	Sewage (Private) Secondary	123
CAR/R/1167420	NO 19663 20435	Sewage (Private) Primary	103
CAR/R/1167439	NO 30162 30017	Sewage (Private) Primary	195
CAR/R/1172447	NO 23078 23442	Sewage (Private) Primary	107
CAR/R/1176886	NO 19668 20386	Sewage (Private) Primary	78
CAR/R/1183179	NO 21002 21469	Sewage (Private) Primary	64
CAR/R/1189878	NO 24097 23895	Null	154
CAR/R/3001603	NO 21079 21458	Point Source - Existing Sewage Treatment System (PSTS)	138
CAR/R/3005469	NO 19640 20468	Point Source - Existing Sewage Treatment System (PSTS)	143

Authorisation No	NGR	Authorisation Activity	Distance from works (m)
CAR/R/3007406	NO 21111 21477	Point Source - Existing Sewage Treatment System (PSTS)	145
CAR/R/5001093	NO 2482 2519	Point Source - Existing Sewage Treatment System (PSTS)	141
CAR/S/1036581	NO 30500 31424	Sewage (Private) Secondary	112
CAR/S/1182297	NO 30421 30169	Null	70
PSTS/3B5E66	NO 19641 20471	Point Source - Existing Sewage Treatment System (PSTS)	145

Aquatic Ecology and Protected Species

13.5.64 Information provided by SEPA indicates that there are several species present in the study area, Table 13-18 shows the invertebrate species found at Lochee Burn and Dronley Burn during sampling in 2019. Since 2019, further sampling has been conducted in the study area that has been made available, with identification of 91 species across the sampling locations. It is expected that the same habitats currently support a similar variety of species.

Table 13-18. Summary of the ecological data provided by SEPA

Water Feature / Course	Survey	Taxon Found
Lochee Burn	10/05/2019	Baetidae, Oligochaeta, Ephemerellidae, Hydropsychidae, Limnephilidae, Rhyacophilidae, Chironomidae, Simuliidae, Pediciidae, Gammaridae, Ancyliidae, Hydrobiidae, Lymnaeidae, Glossiphoniidae, Planariidae
Dronley Burn	10/05/2019	Ephemerellidae, Heptageniidae, Leptophlebiidae, Chloroperlidae, Leuctridae, Nemouridae, Perlodidae, Glossosomatidae, Goeridae, Hydropsychidae, Lepidostomatidae, Limnephilidae, Polycentropodidae, Rhyacophilidae, Sericostomatidae, Chironomidae, Simuliidae, Muscidae, Pediciidae, Dytiscidae, Elmidae, Hydraenidae, Scirtidae, Gammaridae, Lymnaeidae, Oligochaeta, Hydracarina, Baetidae, Heptageniidae, Leuctridae, Ephemerellidae, Nemouridae, Hydroptilidae, Perlodidae, Glossosomatidae, Hydropsychidae, Limnephilidae, Rhyacophilidae, Sericostomatidae, Chironomidae, Simuliidae, Limoniidae, Pediciidae, Dytiscidae, Elmidae, Gammaridae, Ancyliidae, Lymnaeidae, Sphaeriidae, Hydracarina, Planariidae, Oligochaeta.

13.5.65A number of species including Atlantic salmon (*Salmo salar*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*) and otter (*Lutra lutra*) have been identified in the River Tay SAC. The River Tay supports high-quality Atlantic salmon population and is consistently in one of the top three salmon rivers in Scotland. Atlantic salmon, brook lamprey, river lamprey sea lamprey and otters have also been listed on the Scotland Biodiversity List⁵⁵.

⁵⁵ Nature Scot (2024) Scottish Biodiversity List (online) Available at: <https://www.nature.scot/doc/scottish-biodiversity-list> [Accessed: July 2024]

Other Designations

13.5.66 The Strathmore and Fife Nitrate Vulnerable Zones (NVZs) covers significant proportions of the study area. These are identified as areas where surface water or groundwater is susceptible to nitrate pollution from agricultural activities. They are designated in accordance with the requirements of the Directive 91/676/EEC and aims to protect water quality by promoting the use of good farming practices.

13.5.67 The Habitat Map of Scotland (HabMoS) is the national repository for habitat and land use data. HabMoS has identified small, dispersed areas of native woodland throughout the study area. HabMoS has also identified the main land cover as being a mix of rocky outcrops, mesic grassland, woodlands and arable land.

13.5.68 The Proposed Development runs through the Central Scotland Green Network Integrated Habitat Network (IHN) woodland hotspot as well multiple areas of woodland habitat, wetland habitat, neutral and acid grassland, heathland and the associated dispersal networks. These areas have been identified as habitat networks where there are areas to improve habitat connectivity.

Sensitivity of Receptors

13.5.69 Table 13-19 summarises the sensitivities of the hydrological and hydrogeological receptors in the study area.

Table 13-19 Sensitivity of hydrology and hydrogeology receptors

Receptor	Water Quality Sensitivity	Hydromorphological Sensitivity
Auchtermuchty WFD Groundwater Body	High Sensitivity – Moderately productive aquifer, supports local PWS. Medium Importance classification and is within a Groundwater Drinking Protected Area.	N/A
Glenfarg WFD Groundwater Body	High Sensitivity – Low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Within a Groundwater Drinking Protected Area.	N/A
Bridge of Earn WFD Groundwater Body	High Sensitivity – Low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Within a Groundwater Drinking Protected Area.	N/A
Strathearn Sand and Gravel WFD Groundwater Body	High Sensitivity – Highly productive aquifer, supports local PWS. Regionally important multi-layered aquifer with yields of up to 10 L/s in lower part and up to 40 L/s in upper parts. Within a Groundwater Drinking Protected Area.	N/A
Perth WFD Groundwater Body	High Sensitivity – Low productivity aquifer with small amounts of groundwater in near surface weathered zone and secondary fractures. Within a Groundwater Drinking Protected Area.	N/A
The Carse Coastal WFD Groundwater Body	High Sensitivity – Moderately productive aquifer of sandstone and partly pebbly with siltstones and sandstones which produces moderate amounts of groundwater. Within a Groundwater Drinking Protected Area.	N/A
Dundee WFD Groundwater Body	High Sensitivity – Moderately productive aquifer of sandstone flaggy in places, which produces moderate amounts of groundwater locally. Within a Groundwater Drinking Protected Area.	N/A
Sidlaw Hills WFD Groundwater Body	High Sensitivity – Moderately productive aquifer, supports local PWS. Medium Importance classification as potential GWDTEs and is within a Groundwater Drinking protected Area	N/A
Private Water Supplies	High Sensitivity - Direct human receptor with pre-processing and water use not known so must be treated with high importance	N/A
Trig to Tryne (TW1)	Low Sensitivity - A relatively small watercourse which flows into Glassart Burn, away from the study area and OHL pathway that does not have its own WFD status.	Low Importance – Heavily modified water body with poor ecological potential.
Unnamed watercourse (TW2)	Low Sensitivity - A relatively small watercourse which flows into Glassart Burn, away from the study area and OHL pathway that does not have its own WFD status.	Low Importance - Minor, relatively unmodified watercourse.
Unnamed watercourse (TW3)	Medium Sensitivity – Small surface watercourses which drains into Lochmill Loch (SSSI).	Medium Importance - Proximity to works and potential as a contaminant pathway route.

Receptor	Water Quality Sensitivity	Hydromorphological Sensitivity
Unnamed Watercourse (TW4, TW5, TW6)	Low Sensitivity - A relatively small network of surface streams and ditches from the Earn Coastal catchment which drain into Netly Burn.	Low Importance – Minor, relatively unmodified watercourse.
Netly Burn (TW7)	Medium Sensitivity - Netly Burn drains a series of connected drainage ditches from the Earn Coastal catchment. Does not have its own WFD status but flows into the River Earn with WFD status and within 1km of where the River Earn flows into River Tay SAC.	Low Importance - Minor, relatively unmodified watercourse.
River Earn (TW8)	High Sensitivity – Drains the Coastal catchment into the Firth of Tay. WFD good ecological potential and WFD status. Significant river width which the OHL crosses over. Flows into the River Tay with SAC status.	High Importance – Large surface water receptor that must be considered.
River Tay (TW9)	Very High Sensitivity – One of the largest rivers in the UK, the River Tay drains a significant volume of water into the Firth of Tay. The River Tay is a SAC, with tributaries of the River Tay supporting groundwater dependent ecosystems.	High Importance – watercourses and tributaries of the River Tay have WFD status, amongst many other important designations.
Unnamed watercourses (TW10, TW11, TW12)	Low Sensitivity - A series of drainage ditches that are associated with the surrounding agricultural land use. They are not connected to any other surface watercourses and extend for less than 200 m throughout the study area.	Low Importance – Minor, relatively unmodified watercourse.
Broadlie Burn (TW13)	Medium Sensitivity – Surface watercourse that drains agricultural land and flows into the Firth of Tay. Does not have WFD classification	Medium Importance – Drains surrounding land to River Tay but with no significant designations of classifications.
Pow of Errol (TW15)	High Sensitivity – A main river draining the Dundee Coastal catchment which drains to the Firth of Tay (SAC status). WFD classification designated as heavily modified water body with overall moderate ecological potential.	Low Importance – The watercourse has a WFD classification of heavily modified indicating altered state from natural conditions. Some reaches show deviation from natural conditions due to direct and/or indirect channel, floodplain, and/or catchment development pressures.
Grange Pow (TW17)	High Sensitivity – A main river draining the Dundee Coastal catchment which drains to the Firth of Tay (SAC status). WFD classification designated as heavily modified water body with overall moderate ecological potential.	Low Importance – The watercourse has a WFD classification of heavily modified indicating altered state from natural conditions. Some reaches show deviation from natural conditions due to direct and/ or indirect channel,

Receptor	Water Quality Sensitivity	Hydromorphological Sensitivity
		floodplain, and/or catchment development pressures.
Inchmatrine Pow (TW22)	Low Sensitivity - A small surface stream that captures the runoff from TW19, TW20 and TW21. It flows in a southerly direction towards Bogmill Pow.	Low Importance – Minor, relatively unmodified watercourse.
Erskine Pow (TW23)	Low Sensitivity – Drainage ditch associated with the surrounding agricultural land use. Eventually drains to Firth of Tay.	Low Importance – The watercourse has connectivity to other surface watercourses and has previously been morphologically altered to accommodate around land use.
Huntly Burn (TW29)	High Sensitivity – A main river draining the Dundee Coastal catchment eventually draining to the Firth of Tay (SAC status). Extends throughout the catchment with many tributaries. WFD status with good ecological potential. Designated as heavily modified on account of physical alterations that cannot be addressed without a significant impact on the drainage of agricultural land.	High Importance – The watercourse has a WFD classification of heavily modified indicating altered state from natural conditions. Some reaches show deviation from natural conditions due to direct and/or indirect channel, floodplain, and/ or catchment development pressures.
Dron Burn (TW33)	Medium Sensitivity – Drains from the Huntly Burn and into the Invergowrie Burn. Connected to a number of surface water ponds that may host significant ecological receptors. Does not have its own WFD designation.	Medium Importance – Drainage and connectivity to other surface watercourses.
Blacklaw Burn (TW35)	Medium Sensitivity – Drains significant reaches of land from upper catchment areas to Invergowrie Burn. Connected to a number of surface water ponds that may host significant ecological receptors. Does not have its own WFD designation.	Medium Importance – Drainage and connectivity to other surface watercourses.
Balruddery Burn (TW36)	Medium Sensitivity – Drains significant reaches of land from upper catchment areas to Invergowrie Burn. Connected to a number of surface water ponds that may host significant ecological receptors. Does not have its own WFD designation.	Medium Importance – Drainage and connectivity to other surface watercourses.
Piperdam Burn (TW38)	High Sensitivity – A surface stream that flows through Piperdam Loch and eventually into Firth of Tay (SAC status). The main stream is approximately 1 km in length. WFD moderate ecological potential.	Medium Importance – WFD classification and connectivity to other watercourses.

Receptor	Water Quality Sensitivity	Hydromorphological Sensitivity
Lundie Burn (TW39, TW40)	Medium Sensitivity – WFD classified river with moderate ecological potential. Designated as heavily modified on account of physical alterations that cannot be addressed without a significant impact on the drainage of agricultural land.	Low Importance - WFD classification of heavily modified.
Unnamed Watercourses (TW14, TW16, TW18, TW19, TW20, TW21, TW24, TW25, TW26, TW27, TW28, TW30, TW31, TW32, TW34, TW37)	Low Sensitivity - A series of drainage ditches that are associated with the surrounding agricultural land use. They are not connected to any other surface watercourses and extend for less than 200 m throughout the study area.	Low Importance - Minor, relatively unmodified watercourse.
Dronly Burn (TW41)	Medium Sensitivity – WFD classified river with moderate ecological potential. Designated as heavily modified on account of physical alterations that cannot be addressed without a significant impact on the drainage of agricultural land.	Low Importance - WFD classification of heavily modified.
Unnamed watercourse (TW42, TW44, TW46)	Low Sensitivity - A series of drainage ditches that are associated with the surrounding agricultural land use. They are not connected to any other surface watercourses and extend for less than 100 m throughout the study area.	Low Importance - Minor, relatively unmodified watercourse.
Fallaws Burn (TW43)	Low Sensitivity – Drainage ditch associated with the surrounding agricultural land use. Eventually drains to Firth of Tay.	Low Importance - Minor, relatively unmodified watercourse.
Fithie Burn (TW45)	Medium Sensitivity – WFD classified river with moderate ecological potential.	Low Importance - WFD classification of heavily modified.

13.5.71 Table 13-20 summarises the sensitivities of the geological receptors in the study area.

Table 13-20 Sensitivity of Geology Receptors

Receptor	Geology Sensitivity
Pitlowie GCR and SSSI: 25.66 Ha (Quaternary), 1000 m north-west of the south of the study area.	Very high as this site is both a GCR and SSSI.
Inchcoonans Clay Pit GCR and SSSI: 1.11 Ha (Quaternary), 600 m south of the centre of the study area.	Very high as this site is both a GCR and SSSI.
Peat, approximately 150 m east and south-east of Tower 144.	Medium Sensitivity - the presence of peat or carbon rich soils is only identified by the BGS. No other sources indicated the potential of peat or carbon rich soils.

13.6 Assessment of Effects, Mitigation and Residual Effects

13.6.1 This section presents the findings of the assessment for the construction and operation phases. The approach to the assessment is based on the methodology set out earlier in Section 13.4.

Assessment of Construction Effects

13.6.2 During the construction phase there is the potential for adverse effects on the water environment from site runoff contaminated by excessive fine sediments (including the potential wash out of fine sediment from temporary spoil storage, embankments, and access tracks), which may reduce water quality, smother habitats and physically impact aquatic organisms; chemical spillages; and physical changes to the form and function of water features as a consequence of:

- vegetation clearance, topsoil/ subsoil stripping and stockpiling;
- general construction activities including runoff and activities at temporary construction compounds, the movement of plant and other vehicles and their maintenance and washing out of;
- works in, over, under and adjacent to water features including the construction of the culverts and watercourse crossings;
- the batching and use of concrete, and other cementitious products including the washing out of plant and equipment; and,
- construction of temporary and permanent access tracks.

Effects on Groundwater

Foundation Improvements

13.6.3 It is unlikely that the works for the Proposed Development will require deep excavation at every tower, but a number of towers may require foundation upgrade works. Where foundation upgrade works are determined to take place, groundwater levels must be considered. Excavation to depth where the groundwater is exposed may provide direct routes for potential contaminants to leach into groundwater. Where excavations will encounter the water table, dewatering and pumping may be required.

13.6.4 The exact location of such foundation improvements is currently unknown. It is unlikely that all towers will require such works, but for the purposes of this assessment a worst-case scenario is assumed. Therefore, it is assumed every tower would require foundation improvements.

13.6.5 The foundation improvements will be captured within a small programme footprint. There are four potential foundation improvement types which include soil replacement, mass fill concrete, pad and column and pile and cap.

13.6.6 There could be impacts from contaminated run-off from fuels, hydraulic fluids, solvents, paints, detergents and other potentially polluting substances from the construction phase. These could wash into the areas of bare earth from vegetation removal and foundation improvements. There is heightened risk where tower foundation works are planned due to proximity to the water table and underlying aquifers. The WFD groundwater bodies identified in Table 13-10 are likely to have negligible adverse impacts resulting in a minor effect (not significant) to groundwater as described in Table 13-21.

Table 13-21 Impacts and effects to groundwater receptors from contamination

Receptor	Sensitivity	Impact	Effect
Auchtermuchty WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Glenfarg WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Bridge of Earn WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Strathearn Sand and Gravel WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Perth WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
The Carse Coastal WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Dundee WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Sidlaw Hills WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)

13.6.7 Due to small area of the tower foundations, groundwater flow and direction is unlikely to be impacted due to relatively large size of all three aquifers. Table 13-22 lists the impacts and effects to groundwater flow.

Table 13-22. Impacts and effects to groundwater receptors from Groundwater flow

Receptor	Sensitivity	Impact	Effect
Auchtermuchty WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Glenfarg WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Bridge of Earn WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Strathearn Sand and Gravel WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Perth WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)

Receptor	Sensitivity	Impact	Effect
The Carse Coastal WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Dundee WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)
Sidlaw Hills WFD Groundwater Body	High	Negligible adverse	Minor adverse (not significant)

Private Water Supplies

13.6.8 The main risks to PWS during construction include:

- spillages of fuel, hydraulic fluids, solvents, grouts, paints and detergents and other potentially polluting substances will be stored and/or used on site;
- sediment laden runoff from construction activity; and,
- foundation improvements could cause disturbance to shallow groundwater.

13.6.9 Brush from tree felling could also lead to an increase in the acidity of the shallow groundwater. Trees and shrubs removed from the working area may increase the potential for soil erosion and reduces the buffering effect on any uncontrolled site run off. These activities can lead to alteration of shallow groundwater pH and must be mitigated against. The main area of concern would be for the sections passing through Pitmedden Wood, which fall under the Forestry Grant Scheme Native Woodland Integrated Habitat Network designation.

13.6.10 From the PWS assessment in Appendix 13.4 (Volume 4), there were three PWS which were identified to have possible contaminant pathways from works (TW-PWS1, TW-PWS2 and TW-PWS7). However, with the use of measures outlined through the Construction Methodology Statement⁵⁶, it is likely that these pathways will be eliminated. Therefore, for the High Importance receptor, there is a minor adverse impact, resulting in a **Moderate Effect (Significant)**.

Effects to Surface Water

13.6.11 Construction activities risk impacting the water quality of the surface water features identified in the study area. The water quality is particularly important where bodies of water are monitored to meet WFD requirements. The risk to water environment is greatest where these activities occur close to and within water features.

Construction site run-off – Sediment Runoff

13.6.12 The water environment and the flora and fauna that it supports may be adversely affected by excessive fine sediment contained within construction site run-off, dewatering activities or from works directly affecting water features. Run-off laden with fine sediment is principally generated by rainfall falling onto land that has been cleared of any vegetation where the ground may be compacted, reducing infiltration. This is of particular concern where vegetation clearance is occurring on the banks of the River Earn and the River Tay. Surface water runoff from the temporary compound areas, stockpiles, access tracks and mud deposited on the main road accesses to the Proposed Development are also all potential sources. Other potential sources of fine sediment contaminated water include that which is generated by the construction activities themselves (e.g., vehicle

⁵⁶ Balfour Beatty (2023) Construction Methodology – ASTI Framework.

washing), debris from the use of overland conveyors to move spoil from below ground works to temporary stockpile locations, dewatering of excavations, and from works directly within water features themselves.

13.6.13 Generally, excessive fine sediment in run-off is chemically inert and affects the water environment through smothering riverbeds and plants, temporarily changing water quality (e.g., increased turbidity and reducing photosynthesis), and by causing physical and physiological adverse impacts on aquatic organisms (e.g., abrasion, irritation etc.). However, where powdered grouts and cements are used this may also contaminate site run-off if not carefully used and may result in significant changes in pH and have other toxic effects on fauna and flora (e.g., cement is quite high in Chromium). Sediment in run-off may also be a vector for other chemicals, with hydrocarbons known to have a high affinity to adsorb to the surface of sediment particles, although the risk of chemical spillages is primarily considered separately in the next section. In addition, sediment-laden run-off also has the potential to impact fish present in any watercourses.

13.6.14 Construction access routes will involve stone road or trackway over the ground to allow access of vehicles. Trackways will lead to compaction beneath access routes, reducing the permeability and infiltration capacity underlying sheet piling. This could see increased run-off and erosion. The same effects would be observed with foot pathways by trampling, in addition to the destruction of habitat and flora. Mitigation measures should be taken to address these impacts.

13.6.15 Table 13-23 presents the assessment of the impacts and effects of sediment runoff to water features.

Table 13-23 Impact and effects of Sediment Runoff to Water Features

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Trig to Tryne (TW1)	NO 21731 15541	66 m south of the vegetation clearance and 33 m north of the existing upgrade. 66 m west of the new temporary stone access track. Stream crosses OHL at NO 21819 15432.	Low	Negligible adverse impact - Some sediment-runoff could indirectly wash from vegetation clearance, however with low probability. Nearby a new stone temporary track will be installed which may increase sediment run off directly into the stream. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Un-named water-course (TW2)	NO 21514 15599	Sources 176 m upstream/ west of Proposed Development. Drains away from the works.	Low	Negligible adverse impact - Some sediment-runoff could indirectly wash from vegetation clearance, however with low probability as TW1 is upstream of Proposed Development. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, certain negligible adverse impact only.	Negligible adverse (not significant)
Un-named water-course (TW3)	NO 21448 15860	Series of streams that drain to surface water pond which then drains to Lochmill Loch. Surface streams are between 70 m and 130 m away from the vegetation clearance. Intersects tar upgrade to private road at NO 21486 15828 and NO 21476 15831.	Medium	Minor adverse impact - Some sediment-runoff could directly wash from vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. These watercourses run directly into Lochmill Loch. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Minor adverse (not significant)
Un-named water-course (TW4)	NO 20653 16734	Drainage ditch that passes through the study area for 321 m flowing towards the south. 22m to the south of a new stone temporary track. 34 m south of the vegetation clearance area for the closest Tower.	Low	Negligible adverse impact - Some sediment-runoff could indirectly wash from new stone temporary track clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Un-named water-course (TW5)	NO 20387 16771	Crosses beneath the OHL at NO 20387 16771, NO 19638 17384 and NO 19430 17647 and flow for a total distance of 1.4 km throughout the study area. Crosses the trackway once and is within proximity of the vegetation clearance alongside 7 of the towers.	Low	Negligible adverse impact - Some sediment-runoff could directly wash from new stone temporary track clearance, vegetation clearance and trackway traffic. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Un-named water-course (TW6)	NO 19810 17169	Flows for 131 m across the study area towards the south-west. TW6 passes the Proposed Development/ trackway at NO 19810 17169. Less than 5 m from vegetation clearance.	Low	Negligible adverse impact - Some sediment-runoff could directly wash from, vegetation clearance and trackway. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Netly Burn (TW7)	NO 19178 18022	Drains into River Earn at NO 19194 18036 and is 94 m from nearest Tower and 58 m from edge of the vegetation clearance.	Medium	Minor adverse impact – Some sediment run-off could wash directly into Netly Burn. This may lead to indirect sediment run-off into River Earn. Netly Burn may also be receiving any run-off from further upstream close to the Proposed Development, but unlikely to be significant amounts over the distances of the Proposed Development. This is likely to have an uncertain, short term, temporary minor adverse impact.	Minor adverse (not significant)
River Earn (TW8)	NO19187 18054	A river in the River Earn catchment, the mainstream is approximately 33.2 km in length. OHL crosses directly above river Earn. OHL runs in a northerly direction and the river runs to the east. 2 towers are found on the banks of the River Earn, within 30 m.	High	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance as these activities are occurring on the River Tay. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the WFD status of the watercourse.	Moderate adverse (significant)
River Tay (TW9)	NO 18586 19347.	The mainstream is 31.5 km in length. River flows west-wards and the OHL crosses directly above it towards the north-west for 409 m. Towers sit on the banks of either side of the river, with vegetation clearance within 10 m of the river.	Very High	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the SAC and WFD status of the watercourse and protected species present.	Moderate adverse (significant)
Un-named water-courses (TW10)	NO 19480 20201	Crosses through planned vegetation clearance at NO 19480 20201 and is 5 m from the access trackway and 2 m from the nearest tower.	Low	Negligible adverse impact - Some sediment-runoff could indirectly and directly wash from vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Un-named water-courses (TW11)	NO 20110 20627	Does not directly cross Proposed Development works but is within the study area. Stretches for 154 m throughout the study area towards the west. Western edge is 55 m from nearest tower and 15 m from edge of vegetation clearance.	Low	Negligible adverse impact - Some sediment-runoff could indirectly and directly wash from vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Un-named water-courses (TW12)	NO 21475 22095	Proposed Development passes ditch at NO 21532 22032. 77 m from nearest tower. Culverted in section beneath residential buildings. Runs parallel alongside trackway (within 10 m).	Low	Negligible adverse impact - Some sediment-runoff could indirectly and directly wash from vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Broadlie Burn (TW13)	NO 21678 22273	Within 5m from vegetation clearance and 16 m from the nearest tower.	Medium	Negligible adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Un-named water-course (TW14)	NO 23024 23526	15 m from nearest tower. Flows alongside trackway. Within area identified for vegetation clearance.	Low	Negligible adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Pow of Errol (TW15)	NO 22256 16954.	A river in the Dundee Coastal catchment. 13.4 km in length. Crosses directly above the Errol Pow. Nearest tower is 15 m. Flows along edge of vegetation clearance area.	High	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term and temporary impact.	Moderate adverse (significant)
Un-named water-course (TW16)	NO 24616 24859	Flows southwards to join the Pow of Errol. 114 m from vegetation clearance and 147 m from tower.	Low	Negligible adverse impact - Some sediment-runoff could indirectly wash from upgrades to the existing track and vegetation clearance. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Grange Pow (TW17)	NO 25209 25807.	10.5 km in length, flows for 300 m throughout the study area. Crosses directly above the Grange Pow. Tower is 15 m from Grange Pow and runs through the section of vegetation clearance for less than 15 m.	High	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance as these activities are occurring on the River Tay. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the WFD status of the watercourse.	Moderate adverse (significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Un-named water-course (TW18)	NO 25853 26028	Found on the edge of the boundary for the study area and flows southwards to join the Grange Pow (TW17). 75 m south of nearest tower.	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)
Un-named water-course (TW19, TW20, TW21)	NO 26048 26281 NO 26386 26514 NO 26671 26677	Series of connection drainage ditches that capture run off. Total distance of drainage ditches is equal to 1.2 m. Watercourses are all found within 75 m of their nearest tower and cross the Proposed Development in three locations. Within 20 m of the vegetation clearance and as close as 2 m. Runs parallel to the OHL.	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)
Inch-matrine Pow (TW22)	NO 26888 26927	A small surface stream that captures the runoff from TW19, TW20 and TW21. It flows in a southerly direction towards Bogmill Pow	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)
Erskine Pow (TW23)	NO 26888 26927	57 m from the edge of the vegetation clearance area and 75 m southwest from the nearest tower. Less than 15 m from the access trackway.	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)
Un-named water-course (TW24, TW25, TW26, TW27)	NO 27347 27199 NO 27901 27589 NO 28016 27663 NO 28230 27827	Drainage ditches within 267 m from nearest tower. Not passing through zones of vegetation clearance. Runs alongside access trackway and tar upgrades to private roads.	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Un-named water-course (TW28)	NO 29017 28364 NO 29335 28584 NO 29540 28774	Towers found within 70 m of the watercourse. Passes alongside existing upgrade (within 5 m) and the access trackway.	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)
Huntly Burn (TW29)	NO 29511 28948.	The mainstream is 22.3 km in length and drains towards the mouth of the River Tay. 140 m from the nearest tower, OHL passes directly above the river	High	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the WFD status of the watercourse.	Moderate adverse (significant)
Un-named water-course (TW30, TW31, TW32)	NO 29906 29189 NO 30003 29341 NO 30104 29571 NO 30658 31236	Within 165 m from the nearest tower. Does not directly cross the Proposed Development but runs alongside the access trackway and vegetation clearance (within 15 m).	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)
Dron Burn (TW33)	NO 30594 32313	Passes beneath Proposed Development at NO 30594 32313 then drains to River Tay. Nearest tower is 105 m directly to the south. 120 m from edge of vegetation clearance.	Medium	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Minor adverse (not significant)
Un-named water-course (TW34)	NO 30584 32579	96 m from vegetation clearance. 114 m from nearest tower. Small drainage ditch that crosses beneath the OHL, not connected to any other surface watercourses.	Low	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Negligible adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Blacklaw Burn (TW35)	NO 30577 33230	Passes beneath OHL at NO 30577 33230. Captures run off from agricultural land use and Sidlaw Hills which is further upstream. Flows in Balruddery Burn (TW36).	Medium	Minor adverse impact - Some sediment-runoff could directly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Minor adverse (not significant)
Balruddery Burn (TW36)	NO 30677 33103	Flows on from Blacklaw Burn (TW35). Does not pass beneath OHL but is within the study area.	Medium	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Minor adverse (not significant)
Piperdam Burn (TW38)	NO 30965 34553	Fed by Piperdam Loch approximately 500 m upstream. Flows to join Fowlis Burn. OHL passes at NO 30956 34553. Within vegetation clearance zone and 15 m from nearest tower.	High	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Moderate adverse (significant)
Lundie Burn (TW39, TW40)	NO 32021 35272 NO 32189 35356	Drainage ditch total length 4.66 km, of which 588 m passes through the study area. Crosses OHL at NO 32021 35272 and is 40 m from vegetation clearance zone.	Medium	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have an uncertain, short term and temporary impact.	Minor adverse (not significant)
Un-named water-course (TW37)	NO 30770 33882	Not connected to any other surface watercourse. Crosses Proposed Development at NO 30770 33882.	Low	Negligible adverse impact - Some sediment-runoff could indirectly and directly wash from vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Dronley Burn (TW41)	NO 33079 37498	176 m from nearest tower. OHL passes directly over river. WFD status.	Medium	Minor adverse impact - Some sediment-runoff could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment runoff could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the WFD status of the watercourse.	Minor adverse (not significant)
Un-named water-course (TW42)	NO 32189 35356	Drainage ditch which is connected to Lundie Burn (TW40). It is situated right next to a tower and so proximity to works means that it is a sensitive surface water receptor.	Low	Moderate adverse Impact – due to the proximity to tower, works at this location is likely to have some moderate, uncertain, short-term, temporary impacts on the water environment at this drainage ditch which flows to Lundie Burn.	Minor adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Fallaws Burn (TW43)	NO 35935 37135	Drainage ditches associated with the surrounding agricultural land use. 30 m from the nearest tower to the north.	Low	Minor adverse Impact – Possibility of minor amounts of sediment run-off to enter the drainage ditch, potentially increasing turbidity. Unlikely to have a significant effect on the local water environment.	Negligible adverse (not significant)
Un-named water-course (TW44)	NO 36667 37174	Drainage ditches associated with the surrounding agricultural land use. Total distance of 768 m throughout the study area crossing beneath the OHL at NO 36602 37140, NO 36809 37163 and NO 37176 37211.	Low	Minor adverse Impact – Possibility of minor amounts of sediment run-off to enter the drainage ditch, potentially increasing turbidity. Unlikely to have a significant effect on the local water environment.	Negligible adverse (not significant)
Fithie Burn (TW45)	NO 38381 37451	Nearest tower is 20 m to the north.	Medium	Minor adverse Impact – Possibility of minor amounts of sediment run-off to enter the drainage ditch, potentially increasing turbidity. Unlikely to have a significant effect on the local water environment.	Minor adverse (not significant)
Un-named water-course (TW46)	NO 39379 37343	160 m from nearest tower to the north. Drainage ditches associated with the surrounding agricultural land use.	Low	Minor adverse Impact – Possibility of minor amounts of sediment run-off to enter the drainage ditch, potentially increasing turbidity. Unlikely to have a significant effect on the local water environment.	Negligible adverse (not significant)

Construction site run-off – spillage risk

13.6.16 During construction, fuel, hydraulic fluids, solvents, grouts, paints and detergents and other potentially polluting substances will be stored and/or used on the Proposed Development. Leaks and spillages of these substances could pollute nearby surface water features if their use is not carefully controlled and if spillages enter existing flow pathways. Like excessive fine sediment in construction site run-off, the risk is greatest where works occur close to and within water features.

13.6.17 To allow such substances to enter a watercourse could be in breach of the Pollution Prevention and Control (Scotland) Regulations 2012⁵⁷, the Environment Act 2021⁵⁸ and Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003⁵⁹, and therefore measures to control the storage, handling and disposal of such substances will need to be in place prior to and during construction.

13.6.18 As with the risk from construction site run-off, the risk to the water environment is greatest where these activities occur close to and within water features.

13.6.19 Table 13-24 displays the impacts and effects of spillage risk to surrounding water features.

57 Scottish Statutory Instruments (2012). Pollution Prevention & Control (Scotland) Regulations 2012. (online) Available at: <https://www.legislation.gov.uk/ssi/2012/360/contents/made> [Accessed: July 2024]

58 Scottish Statutory Instruments (2021). Environment Act 2021. (online) Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents> [Accessed: July 2024]

59 Scottish Statutory Instruments (2003). The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003. (online) Available at: <https://www.legislation.gov.uk/ssi/2003/531/contents/made> [Accessed: July 2024]

Table 13-24 Summary of the effects of Spillage Risk

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Trig to Tryne (TW1)	NO 21731 15541	66 m south of the vegetation clearance and 33 m north of the existing upgrade. 66 m west of the new temporary stone access track. Stream crosses OHL at NO 21819 15432.	Low	Negligible adverse impact – Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. However, this will likely only be small amounts, and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Negligible adverse (not significant)
Unnamed watercourse (TW2)	NO 21514 15599	Sources 176 m upstream/ west of Proposed Development. Drains away from the works.	Low	Negligible adverse impact – Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. With standard mitigation, is predicted to have a short term and temporary impact.	Negligible adverse (not significant)
Unnamed watercourse (TW3)	NO 21448 15860	Series of streams that drain to surface water pond which then drains to Lochmill Loch. Surface streams are between 70 m and 130 m away from the vegetation clearance. Intersects tar upgrade to private road at NO 21486 15828 and NO 21476 15831.	Medium	Minor adverse impact - Chemical spillages could occur during works to clear vegetation and during the upgrade to the existing track. These watercourses run directly into Lochmill Loch. However, this will likely not happen, with standard mitigation practice, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	Minor adverse (not significant)
Unnamed watercourse (TW4)	NO 20653 16734	Drainage ditch that passes through the study area for 321 m flowing towards the south. 22 m to the south of a new stone temporary track. 34 m south of the vegetation clearance area for the closest tower.	Low	Negligible adverse impact - Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed watercourse (TW5)	NO 20387 16771	Crosses beneath the OHL at NO 20387 16771, NO 19638 17384 and NO 19430 17647 and flow for a total distance of 1.4 km throughout the study area. Crosses the trackway once and is within proximity of the vegetation clearance alongside 7 of the towers.	Low	Negligible adverse impact - Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed watercourse (TW6)	NO 19810 17169	Flows for 131 m across the study area towards the south-west. TW6 passes the Proposed Development / trackway at NO 19810 17169. Less than 5 m from vegetation clearance.	Low	Negligible adverse impact - Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Netly Burn (TW7)	NO 19178 18022	Drains into River Earn at NO 19194 18036 and is 94 m from nearest tower and 58 m from edge of the vegetation clearance.	Medium	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
River Earn (TW8)	NO19187 18054	A river in the River Earn catchment, the main stream is approximately 33.2 km in length. OHL crosses directly above river Earn. OHL runs in a northerly direction and the river runs to the east. Two towers are found on the banks of the River Earn, within 30 m.	High	Minor adverse impact - Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. With standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the WFD status of the watercourse.	Moderate adverse (significant)
River Tay (TW9)	NO 18586 19347.	The mainstream is 31.5 km in length. River flows west-wards and the OHL crosses directly above it towards the north-west for 409 m. Towers sit on the banks of either side of the river, with vegetation clearance within 10 m of the river.	Very High	Minor adverse impact - Chemical spillages could occur during works to upgrade the existing track and vegetation clearance. With standard mitigation, is predicted to have a short term and temporary impact. This has been categorised as minor however due to the WFD status of the watercourse.	Moderate adverse (significant)
Unnamed water-courses (TW10)	NO 19480 20201	Crosses through planned vegetation clearance at NO 19480 20201 and is 5 m from the access trackway and 2 m from the nearest tower.	Low	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed water-courses (TW11)	NO 20110 20627	Does not directly cross Proposed Development works but is within the study area. Stretches for 154 m throughout the study area towards the west. Western edge is 55 m from nearest tower and 15 m from edge of vegetation clearance.	Low	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed water-courses (TW12)	NO 21475 22095	Proposed Development passes ditch at NO 21532 22032. 77 m from nearest Tower. Culverted in section beneath residential buildings. Runs parallel alongside trackway (within 10 m).	Low	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Broadlie Burn (TW13)	NO 21678 22273	Within 5 m from vegetation clearance and 16 m from the nearest tower.	Medium	Negligible adverse impact - Chemical spillages could occur during vegetation clearance and upgrade to existing trackway. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed watercourse (TW14)	NO 23024 23526	15 m from nearest tower. Flows alongside trackway. Within area identified for vegetation clearance.	Low	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Pow of Errol (TW15)	NO 22256 16954.	A river in the Dundee Coastal catchment. 13.4 km in length. Crosses directly above the Errol Pow. Nearest tower is 15 m. Flows along edge of vegetation clearance area.	High	Minor adverse impact - Chemical spillages could occur during vegetation clearance and upgrade to existing trackway. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Moderate adverse (significant)
Unnamed watercourse (TW16)	NO 24616 24859	Flows southwards to join the Pow of Errol. 114 m from vegetation clearance and 147 m from tower.	Low	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Grange Pow (TW17)	NO 25209 25807.	10.5 km in length, flows for 300 m throughout the study area. OHL crosses directly above the Grange Pow. Tower is 15 m from Grange Pow and runs through the section of vegetation clearance for less than 15 m.	High	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Moderate adverse (significant)
Unnamed watercourse (TW18)	NO 25853 26028	Found on the edge of the boundary for the study area and flows southwards to join the Grange Pow (TW17). 75 m south of nearest tower.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed watercourse (TW19, TW20, TW21)	NO 26048 26281 NO 26386 26514 NO 26671 26677	Series of connection drainage ditches that capture run off. Total distance of drainage ditches is equal to 1.2 m. Watercourses are all found within 75 m of their nearest tower and cross the Proposed Development in three locations. Within 20 m of the vegetation clearance and as close as 2 m. Runs parallel to the OHL.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Inchmatrine Pow (TW22)	NO 26888 26927	A small surface stream that captures the run off from TW19, TW20 and TW21. It flows in a southerly direction towards Bogmill Pow.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Erskine Pow (TW23)	NO 26888 26927	57 m from the edge of the vegetation clearance area and 75 m south-west from the nearest tower. Less than 15 m from the access trackway.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Unnamed water-courses (TW24, TW25, TW26, TW27)	NO 27347 27199 NO 27901 27589 NO 28016 27663 NO 28230 27827	Drainage ditches within 267 m from nearest tower. Not passing through zones of vegetation clearance. Runs alongside access trackway and upgrades to private roads.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed watercourse (TW28)	NO 29017 28364 NO 29335 28584 NO 29540 28774	Towers found within 70 m of the watercourse. Passes alongside existing upgrade (within 5 m) and the access trackway.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Huntly Burn (TW29)	NO 29511 28948.	The mainstream is 22.3 km in length and drains towards the mouth of the River Tay. 140 m from the nearest tower, OHL passes directly above the river	High	Minor adverse impact - Chemical spillages could occur during vegetation clearance and upgrades to the existing trackway. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Moderate adverse (significant)
Unnamed water-courses (TW30, TW31, TW32)	NO 29906 29189 NO 30003 29341 NO 30104 29571 NO 30658 31236	Within 165 m from the nearest tower. Does not directly cross the Proposed Development but runs alongside the access trackway and vegetation clearance (within 15 m).	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Dron Burn (TW33)	NO 30594 32313	Passes beneath Proposed Development at NO 30594 32313 then drains to River Tay. Nearest tower is 105 m directly to the south. 120 m from edge of vegetation clearance.	Medium	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Unnamed watercourse (TW34)	NO 30584 32579	96 m from vegetation clearance. 114 m from nearest tower. Small drainage ditch that crosses beneath the OHL, not connected to any other surface watercourses.	Low	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Blacklaw Burn (TW35)	NO 30577 33230	Passes beneath OHL at NO 30577 33230. Captures run off from agricultural land use and Sidlaw Hills which is further upstream. Flows in Balruddery Burn (TW36).	Medium	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)
Balruddery Burn (TW36)	NO 30677 33103	Flows on from Blacklaw Burn (TW35). Does not pass beneath OHL but is within the study area.	Medium	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)
Piperdam Burn (TW38)	NO 30965 34553	Fed by Piperdam Loch approximately 500 m upstream. Flows to join Fowlis Burn. OHL passes at NO 30956 34553. Within vegetation clearance zone and 15 m from nearest tower.	High	Minor adverse impact - Chemical spillages could occur during vegetation clearance and upgrades to the existing trackway. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Moderate adverse (significant)
Lundie Burn (TW39, TW40)	NO 32021 35272 NO 32189 35356	Drainage ditch total length 4.66 km, of which 588 m passes through the study area. Crosses OHL at NO 32021 35272 and is 40 m from vegetation clearance zone.	Medium	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)
Unnamed watercourse (TW37)	NO 30770 33882	Not connected to any other surface watercourse. Crosses the Proposed Development at NO 30770 33882.	Low	Negligible adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Dronley Burn (TW41)	NO 33079 37498	176 m from nearest tower. OHL passes directly over river. WFD status.	Medium	Minor adverse impact - Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)

Surface Water	NGR	Direction and distance to the Proposed Development	Sensitivity	Impact	Effect
Unnamed watercourse (TW42)	NO 32189 35356	Drainage ditch which is connected to Lundie Burn (TW40). It is situated right next to a tower and so proximity to works means that it is a sensitive surface water receptor.	Low	Moderate adverse impact – Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)
Fallaws Burn (TW43)	NO 35935 37135	Drainage ditches associated with the surrounding agricultural land use. 30 m from the nearest tower to the north.	Low	Minor adverse Impact – Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Unnamed watercourse (TW44)	NO36667 37174	Drainage ditches associated with the surrounding agricultural land use. Total distance of 768 m throughout the study area crossing beneath the OHL at NO 36602 37140, NO 36809 37163 and NO 37176 37211.	Low	Minor adverse Impact – Chemical spillages could occur during vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)
Fithie Burn (TW45)	NO 38381 37451	160 m from nearest tower to the north. Drainage ditches associated with the surrounding agricultural land use.	Low	Minor adverse Impact – Chemical spillages could occur during vegetation clearance and upgrade to exiting trackway. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Minor adverse (not significant)
Unnamed watercourse (TW46)	NO 39379 37343	160 m from nearest Tower to the north. Drainage ditches associated with the surrounding agricultural land use.	Low	Minor adverse Impact – Chemical spillages could occur during vegetation clearance and upgrade to exiting trackway. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	Negligible adverse (not significant)

Foundation Improvements

13.6.21 There are 26 towers which are within 50 m of a water feature. Potential foundation improvements at these towers have the potential to impact the water quality of the water feature. However, as listed within the Principal Contractor's Construction Methodology Statement⁶⁰, silt busters and silt traps will be used to contain and treat water from concrete washout and from pumping. Therefore, it is unlikely that any contaminated or silt laden discharge would enter any of the water features.

13.6.22 However, Tower 160 sits over a tributary to Lundie Burn (TW39) and Tower 94 sits over unnamed watercourse TW10. Foundation improvements could risk silt / concrete contamination to the water feature. Any contamination or sediment will the enter directly into the highly sensitive Dean Water. To reduce impact downstream, silt fencing will be utilised as well as a site-specific pollution prevention plan.

13.6.23 Table 13-25 shows the towers within 50 m of water features which could be impacted by foundation improvements.

Table 13-25 Towers within 50 m of water features

Tower	Water Feature ID	Sensitivity	Distance to Watercourse	Impact	Effect
81	TW6	Low	25 m	Negligible adverse, uncertain, temporary, short-term, direct	Negligible adverse (not significant)
83	TW6	Low	5 m	Negligible adverse, uncertain, temporary, short-term, direct	Negligible adverse (not significant)
85	TW8	High	5 m	Minor adverse, uncertain, temporary, short-term, direct	Moderate adverse (significant)
90	TW9	Very High	6 m	Minor adverse, uncertain, temporary, short-term, direct	Moderate adverse (significant)
91	TW9	Very High	4 m	Minor adverse, uncertain, temporary, short-	Moderate adverse (significant)
94	TW10	Low	3 m	Negligible adverse, uncertain, temporary, short-term, direct	Negligible adverse (not significant)
105	TW13	Medium	6 m	Minor adverse, uncertain, temporary, short-term	Minor adverse (not significant)
110	TW14	Low	7 m	Negligible adverse, uncertain, temporary, short-term	Negligible adverse (not significant)
115	TW15	High	3 m	Minor adverse, uncertain, temporary, short-term	Moderate adverse (significant)
121	TW17	Medium	4 m	Minor adverse, uncertain, temporary, short-term	Minor adverse (not significant)
125	TW20	Low	25 m	Negligible adverse, uncertain, temporary, short-term	Negligible adverse (not significant)
126	TW20	Low	27 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
127	TW21	Low	42 m	Negligible adverse, uncertain, temporary, short term	Minor adverse (not significant)

⁶⁰ Balfour Beatty (2023) Construction Methodology – ASTI Framework.

Tower	Water Feature ID	Sensitivity	Distance to Watercourse	Impact	Effect
130	TW24	Low	48 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
134	TW28	Low	27 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
137	TW28	Low	37 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
138	TW30	Low	36 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
139	TW31	Low	23 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
148	TW34	Low	29 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
150	TW35	Medium	31 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
155	TW38	High	40 m	Negligible adverse, uncertain, temporary, short term	Minor adverse (not significant)
160	TW39	Medium	2m	Minor adverse, uncertain, temporary, short-term	Minor adverse (not significant)
174	TW42	Low	30 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
175	TW44	Low	24 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
179	TW46	Low	16 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)
180	TW46	Low	17 m	Negligible adverse, uncertain, temporary, short term	Negligible adverse (not significant)

Hydromorphology

Culverts and Crossings

13.6.24 Water crossings may have potential to impact surface water by restricting the downstream movement of water and sediments. There is potential for adverse impacts to the hydromorphology of surface water features from construction works, particularly upgraded watercourse crossings, but also from fine sediment deposition that may be introduced into the channel via surface water runoff from exposed areas stripped of vegetation and where the soil may become compacted due to the movement of construction vehicles. This could cause water and sediment accumulation upstream of water crossings and starvation further downstream leading to increased localised erosion and reduced habitat substrate. However, in the context of overall river geomorphology, these structures are thought to have little impact on river morphology, as no significant areas of deposition or erosion have been identified near to the location of planned water crossings.

13.6.25 There are several access route options proposed as part of the Proposed Development, which will be upgraded depending on a number of factors. Effects will be permanent for the majority of crossings. One new temporary culvert has been identified for construction near Tower 168.

13.6.26 It is not mentioned how the culverts will be upgraded in the Principal Contractor's Construction Methodology Statement ⁶¹, however it is anticipated that the potential impacts to the watercourse from the culverts and associated vegetation clearance will consist of small amounts of sediment run off and the potential for spillages. Therefore, the magnitude of impact is assessed to be negligible adverse, which given the low or medium importance of the receptors for hydromorphology, results in a **negligible adverse effect (not significant)**. There is an exception of culverts at Towers 137-138 and Tower 155, which given the high importance of the watercourse and proximity to WFD status waterbodies, results in a **minor adverse effect (not significant)**.

13.6.27 It is noted however in the Construction Methodology Statement that it has been identified that it is unlikely that any temporary bridges will be required as no bridge upgrades have been identified. In the event a temporary bridge is required, it is anticipated that the potential impacts to the watercourse from the temporary bridge and associated vegetation clearance would consist of small amounts of sediment run off and the potential for spillages during construction and use. However, this is likely to have a small temporary impact on the watercourse and result in **negligible adverse effects (not significant)**.

Table 13-26 Culverts and affected watercourses ID

Tower (T)	Affected Watercourse ID	Sensitivity	Existing / New	Impact	Effect
125 - 126	TW19, TW20, TW21	Low	Existing, upgrades to culvert	Negligible adverse, uncertain, temporary, short term	Negligible adverse effect (not significant)
132-134	TW28	Low	Existing, upgrades to culvert	Negligible adverse, uncertain, temporary, short term	Negligible adverse effect (not significant)
137-138	TW29	High	Existing, upgrades to culvert	Negligible adverse, uncertain, temporary, short term	Minor adverse effect (not significant)
155	TW38	High	Existing, upgrades to culvert	Negligible adverse, uncertain, temporary, short term	Minor adverse effect (not significant)
168	TW42	Low	New temporary culvert	Negligible adverse, uncertain, temporary, short term	Minor adverse effect (not significant)
175	TW43	Low	Existing, upgrades to culvert	Negligible adverse, uncertain, temporary, short term	Negligible adverse effect (not significant)
181-182	TW46	Low	Existing, upgrades to culvert	Negligible adverse, uncertain, temporary, short term	Negligible adverse effect (not significant)

**These are culverts to be upgraded – not including the culverts for registration only (presumed no actual physical works at these locations)*

⁶¹ Balfour Beatty (2023) Construction Methodology – ASTI Framework.

Foundation Improvements

13.6.28 Foundation improvements to towers over or near water features have the potential to impact the hydromorphology. Fine sediment deposition that may be introduced into the channel via surface water runoff from exposed areas stripped of vegetation. Bank erosion could also occur due to increased area of exposed earth.

13.6.29 Tower 160 lies directly over a water feature (a tributary of Lundie Burn (TW39)). Any foundation improvement works that take place here could have a medium impact to the high sensitivity TW39 and TW40, resulting in a **moderate adverse effect (significant)**.

Effects on Peat

13.6.30 Considering that areas of peat are recorded outwith the Proposed Development (approximately 150m south and southeast), are very small and isolated, and given no access track or construction compounds are proposed in the areas of peat, it is not expected that the construction will impact on these receptors. Due to the distance of the receptors from the Proposed Development and as all works will be undertaken in accordance with best practice, the potential magnitude of impact on the peat ('medium' sensitivity) is 'negligible'. Therefore, the significance of effect is 'negligible' (**not significant**) for the peat identified.

13.6.31 A Peat Landslide Hazard and Risk Assessment (PLHRA) is therefore not necessary.

Effects on Geologically Related Designated Sites

13.6.32 Site clearance and preparation works for installation of the Proposed Development has the potential to result in the following impacts on the identified geologically designated sites, without appropriate controls or mitigation:

- potential adverse impact and/or damage to sensitive geological receptors (i.e., the GCR / SSSI sites located within the study area);
- an adverse effect on geological setting from pollution, fuel, oil, concrete or other hazardous substances (from construction plant and equipment); and,
- potential beneficial effect on geologically designated sites from exposing rocks / soils during construction (without damage).

13.6.33 Considering the distances at which the geology related designated sites are located (Pitlowie GCR and SSSI, 1 km north-west of the south; and Inchcoonans Clay Pit GCR and SSSI, 600m south of the centre), it is not expected that the construction of the Proposed Development will impact on these receptors. Control of working areas will be employed by the Principal Contractor to avoid disturbance of designated sites by construction plant and associated activities. Best practice would ensure that the potential magnitude of impact on the designated SSSI / GCR sites ('very high' sensitivity) is 'negligible' and thus the significance of effect is '**minor**' (**not significant**).

13.6.34 No additional mitigation is required.

Assessment of Operational Effects

13.6.35 OHLs require very little maintenance once operational. Regular inspections are undertaken to identify any unacceptable deterioration of components so that they can be replaced. From time to time, inclement weather, storms, or lightning can cause damage to either the insulators or the conductors. If conductors are damaged, short sections may have to be replaced. During the operation of the Proposed Development, it will be necessary to manage vegetation along the OHL to maintain required safety clearance distances.

13.6.36 Due to the nature of the Proposed Development, operational residues and emissions are very limited. No operational emissions are expected to air, soil or water (with the exceptions of small amounts of foul drainage from welfare facilities). Waste would be limited to that generated from maintenance activities and staff welfare facilities.

13.6.37 There are not considered to be any operational effects on the identified geology receptors.

Cumulative Effects

13.6.38 The cumulative effects assessment considers other developments within 3 km of the OHL as set out in Chapter 5: EIA Approach and Methodology (Volume 2) and shown Figure 5.1 (Volume 3). The cumulative assessment for hydrology and geology is shown in Table 13-27 and Table 13-28.

13.6.39 Providing all developments adopt and implement best practice mitigation measures, the risk of significant cumulative effects can be reduced and minimised through standard best practices, to an extent to which they can no longer be considered significant.

Table 13-27 Interactive (intra) cumulative assessment for Associated SSEN Developments

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Alyth – Tealing 275 kV OHL upgrade	A	Alyth -Tealing	Upgrade of approximately 14 km of an existing 275 kV OHL between Alyth Substation and Tower 685 north-west of Tealing Substation to enable operation at 400 kV.	EIA Report in preparation (alongside the EIA Report for the Proposed Development.	No significant effects predicted	Construction of the Alyth-Tealing OHL may cause additional sediment laden surface run-off, increased risk from pollution (chemical and oil spills) and increased aquatic habitat disruption. Impacts are thought to be associated with the construction phase, with only minor effects during operation from maintenance. Therefore, no likely significant cumulative effects.	None.
Emmock (Tealing) substation	B	Near Emmock Road, Tealing	Construction of a new 400 kV substation in Tealing.	Scoping Report submitted 2 nd July 2024.	Not available.	Construction of the Emmock (Tealing) substation may cause additional sediment laden surface run-off, increased risk from pollution (chemical and oil spills) and increased aquatic habitat disruption. Impacts are thought to be associated with the construction phase, with only minor effects during operation from maintenance. Therefore, no likely significant cumulative effects.	None.

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Kintore - Tealing 400K Connection	C	Kintore - Tealing	Construction of a new 400 kV OHL between Kintore and Tealing.	In Preparation – no screening or scoping submitted.	Not available.	Construction of the OHL and two associated substations may cause additional sediment laden surface run-off, increased risk from pollution (chemical and oil spills) and increased aquatic habitat disruption. Impacts are thought to be associated with the construction phase, with only minor effects during operation from maintenance. Therefore, no likely significant cumulative effects.	None.

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Alyth-Tealing and Tealing-Westfield OHL Tealing (Emmock) substation tie-ins and associated tower dismantling	D	Tealing	Construction of a new OHL originating at some point on the existing OHL from the Alyth-Tealing OHL between Tower 680 and Tower 682, as well as the Proposed Development between Tower 180 and Tower 182 (likely Tower 181), connecting to the new proposed Tealing (Emmock) substation. This will enable the removal of approximately 1.5 km of redundant OHL between Towers 680/682 and the existing Tealing Substation.	In Preparation – no screening or scoping submitted.	Not available.	Construction of associated tie-ins and tower decommissioning may lead to increased risk from pollution. Some minor disruption to the earthworks may be required for tower decommissioning. Therefore, no likely significant cumulative effects.	None.

Table 13-28 In-combination (inter) cumulative assessment for Other SSEN and 3rd Party Developments

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Muir of Pert Energy Storage Facility	E	Muir of Pert Farm, Tealing, Dundee DD4 0QL	Energy storage facility up to 50 MW, compound of equipment, access, fencing, security cameras, landscaping, tree planting, demolition of derelict buildings and other associated works.	Proposal of Application (PAN) Approved Subject to Conditions 12 th July 2023 and EIA Screening Request submitted and determined EIA Not Required 11 th July /2023	Not available.	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.
Moatmill Bridge Tealing Energy Storage Facility	F	Land at Moatmill Bridge, Tealing	Energy storage facility up to 50 MW, compound of equipment, meter building, fencing, security cameras, new belt of native trees and landscaping.	Proposal of Application Notice (PAN) Approved Subject to Conditions 3 rd May 2023.	Not available.	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.
Tealing Solar Energy Park	G	Near Duntrune, DD4 0PR	Application for Installation of a solar energy park of approximately 100 MW and all associated infrastructure.	Application submitted 17 th November 2023. EIA not required.	No EIA completed, however from assessment completed, significant effects are considered unlikely.	No likely significant cumulative effects.	None.

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Tealing Battery Energy Storage Farm	H	Land to the north-east of Gagie Home Farm, Duntrune, DD4 OPR	Application for Installation of an 80 MW Battery Energy Storage Facility and associated infrastructure.	Application Consented 13 th December 2023 EIA not required.	No EIA completed, however from assessment completed, significant effects are considered unlikely.	No likely significant cumulative effects.	None.
Solar Farm at land 500 m East of Stoneygroves Liff	I	Land 500 m east of Stoneygroves Liff	Solar farm installation with an export capacity of 20 MW (AC) (with peak generation capacity of 24-28M W) comprising ground-mounted solar photovoltaic arrays together with associated infrastructure and landscaping	Application Approved Subject to Conditions 13 th March 2024.	EIA shows no relevant significant effects for hydrology, hydrogeology and geology	No likely significant cumulative effects predicted due to relevant distance.	None.
Battery Energy Storage at Cordon Farm, Abernethy	J	Land 600 m north-east of Cordon Farm, Abernethy	Formation of 30 MW BESS with associated access and infrastructure.	Proposal of Application submitted 6 th December 2022	Not available.	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Jamesfield Energy Storage Facility	K	Land 140 m north-east of Jamesfield Organic Centre Newburgh	Formation of a 49 MW BESS facility comprising battery storage units, ancillary buildings, vehicular access, landscaping and associated works.	Application Consented 28 th September 2022. EIA not required	No EIA completed, however from assessment completed, significant effects are considered unlikely.	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.
Balnuith Farm BESS (Tealing)	L	Balnuith Farm, Tealing, DD4 0RE	The construction and operation of a battery energy storage facility for the storage of up to a 249 MW of electricity together with associated infrastructure, substation, security fencing, CCTV, security lighting and landscaping.	Screening Opinion issued 6 th September 2023	Not available.	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
Fithie Energy Park BESS	M	Land to the northwest of Tealing Substation	Construction and Operation of up to 1400 MW battery energy storage system (BESS) and associated infrastructure	Screening Report submitted 23 rd February 2024	Not available,	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.
Myreton BESS	N	Land to the south of Tealing Substation	A proposed battery energy storage system with an installed capacity of around 750 MW.	Screening Report submitted 22 nd February 2024	Not available.	Potential minor cumulative effects associated with the construction phases of both developments due to their relative proximity. Impacts could include increased sediment-laden runoff and contaminated runoff into water receptors. No likely significant cumulative effects.	None.

Development	Ref. on Figure 5.1	Location	Description	Status	Residual Significant Effects (if known) / information from any available sources on likely significant effects	Cumulative Assessment	Additional Mitigation
SPEN TKUP Lines (Uprate to 400 kV operation)	O	Tower YS065 (SHET/SPT Border) near Pitmedden Forest to YS001 (Westfield) and YJ084 (Westfield) to YJ001 (Longannet) ⁶²	Increase voltage of approximately 30 km of OHL from 275 kV to 400 kV	No EIA screening or scoping available. Only high-level plan of route available.	Not available.	Construction of associated tie-ins and tower decommissioning may lead to increased risk from pollution. Some minor disruption to the earthworks may be required for tower decommissioning. Therefore, no likely significant cumulative effects.	None.

⁶² https://www.spenergynetworks.co.uk/pages/tkup_project.aspx#tablist1-tab2

13.7 Mitigation

13.7.1 The following section describes the mitigation and monitoring that is proposed to avoid, minimise, reduce and compensate for predicted adverse effects to acceptable levels or to ameliorate non-significant effects in accordance with good practice.

13.7.2 There are a number of potential water quality, morphological, hydrological and drainage impacts that could occur as a result of the Proposed Development. With mitigation however, the potential impacts could be avoided, minimised and/or reduced. Mitigation measures that have been designed into the Proposed Development and are therefore considered as 'embedded mitigation' have been taken into consideration in the assessment of the significance of effects on the water environment.

Access Requirements

13.7.3 A temporary bridge is deemed unlikely, however if required the Principal Contractor would work closely with SEPA / asset owner to ensure any required permissions are obtained prior to commencing and to ensure all regulations are followed. There are no further mitigation measures on this.

13.7.4 If site assessments deem that an unidentified ford is required, and in order to carry out fording, a very detailed and robust risk assessment and method statement will be developed by the contractor on a site-by-site basis. The Principal Contractor will liaise with the asset owner and SEPA to facilitate the granting of any necessary permissions / licenses. A site-specific risk assessment and method statement would also state that:

- vehicle movements will be reduced to the bare minimum;
- strict cleaning protocol requirement either side of the water;
- pre-post entry condition assessment record photographs;
- detailed inspection of plant prior to entry; and,
- any additional necessary precautions identified.

Foundation upgrades

13.7.5 A number of foundation upgrades are likely, however the specific towers and waterbodies this will affect have not yet been identified and therefore the worst case has been assessed. This EIA assesses an unlikely worst-case scenario that all tower foundations will require upgrading. In Table 13-25 above, waterbodies within 50m of potential tower foundation upgrades have been identified.

13.7.6 The Construction Methodology Statement⁶³ states that "*foundation upgrade sites are within proximity to minor watercourses (burns / ditches) where there could be a risk of silt / concrete contamination or the requirement to pump around*". To risk any contamination during foundation improvements, silt fencing, silt socks and silt busters will be implemented in addition to a site-specific pollution plan developed by the project environmental advisor.

13.7.7 A permit to pump / discharge will be issued prior to pumping to ensure that all mitigation measures and pollution risks are addressed and in place.

13.7.8 Foundation improvements will have the potential to impact the hydromorphology at a watercourse, in particular TW39 and TW40 could be impacted by any foundation improvement works at Tower 160. It is outlined in the

⁶³ Balfour Beatty (2023) Construction Methodology – ASTI Framework.

Construction Methodology Statement, that pre-seeded natural coir mesh will be installed at the point of site restoration in order to accelerate bank restoration and reduce the risk of erosion and scouring.

Peat

13.7.9 Peat has been identified outside the Proposed Development, in a localised area and only identified from one source. Following assessment, the effect on peat was deemed to be negligible. The impact on the peat, if encountered, can be managed through the use of a Construction Environmental Management Document (CEMD) and best practice.

Standard Mitigation

The mitigation listed in this section will be implemented through a CEMD and Water Management Plan (WMP), and is considered likely to reflect / include any conditions which may be imposed by SEPA or other statutory consultees through the consenting and future CAR application processes.

Control of Construction Water Environment Risks

13.7.10A CEMD referring to a range of standard mitigation measures will be implemented by the Principal Contractor as necessary to protect the water environment from pollution and physical impacts during construction works.

13.7.11 Pollution prevention mitigation measures that accord with legal compliance and good practice guidance are to be implemented to:

- control and minimise the risk of pollution to surface waters and groundwater by managing construction site runoff and the risk of chemical spillages;
- control the storage, handling and disposal of potentially polluting substances during construction;
- manage water removed from excavations to ensure to protect nearby water features from any pollution risk but also to support flows if there is a risk of reductions to baseflow;
- if necessary, provide compensatory discharges to surface water features or GWDTEs that are groundwater fed to minimise impacts on the water level and flows to these receptors and any third-party users; and,
- avoid and minimise the risk of damage to physical form and processes of water features.

Secondary Consents

13.7.12 The construction of the Proposed Development will be undertaken in accordance with good practice as detailed below. It is assumed that all temporary works will be carried out under the necessary consents / permits (e.g., CAR licences as required under the Water Environment (Controlled Activities) Regulations 2011⁶⁴, and that the Principal Contractor will comply with any conditions imposed by any relevant permission. It is assumed that that the Principal Contractor will ensure all permits / consents in place for works in, or near watercourses.

Standard Good Practice

13.7.13 There are many ways in which construction pollution risks to the water environment can be dealt with. All works will be undertaken in line with a CEMD for the Proposed Development, which shall be developed for the consented project in advance of and during construction. Central to this will be a programme of water quality monitoring

⁶⁴ SEPA (2024). Controlled Water Activities Consents (Scotland) (online)<https://www.gov.uk/find-licences/controlled-water-activities-car-consents-scotland#:~:text=Apply%20for%20this%20licence&text=Protection%20Agency%20website-,You%20must%20be%20authorised%20by%20the%20Scottish%20Environment%20Protection%20Agency,impact%20on%20the%20water%20environment.> [Accessed: July 2024]

(described later under 'Additional Mitigation') and the implementation of a temporary drainage system. The temporary drainage system will be prepared in accordance with good practice guidance. There will be no direct discharges to groundwater or surface waters without appropriate treatment (where required to meet consent standards); the Principal Contractor will ensure that there is adequate space to ensure that appropriate drainage control measures can be implemented for the duration of the construction works; and all secondary consents will be complied with. Further details are provided in the following sections.

13.7.14 The design is to follow best practice outlined by a CEMD. The Guidance of Pollution Prevention (GPP) on the NetRegs website⁶⁵ cover a number of environmental issues relating to construction including:

- GPP 4: treatment and disposal of wastewater where there is no connection to the public sewer;
- GPP 5: works and maintenance in or near water;
- GPP 8: safe storage and disposal of used oils; and,
- GPP 20: Dewatering underground ducts and chambers.

13.7.15 Where new GPPs are yet to be published, previous Pollution Prevention Guidance (PPGs) still provide useful advice on the management of construction to avoid, minimise and reduce environmental impacts, although they should not be relied upon to provide accurate details of the current legal and regulatory requirements and processes.

13.7.16 Although no significant effects are predicted for peat, due to its very localised recorded location and distance from the Proposed Development, and so no specific mitigation is required, it should be highlighted that as peat has been identified there may be unrecorded deposits present, or the deposits identified could be larger in extent. As such, the CEMD should consider the presence of unidentified peat or carbon rich soils and provide procedures and best practice for following where encountered. A geotechnical specialist should be present onsite to monitor the construction works relating to the ground and provide specialist advice, where required.

Management of Construction Site Run-off

13.7.17 Mitigation measures to manage run-off will be detailed in a WMP. Below is a summary of measures:

- Avoidance of wet weather working where practical, especially site clearance, earthworks and works to water features;
- Appropriate separate storage of topsoil/subsoil and materials, and at least 20 m from water features on flat ground;
- Any earth bund / stockpile to be present for longer than two weeks will be either seeded, covered using geotextiles, or other pressures provided to ensure it is not a source of excessive fine sediment in runoff to water features;
- The implementation of a temporary drainage system and other measures to manage pollution risk during construction (e.g., fabric silt fences, lagoons, bunds, straw bales, sandbags, lamella clarifiers or other proprietary measures as may be required) etc.;
- Any dewatering of excavations will include measures where necessary to filter the water prior to discharge to a watercourse or ground (there shall be no discharge of any construction site runoff to existing ponds); and,

⁶⁵ NetRegs (2024) Guidance for Pollution Prevention (GPP) documents (online) Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/> [Accessed: July 2024]

- The control of mud deposits at entry and exits to the works areas for the Proposed Development using wheel washing facilities and/or road sweepers operating during earthworks or other times as considered necessary.

13.7.18 Construction works directly affecting water features will require careful management and the implementation of stringent working practices and mitigation.

13.7.19 Any works in the channels of smaller watercourses will be undertaken in a dry working environment, where possible, with flow temporarily over-pumped or flumed or isolated from the working area using sand / pea gravel bags or other similar inert barriers.

Construction Phase

13.7.20 During the construction phase:

- excavation material should be re-positioned where possible or re-purposed in a sustainable manner, such as donations to another appropriate use e.g., ecological benefits;
- water features should be avoided where possible; and,
- the 50 m buffer zone around water features should be complied with where possible. All water features have had a 50 m buffer zone applied to them to ensure that wherever possible new permanent or temporary infrastructure are set back. This will help to mitigate the risk from construction and operational phase run off (including chemical spillages) as well as avoid physical impacts. However, it will not be possible to avoid the 50 m buffer zone in every instance, especially where the Proposed Development crosses surface water bodies.

Management of spillage risk

13.7.21 To prevent chemicals, fuels / oils and other such substances from entering the water environment, measures to control the storage, handling and disposal of these substances would be put in place prior to and during construction. The CEMD and WMP will provide detailed information relating to the control of spillages and leaks. In summary they will include:

- Spill kits will be available on the site in watertight containers (e.g. works near watercourses) and carried on all mobile plant. They would be regularly checked and topped up, especially after use. Appropriate training would be given to all construction workers in their use;
- Storage of fuel and chemicals would be in accordance with GPP 8: Safe storage and disposal of used oils;
- Surface water drains on local roads or within the Proposed Development compound area will be identified by the Principal Contractor and where there is a risk that fine particulates or spillages could enter them, they would be protected (e.g. covers or sandbags);
- Any containers / tanks of contaminating substances (e.g. fuel) onsite would be leak-proof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism. The containers would be protected by temporary impermeable bunds (or drip trays for small containers) with a capacity of 110% of the maximum stored volume. Areas for transfer of contaminating substances (including refuelling areas) would be similarly protected;
- Any permanent oil storage tanks and temporary storage of 201 litres or more of oil in drums and mobile bowsers, and ancillary pipe work, valve, filters, sight gauges and equipment requiring secondary containment, e.g., bunding or drip trays;

- No oil would be stored within 20 m of a watercourse and potentially further if ground is angled towards a water body except for fixed/large plant associated with the construction of new bridges / culverts or hand tools;
- Where possible re-fuelling will be undertaken in designated areas within main compounds or satellite compounds. It is possible that refuelling of mobile plant may be required by mobile fuel bowser. This will not be undertaken within 20 m of a water feature, and only on flat land (or otherwise a greater distance and other measures may be required subject to an on-site risk assessment) and with a drip tray / plant nappy. Certain semi-mobile very large plant (e.g., crane) may need to be located close to watercourses and potentially within 20 m. Due to the difficulties in moving plant such as this they may need to be refuelled in situ. Again, a site-specific risk assessment will need to be undertaken by the Principal Contractor;
- Biodegradable hydraulic oils would be used where possible in all plant and only in equipment working in or over watercourses;
- Any plant, machinery or vehicles would be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off site if possible or only at designated areas in the site compound;
- All fixed plant used on the Proposed Development to be self-bunded;
- Mobile plant to be in good working order, kept clean and fitted with plant 'nappies' at all times;
- An Emergency Response Plan or similar titled plan would be prepared and included in the CEMD;
- Spill kits and oil absorbent material to be carried by mobile plant and located at high-risk locations across the Proposed Development and regularly topped up;
- All construction workers would receive spill response training;
- The Proposed Development will be secured to prevent any vandalism that could lead to a pollution incident; and,
- Construction waste / debris are to be prevented from entering any surface water drainage or water feature.

13.7.22 Any temporary site welfare facilities will be appropriately managed, and all foul waste disposed of by an Principal Contractor to a suitably licensed facility. The main site compound (subject to separate consent and therefore not assessed within this EIAR) will have accommodation and welfare facilities. It is expected that a suitably sized storage tank will be provided that would be periodically pumped out by a specialist Principal Contractor so that the water could be disposed of at a suitably licensed waste facility.

13.7.23 There may be localised lowering / control of groundwater required to enable the construction of the shafts and tunnel.

13.7.24 To minimise the impact of any groundwater control activities during construction on the water receptors, a Construction Groundwater Control Strategy will need to be prepared by the Principal Contractor at the detailed design stage. Furthermore, best practice mitigation measures will be followed to avoid and or minimise impact on groundwater and will be included in the CEMD. The mitigation measures will be informed by the findings from the ground investigation which will provide information of site-specific ground conditions, including groundwater quality and quantity data.

Management of groundwater activities

13.7.25 As a minimum the Principal Contractor will adhere to the following mitigation measures:

- Groundwater control will be implemented to ensure water levels in adjacent water features are maintained and any discharge is of a suitable quality;
- A programme of water monitoring of the dewatering discharges will be put in place;
- If discharging water to a nearby watercourse, the rate of discharge will need to be agreed with the relevant authority to ensure that there is no unacceptable increase in flood risk or risk of scour. Any discharge will need to be undertaken with the agreement of the relevant statutory regulator and will need to comply with the pollution prevention requirements set out in the CEMD; and,
- The risk from groundwater flooding will be managed through appropriate working practices (during excavations) and with adequate plans and equipment in place for de-watering to ensure safe dry working environments.

Management of Geological Designated Sites

13.7.26 Control of working areas and marking out of the geological designated sites (Pitlowie GCR and SSSI, 1 km north-west of the south; and Inchcoonans Clay Pit GCR and SSSI, 600 m south of the centre) will be employed by the Principal Contractor to avoid disturbance to these areas from construction plant and activities.

Management of Unexpected Contamination

13.7.27 There is a minor potential that contaminated material is encountered during construction of the Proposed Development, however only temporary and limited disturbance to land is expected, and these works will be managed through the CEMD. Unexpected Contaminated Land will follow the Generic Environmental Management Plan.

Management of UXO risks

13.7.28 As indicated in Paragraph 13.5.14, the UXO Desk Study and Constraints Assessment and associated maps⁶⁶ identify numerous Moderate and High risk UXO areas along the wider ASTI route, predominantly associated with existing military training installations. The report recommends that these areas are avoided, or if unable to be avoided, then risk mitigation measures should be implemented for groundworks within these areas. Whilst the majority of the features identified are further north of the Proposed Development, there are a couple of features within the study area of the Proposed Development (namely RAF Tealing and other Barracks and Camps). It would therefore be prudent for the Principal Contractor to establish with Zetica measures specific to the Proposed Development prior to any works commencing.

Additional Mitigation

Water Quality and Flow Monitoring

13.7.29 A Water Quality and Flow Monitoring Plan and subsequent delivery of that monitoring is proposed for the following requirements:

- Any works directly to a water body should be monitored before, during and after construction; and,
- Any PWS identified in Appendix 13.4 (Volume 4) should be monitored before, during and after construction.

13.7.30 A water quality monitoring programme could ensure that mitigation measures are operating as planned and managing the risk of water pollution. The purpose of the monitoring programme will also be to ensure that should pollution occur it is identified as quickly as possible and appropriate action is taken in line with the Emergency

⁶⁶ Zetica UXO (2023) ASTI Scheme UXO Desk Study & Constraints Assessment.

Response Plan. To support the construction phase monitoring, a pre-construction baseline will need to be determined.

13.7.31 The water quality monitoring programme will be developed by the Principal Contractor in consultation with SEPA and other relevant stakeholders during the process of obtaining CAR licences for works affecting, or for temporary discharges to, the water features and watercourses in and around the Proposed Development. Water quality monitoring will be required of all potentially affected water features and may include daily visual and olfactory observations or after heavy or prolonged rainfall, in situ monitoring using a calibrated hand-held probe, and potentially grab samples on a regular or ad hoc basis for analysis at an accredited laboratory.

13.7.32 To ensure that monitoring during construction is effective it will be necessary to carry out pre-construction monitoring. There is no guidance on how long or frequent this should be, but it is recommended that as a minimum there are six to twelve monthly visits taking in a range of flow and weather conditions. The scope of pre-construction water quality monitoring, and monitoring during construction will be set out in the Water Quality and Flow Monitoring Plan, pursuant to a pre-commencement planning condition.

13.7.33 The schedule of mitigation required is summarised in Table 13-29.

Table 13-29. Schedule of Mitigation

Mitigation Item	Location	Timing of Measure	Mitigation Measure	Mitigation Purpose / Objective	Specific Consultation or Approval Required	Potential Monitoring Requirements
WE1	Throughout Proposed Development	Prior to and during construction	The Water Environment (Controlled Activities) Regulations 2011 (CAR) (Scottish Government, 2011b) require licences to be sought for design and construction activities affecting watercourses, including engineering works (culverts and bridges) and discharges (outfalls, attenuation and treatment). The Principal Contractor will be required to provide a detailed Construction Method Statement which will include proposed mitigation measures for specific activities including any requirements identified through the pre-CAR consultation process.	Ensure compliance with regulatory requirements for the protection and effective management of the water environment.	It is intended that the appointed Principal Contractor be responsible for submitting applications and securing CAR authorisation based on their detailed design. The CAR application and surface water quality monitoring plan may require approval from SEPA.	No

Mitigation Item	Location	Timing of Measure	Mitigation Measure	Mitigation Purpose / Objective	Specific Consultation or Approval Required	Potential Monitoring Requirements
WE2	Throughout Proposed Development	Prior to and during construction	<p>A CEMD and WMP include, but may not be limited to:</p> <ul style="list-style-type: none"> avoidance of wet weather working where practical, especially site clearance, earthworks and works to water features; appropriate separate storage of topsoil/subsoil and materials, and at least 20 m from water features on flat ground; any earth bund/ stockpile to be present for longer than two weeks will be either seeded, covered using geotextiles, or other pressures provided to ensure it is not a source of excessive fine sediment in run-off to water features; the implementation of a temporary drainage system and other measures to manage pollution risk during construction; any dewatering of excavations will include measures, where necessary, to filter the water prior to discharge to a watercourse or ground (there shall be no discharge of any construction site run-off to existing ponds); the control of mud deposits at entry and exits to the site using wheel washing facilities and/or road sweepers operating during earthworks or other times as considered necessary; and, any works in the channels of smaller watercourses will be undertaken in a dry working environment, with flow temporarily over-pumped or flumed or isolated from the working area using sand/ pea gravel bags or other similar and inert barrier. 	To protect the water environment from uncontrolled construction runoff.	No	No

Mitigation Item	Location	Timing of Measure	Mitigation Measure	Mitigation Purpose / Objective	Specific Consultation or Approval Required	Potential Monitoring Requirements
WE3	Throughout Proposed Development	Prior to and during construction	<p>A CEMD and Water Management Plan should be prepared / updated and include, but may not be limited to:</p> <ul style="list-style-type: none"> measures to minimise the risk and potential effects of spillage incidents shall typically include; storage of oils and diesel, along with the general maintenance and refuelling of plant, shall be restricted to impermeable bunded areas with a minimum 110% storage capacity and away from or where spillages could reach a surface water; storage of fuel and chemicals would be in accordance with GPP 8: Safe storage and disposal of used oils; and, re-fuelling will be undertaken in designated areas within main compounds or satellite compounds. It is possible that refuelling of mobile plant may be required by mobile fuel bowser. This will not be undertaken within 20 m of a water feature, and only on flat land and with a drip tray/ plant nappy. 	To avoid spillages and reduce impacts on the water environment in relation to refuelling.	No	No
WE4	Throughout Proposed Development	Detailed Design and During Construction	<p>If discharging groundwater to a nearby watercourse, the rate of discharge will need to be agreed with the relevant authority to ensure that there is no unacceptable increase in flood risk or risk of scour. Any discharge will need to be undertaken with the agreement of the relevant statutory regulator and will need to comply with the pollution prevention requirements set out in the CEMD.</p> <p>A Construction Groundwater Control Strategy will need to be prepared by the Principal Contractor at the detailed design stage. Furthermore, best practice mitigation measures will be followed to avoid and/or minimise impact on groundwater and will be included in the CEMD.</p>	To minimise the impact of any groundwater control activities during construction on the water receptors.	Relevant Authority	No.
WE5	Affected works	Prior to and during construction	<p>The water quality monitoring programme will be developed by the Principal Contractor in consultation with SEPA and other relevant stakeholders during the process of obtaining CAR licences for works affecting, or for temporary discharges to, the water features and watercourses in and around the Proposed Development.</p> <p>Water quality monitoring will be required of all potentially affected water features and may include daily visual and olfactory observations or after heavy or prolonged rainfall, in situ monitoring using a calibrated hand-held probe, and potentially samples on a regular or ad hoc basis for analysis at an accredited laboratory.</p>	To ensure that should pollution occur it is identified as quickly as possible and appropriate action is taken in line with the Emergency Response Plan.	No	Minimum six to twelve monthly visits.

Mitigation Item	Location	Timing of Measure	Mitigation Measure	Mitigation Purpose / Objective	Specific Consultation or Approval Required	Potential Monitoring Requirements
WE6	Throughout Proposed Development	Prior to construction	Avoid any areas of risk identified through the UXO desk study ⁶⁷ . If unable to avoid, then risk mitigation measures should be implemented for groundworks within these areas. The Principal Contractor should check with Zetica for a targeted assessment of the Proposed Development specifically prior to any works commencing.	To minimise UXO risk.	Zetica	No.

⁶⁷ Zetica UXO (2023) ASTI Scheme UXO Desk Study & Constraints Assessment.

13.8 Residual Effects

- 13.8.1 All identified impacts are described after mitigation as **negligible adverse** or **minor adverse (not significant)**.
- 13.8.2 It is expected that there will be minimal impacts from the operation of the Proposed Development. This is due to the nature of the Proposed Development, where operational residue and emissions are very limited and additional works are only expected if there is unexpected damage to the Proposed Development. The Proposed Development also has no fixed operational life, and in the case of decommissioning the worst-case effects are expected to be representative of the construction phase.
- 13.8.3 Table 13-30 presents a summary of the residual effects of the construction and operation of the Proposed Development on the water quality and hydromorphology of surface and groundwater bodies.
- 13.8.4 No significant environmental effects on the water environment have been predicted with the application of the mitigation measures described in this chapter of the EIA Report.

Table 13-30 Summary of Effects

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Auchtermuchty WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
Glenfarg WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
Bridge of Earn WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
Starthearn Sand and Gravel	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
Perth WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
The Carse Coastal WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Dundee WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
Sidlaw Hills WFD Groundwater body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
	Foundation Improvements – change in groundwater flow direction and local flow patterns	Minor	Implementation of CEMD, standard mitigation and embedded mitigation	Minor	Not Significant
Private Water Supplies	Foundation Improvements – groundwater contamination	Moderate	Implementation of CEMD, standard mitigation and embedded mitigation. Testing and monitoring of water quality before during and after construction.	Minor	Not Significant
	Water Quality- Pollution	Moderate	Implementation of CEMD, standard mitigation and embedded mitigation. Testing and monitoring of water quality before during and after construction.	Minor	Not Significant
	Water Quality- Sediment Run-off	Moderate	Implementation of CEMD, standard mitigation and embedded mitigation. Testing and monitoring of water quality before during and after construction.	Minor	Not Significant
Trig to Tryne (TW1)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMD, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMD, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW2)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMD, standard mitigation and embedded mitigation.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Water Quality – Spillage Risk	Negligible	Implementation of CEMD, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW3)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMD, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMD, standard mitigation and embedded mitigation.	Minor	Not Significant
Unnamed watercourse (TW4)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW5)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW6)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Netly Burn (TW7)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
River Earn (TW8)	Water Quality – Sediment Laden Runoff	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Hydromorphology – foundation Improvements	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
River Tay (TW9)	Water Quality – Sediment Laden Runoff	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Hydromorphology – foundation Improvements	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
Unnamed watercourses (TW10)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourses (TW11)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourses (TW12)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Broadlie Burn (TW13)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Hydromorphology – foundation Improvements	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW14)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Pow of Errol (TW15)	Water Quality – Sediment Laden Runoff	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Hydromorphology – foundation Improvements	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW16)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Grange Pow (TW17)	Water Quality – Sediment Laden Runoff	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Hydromorphology – foundation Improvements	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW18)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW19, TW20, TW21)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Inchmatrine Pow (TW22)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Erskine Pow (TW23)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW24, TW25, TW26, TW27)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW28)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Huntly Burn (TW29)	Water Quality – Sediment Laden Runoff	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
Unnamed watercourse (TW30, TW31, TW32)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Dron Burn (TW33)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
Unnamed watercourse (TW34)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Blacklaw Burn (TW35)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Balruddery Burn (TW36)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
Piperdam Burn (TW38)	Water Quality – Sediment Laden Runoff	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Moderate	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Hydromorphology – foundation Improvements	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
Lundie Burn (TW39, TW40)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Hydromorphology – foundation Improvements	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourses (TW37)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Dronley Burn (TW41)	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Sediment Laden Runoff	Minor		Minor	Not Significant
Unnamed watercourse (TW42)	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Sediment Laden Runoff	Minor		Minor	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Fallaws Burn (TW43)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Unnamed watercourse (TW44)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Fithie Burn (TW45)	Water Quality – Sediment Laden Runoff	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
	Water Quality – Spillage Risk	Minor	Implementation of CEMP, standard mitigation and embedded mitigation.	Minor	Not Significant
Unnamed watercourse (TW46)	Water Quality – Sediment Laden Runoff	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Water Quality – Spillage Risk	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant
Pitlowie GCR and SSSI	Potential adverse impact and/or damage to sensitive geological receptors (i.e., the GCR / SSSI sites located within the study area)	Very High	Implementation of CEMP, standard mitigation and embedded mitigation.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
			Control of working areas and marking out of the designated sites will be employed to avoid disturbance to these areas from construction plant and activities.		
	An adverse effect on geological setting from pollution, fuel, oil, concrete or other hazardous substances (from construction plant and equipment).	Very High	Implementation of CEMP, standard mitigation and embedded mitigation. Control of working areas and marking out of the designated sites will be employed to avoid disturbance to these areas from construction plant and activities.	Negligible	Not Significant
Inchcoonans Clay Pit GCR and SSSI	Potential adverse impact and/or damage to sensitive geological receptors (i.e., the GCR / SSSI sites located within the study area)	Very High	Implementation of CEMP, standard mitigation and embedded mitigation. Control of working areas and marking out of the designated sites will be employed to avoid disturbance to these areas from construction plant and activities.	Negligible	Not Significant
	An adverse effect on geological setting from pollution, fuel, oil, concrete or other hazardous substances (from construction plant and equipment).	Very High	Implementation of CEMP, standard mitigation and embedded mitigation. Control of working areas and marking out of the designated sites will be employed to avoid disturbance to these areas from construction plant and activities.	Negligible	Not Significant