Scottish & Southern Electricity Networks

TRANSMISSION

Environmental Impact Assessment (EIA) Report

LT383 Alyth to Tealing Overhead Line (OHL) 400kV Upgrade

November 2024

VOLUME 2: CHAPTER 12 – HYDROLOGY, HYDROGEOLOGY AND SOILS

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12. HYDROLOGY, HYDROGEOLOGY AND SOILS

12.1 Introduction

12.1.1 This chapter of the EIA Report identifies and assesses the potential impacts and effects of the Proposed Development on the hydrology, hydrogeology, and soils (primarily peat) during construction and operation. As noted in Chapter 3 (Volume 2), while this EIA Report will focus on the construction and operational effects of the Proposed Development, commentary will also be provided on potential impacts and effects from decommissioning on hydrology, hydrogeology and soils predicted.

12.1.2 As indicated in the Scoping Report, geology has been scoped out of the EIA Report, due to the absence of viable geology receptors and due to the shallow nature of the proposed ground disturbance works. Furthermore, it is unlikely that contaminated land will be a significant constraint to the Proposed Development, or the nature of the proposed works would result in significant environmental effects to contamination. As a result, this topic has also 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.

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

12.1.4 There is interaction between environmental topics and therefore this chapter should be read in conjunction with Chapter 7 (Volume 2).

12.1.5 Potential impacts and effects on the water environment and soils receptors have been described for the construction, operation and decommissioning phases of the Proposed Development. Further, the approach to mitigating potential impacts during all phases have been described with reference to good practice guidance and design, which is described later.

12.1.6 This chapter is also supported by the following figures (which are provided in Volume 3) and technical appendices (which are provided in Volume 4):

- Figure 12.1 Surface Water Receptors;
- Figure 12.2 Groundwater Receptors;
- Figure 12.3 Peat;
- Appendix 12.1 PWS Assessment; and
- Appendix 12.2 Site Walkover Photos.

12.2 Legislation and Policy

12.2.1 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

12.2.2 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')[12];
- Water Environment Water Services ('the WEWS Act') (Scotland) Act 2003[3];
- Environmental Liability (Scotland) Regulations 2009[4];
- Pollution Prevention and Control (Scotland) Regulations 2012 (PPC)[5];
- The Climate Change (Scotland) Act 2009[6];
- Contaminated Land (Scotland) Regulations (2005)[7];
- The Environmental Protection (Duty of Care) (Scotland) Regulations (2014)[8]
- The Construction (Design and Management) Regulations (2015)[9]
- Nature Conservation (Scotland) Act (2004)[10]
- Town & Country Planning (Scotland) Act (1997) as amended[11]
- Environmental Protection Act (1990) (as amended) and Part 2A The Contaminated Land Regime (2006)[12]
- Scotland's Zero Waste Plan (2010)[13]
- Scottish Energy Strategy (2017)[14]
- Electricity Act (1989)[15]

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

[2] While EU directives ceased to have leal 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.

[3] 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]

[4] Scottish Parliament (2009). Environmental Liability (Scotland) Regulations 2009. (online) Available at: https://www.legislation.gov.uk/ssi/2009/266/contents/made [Accessed: July 2024]

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

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

[7] Scottish Parliament (2005). The Contaminated Land (Scotland) Regulations 2005. (online) Available at: https://www.legislation.gov.uk/sdsi/2005/0110697936 [Accessed: July 2024]

[8] Scottish Parliament (2014). The Environmental Protection (Duty of Care) (Scotland) Regulations. (online) Available at: https://www.legislation.gov.uk/ssi/2014/4/contents/made [Accessed: July 2024]

[9] Scottish Parliament (2015). The Construction (Design and Management) Regulation 2015. (online) Available at: https://www.legislation.gov.uk/uksi/2015/51/contents/made [Accessed: July 2024]

[10] Scottish Parliament (2004). Nature Conservation (Scotland) Act 2004. (online) Available at: https://www.legislation.gov.uk/asp/2004/6/contents [Accessed: July 2024]

[11] Scottish Parliament (1997). Town and County Planning (Scotland) Act 1997. (online) Available at: https://www.legislation.gov.uk/ukpga/1997/8/contents[Accessed: July 2024]

[12] Scottish Parliament (1990). Environmental Protection Act (1990) (as amended) and Part 2A The Contaminated Land Regime (online) Available at: https://www.gov.scot/publications/environmental-protection-act-1990-part-iia-contaminated-land-statutory-guidance/pages/17/ [Accessed: July 2024]

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

[14] The Scottish Government (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]

[15] Gov.uk (1989) Electricity Act 1989 (online) Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents [Accessed: July 2024]

Planning Policy

12.2.3 Applications for energy developments in Scotland with an electrical generation capacity in excess of 50MW are 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)[16]. There are legal, policy and advice documents which are material considerations to the decision-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)

12.2.4 The National Planning Framework 4 (NPF4), published in February 2023[17], replaces the previous National Planning Framework 3 (NPF3)[18]. NPF4 sets out the Scottish Government's 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.

12.2.5 Policy 5 within NPF4 highlights the development proposals that need to be satisfied in relation to the effects on soils for the Proposed Development to be supported.

12.2.6 Policy 11 within NPF4 states that project design and mitigation should address any effects on hydrology, the water environment and flood risk.

Planning Advice Notes and Specific Advice Sheets

12.2.7 Planning Advice Notes (PANs) and Specific Advice Sheets set out detailed advice from the Scottish Government in relation to a number of planning issues. PANs and Specific Advice Sheets relevant to the Proposed Development are outlined in Table 12-1 Planning Advice Notes and Specific Advice Sheets.

Table 12-1 Planning Advice Notes and Specific Advice Sheets

Planning Advice Notes and Specific Advice Sheets	Key Requirements relating to the Water Environment and Soils	The Proposed Development
Planning and waste management Advice[19] PAN 79: Water and drainage[20]	States that there should be environmental protection considerations to mitigate any potential effects on the water environment and Soils.	Mitigation measures are aligned to the Advice and are outlined in Section 12.8 of this chapter

River Basin Management Plan

12.2.8 The River Basin Management Plan (RBMP) for Scotland 2021-2027[21] sets out a range of actions to address impacts to the water environment. The RBMP outline actions for public bodies and land managers, and are

[16] The Scottish Government. (1997). Town and Country Planning (Scotland) Act 1997. (online) Available at: https://www.legislation.gov.uk/ukpga/1997/8/section/57 [Accessed: July 2024]
[17] The Scottish Government. (2023) National Planning Framework 4. (online) Available at: https://www.gov.scot/publications/national-planning-framework-4/ [Accessed: July 2024]
[18] The Scottish Government. (2014). National Planning Framework 3. (online) Available at: https://www.gov.scot/publications/national-planning-framework-3/ [Accessed: July 2024]
[19] 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]
[20] 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]
[21] SEPA (2021). 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]

produced by the Scottish Environment Protection Agency (SEPA) on behalf of the Scottish Government. 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.

Local Planning Policy – Angus Council

12.2.9 The Angus Local Development Plan[22] (LDP) was formally adopted in September 2016 and provides the local planning policy for Angus up to 2026. In December 2022, an Action Programme was published to provide an overview of the policy development work and activity since 2020 but is not an update to the Angus LDP itself. The policies applicable to the Proposed Development are outlined in Table 12-2 List of water environment and soils related policies outlined in Angus LPD.

Table 12-2 List of water environment and soils related policies outlined in Angus LPD

Policy Number	Description
Policy PV14: Water Quality	"*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.*"
Policy PV17: Waste Management Facilities	"*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*"
Policy PV20: Soils and Geodiversity	"*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.*"

[22] Angus Council 2016. Local Development Plan. Available Online: https://www.angus.gov.uk/media/angus_local_development_plan_adopted_september_2016

Local Planning Policy – Perth and Kinross Council

12.2.10 The Perth and Kinross LDP[23] was formally adopted on 29th November 2019 and provides the local planning policy for Perth and Kinross. The policies applicable to the Proposed Development are outlined in Table 12-3.

Table 12-3 List of water environment and soils related policies outlined in Perth and Kinross LPD

Policy Number	Description
Policy 35: Electricity Transmission Infrastructure	"*Proposals for electricity transmission infrastructure (including lines, towers/pylons/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*."
Policy 38B: National Designations	"*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.*"
Policy 51: Soils	"*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.* *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.*"
Policy 53A: Water Environment	"*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.*"
Policy 53D: Reinstatement of Natural Watercourses	"*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.*"

[23] Perth and Kinross Council 2019. Local Development Plan. Available Online: https://www.pkc.gov.uk/article/15042/Adopted-Development-Plan

12.3 Consultation Undertaken to Date

12.3.1 Table 12-4 lists the consultation that has taken place in preparing this assessment.

Table 12-4 Summary of Consultation through Scoping Opinion

Consultee	Key Issue	Action Taken
Scottish Water	All Scottish Water assets potentially affected by the activity should be identified, with particular consideration being given to access roads and pipe 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) at Hauc.diversions@scottishwater.co.uk. 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. Scottish Water have produced a list of precautions for a range of activities. The list of precautions for assets details protection measures to be taken if there are assets in the area. Please note that site specific risks and mitigation measures will require to be assessed and implemented.	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.
NatureScot	"The Alyth to Tealing project crosses the SAC at 2 locations, the Dean Water and River Isla near Meigle. There are no towers within the SAC, but they are adjacent in a few places. To protect the SAC interests good working practices are essential. CEMPs, GEMPs, pollution plans etc. will all need to include details of working in proximity and above the River Tay SAC. We recommend that site specific plans for each crossing, detailing all aspects of construction and the mitigation needed to avoid adverse effects are produced and submitted in support of the application."	Distance and risk to the River Tay SAC and associated watercourses identified in Table 12-21 and Table 12-22. Crossings are listed in Table 12-24. A site-specific pollution prevention plan will be developed by the project environmental advisor. All construction mitigation measures will be outlined in the CEMP.
Scottish Environment Protection Agency (SEPA)	'Provided watercourse crossings are designed to accommodate the 1 in 200-year event plus climate change and other infrastructure is located well away from watercourses we do not foresee from current information a need for detailed information on flood risk.'	Crossings are listed in Table 12-24 and the EIA addresses the type of culvert required. This requirement is also listed in Table 12-27 Schedule of Mitigation .

12.4 Assessment Methodology and Significance Criteria

Extent of the Study Area

12.4.1 The Proposed Development site stretches across approximately 14 km from Alyth Substation (NO 28839 47040) to tower 685 (NO 38802 38985). The Proposed Development site is within the Perth and Kinross Council and Angus Council areas.

12.4.2 For the purposes of this EIA Report, a 1 km study area around the Proposed Development has been used for the assessment of hydrology, hydrogeology and soils. However, the Limit of Deviation (LOD) (200 m) will be the principal focus for both the water environment walkovers and assessment (See Figure 12.1). The baseline also considers downstream attributes beyond the 200 m LOD 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.

12.4.3 The study area and LOD are determined by the location of the Proposed Development, construction works and access routes.

Method of Baseline Data Collation

12.4.4 A summary of baseline conditions for the Proposed Development and study area is presented in Section 12.5. This involved using a range of sources to identify and characterise the area.

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

- Online Ordnance Survey digital maps[24];
- Met Office website[25];
- SEPA website[26];
- SNH Standing Waters Database[27];
- Scotland's Aquaculture website[28];
- Scotland's Environment website[29];
- Scotland's soils website[30];
- National River Flow Archives website[31];
- British Geological Society (BGS) website[32];
- NatureScot[33];

[24] Ordnance Survey. (2024) (Online). Available at: https://www.ordnancesurvey.co.uk/ [Accessed: July 2024]
[25] Meteorological Office website. (2024) (Online). Available at: https://www.metoffice.gov.uk/public/weather/climate/gfhyzzs9j [Accessed: July 2024]
[26] SEPA website. (2024) (online). Available at: https://www.sepa.org.uk/ [Accessed: July 2024]
[27] Scottish Natural Heritage (2024) Standing Waters Database. (online). Available at: http://gateway.snh.gov.uk/pls/apex_cagdb2/f?p=111:1000 [Accessed: July 2024]
[28] Scottish Government (2024) Scotland's Aquaculture website. (online). Available at: http://aquaculture.scotland.gov.uk/ [Accessed: July 2024]
[29] Scottish Government (2024) Scotland's Environment website. (online). Available at: https://www.environment.gov.scot/maps/scotlands-environment-map/ [Accessed: July 2024]
[30] Scottish Government (2024) Scotland's soils website. (online). Available at: http://map.environment.gov.scot/Soil_maps/?layer=1 [Accessed: July 2024]
[31] UK Centre for Ecology and Hydrology (2024) National River Flow Archive website. (online). Available at: https://nrfa.ceh.ac.uk/data/station/info/6001 [Accessed: July 2024]
[32] British Geological Survey (BGS) (2024) Online Mapping. (online). Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html [Accessed: July 2024]
[33] NatureScot (2024) (online). Available at: https://www.nature.scot/ [Accessed: July 2024]

- Scotlands aquifers and groundwater bodies[34];
- UK centre for Ecology and Hydrology[35];
- Scotland's Environment map[36];
- 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.
- Private Water Supply (PWS) data from Angus Council (received 23rd February 2024); and
- PWS data from Perth and Kinross Council (received 18th January 2024).

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

Source-Pathway-Receptor Approach

12.4.7 The qualitative assessment of potential likely significant effects during the construction, operational and decommissioning 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).

12.4.8 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.

12.4.9 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.

[34] British Geological Survey (2024) Scotland's Aquifers and Groundwater Bodies. (online) Available at: https://www2.bgs.ac.uk/groundwater/waterResources/ScotlandsAquifers.html [Accessed: July 2024]
[35] National River Flow Archive (2024) Rainfall Statistics (online) Available at: https://nrfa.ceh.ac.uk/rainfall-statistics [Accessed: July 2024]
[36] Scottish Government (2024) Scotland's Environment Map (online) Available at: https://www.environment.gov.scot/maps/scotlands-environment-map/ [Accessed: July 2024]

12.4.10 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 LOD 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

12.4.11 The assessment of effect significance outlined within the below sections is consistent with the terminology and criteria outlined within Chapter 5 (Volume 2) of this EIA Report.

12.4.12 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 12-5 which has been modified from Design Manual for Roads and Bridges (DMRB) LA 113 Road drainage and the water environment[37] to include hydromorphology.

12.4.13 The sensitivity of receptors, or importance, of the potentially affected soils features has been established on the basis of a five-point scale, using the criteria presented in Table 12-5 which has been modified from DMRB LA 109 Geology and soils[38].

12.4.14 The magnitude of adverse or beneficial impacts has been determined by the seven-point scale presented in Table 12-6 taking both DMRB LA 113 Road drainage and the water environment and DMRB LA 109 Geology and soils into account.

12.4.15 The significance of effects has been determined using the matrix presented in Table 12-7. The assessment has considered the magnitude of impacts and the sensitivity of the resources/ receptors that could be affected in order to classify the effect. After using the matrix to determine the effect, professional judgement will be used to determine the residual significance.

[37] Highways England (2020) Design Manual for Roads and Bridges LA 113 Road Drainage and the Water Environment.
[38] Highways England (2020) Design Manual for Roads and Bridges LA 109 Geology and Soils.

Table 12-5 Receptor Importance Descriptions

Sensitivity	Groundwater	Surface Water	Hydromorphology	Soils
Very High	Principal aquifer providing a regionally important resource and/ or supporting a site protected under International and UK legislation Ecology and Nature Conservation Groundwater locally supports Groundwater Dependent Terrestrial Ecosystems (GWDTE).	Watercourse having a WFD classification shown in a RBMP and Q95 (flow exceeded 95% of the time) ≥1.0 m^3/s The Proposed Development site protected/ designated under International or UK habitat legislation (SAC, SPA, SSSI, Water Protection Zone (WPZ), Ramsar site. International Designated Salmonid/Cyprinid fishery. Species protected by international legislation.	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.	Receptor contains Class 1 or 2 priority peatland and soils directly support a designated site (e.g. SAC, SPA, RAMSAR, SSSI etc.)
High	Principal aquifer providing locally important resource or supporting river ecosystem and/ or supporting sensitive habitats of national importance. Groundwater supports a GWDTE.	Watercourse having a WFD classification shown in a RBMP and Q95 m^3/s <1.0 m^3/s. Major Cyprinid Fishery. Species protected under International or UK legislation Ecology and Nature Conservation	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.	Receptor contains Class 1 or 2 priority peatland.
Medium	Aquifer providing water for agricultural or industrial use with limited connection to surface water. Secondary Aquifer. Groundwater of limited value because its quality does not allow potable or other quality sensitive uses.	WFD not having a WFD classification shown in a RBMP and Q95 >0.001 m^3/s.	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.	Receptor contains Class 3 or 5 peatland areas, or other areas identified as being carbon rich or peaty soils from sources outwith the 2016 Carbon and Peatland Map. Or soils supporting non-statutory designated sites (e.g. Local Nature Reserves (LNR))

Sensitivity	Groundwater	Surface Water	Hydromorphology	Soils
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.	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	No Change

Table 12-6 Magnitude of Effect

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

12.4.16 The significance of effects has been determined using the matrix presented in Table 12-7. Effects classed as moderate or greater are considered 'Significant'.

Table 12-7 Matrix for assessment of significance

		Sensitivity				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude	**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

12.4.17 The EIA 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. 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.

12.4.18 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 and 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.

12.4.19 The PWS data was supplied by Perth and Kinross Council and Angus Council. The data collected from the council 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.

12.4.20 Any borehole data from BGS sources are included on the basis that: "*The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation*".

12.4.21 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 light of these circumstances.

12.4.22 Baseline conditions for soils 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 the James Hutton Institute and NatureScot.

12.4.23 For the purposes of the assessment, it is assumed that the decommissioning phase includes total removal of all infrastructure associated with the Proposed Development.

12.5 Baseline Conditions

Study Area Topography, Land Use and Climate

12.5.1 The study area is characterised by hilly upland with elevations up to approximately 301 m Above Ordnance Datum (mAOD). To the centre of the Proposed Development, nearby the Auchterhouse Hill SSSI, elevations reach to around 425 mAOD, while in the valley around the River Isla elevation is approximately 36 mAOD. The land use is predominantly arable land with pastures and shrub and/or herbaceous vegetation associations. This is interspersed with areas of forest, open water and urban fabric with roads, utilities and power lines, and properties[39].

12.5.2 The Proposed Development is situated between Alyth, a town in the county of Perthshire, and Tealing, a village located approximately 9.5 km north of Dundee in the county of Angus. The OHL route passes through a rural landscape consisting of a broad valley, a band of low undulating hills forming a scarp and associated dipslope. The OHL route does not cross any urban area.

12.5.3 The National River Flow Archive (NRFA) website[40] shows that the majority of the Proposed Development falls within two catchment areas which record rainfall. These include Dighty Water at Balmossie Mill catchment (NO476325) at the southeast of the site, and the Dean Water at Dean Bridge catchment (N0293458) which is at

[39] HeiGIT (2024) OSM Landuse Cover (online) Available at: https://osmlanduse.org/#12/-2.92584/56.53376/0/ [Accessed: July 2024]
[40] UK Centre for Ecology and Hydrology (2024) National River Flow Archive. (online) https://nrfa.ceh.ac.uk/ [Accessed: July 2024]

the northwest of the site. At the northern most 820 m of the site there is no catchment data. Standard Annual Average Rainfall (SAAR) for the period 1961-1990 is 823 mm per year at Dean Bridge, and 797 mm per year at Balmossie Mill.

12.5.4 The days of rainfall above 1 mm is also recorded by the Met Office[41]. Leuchars Station located approximately 17 km southeast from the Proposed Development is the closest station. Chart 6-1 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.

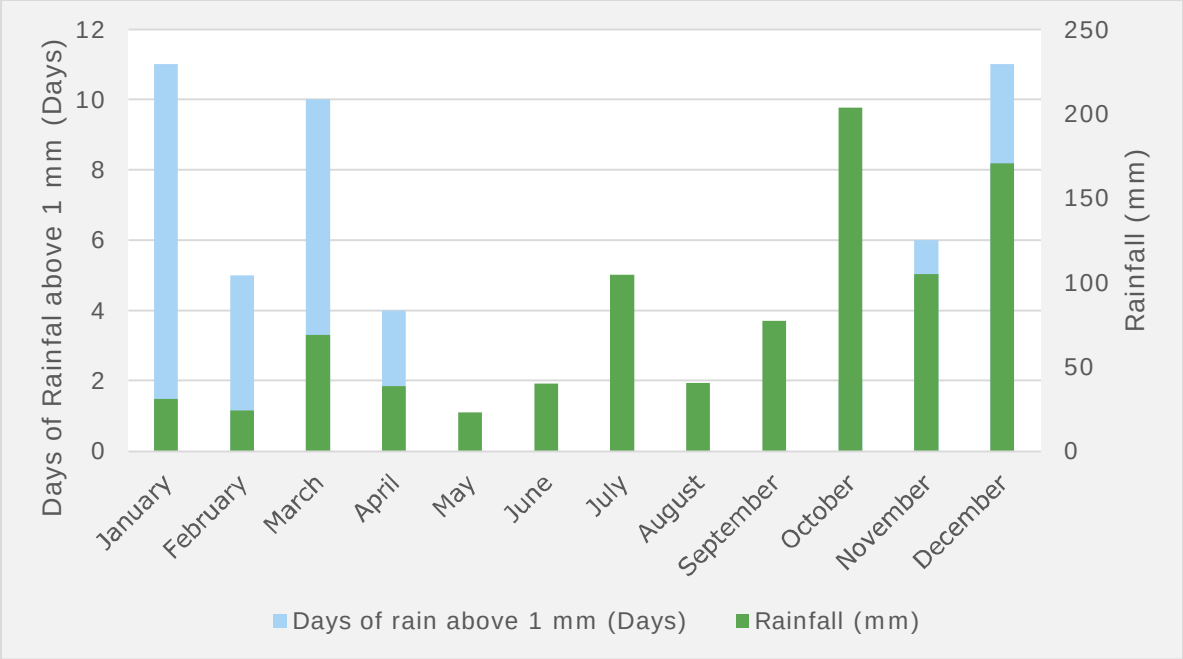

Chart 6-1 Rainfall (mm) and days of rainfall above 1 mm at Leuchars Station throughout 2023

Soils and Peat

12.5.5 The National Soil Map of Scotland[42] indicates that the Proposed Development, limit of deviation and study area are predominately underlain by soils comprising brown earth and humus-iron podzols. Locally, within the southern extent of the Proposed Development, limit of deviation and study area, noncalcareous gleys are recorded. Alluvial soils are also locally recorded within the northern extent of the Proposed Development, limit of deviation and study area. The soils identified by the National Soil Map of Scotland variously underlying the Proposed Development, limit of deviation and study area are generally not recorded as being peat or carbon rich, with the exception of the alluvial soils which are recorded as mineral alluvial soils with peaty alluvial soils. It is therefore possible that peat or carbon rich soils may be present where the alluvial soils are recorded.

12.5.6 The 2016 Carbon and Peatland map[43] provides an indication of the peatland classification across the study area. A description of the different carbon and peatland classifications is provided in Table 12-8.

[41] Met Office (2024) Historic Station Data (online). Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/historic-station-data [Accessed: July 2024]
[42] Scotland's Environment (2024) National Soil Map of Scotland. (online) Available at: https://map.environment.gov.scot/Soil_maps/?layer=1 [Accessed: July 2024]
[43] Scotland's Environment (2016) Carbon and Peatland Map. (online) Available at: https://map.environment.gov.scot/Soil_maps/?layer=1 [Accessed: July 2024]

Table 12-8 Classification of Carbon and Peatland Habitats (reproduction of Map Legend available on Scotland Environment Website[44]

Class of Carbon Peatland	Class Description	Indicative Soil	Indicative Vegetation
1	Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value.	Peat Soil	Peatland
2	Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential.	Peat soil with occasional peaty soil	Peatland or areas with high potential to be restored to peatland
3	Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.	Predominantly peaty soil with some peat soil	Peatland with some heath
4	Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils.	Predominantly mineral soil with some peat soil	Heath with some peatland
5	Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.	Peat soil	No peatland vegetation
0	Peatland habitats are not typically found on such soils.	Mineral soils	No peatland vegetation
-1	Information to be updated when new data are released.	Not classified (unknown soil type)	Not applicable
-2	Non-soil (e.g. loch, built up area, rock and scree).	No soil	Not applicable

12.5.7 The Carbon and Peatland Map indicates the Proposed Development, limit of deviation and study area are all predominantly underlain by Class 0 mineral soils where peatland habitats are not generally found. No Class 1 or Class 2 peatland habitats are recorded within the Proposed Development or limit of deviation; however, a small area of Class 1 peatland habitat is recorded within the study area approximately 550 m north of the Proposed Development at Tower 671 within Auchterhouse Hill SSSI. Outwith the Class 1 and Class 2 peatland habitats, a small area of Class 5 peatland is recorded underlying the Proposed Development between Towers 670 and 671, as well as being present within the study area surrounding the area of Class 1 peatland identified. Figure 12.3 shows the classification of soils present in relation to the Proposed Development and study area.

Hydrogeology

12.5.8 According to the Hydrogeology 625k digital map[45] found on BGS Geoindex (herein 'Hydrogeological Map'), the OHL alignment passes through two aquifer units: the Arburthnott Garvock Group and the unnamed Silurian to Devonian volcanic intrusion.

[44] Scotland's Environment (2016) Classification of Peatland. (online) Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ [Accessed: July 2024]

[45] British Geological Society (2020) Hydrogeology 625K digital hydrogeological map of the UK (online) Available at: https://www.bgs.ac.uk/datasets/hydrogeology-625k/ [Accessed: July 2024}

12.5.9 The Arbuthnott Garvock Group underlying the Proposed Development has been classed as a moderately productive 2b aquifer with groundwater flow through fractures and other discontinuities according to Hydro-geological Map. It consists of sandstones which in some places may be flaggy with siltstones, mudstones and conglomerates and interbedded lavas. Thickness can vary from 2400 to 3150 m and locally yields of moderate amounts of groundwater.

12.5.10 The Arbuthnott Garvock Group is part of the Lower Old Red Sandstone Aquifer. Table 12-9 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 oxic[46], moderately mineralised and dominated by Ca(Mg) HCO_3[47].

Table 12-9 Aquifer properties of the Lower Old Red Sandstone

Porosity (%)	Hydraulic Conductivity (m/d)	Transmissivity (m^2/d)	Specific Capacity (m^3/d/m)	Storativity	Operational Yield (m^3/d)
~10	0.01-2	50-150	40-100	~0.0001	200-400

12.5.11 Unnamed Silurian to Devonian volcanic intrusions have been recorded on the Hydrogeological Map as type 2c low productivity aquifers with flow through fractures and other discontinuities. These intrusions consist of mafic lava and mafic tuff. Near surface weathered zones and secondary faults there may be small amounts of groundwater present. Although extrusive rock is generally impermeable, it is recorded that rare springs can yield up to 2 L/s.

12.5.12 From the SEPA website the Proposed Development is also located on two WFD groundwater bodies. In the southwest, the Sidlaw Hills WFD Groundwater body (ID: 150698) covers an area of 129.1 km^2 and has been classed by SEPA as having a Good status (overall 2022)[48] (refer to

12.5.13 Table 12-10 below). The overall status from 2017 to the latest assessment in 2022 is Good, with quantitative status being Good from 2017 to present, and chemical Status being Good. Between 2012 and 2016 the overall status, quantitative status and chemical status were classed as poor. The status for 'Water Quality' was also Poor between 2013 and 2016, but until present has been classed as good. There is no further information on influences on the groundwater body.

12.5.14 In the north-west, the Strathmore WFD groundwater body (ID: 150681) covers an area of 573.3 km^2 and has been classed by SEPA as having a Poor status (overall 2022) (refer to

12.5.15 Table 12-10 below). The overall status and quantitative status were classed as Poor between 2012 and present. Both the water quality and chemical status have been classed as Good since 2018. There is no information on influences which may be affecting the Groundwater Body's ability to reach 'Good Status'. Poor status of groundwater will also play a part in influencing the status of watercourses in the local area.

12.5.16 The Isla and Lower Tay Sand and Gravel (ID: 150740) is situated along the River Tay and River Isla and is dominated by intergranular flow (refer to

[46] Contains Oxygen

[47] British Geological Society. (2015) Scotland's Aquifers and Groundwater Bodies (online) Available at: https://nora.nerc.ac.uk/id/eprint/511413/1/OR15028.pdf [Accessed: July 2024]

[48] Scotland Environmental Protection Agency. (2015) Water Classification Hub. (online) Available at: https://www.sepa.org.uk/data-visualisation/water-classification-hub [Accessed: July 2024]

12.5.17 Table 12-10 below). It covers an area of 253.7 km^2 and has been classed as having a Good status (overall 2022). It is likely that this groundwater is supporting GWDTEs including local watercourses, and maybe in hydrological connectivity with still water features.

12.5.18 There may also be pockets of groundwater within the permeable sands and gravels of other overlying superficial deposits present such as within till-diamicton, glaciofluvial deposits, alluvium and river terrace deposits. This could occur particularly where superficial deposits are found at significant thickness. Flow would likely follow the topography of the surface and underlying bedrock.

12.5.19 There is limited groundwater level data available, however from borehole records on BGS GeoIndex, groundwater levels appear to be relatively shallow. Some records indicate water levels around 1.06 – 2.05 m bgl (BGS Reference: NO24SE1, NO34SW3). As the groundwater is shallow there may be at an increased risk from diffuse and point-source pollution.

12.5.20 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.

12.5.21 Table 12-11 below summarises the Drinking Water Protected Areas (Ground). These are all found within the Sub Basin District Tay. The Drinking Water Protected Area (DWPA) (groundwater) dataset represent the individual groundwater bodies in Scotland. These have been identified by SEPA in line with the requirements of the Water Environment (DWPA) (Scotland) Order 2013. The dataset is required to fulfil the requirements of the European Union Water Framework Directive[49].

Table 12-10. WFD Groundwater Bodies

RBMP Parameter	Sidlaw Hills (ID: 150698) (2022)	Strathmore (ID:150681) (2022)	The Isla and Lower Tay Sand and Gravel (ID: 150740) (2022)
Overall status	Good	Poor	Good
Quantitative status	Good	Poor	Good
Saline Intrusion	Good	Good	Good
Surface Water Interaction	Good	Poor	Good
Water balance	Good	Good	Good
Chemical status	Good	Good	Good
Chem – Surface Water Interaction	Good	Good	Good
Specific pollutants	Good	Good	Good
Chromium	Good	Good	Good
Zinc	Good	Good	Good
Manganese	Good	Good	Good
Other Substances	Good	Good	Good
Nitrate	Good	Good	Good

[49] While EU directives ceased to have leal 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.

RBMP Parameter	Sidlaw Hills (ID: 150698) (2022)	Strathmore (ID:150681) (2022)	The Isla and Lower Tay Sand and Gravel (ID: 150740) (2022)
Priority substances	Good	Good	Good
Cadmium	Good	Good	Good
Lead	Good	Good	Good
Drinking Water Protected Area	Good	Good	Good
Priority substances	Good	Good	Good
Atrazine	Good	Good	Good
Simazine	Good	Good	Good
Other Substances	Good	Good	Good
Epoxyconazole	Good	Good	Good
Nitrate	Good	Good	Good
General tests	Good	Good	Good
Priority substances	Good	Good	Good
Atrazine	Good	Good	Good
Simazine	Good	Good	Good
Trichloroethene	Good	Good	Good
Benzene	Good	Good	Good
Specific pollutants	Good	Good	Good
Chromium	Good	Good	Good
Other Substances	Good	Good	Good
Electrical Conductivity	Good	Good	Good
Epoxyconazole	Good	Good	Good
Nitrate	Good	Good	Good
Free Product	Good	Good	Good
Vinyl Chloride	Good	Good	Good
Water quality	Good	Good	Good

Table 12-11 Groundwater Drinking Protected Zones

Protected Area Name	Protected Area ID	Risk Assessment	Water Dependent
Sidlaw Hills	150601	Green	Yes
Strathmore	150681	Green	Yes
Isla and Lower Tay Valleys	150740	Green	Yes

Ground Water Dependent Terrestrial Ecosystems

12.5.22 Ecology surveys have identified a number of terrestrial ecosystems which have the potential to be dependent on groundwater (see Chapter 7 (Volume 2) for further detail and assessment). For this chapter, any habitat that may be dependent on upwelling groundwater, groundwater flow, or a constant or seasonally high groundwater table (including perched) will be considered. This chapter uses the GWDTEs to assess the sensitivity of groundwater bodies, whereas the ecology chapter will assess the impacts of the Proposed Development to the GWDTEs.

12.5.23 The ecology chapter identifies areas as having values of Moderate, High or Moderate to High GWDTE potential. In summary, the following areas have been identified as having potential GWDTEs:

- patches of Lowland Fen Scottish Biodiversity List (SBL) priority habitat – two spring flushes on the northern slopes of the hill north-east of Newtyle. These spring flush habitats are both Lowland Fen SBL priority habitats and Wetlands Tayside local priority habitat (LPH);
- purple Moor Grass and Rush Pasture (PMRP) Marshes- One further marsh was considered to be a GWDTE but does not align with any SBL priority habitats; and
- Wet Woodland.

12.5.24 Both spring flushes are located on the Strathmore groundwater body, and the wet woodland is located on the Isla and Lower Tay Sand and Gravel groundwater body. Both the Sidlaw Hill and Strathmore groundwater bodies have patches of the Purple Moor Grass and Rush Pasture Marshes.

12.5.25 Of the identified GWDTEs the PMRP and spring flushes are considered to be highly GWDTE. The wet woodland is classed as moderately GWDTE.

12.5.26 The majority of these GWDTE are situated around the middle of the Proposed Development.

Surface Water

12.5.27 Surface water features (and their attributes) within the study area are described in this section. Under the WFD, 'water bodies' are the basic management units, defined as all or part of a river system or aquifer. Water bodies form part of larger 'river basin districts' (RBD), for which a River Basin management Plan (RBMP) is used to summarise baseline conditions and set broad improvement objectives[50]. For Scotland, most fall into a single RBD that extends seaward limit of three nautical miles[51].

12.5.28 This baseline is presented by each water body, noting that some features are present within the catchments of designated WFD water bodies rather than being designated as a WFD water body in their own right.

12.5.29 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 (Table 12-14).

[50] 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]

[51] Scottish Government (2016) River Basin Districts: information and maps (online) Available at: https://www.gov.scot/publications/river-basin-districts-information-maps/ [Accessed: July 2024]

12.5.30 There are two catchment areas within the study area (see Table 12-12 below). The majority of the Proposed Development sits within the River Tay catchment area (4991.23 km^2, ID: 277175) while the southern end of the Proposed Development towards Tealing sits within the Dighty Water catchment (129.07 km^2, catchment ID: 44).

12.5.31 Within the River Tay catchment area there are three WFD designated waterbodies which cross the Proposed Development. These includes Commerton Burn, Dean Water (Kerbet Water to R Isla Confluences), and the River Isla (Glencally Burn to Dean Water Confluences). Close to the Proposed Development are the River Isla (Dean Water to R Ericht Confluences), Alyth Burn, Meigle Burn, Eassie Burn and Glamis Burn within the River Tay catchment area, and Fithie Burn within the Dighty Water Catchment area. RBMP Parameter information for each of these watercourses is shown in Table 12-13.

Table 12-12 River and Dighty Water catchments

Catchment	Water Feature
River Tay	Kirkinch Burn (AT16)
	Camno Burn (AT17)
	Meigle Burn (AT18)
	Dean Water (AT19)
	River Isla (AT21)
	Commerton Burn (AT22)
	Eassie Burn (AT23)
	Alyth Burn (AT24)
	Glamis Burn (AT25)
	Denend Burn (AT29)
	Unnamed Watercourses (AT11, AT12, AT13, AT14, AT15, AT20, AT30, AT32)
Dighty Water	Fithie Burn (AT1)
	Unnamed Pond (AT26)
	Den Burn (AT27)
	Unnamed Pond (AT28)
	Auchterhouse Burn (AT31)
	Unnamed Watercourse (AT2, AT3, AT4 AT5, AT6, AT7, AT8, AT9, AT10)

12.5.32 The River Isla is within the River Tay catchment and rises from the Grampian Mountains at approximately NO 18085 78364 and flows through Glen Isla and the Valley of Strathmore before joining the River Tay at NO 16044 37729. During the site walkover on the 28th of May 2024, the river appeared to be heavily vegetated on both banks. Due to heavy rainfall during the month of May, the river was relatively high. The riverbed appeared to be a mix of sands, silt pebbles and cobbles with some larger boulders as well. However, it was difficult to fully confirm as the water was brown and slightly opaque. Overall, there was no evidence of pollution and the water looked to be good quality (refer to Photo 12-1 below). According to the NRFA, the River Isla has a Q95 of around 1.619 $m/^3s$.

12.5.33 Dean Water (AT19), also situated within the River Tay catchment, is sourced at NO 43328 50230 from Loch Forfar and joins the River Isla (AT21) at NO 28098 45616, approximately 17 km downstream from its source and 1.70 km downstream from the Proposed Development. Dean Water is also heavily vegetated on the banks with trees and shrubs. During the site walkover, the water was brown and opaque, so no details on the underlying bed morphology were recorded (see Photo 12-1). According to the NRFA, Dean Water is likely to have a Q95 of around 0.697 $m/^3s$.

Photo 12-1 River Isla at NO 27934 45440 facing east taken on the 28th of May

Photo 12-2 Dean Water at NO 28651 45837 facing west taken on the 28th of May

12.5.34 Fithie Burn (AT1) is sourced at approximately NO 36375 38634 and flows into the Dighty Water at NO 45277 32451. During the site walkover, 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 amounts of pebbles and cobbles. The nearby agricultural field drains, which flowed in the Fithie Burn, appeared to be modified and heavily vegetated.

12.5.35 Commerton Burn (AT22) is sourced from Camno Burn (AT17) at NO 32275 45743 and flows into Dean Water (AT19) at NO 33119 47789. During the site walkover, it was observed that Commerton Burn had clear water with no submerged/floating macrophytes. The riverbed was dominated by silt and sand with reeds and vegetation.

12.5.36 According to SEPA, the main pressures on these water courses are a result of agriculture including arable and mixed farming, forestry, recreation, mining and quarrying, urban run-off and sewage disposal, septic tanks and other methods of refuse disposal[52].

12.5.37 Q95s were only available for Dean Water at Dean Bridge and the River Isla at Wester Cardean. Similar WFD status watercourses in the area (Monikie Burn, Dighty Water, Alyth Burn and Colliston Burn) have recorded Q95s of 0.007 m^3/s – 0.25 m^3/s. To establish the sensitivity of watercourses within the study area, similar Q95s have been presumed.

Photo 12-3 (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

[52] SEPA (2010) River Tay Catchment Summary (online) Available at: https://www.sepa.org.uk/media/76597/doc-14-tay_catchment_profile.pdf [Accessed: July 2024]

Photo 12-4 (left) Commerton Burn at NO 30813 44327 facing southwest (upstream); (right) tributary of Commerton Burn at NO 30813 44327 facing northeast (downstream) taken on the 28th of May

Table 12-13 WFD Classifications[53]

River Basin Management Plan (RBMP) Parameter	Fithie Burn (2022)	Commerton Burn (2022)	Dean Water (Kerbet Water to R Isla Confluences) (2022)	River Isla (Glencally Burn to Dean Water Confluences) (2022)	River Isla (Dean Water to R Ericht Confluences) (2022)	Alyth Burn (2022)	Meigle Burn (2022)	Eassie Burn (2022)	Glamis Burn (2022)	Dronley Burn (2022)
Overall status	Poor Ecological Potential	Moderate Ecological Potential	Moderate Ecological Potential	Good	Good	Good	Moderate Ecological Potential	Good Ecological Potential	Good Ecological Potential	Good Ecological Potential
Pre-HMWB status	Bad	Bad	Poor	Good	Good	Good	Poor	Moderate	Poor	Bad
Overall ecology	Bad	Bad	Poor	Good	Good	Good	Poor	Moderate	Poor	Bad
Physico-Chem	Good	Poor	Moderate	High	High	High	Moderate	Good	Good	High
Temperature	High	High	High	High	High	High	High	High	High	High
Reactive phosphorus	Good	Poor	Moderate	High	High	High	Moderate	Good	Good	High
Dissolved Oxygen	High	High	High	High	High	High	Good	High	High	High
Acidity	High	High	High	High	High	High	High	High	High	High
pH	High	High	High	High	High	High	High	High	High	High
Biological elements	Poor	Good	Moderate	Good	High	Good	Moderate	Good	Good	High
Invertebrate animals	Good	Good	Good	High	High	High	Moderate	High	Good	N/A

[53] SEPA. https://www.sepa.org.uk/data-visualisation/water-classification-hub

River Basin Management Plan (RBMP) Parameter	Fithie Burn (2022)	Commerton Burn (2022)	Dean Water (Kerbet Water to R Isla Confluences) (2022)	River Isla (Glencally Burn to Dean Water Confluences) (2022)	River Isla (Dean Water to R Ericht Confluences) (2022)	Alyth Burn (2022)	Meigle Burn (2022)	Eassie Burn (2022)	Glamis Burn (2022)	Dronley Burn (2022)
Macroinvertebrates (RiCT/ WHPT)	Good	Good	Good	High	High	High	Moderate	High	Good	N/A
Macroinvertebrates (ASPT)	Good	Good	Good	High	High	High	Moderate	High	Good	N/A
Macroinvertebrates (NTAXA)	High	High	High	High	High	High	High	High	High	N/A
Fish	Poor	High	Moderate	Good	High	High	High	High	High	High
Fish ecology	N/A	N/A	Moderate	Good	N/A	N/A	N/A	N/A	N/A	N/A
Fish barrier	Poor	High	High	High	High	High	High	High	High	High
Hydromorphology	Bad	Bad	Poor	Good	Good	Good	Poor	Moderate	Poor	Bad
Morphology	Bad	Bad	Poor	Good	Good	Good	Poor	Moderate	Poor	Bad
Overall hydrology	Good	Moderate	Moderate	Good	Good	High	Moderate	Good	Good	Good
Modelled hydrology	Good	Moderate	Moderate	Good	Good	High	Poor	Good	Good	Good
Hydrology (medium/ high flows)	High	High	High	Good	Good	High	High	High	High	High
Hydrology (low flows)	Good	Moderate	Moderate	Good	Good	High	Poor	Good	Good	Good
Water quality	Good	Poor	Moderate	High	High	Good	Moderate	Good	Good	High

12.5.38 Table 12-14 lists all the water features identified in the baseline alongside their national grid reference (NGR), a description summary, proximity to the Proposed Development, and whether they have been scoped in or out for further assessment. All water features listed below will be assessed, including scoped out features, during pre-construction surveys to identify any other flow pathways not identified below. All features will be mitigated against all temporary construction impacts through the implementation of CEMP and the Water Management Plan (WMP).

Table 12-14 Surface Water Features within the study area

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
Fithie Burn	AT1	NO 39657 37073	A WFD classified watercourse sourced at approximately NO 36375 38634 and flows into the Dighty Water at NO 45277 32451.	Approximately 350 m from Tower 678 at source.	Scoped Out No identifiable pathway.
Unnamed Watercourse	AT2	NO 39442 38690	Stream sourced at approximately NO 36165 39099 and flows into Tealing Burn at NO 40888 38575.	Within 200 m of Proposed Development for approximately 2.84 km. Crosses vegetation clearance, proposed access track, trackway, upgrade to track stone and upgrades to culverts at NO 38005 38848 and NO 38185 38845. Potential new culvert at NO 38694 38892. 46 m downgradient from Tower 678 and 35 m downgradient from Tower 679.	**Scoped In** Proximity to works. Culverts and upgrades to trackways crossing watercourse.
Unnamed Watercourse	AT3	NO 37093 38917	Small stream sourced at approximately NO 36742 39308 and flows into AT2 at NO 37102 38850.	Crosses upgrade to track stone at NO 37093 38917. 58 m west of vegetation clearance.	**Scoped In** Proximity to works.
Unnamed Watercourse	AT4	NO 36579 39051	Small stream sourced at NO 36735 39219.	64 m upgradient of operational corridor.	Scoped Out No identifiable Pathway.
Unnamed Watercourse	AT5	NO 36164 38999	Small stream sourced from NO 36138 39088.	18 m upgradient of vegetation clearance.	Scoped Out No identifiable Pathway.
Unnamed Watercourse	AT6	NO 34945 39574	Sourced at NO 34939 39692,	Within and 45 m downgradient of	**Scoped In**

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
			tributaries of Hodge Burn which is joined at NO 34671 38913 approximately 728 m downstream. This then joins Den Burn (AT27) at NO 33934 39072.	vegetation clearance, upgrade to track stone and perm crosses the watercourse at NO 34945 39574. New culvert at NO 34946 39572, NO 34981 39508, NO 35104 39464, NO 35231 39033, NO 35250 39090, NO 35257 39153, NO 34881 38946[54].	Proximity to works. Perm and upgrades to trackways crossing watercourse.
Unnamed Watercourse	AT7	NO 34679 39689	Source within operational boundary at NO 34670 39726. Tributaries of Hodge Burn which is joined at NO 34723 38892 approximately 735 m downstream. This then joins Den Burn (AT27) at NO 33934 39072.	Within operational corridor and vegetation clearance. 7 m north-west of Tower 671, 8 m west of trackway.	**Scoped In** Proximity to works.
Unnamed Watercourse	AT8	NO 34542 39735	Source within operational boundary at NO 34542 39735 and from NO 34451 39738. Tributaries of Hodge Burn which joins AT6 at NO 34563 39501 and joins Hodge Burn at NO 34723 38892.	Within operational corridor, 115 m east of vegetation clearance and flows on the eastern side of an existing haul road which is to be upgraded (NO 34431 39731).	**Scoped In** Proximity to works.
Unnamed Watercourse	AT9	NO 33453 40612	Source at approximately NO 34042 41230, tributaries of Den Burn (AT27) which is joined at NO 32235 38919 2.10 km downstream of the Proposed Development.	Within operational corridor and vegetation clearance, 29 m west of new temporary haul road (NO 33474 40585) and 15 m west of Tower 666.	**Scoped In** Proximity to works.

[54] Majority of culverts are on different tributaries but due to similarity are classed as the same receptor.

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
Unnamed Watercourse	AT10	NO 33614 40272	Source within operational corridor at NO 33708 40195, tributary of AT9 which it joins approximately 426 m downstream at NO 33351 40392.	5 m downgradient from vegetation clearance, 15 m downgradient of Tower 667. Within operational corridor, an existing haul road (to be upgraded) crosses at NO 33614 40272.	**Scoped In** Proximity to works.
Unnamed Watercourse	AT11	NO 32923 40849	Source downgradient of works at NO 32927 40849. Tributary of Denend Burn (AT29) which it flows into at NO 32442 40987 after flowing into a pond.	New road and perm cross watercourse at NO 32923 40849, upgrades to track stone also at NO 32908 40848 15 m downstream of perm. Proposed access route 18 m to the east and vegetation clearance 40 m upgradient and west. Potential new culvert at NO 33549 40317, NO 33623 40265.	**Scoped In** Proximity to works. Perm, new haul road and upgrades to track stone cross watercourse.
Unnamed Watercourse	AT12	NO 32772 41097	Source downgradient of works at NO 32772 41097. Tributary of AT11 which it joins at NO 32531 40940.	23 m downgradient of vegetation clearance, 112 m downgradient of upgrades to track stone, 78 m downgradient of proposed access route and 56 m downgradient of Tower 663.	**Scoped In** Proximity to works
Unnamed Watercourses	AT13	NO 33005 41261	Source at NO 33103 41215, tributaries of Denend Burn (AT29) which it joins at NO 32378 41065.	Upgrade to track stone at NO 33005 41261 crosses watercourse. 18 m downgradient of new haul road. 75 m west of Tower 663 and within and 52 m from vegetation clearance. New culverts at NO 32909 40816, NO 32907 40849, NO 33043 40871 and NO 32927 40993[55]. Upgrade to culvert at NO 32921 40975.	**Scoped In** Proximity to works.

[55] Majority of culverts are on different tributaries but due to similarity are classed as the same receptor.

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
Unnamed Watercourses	AT14	NO 32739 41524	Source at NO 33015 41784, tributaries of AT13 which join at NO 32546 41305.	97 m downgradient from vegetation clearance, 122 m downgradient from new haul road (NO 32836 41603) and 119 m downgradient from Tower 662. 96 m downgradient from proposed access route. New culvert at NO 33013 41300.	**Scoped In** Pathway due to watercourse downgradient on steep terrain.
Unnamed Watercourse	AT15	NO 32574 41971	Source at NO 32574 41971 within operational corridor. Tributary of Balkeerie Burn which it joins at NO 32833 43739 approximately 2.04 km downstream.	2.3 m downgradient of new haul road and within vegetation clearance. 23 m downgradient from other vegetation clearance and 69 m downgradient from Tower 659. New culvert at NO 32572 41947. Upgrades to track tarmac are at NO 32726 43566 and NO 32777 43650.	**Scoped In** Proximity to works and upgrades to culverts and road crossings.
Kirkinch Burn	AT16	NO 31063 44097	Sourced from Denend Burn at NO 30671 42584 and flows into Camno Burn (AT17) at NO 30817 44316. Kirkinch Burn is under the Commerton Burn WFD waterbody.	Temporary bridge at NO 31063 44097, proposed access route to cross watercourse. Upgrade to culvert at NO 31064 44095. Within vegetation clearance.	**Scoped In** Proximity to works and temporary bridge to be built. WFD waterbody status.
Camno Burn	AT17	NO 30795 44301	Sourced from Meigle Burn (AT18) and Mill Burn at NO 26787 43097. Becomes Commerton Burn (AT22) at NO 32275 45743 2.43 km downstream. A small section of the burn between Kirkinch Burn (AT16) and Commerton Burn (AT22) as classed	Culvert upgrade at NO 30790 44307, proposed access route crosses watercourse. Within 4 m of vegetation clearance and Tower 650.	**Scoped In** Proximity to works, culvert and part of watercourse has WFD status.

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
			as the Commerton Burn WFD waterbody. A small section of the burn is also classed as the Meigle Burn WFD waterbody between its source and NO 27620 42203.		
Meigle Burn	AT18	NO 29531 45583	Meigle Burn is a WFD waterbody sourced at approximately NO 28206 39218. It joins Dean Water (AT19) at NO 29366 45792.	145 m from vegetation clearance.	Scoped Out Any surface run-off associated with works would flow into Dean Water (AT19) first.
Dean Water	AT19	NO 29747 45473	SAC and WFD classified waterbody sourced at NO 43328 50230 from Loch Forfar and joins the River Isla (AT21) at NO 28098 45616, approximately 17 km downstream from its source and 1.70 km downstream from the Proposed Development.	Within 12 m of Tower 645 and vegetation clearance and 15 m from proposed trackway.	**Scoped In** Proximity to works, WFD status, SAC status.
Unnamed Watercourses	AT20	NO 29618 45766	Two tributaries of Dean Water (AT19), Source at NO 30002 46196, joins at Dean Water at NO 29544 45755 46 m downstream.	Culvert upgrade at NO 29598 45767, vegetation clearance and Tower 644 over watercourse at NO 29618 45766	**Scoped In** Proximity to works, proximity to WFD status and SAC status watercourse.
River Isla	AT21	NO 29219 46513	The River Isla rises in the Grampian Mountains at approximately NO 18085 78364 and flows through Glen Isla and the Valley of Strathmore before joining the River Tay at NO 16044 37729. It is a	110 m from vegetation clearance. Overhead line crosses over.	**Scoped In** WFD and SAC status.

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
			WFD and SAC classified watercourse.		
Commerton Burn	AT22	NO 32275 45743	Sourced from Camno Burn (AT17) at NO 32275 45743 but for which the WFD status can be sourced at NO 30807 40192. Flows into Dean Water (AT19) at NO 33119 47789.	2.04 km from nearest works, however, flows from Camno burn (AT17) which is in very close proximity to works and has a culvert upgrade.	**Scoped In** WFD watercourse, direct pathway from Camno Burn and flows into SAC and WFD classified Dean Water.
Eassie Burn	AT23	NO 34472 48146	WFD status watercourse sourced at NO 35892 39764. Enters Dean Water (AT19) at NO 34472 48146. The WFD status covers several watercourses from the source to Eassie Burn, all of which are over 2 km from the Proposed Development.	Source of Eassie Burn WFD classified watercourse is 736 m upgradient of nearest works. This is the closest the WFD classified watercourses get to the Proposed Development. Eassie Burn itself is 4.40 km northeast of the Proposed Development.	Scoped Out No identifiable Pathway.
Alyth Burn	AT24	NO 27813 49563	Alyth Burn is a WFD status watercourse. Its source is NO 17881 57658, and it is a tributary of the River Isla (AT21) which it joins at NO 27813 49563.	2.62 km west of nearest substation.	Scoped Out No identifiable Pathway.
Glamis Burn	AT25	NO 36583 40252	Glamis Burn is a WFD status watercourse. Its source is at NO 36583 40252, and it enters Dean Water (AT19) at NO 38734 48432. The WFD status covers several watercourses from	The source of Glamis Burn WFD watercourse is 1.28 km upgradient of the nearest works. This is the closest the WFD classified watercourses get to the Proposed Development. Glamis Burn itself is 6.47 km	Scoped Out No identifiable Pathway.

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
			the source to Glamis Burn, all of which are over 2 km from the Proposed Development.	north-east of the Proposed Development.	
Unnamed Pond	AT26	NO 35547 38223 and NO 35502 38252	Two small ponds. On satellite imagery, the ponds look green, potentially due to vegetation or algae.	The ponds are 66 m and 92 m south of the proposed access route entry point and vegetation clearance. The proposed access route is an existing road.	**Scoped In** Proximity to works.
Den Burn	AT27	NO 33936 39055	Source is from Hodge Burn at NO 33934 39072, joins Neuk Burn at NO 31971 38902.	Crosses proposed access route at NO 33936 39055. This is an existing road.	**Scoped In** Proximity to works.
Unnamed Pond	AT28	NO 33471 39963	Unnamed pond at NO 33471 39963.	3.5 m from proposed access route. This is an existing road.	**Scoped In** Proximity to works.
Denend Burn	AT29	NO 31927 40761	Watercourse sourced from unnamed pond named for watercourse AT11. Denend Burn flows into Kirkinch Burn (AT16) at NO 30671 42584 after being joined with Newtyle Burn at NO 30394 42113. At this point it becomes part of the Commerton Burn WFD watercourse, 2.06 km downstream from the works.	Proposed access route crosses watercourse at NO 31927 40761.	**Scoped In** Proximity to works.
Unnamed Watercourse	AT30	NO 31383 41970	Small stream/ drain located between NO 31959 41971 and NO 31308 41981.	580 m from Tower 659.	**Scoped Out** No obvious flow paths.
Auchterhouse Burn	AT31	NO 31524 39586	Source at NO 31420 39729, WFD status watercourse	220 m south-west of proposed access	**Scoped In** Proximity to works, WFD watercourse.

Water Feature	ID	NGR	Description Summary	Direction and Distance to the Proposed Development	Scoped in/ out and justification
			as part of the Dronley Burn WFD stem which flows into Dronley Burn at NO 33059 36588 and then Dighty Water at NO 34697 35169.	route. This is an existing route.	
Two Unnamed Watercourses	AT32	NO 30863 44067	Sourced from Camno Burn (AT17) at NO 28476 42560 and tributaries of Kirkinch Burn (AT16) which it joins at NO 30983 44190.	0 and 15 m from vegetation clearance, 14 m from Tower 651.	**Scoped In** Proximity to works, proximity to WFD status waterbody
Unnamed Watercourse	AT33	NO 31348 43910	Tributaries of Kirkinch Burn (AT16), source at NO 31367 43438 and NO 31265 43991.	Within 10 m of vegetation clearance and proposed access route.	**Scoped In** Proximity to works.

Water Quality

12.5.39 Table 12-15 displays the observational and laboratory chemistry results from SEPA of the Commerton Burn downstream of Newtyle Sewage Treatment Works (STW) (samples taken from eight months in 2019, two months in 2023 and one month in 2024), Meigle Burn at Cardean upstream of confluence (samples taken from nine months in 2019, two months in 2022 and three months in 2023), Meigle Burn upstream of Meigle STW (samples taken from eight months in 2019) and the River Isla at Wester Cardean Gauging Station (samples taken from eight months in 2019, two months in 2022, seven months in 2023 and one month in 2024). The River Isla at Wester Cardean Gauging Station had more determinands sampled than the other sampling locations. The locations of the SEPA monitoring locations are shown in Figure 12.1 (Volume 3).

12.5.40 A summary of results and average environmental quality standards (EQS) are shown in Table 12-15:

- each of the locations have a similar overall chemistry with a generally neutral pH which was slightly alkaline at times with a range of 7.14-8.3;
- Biochemical Oxygen Demand (BOD) at the sampling locations was low-moderate between <1.0 mg/l to 4.8 mg/l. However, it should be noted that of all 46 samples >2 was detected 7 times which suggests more natural and unperturbed conditions with periods when the water may be more moderately polluted;
- Electrical Conductivity was good with a range of 83-824 µS/cm;
- Ammoniacal Nitrogen was very low with a detected range of 0.028-0.629 mg/L and the rest of the samples below the limit of detection;
- the River Isla at Wester Cardean Gauging Station had lower average results then the other sampling locations for Alkalinity (as $CaCO^3$), Chloride, Electrical conductivity (25°C), Nitrate (as N), and total oxidised nitrogen (as N).

12.5.41 Although limited water samples were taken and each sampling location was based at the northern end of the Proposed Development including the flow conditions, and the suite of analysis was for key parameters only, as a whole the data suggest the quality of water in water features in the study area is generally good and but may have areas more susceptible to moderate pollution from urban areas and arable land.

Table 12-15 SEPA Chemistry Data

Determinand	Commerton B. D/S Newtyle Stw (S1)			Meigle B. At Cardean U/S Of Confl. (S2)			Meigle B. U/S Meigle Stw (S3)			River Isla At Wester Cardean Gauging Station (S4)			Environmental Quality Standards (EQS)[56]
	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	
Alkalinity (as CaCO3)	79.13	60.7	98.7	150.91	107	171	153.9	143	173	43.2	22.7	55.6	
Aluminium										117.42	31.1	282	15
Ammoniacal Nitrogen (as N)	0.16	0.02	0.63	0.17	0.03	0.39	0.10	0.02	0.27	0.02	0.02	0.03	
Arsenic										4.25	2	5	50
Biochemical Oxygen Demand – ATU suppressed	1.75	0.5	4.8	1.40	0.52	3.1	1.49	0.5	3.2	1.31	0.5	1.9	
Cadmium										0.01	0.012	0.02	NA
Calcium										15.50	8.54	18.9	
Chloride	34.99	18.7	119	43.49	23.8	123	36.87	26.6	63.3	7.98	5.5	11.5	250000
Chromium										0.74	0.5	0.81	N/A
Copper										1.01	0.7	1.53	1
Electrical conductivity (25°C)	328.33	246	617	552.45	407	824	530.2	464	620	135.48	83.6	161	

[56] 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	Commerton B. D/S Newtyle Stw (S1)			Meigle B. At Cardean U/S Of Confl. (S2)			Meigle B. U/S Meigle Stw (S3)			River Isla At Wester Cardean Gauging Station (S4)			Environmental Quality Standards (EQS)[56]
	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	
Iron										0.21	0.12	0.39	1000
Lead										0.63	0.35	0.72	1.2
Magnesium										3.42	2.31	4	
Manganese										0.01	0.01	0.02	123
Nickel										1.72	0.81	2	4
Nitrate (as N)	5.72	3.88	7.82	8.05	6.29	10.5	7.80	5.15	9.88	1.39	0.76	1.8	
Nitrite (as N)	0.03	0.01	0.01	0.05	0.01	0.13	0.04	0.01	0.08	0.01	0.01	0.01	
Nonionised ammonia (as N)	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	11.47	9.12	13	10.63	7.48	13.6	10.80	8.15	14.2	11.62	10.3	14.4	
Oxygen – dissolved - % saturation	99.14	87	112	90.7	74.9	121	93.24	78.1	126	101.9	98.6	106	
pH	7.75	7.35	8.14	7.91	7.71	8.15	7.94	7.84	8.2	7.66	7.14	7.97	
Potassium										1.13	1.04	1.27	
Reactive Phosphorus (as P)	0.26	0.02	1.2	0.10	0.04	0.30	0.06	0.01	0.12	0.01	0.00	0.009	

Determinand	Commerton B. D/S Newtyle Stw (S1)			Meigle B. At Cardean U/S Of Confl. (S2)			Meigle B. U/S Meigle Stw (S3)			River Isla At Wester Cardean Gauging Station (S4)			Environmental Quality Standards (EQS)[56]
	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	Average of Results	Min of Results	Max of Results	
Sample Temperature	9.30	4	15.3	8.94	3.7	15.4	9.34	3.5	15.2	9.94	1	16.9	
Silicate (reactive – as SiO2)	11.81	9.36	14.3	9.59	5.15	12.1	9.60	5.77	11.9				
Sodium										5.95	4.59	6.76	
Total Oxidised Nitrogen (as N)	5.75	3.89	7.88	8.10	6.34	10.5	7.83	5.23	9.9	1.40	0.76	1.81	
Total Phosphorus (as P)							0.11	0.04	0.25				
Vanadium										1.63	0.43	2	20
Zinc										1.80	1.06	2.77	10.9

Private Water Supplies

12.5.42 A separate PWS assessment can be found within Appendix 12.1 (Volume 4).

12.5.43 There are 10 PWS within 1 km of the Proposed Development. Information was supplied by Perth and Kinross Council on the 17th January 2024 and Angus Council on the 23rd February 2024, and is shown in Table 12-16. The data collected from the Perth and Kinross Council and Angus Council do 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.

12.5.44 Property owners for Little Scotston and Scotston have been contacted to gain details of PWS coordinates, usage and source. At the time of writing, no details were available. Therefore, information provided by Perth and Kinross and Angus Council will be assumed to be correct until further information is available. West Navey have confirmed that there is a PWS is still in use but have not confirmed its precise location.

Table 12-16 Private Water Supplies

PWS Reference	Property	Distance From Proposed Development (m)	National Grid Reference	Source	Scoped In/ Out
PWS-AT-1	Little Scotston	99.55	NO 33799 39187	Spring	Scoped In Proximity to Development.
PWS-AT-2	Balkemback	390.92	NO 39175 38095	Spring	Scoped Out No identifiable Pathway.
PWS-AT-3	Old Balkello	631.51	NO 36655 38277	Spring	Scoped Out No identifiable Pathway.
PWS-AT-4	Scotston	19.13	NO 33435 39871	Spring	Scoped In Proximity to Development.
PWS-AT-5	Quarry House	585.23	NO 34981 38211	Well	Scoped Out No identifiable Pathway.
PWS-AT-6	Kinpurney	117.00	NO 30962 42375	Spring1 – main	Scoped In Proximity to Development.

PWS Reference	Property	Distance From Proposed Development (m)	National Grid Reference	Source	Scoped In/ Out
PWS-AT-7	West Nevay	17.90	NO 32773 43776	Spring	Scoped In Proximity to Development.
PWS-AT-8	Davidston	51.49	NO 31553 39759	Well	Scoped In Proximity to Development.
PWS-AT-9	Pitpointie	896.64	NO 35243 37478	Spring	Scoped Out No identifiable Pathway.
PWS-AT-10	Balluderon	190.77	NO 37601 38637	Spring	Scoped In Proximity to Development.

Other Abstractions

12.5.45 Within 1 km of the Proposed Development there are 272 CAR licenses recorded (sourced from SEPA). The authorisation activities for these are primarily listed as sewage, agriculture, and sewage treatment works. Of these, nine CAR licenses which are within 200 m of the Proposed Development have been scoped in. These are shown below in Table 12-17.

Table 12-17 CAR Licences

Authorisation No	NGR	Authorisation Activity	Distance From Site (m)
CAR/L/1188697	NO 40075 37220	N/A	83 m from operational corridor.
CAR/R/1050476	NO 39912 37316	Sewage (Private) Primary	21 m from operational corridor, 84 m from vegetation clearance.
CAR/R/1014947	NO 39849 37625	Sewage (Private) Primary	48 m from operational corridor, 150 m from vegetation clearance.
CAR/R/1179253	NO 39830 37780	Sewage (Private) Primary	74 m from operational corridor, 93 m from vegetation clearance.
CAR/R/1031621	NO 39780 37840	Sewage (Private) Primary	42 m from operational corridor, 55 m from vegetation clearance.

Authorisation No	NGR	Authorisation Activity	Distance From Site (m)
CAR/R/1124964	NO 39820 37870	Sewage (Private) Primary	87 m from operational corridor, 100 m from vegetation clearance.
CAR/R/1017535	NO 39820 37891	Sewage (Private) Primary	93 m from operational corridor, 107 m from vegetation clearance.
CAR/R/1147737	NO 39537 38149	Sewage (Private) Primary	14 m from operational corridor, 30 m from vegetation clearance.
CAR/R/1122999	NO 31630 43260	Sewage (Private) Primary	60 m from operational corridor, 61 m from vegetation clearance.

Aquatic Ecology and Protected Species

Information provided by SEPA indicates that there are several species present in the study area. Table 12-18 shows invertebrates found at Commerton Burn (AT22) and Meigle Burn (AT18) in May and November 2023. None of the species are listed within Schedule 5 of the Wildlife and Countryside Act 1981[57] or within the Biodiversity List[58].

Table 12-18 Aquatic Ecology Data

Water Feature/ Course	Survey	Taxon Found
Commerton Burn (AT22)	May 2023	Baetidae, Heptageniidae, Chloroperlidae, Leuctridae, Perlodidae, Hydropsychidae, Lepidostomatidae, Limnephilidae Polycentropodidae, Chironomidae, Simuliidae, Elmidae, Gammaridae, Hydrobiidae, Planariidae, Oligochaeta, Hydracarina
Commerton Burn (AT22)	November 2023	Heptageniidae, Leuctridae, Perlodidae, Odontoceridae, Philopotamidae, Nemouridae, Rhyacophilidae, Glossosomatidae, Polycentropodidae, Limnephilidae, Ancylidae, Gammaridae, Elmidae, Hydropsychidae, Simuliidae, Planariidae, Baetidae, Hydrobiidae, Asellidae, Chironomidae, Oligochaeta
Meigle Burn (AT18)	May 2023	Baetidae, Heptageniidae, Glossosomatidae, Hydropsychidae, Leptoceridae, Limnephilidae, Psychomyiidae, Ceratopogonidae, Chironomidae,

[57] Nature Scot. 2022 Table of Scotland's Protected Species. Available at: https://www.nature.scot/doc/table-all-scotlands-protected-species
[58] Nature Scot. (2024) Scottish Biodiversity List (online) Available at: https://www.nature.scot/doc/scottish-biodiversity-list [Accessed: July 2024]

Water Feature/ Course	Survey	Taxon Found
		Dytiscidae, Elmidae, Asellidae, Gammaridae, Ancylidae, Lymnaeidae, Erpobdellidae, Glossiphoniidae, Planariidae, Oligochaeta, Nematoda
Meigle Burn (AT18)	November 2023	Baetidae, Perlodidae, Glossosomatidae, Hydropsychidae, Leptoceridae Limnephilidae, Psychomyiidae, Rhyacophilidae, Ceratopogonidae, Simuliidae, Pediciidae, Elmidae, Hydraenidae, Asellidae, Gammaridae, Ancylidae, Lymnaeidae, Erpobdellidae, Glossiphoniidae, Planariidae, Oligochaeta, Nematoda

12.5.46 A 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 which includes the Dean Water and River Isla. Trout, pike and roach have also been noted in the River Isla59. Atlantic salmon, brook lamprey, river lamprey sea lamprey and otters have also been listed on the Scotland Biodiversity List[60].

12.5.47 It should be noted that at Dean Water (Kerbet Water to R Isla Confluences), there is a weir located at NO 28835 45875. This is identified as being passable for fish under certain conditions, but that no fish pass presently (2020)[61].

Other Designations

12.5.48 The Strathmore and Fife Nitrate Vulnerable Zones (NVZs) cover the entirety 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 aim to protect water quality by promoting the use of good farming practices.

12.5.49 Auchterhouse Hill SSSI is located 180 m north-east of the central area of the site and consists of subalpine dry heath. It is located on an upgradient of the Proposed Development and the sources of some of the watercourses which pass within 200 m of the Proposed Development are located on the hill.

12.5.50 The River Isla and Dean Water located in the northwest of the Proposed Development are classed as SAC due to the importance of the River Tay and the presence of some of its tributaries approximately 17 km downstream of the Proposed Development. Protected species found in these watercourses are mentioned in the *Aquatic Ecology and Protected Species* section of this chapter.

12.5.51 Areas of native woodland were identified by the Native Woodland Survey Scotland (NWSS) and areas of plantation woodland have also been identified near to the site. Some watercourses including the River Isla

[59] Visit Scotland. (2024) River Isla (online) Available at: https://www.visitscotland.com/info/see-do/river-isla-p2570531#:~:text=Fishing%20is%20available%20on%20the,trout%2C%20pike%20and%20roach [Accessed: July 2024]
[60] Nature Scot. (2024) Scottish Biodiversity List (online) Available at: https://www.nature.scot/doc/scottish-biodiversity-list [Accessed: July 2024]
[61] Scottish Government (2024) Scotland's Environment Map (online) Available at: https://map.environment.gov.scot/sewebmap/ [Accessed: July 2024]

(Glencally Burn to Dean Water Confluences), Dean Water (Kerbet to River Isla Confluence) and Commerton Burn (near Kirkinch) may qualify as Rivers SBL priority habitat by meeting at least one of the criteria listed on the SBL priority habitat description.

12.6 Sensitivity of Receptors

12.6.1 Table 12-19 shows the importance of the water features assessed from the above baseline information.

Table 12-19 Sensitivity of Hydrology and Hydrogeology Receptors

Receptor	Water Quality Sensitivity	Hydromorphology Sensitivity
Sidlaw Hills WFD Groundwater Body	**High** – Moderately productive aquifer, supports local PWS. High classification as potential GWDTEs and is within a Groundwater Drinking protected Area.	N/A
Strathmore WFD Groundwater Body	**High** – Moderately productive aquifer, supports local PWS. High classification as potential GWDTEs and is within a Groundwater Drinking protected Area.	N/A
The Isla and Lower Tay Sand and Gravel WFD Groundwater Body	**High** – Moderately productive aquifer, supports local PWS. High classification as potential GWDTEs and is within a Groundwater Drinking protected Area. It is also likely that the aquifer supports the River Isla (AT21) and River Tay.	N/A
Private Water Supplies	**High –** direct human receptor.	
AT2	**Low –** A relatively small watercourse which flows into Tealing Burn that does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT3	**Low –** A relatively small watercourse which flows into AT2 that does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT6	**Low –** Relatively small tributaries of Hodge Burn which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT7	**Low –** Relatively small tributaries of Hodge Burn which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT8	**Low –** Relatively small tributaries of Hodge Burn which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT9	**Low –** Relatively small tributaries of Den Burn (AT27) which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.

Receptor	Water Quality Sensitivity	Hydromorphology Sensitivity
AT10	**Low –** Relatively small tributaries of AT9 which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT11	**Low –** Relatively small tributaries of Denend Burn **(**AT29) which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT12	**Low –** Relatively small tributaries of AT11 which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT13	**Low –** Relatively small tributaries of Denend Burn (AT29) which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT14	**Low –** Relatively small tributaries of AT13 which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT15	**Low –** Flows into Balkeerie Burn which does not have its own WFD status.	**Low** – Minor, relatively unmodified watercourse.
AT16 (Kirkinch Burn)	**Medium** – Moderate WFD classification as part of the Commerton Burn WFD stem.	**Low –** The watercourse has a WFD classification of Bad for morphology and is classified as a Heavily Modified Water body within the Commerton Burn WFD watercourse.
AT17 (Camno Burn)	**Medium –** Gains moderate WFD classification as part of the Commerton Burn WFD stem downstream of the Proposed Development.	**Low –** The watercourse has a WFD classification of Poor for morphology and is classified as a Heavily Modified Water body.
AT19 (Dean Water)	**Very High –** Good WFD classification, SAC classified waterbody and flows into the River Tay which is also WFD and SAC classified.Q95 of 0.697 $m/^3s$. Protected species atlantic salmon, brook lamprey, river lamprey, sea lamprey and otter identified in watercourse.	**Low –** The watercourse has a WFD classification of Poor for morphology and is classified as a Heavily Modified Water body.
AT20	**High –** Minor watercourse, flows into Dean Water (AT19) WFD and SAC 46 m downstream of the Proposed Development and has proposed upgrades to culvert and tower over the watercourse.	**Low** - Minor, relatively unmodified watercourse with culvert. Flows into Dean Water (AT19) which has a WFD classification of Poor for morphology and is classified as a Heavily Modified Water body.
AT21 (River Isla)	**Very High –** Moderate ecological potential WFD classification, SAC classified waterbody and flows into River Isla downstream of the Proposed Development which is also WFD and SAC classified. Q95 of	**High –** The watercourse has a WFD classification of Good for morphology and conforms closely to a natural, unaltered state. Some reaches show deviation from natural conditions due to direct and/or

Receptor	Water Quality Sensitivity	Hydromorphology Sensitivity
	1.619 m^3/s. Protected species atlantic salmon, brook lamprey, river lamprey, sea lamprey and otter identified in watercourse.	indirect channel, floodplain, and/ or catchment development pressures.
AT22 (Commerton Burn)	**High –** Moderate ecological potential WFD status. Flows into Dean Water (AT19) WFD and SAC classified watercourse.	**Low –** The watercourse has a WFD classification of Bad for morphology and is classified as a Heavily Modified Water body.
AT26	**Low –** Relatively small ponds with no classifications or obvious connections to other waterbodies.	**Low –** Minor, relatively unmodified waterbodies.
AT27 (Den Burn)	**Low –** Relatively minor watercourse with no WFD status. Flows into Neuk Burn which also does not have WFD status.	**Low –** Minor, relatively unmodified watercourse.
AT28	**Low –** Relatively small pond with no classifications or obvious connections to other waterbodies.	**Low –** Minor, relatively unmodified waterbody.
AT29 (Denend Burn)	**Medium –** Gains moderate WFD classification as part of the Commerton Burn WFD stem downstream of the Proposed Development.	**Low -** Minor, relatively unmodified watercourse.
AT31 (Auchterhouse Burn)	**Medium –** Part of the Dronley Burn WFD stem with a good ecological potential classification. Flows into Dronley Burn which is also WFD classified.	**Low –** The watercourse has a WFD classification of Bad for morphology and is classified as a Heavily Modified Water body.
AT32	**Medium –** Tributaries of Kirkinch Burn with moderate WFD classification as part of the Commerton Burn WFD stem.	**Low -** Minor, relatively unmodified watercourse.
AT33	**Medium –** Relatively small watercourse which flows into Kirkinch Burn with a Moderate WFD classification as part of the Commerton Burn WFD stem.	**Low -** Minor, relatively unmodified watercourse.

12.6.2 Table 12-20 summarises the sensitivities of the soils receptors in the study area.

Table 12-20 Sensitivity of Soils Receptors

Receptor	Soils Sensitivity
Class 1 Peatland Habitat, approximately 550 m north of the Proposed Development	**Very High Sensitivity** - receptor both Class 1 Peatland Habitat and supporting designated site (Auchterhouse Hill SSSI)
Class 5 Carbon and Peatland Habitat, within Proposed Development and approximately 300 m north of the	**Medium Sensitivity** – receptor is Class 5 Carbon and Peatland Habitat

Receptor	Soils Sensitivity
Proposed Development surrounding the Class 1 Peatland Habitat	
Potential peat soils within alluvial deposits identified towards northern extent of Proposed Development and study area.	**Low Sensitivity** – the presence of peat or carbon rich soils are not proven within the alluvial soils and may only be locally present within what is otherwise a mineral soil. No other sources indicated the potential of peat or carbon rich soils associated with the alluvium.

12.7 Assessment of Effects

12.7.1 This section presents the findings of the assessment for the construction/demolition phases and the operational phase. The approach to the assessment is based on the methodology set out earlier in Section 12.4. The below effects consider the Embedded Mitigation outlined within Section 12.8.

Assessment of Construction Effects

Water Environment

12.7.2 During the construction phase there is the potential for adverse effects on the water environment from site run-off 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 run-off and activities at temporary construction compounds, the movement of plant and other vehicles, and their maintenance and washing out of sediment;
- works in, over and adjacent to water features including construction of multiple upgrades to watercourse crossings, new culverts, upgrades to culverts and a temporary bridge (as identified in Table 12-14 and Table 12-24;
- 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.

Soils Environment

12.7.3 During the construction/ demolition phase of the Proposed Development, the works (inclusive of any site clearance or preparation works e.g. access tracks) have the potential to result in the below effects without suitable mitigation and control measures:

- over compaction of soils caused by the use of heavy machinery onsite;
- structural deterioration of soil materials during excavation, soil handling, storage and replacement;
- erosion and loss of soils during soil handling, storage and replacement; and
- disturbance and loss of deposits of peat.

Effects on Groundwater

Foundation Improvements

12.7.4 It is unlikely that the proposed works 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.

12.7.5 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.

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

12.7.7 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. Therefore, for the Sidlaw Hills WFD Groundwater Body, Strathmore WFD Groundwater Body, and the Isla and Lower Tay Sand and Gravel WFD Groundwater Body (High sensitivity), there is a negligible adverse impact resulting in a **minor effect (not significant).**

12.7.8 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. However, with the implementation of CEMP these impacts are likely to be negotiable. Therefore, for the Sidlaw Hills WFD Groundwater Body, Strathmore WFD Groundwater Body, and the Isla and Lower Tay Sand and Gravel WFD Groundwater Body (High sensitivity), there is a negligible adverse impact resulting in a **minor effect (not significant).**

12.7.9 None of the PWS are situated within close proximity of any foundation improvement works. Therefore, for the High sensitive receptor, the impact is negligible resulting in a **minor effect (not significant).**

Private Water Supplies

12.7.10 As well as increasing surface run-off, brash from tree felling may 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.

12.7.11 Construction is generally unlikely to have an effect on the PWS in the study area. Three PWS (PWS-AT-1, PWS-AT-4, and PWS-AT-7) were identified in Appendix 12.1 (Volume 4) as potentially at risk from the construction due to the proximity to the access route and downgradient location which could increase the risk of sediment, chemical spillages and run-off entering the supplies. However, with appropriate mitigation measures (please see Section 12.8) this is likely to have a negligible impact on the PWS (High Sensitivity), resulting **minor effect (not significant)**.

Effects to Surface Water

Construction Site Run-off – Sediment Run-off

12.7.12 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. Surface water run-off from the temporary compound areas, stockpiles, access tracks and mud deposited on the main road accesses to the Proposed Development site 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 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.

12.7.13 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 (for example, 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 primary considered separately in the next section. In addition, sediment-laden run-off also has the potential to impact fish present in any watercourses.

12.7.14 Temporary construction access routes will involve stone road or trackway over the ground to allow access of vehicles. No significant effects should be caused by this as no earth re-works is required. 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.

12.7.15 Water crossings may have potential to impact surface water crossings by restricting the downstream movement of water and sediments. This could cause water and sediment accumulation upstream of water crossings and starvation further downstream leading to increased erosion and reduced habitat substrate. However, Policy 53D of the Perth and Kinross LPD states that the council will not support works to new or existing culverts unless there is no practical alternative. The locations of temporary and permanent crossings are identified in Table 12-24.

12.7.16 Allowing such substances to enter a watercourse could be in breach of the Pollution 13 Prevention and Control (Scotland) Regulations 2012[62], the Environment Act 2021[63], and Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003[64], and therefore measures to control the storage, handling and disposal of such substances will need to be in place prior to and during construction.

12.7.17 Table 12-21 lists the potential impact and effect for sediment laden run-off for each scoped in water feature.

[62] 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)

[63] UK Public General Acts (2021). Environment Act 2021. Online:https://www.legislation.gov.uk/ukpga/2021/30/contents

[64] 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 12-21 Impact and Effects of Sediment Run-off to Water features

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
AT2	NO 39442 38690	Within 200 m of Proposed Development for approximately 2.84 km. Crosses vegetation clearance, proposed access track, trackway, upgrade to track stone and upgrades to culverts at NO 38005 38848 and NO 38185 38845. Potential new culvert at NO 38694 38892. 46 m downgradient from Tower 678 and 35 m downgradient from Tower 679.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and culverts, and vegetation clearance. Sediment run-off 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)
AT3	NO 37093 38917	Crosses upgrade to track stone at NO 37093 38917.58 m west of vegetation clearance.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off 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)
AT6	NO 34945 39574	Within and 45 m downgradient of vegetation clearance, upgrade to track stone and perm crosses the watercourse at NO 34945 39574. New culvert at NO 34946 39572, NO 34981 39508, NO 35104 39464, NO 35231 39033, NO 35250 39090, NO 35257 39153, NO 34881 38946.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off 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)
AT7	NO 34679 39689	Within operational corridor and vegetation clearance. 7 m northwest of Tower 671 and 8 m west of trackway.	Low	Negligible adverse impact- some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				clearance. Sediment run-off 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.	
AT8	NO 34451 39738	Within operational corridor, 115 m east of vegetation clearance and flows on the eastern side of an existing haul road which is to be upgraded (NO 34431 39731).	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the new haul road and vegetation clearance. Sediment run-off 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)
AT9	NO 33453 40612	Within operational corridor and vegetation clearance, 29 m west of new temporary track (NO 33474 40585) and 15 m west of Tower 666.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off 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)
AT10	NO 33614 40272	5 m downgradient from vegetation clearance, 15 m downgradient of Tower 667. Within operational corridor, an existing haul road (to be upgraded) crosses at NO 33614 40272.	Low	Low adverse impact - some sediment run-off could indirectly and directly wash from the new haul road, associated crossing and vegetation clearance. Sediment run-off could also occur from works associated to temporary compound. However, this will likely only be small amounts, and with standard mitigation, is	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				predicted to have a short term, temporary, uncertain negligible adverse impact only.	
AT11	NO 32923 40849	New road and perm cross watercourse at NO 32923 40849, upgrades to track stone also at NO 32908 40848 15 m downstream of perm. Proposed access route 18 m to the east and vegetation clearance 40 m upgradient and west. Potential new culvert at NO 33549 40317, NO 33623 40265,	Low	Negligible adverse impact - some sediment-run-off could indirectly and directly wash from the new road and associated crossings, and vegetation clearance. Sediment run-off 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)
AT12	NO 32772 41097	23 m downgradient of vegetation clearance, 112 m downgradient of upgrades to existing track stone tarmac, 78 m downgradient of proposed access route and 56 m downgradient of Tower 663.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off could also occur from works associated to temporary compounds. 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)
AT13	NO 33005 41261	Upgrade to track stone at NO 33005 41261 crosses watercourse. 18 m downgradient of new haul road. 75 m west of Tower 663 and within and 52 m from vegetation clearance. New culverts at NO 32909 40816, NO 32907 40849, NO 33043 40871 and NO 32927 40993. Upgrade to culvert at NO 32921 40975.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off could also occur from works associated to temporary compounds. 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)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
AT14	NO 32739 41524	97 m downgradient from vegetation clearance, 122 m downgradient from new haul road (NO 32836 41603) and 119 m downgradient from Tower 662. 96 m downgradient from proposed access route. New culvert at NO 33013 41300.	Low	Negligible adverse impact - some sediment-run-off could indirectly and directly wash from the new haul road and vegetation clearance. Sediment run-off 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)
AT15	NO 32574 41971	2.3 m downgradient of new haul road and within vegetation clearance. 23 m downgradient from other vegetation clearance and 69 m downgradient from Tower 659. New culvert at NO 32572 41947. Upgrades to track tarmac are at NO 32726 43566 and NO 32777 43650.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the new haul road, vegetation clearance and upgrades to culverts. Sediment run-off 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)
AT16 (Kirkinch Burn)	NO 31063 44097	Temporary bridge at NO 31063 44097, proposed access route to cross watercourse. Upgrade to culvert at NO 31064 44095. Within vegetation clearance.	Medium	Negligible adverse impact - some sediment run-off could indirectly and directly wash from works associated with the temporary bridge, vegetation clearance and proposed access routes. Sediment run-off 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)
AT17 (Camno Burn)	NO 30795 44301	Culvert upgrade at NO 30790 44307, proposed access route crosses watercourse. Within 4 m	Medium	Negligible adverse impact - some sediment run-off could indirectly and directly wash from vegetation clearance, upgrades to the culvert and	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
		of vegetation clearance and Tower 650.		proposed access route. Sediment run-off 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.	
AT19 (Dean Water)	NO 29747 45473	Within 12 m of Tower 645 and vegetation clearance and 15 m from proposed trackway.	Very High	Minor adverse impact - Some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off 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 status of the watercourse and protected species present.	**Moderate adverse (significant)**
AT20	NO 29618 45766	Culvert upgrade at NO 29598 45767, vegetation clearance and Tower 644 over watercourse at NO 29618 45766	High	Minor adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off 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 status of the watercourse AT20 flows into and the protected species present.	**Moderate adverse (significant)**
AT21 (River Isla)	NO 29219 46513	110 m from vegetation clearance. Overhead line crosses over.	Very High	Minor adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off	**Moderate adverse (significant)**

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				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 status of the watercourse and protected species present.	
AT22 (Commerton Burn)	NO 32275 45743	2.04 km from nearest works; however, flows from Camno Burn (AT17) which is in very close proximity to the proposed works and has a culvert upgrade.	High	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run-off could also occur from works associated to temporary compound. However, it is likely that due to the distance of the works and dissolution and 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)
AT26	NO 35547 38223 and NO 35502 38252	The ponds are 66 m and 92 m south of the proposed access route entry point and vegetation clearance. The proposed access route is an existing road.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the proposed access route. Sediment run-off 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)
AT27 (Den Burn)	NO 33936 39055	Crosses proposed access route at NO 33936 39055. This is an existing road.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the proposed access route. Sediment run-off could also occur from works associated to temporary compound. However, this will likely only be small amounts,	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				and with standard mitigation, is predicted to have a short term, temporary, uncertain negligible adverse impact only.	
AT28	NO 33471 39963	3.5 m from proposed access route. This is an existing road.	Low	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the proposed access route. Sediment run-off 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)
AT29 (Denend Burn)	NO 31927 40761	Proposed access route crosses watercourse at NO 31927 40761.	Medium	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the proposed access route. Sediment run-off 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)
AT31 (Auchter house Burn)	NO 31524 39586	220 m south-west of proposed access route. This is an existing route.	Medium	Negligible adverse impact - some sediment run-off could indirectly and directly wash from the proposed access route. Sediment run-off 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)
AT32	NO 30863 44067	0 and 15 m from vegetation clearance, 14 m from Tower 651.	Medium	Negligible adverse impact - some sediment run-off could indirectly and directly wash from vegetation clearance. Sediment run-off could also	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				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.	
AT33	NO 31348 43910	Within 10 m of vegetation clearance and proposed access route.	Medium	Negligible adverse impact - some sediment run-off could indirectly and directly wash from upgrades to the existing track and vegetation clearance. Sediment run off 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)

Construction Site Run-off – Spillage Risk

12.7.18 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 site. 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.

12.7.19 Allowing such substances to enter a watercourse could be in breach of the Pollution 13 Prevention and Control (Scotland) Regulations 2012[65], the Environment Act 2021[66], and Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003[67], and therefore measures to control the storage, handling and disposal of such substances will need to be in place prior to and during construction.

12.7.20 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. Table 12-22 displays the impacts and effects of spillage risk to surrounding water features.

[65] 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]
[66] UK Public General Acts (2021). Environment Act 2021. Online: https://www.legislation.gov.uk/ukpga/2021/30/contents
[67] 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 12-22 Impacts and Effects of Spillage Risk to Water features

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
AT2	NO 39442 38690	Within 200 m of Proposed Development for approximately 2.84 km. Crosses vegetation clearance, proposed access track, trackway, upgrade to track stone and upgrades to culverts at NO 38005 38848 and NO 38185 38845. Potential new culvert at NO 38694 38892. 46 m downgradient from Tower 678 and 35 m downgradient from Tower 679.	Low	Negligible adverse impact - chemical spillages could occur during works to upgrade the existing track including upgrading culverts 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)
AT3	NO 37093 38917	Crosses upgrade to track stone at NO 37093 38917. 58 m west of 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)
AT6	NO 34945 39574	Within and 45 m downgradient of vegetation clearance, upgrade to track stone and perm crosses the watercourse at NO 34945 39574. New culvert at NO 34946 39572, NO 34981 39508, NO 35104 39464, NO 35231 39033, NO 35250 39090, NO 35257 39153, NO 34881 38946.	Low	Negligible adverse impact - chemical spillages could occur during works to upgrade the existing track including new crossing of this watercourse. 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)
AT7	NO 34679 39689	Within operational corridor and vegetation clearance. 8 m west of trackway. 7 m from Tower 671.	Low	Negligible adverse impact- Chemical spillages could occur during works to 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)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
AT8	NO 34451 39738	Within operational corridor, 115 m east of vegetation clearance and 226 m east of new haul road.	Low	Negligible adverse impact- Chemical spillages could occur during works to produce the new haul road and works associated with 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)
AT9	NO 33453 40612	Within operational corridor and vegetation clearance, 29 m west of new haul road. 15 m from Tower 666.	Low	Negligible adverse impact- Chemical spillages could occur during works to produce the new haul road and works associated with 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)
AT10	NO 33614 40272	5 m downgradient from vegetation clearance. Within operational corridor, new haul road crosses at NO 33614 40272. 15 m downgradient from Tower 671.	Low	Negligible adverse impact- Chemical spillages could occur during works to produce the new haul road and associated crossing and works associated with 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)
AT11	NO 32923 40849	New road and perm cross watercourse at NO 32923 40849, upgrades to track stone also at NO 32908 40848 15 m downstream of perm. Proposed access route 18 m to the east and vegetation clearance 40 m upgradient and west. Potential new culvert at NO 33549 40317, NO 33623 40265,	Low	Negligible adverse impact- chemical spillages could occur during works to upgrade the existing track and works associated with 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)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
AT12	NO 32772 41097	23 m downgradient of vegetation clearance, 112 m downgradient of upgrades to track stone, 78 m downgradient of proposed access route.	Low	Negligible adverse impact- chemical spillages could occur during works to upgrade the existing track and works associated with 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)
AT13	NO 33005 41261	Upgrade to track stone at NO 33005 41261 crosses watercourse. 18 m downgradient of new haul road. 75 m west of Tower 663 and within and 52 m from vegetation clearance. New culverts at NO 32909 40816, NO 32907 40849, NO 33043 40871 and NO 32927 40993. Upgrade to culvert at NO 32921 40975.	Low	Negligible adverse impact- chemical spillages could occur during works to upgrade the existing track and associated crossing, works associated with the new haul road and works associated with 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)
AT14	NO 32739 41524	97 m downgradient from vegetation clearance, 122 m downgradient from new haul road (NO 32836 41603) and 119 m downgradient from Tower 662. 96 m downgradient from proposed access route. New culvert at NO 33013 41300.	Low	Negligible adverse impact- chemical spillages could occur during works to upgrade the existing track and associated crossing, works associated with the new haul road and works associated with 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)
AT15	NO 32574 41971	2.3 m downgradient of new haul road and within vegetation clearance. 23 m downgradient from other vegetation clearance and 69 m downgradient from Tower 659. New culvert at NO 32572 41947. Upgrades to track tarmac are at NO 32726 43566 and NO 32777 43650.	Medium	Negligible adverse impact- chemical spillages could occur during works to upgrade the existing track and works associated with vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				direct, short term, temporary, uncertain negligible adverse impact is predicted.	
AT16 (Kirkinch Burn)	NO 31063 44097	Temporary bridge at NO 31063 44097, proposed access route to cross watercourse. Upgrade to culvert at NO 31064 44095. Within vegetation clearance.	Medium	Negligible adverse impact-chemical spillages could occur during works to produce the temporary bridge, works associated with the new haul road and works associated with 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)
AT17 (Camno Burn)	NO 30795 44301	Culvert upgrade at NO 30790 44307, proposed access route crosses watercourse. Within 4 m of vegetation clearance and Tower 650.	Medium	Negligible adverse impact-chemical spillages could occur during works to upgrade the existing culvert and associated crossing and works associated with 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)
AT19 (Dean Water)	NO 29747 45473	Within 12 m of vegetation clearance, 15 m from proposed trackway and 10 m from Tower 645.	Very High	Minor adverse impact-chemical spillages could occur during works to the proposed trackway and works associated with vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted. This has been categorised as minor; however, due to the SAC status of the watercourse and protected species present.	**Moderate adverse (significant)**
AT20	NO 29618 45766	Culvert upgrade at NO 29598 45767, vegetation clearance and Tower 644 over	High	Minor adverse impact-chemical spillages could occur during works to the	**Moderate adverse (significant)**

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
		watercourse at NO 29618 45766		upgrades to existing culvert and works associated with vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted. This has been categorised as minor; however, due to the SAC status of the watercourse AT20 flows into and the protected species present.	
AT21 (River Isla)	NO 29219 46513	110 m from vegetation clearance. Overhead line crosses over.	Very High	Minor adverse impact-chemical spillages could occur during works associated with vegetation clearance. However, with the implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted. This has been categorised as minor; however, due to the SAC status of the watercourse and protected species present.	**Moderate adverse (significant)**
AT22 (Commerton Burn)	NO 32275 45743	2.04 km from nearest works, however, flows from Camno Burn (AT17) which is in very close proximity to works and has a culvert upgrade.	High	Negligible adverse impact-chemical spillages could occur during works to the upgrades to existing culvert and works associated with vegetation clearance. However, it is likely that due to the distance of the works and dissolution and 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)
AT26	NO 35547 38223 and NO 35502 38252	The ponds are 66 m and 92 m south of the proposed access route entry point and vegetation clearance. The proposed access route is an existing road.	Low	Negligible adverse impact-chemical spillages could occur during works to upgrade the existing track and works associated with vegetation clearance. However, with the	Negligible adverse (not significant)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
				implementation of good practice and standard mitigation measures, a direct, short term, temporary, uncertain negligible adverse impact is predicted.	
AT27 (Den Burn)	NO 33936 39055	Crosses proposed access route at NO 33936 39055. This is an existing road.	Low	Negligible adverse impact-chemical spillages could occur during works to upgrade the existing. 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)
AT28	NO 33471 39963	3.5 m from proposed access route. This is an existing road.	Low	Negligible adverse impact-chemical spillages could occur during works to upgrade the existing track. 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)
AT29 (Denend Burn	NO 31927 40761	Proposed access route crosses watercourse at NO 31927 40761.	Medium	Negligible adverse impact-chemical spillages could occur during works to upgrade the existing track. 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)
AT31 (Auchterhouse Burn)	NO 31524 39586	220 m south-west of proposed access route. This is an existing route.	Medium	Negligible adverse impact-chemical spillages could occur during works to upgrade the existing track. 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)

Water Feature	NGR	Direction and Distance to the Proposed Development	Sensitivity	Impact	Effect
AT32	NO 30863 44067	0 and 15 m from vegetation clearance and 14 m from Tower 651.	Medium	Negligible adverse impact- chemical spillages could occur during works associated with 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)
AT33	NO 31348 43910	2.3 m downgradient of new haul road (NO 32574 41969) and within vegetation clearance. 23 m downgradient from other vegetation clearance. Upgrades to culverts at NO 32730 42554 (641 m downstream), NO 32777 42635 (761 m downstream), and NO 32855 42789 (939 m downstream). Upgrades to track tarmac are at NO 32726 43566 and NO 32777 43650.	Low	Negligible adverse impact- chemical spillages could occur during works to upgrade the existing track and associated crossing and culverts, works associated with the new haul road and works associated with 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)

Foundation Improvements

12.7.21 There are 12 towers which are within 50 m of a water feature. Potential foundation improvements at these towers have the potential to impact the quality and morphology of the water feature. However, as listed within the Principal Contractor's Construction Methodology Statement[68], silt busters and silt traps will be used to contain and treat water from concrete washout and from pumping. Therefore, it unlikely that any contaminated or silt laden discharge would enter any of the water features.

12.7.22 However, Tower 644 sits over a tributary to AT20. 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.

12.7.23 Table 12-23 shows the towers within 50 m of water features which could be impacted by foundation improvements.

[68] Balfour Beatty (2023) Construction Methodology – ASTI Framework.

Table 12-23 Towers within 50 m of Water Features

Tower	Water Feature ID	Sensitivity	Distance to Watercourse	Impact	Effect
679	AT2	Low	35 m downgradient	Negligible adverse	Negligible adverse effect (not significant)
678	AT2	Low	46 m downgradient	Negligible adverse	Negligible adverse effect (not significant)
677	AT2	Low	27 m	Negligible adverse	Negligible adverse effect (not significant)
672	AT6	Low	27 m downgradient	Negligible adverse	Negligible adverse effect (not significant)
671	AT7	Low	7 m	Negligible adverse	Negligible adverse effect (not significant)
666	AT9	Low	15 m	Negligible adverse	Negligible adverse effect (not significant)
667	AT10	Low	15 m downgradient	Negligible adverse	Negligible adverse effect (not significant)
651	AT32	Medium	14 m	Negligible adverse	Negligible adverse effect (not significant)
650	AT17	Medium	4 m	Negligible adverse	Negligible adverse effect (not significant)
645	AT19	Very High	10 m	Negligible adverse	Negligible adverse effect (not significant)
644	AT20	High	0 m, tower over watercourse (tributary to AT19)	Medium adverse Tower is located over the water feature, and so the risk of contamination is high. However, the dilution and distribution of the Dean Water will also be High and will implementation of a site-specific pollution prevention plan will mitigate any impacts.	**Moderate adverse effect (significance)**

Hydromorphology

Culverts and Crossings

12.7.24 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 run-off from exposed areas stripped of vegetation and where the soil may become compacted due to the movement of construction vehicles.

12.7.25 Watercourse crossings have the potential to prevent movement of coarse sediment, which could lead to excess accumulation upstream and starvation of supply downstream that could trigger localised erosion. There are several access route options proposed as part of the Proposed Development, which will be either created or upgraded depending on a number of factors. Effects will be permanent for the majority of crossings, as access roads will be retained through the operation phase; however, the bridge is to be temporary for the construction period only if it is needed. The number and types of crossings listed by potential access route are summarised Table 12-24. The watercourse crossings are grouped into new crossing and upgrades to existing crossings.

12.7.26 It is not mentioned how the culverts will be upgraded in the Principal Contractor's Construction Methodology Statement[68]; however, if culverts are existing, it is anticipated that the potential impacts to the watercourse from the upgraded culverts and associated vegetation clearance would 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 and medium importance of the receptors for hydromorphology, results in a negligible adverse effect (not significant) with the exception of the upgrades to the culvert over AT20 which, given the high importance of the watercourse it crosses, is given a minor adverse effect (not significant).

12.7.27 New crossings are proposed generally on small tributaries and unnamed drains with low importance. There is no information in the Principal Contractor's Construction Methodology Statement[68] on culverts. However, in drawing LT384-BB-ROAD-ZZ-D-H-0002 it is shown a pipe culvert is to be used. As per SEPAs guidance in the scoping opinion received September 2024, culverts should also be designed to accommodate a 1 in 200-year event and also accommodate climate change and other infrastructure.

12.7.28 Watercourses visited on the site visit were noted to often be sandy and silty. This means that there may be larger amounts of coarse, transportable material that can be eroded into the channel. However, many of these tributaries have small catchments therefore, it is not anticipated that there will be excess sediment accumulation or downstream erosion. Where multiple crossings are proposed at different locations on the same watercourse, such as those proposed on receptor AT6, there is a higher risk of the cumulative loss of channel and banks. However, receptors with multiple crossings proposed tend to be on different reaches of the watercourse and not on the same channel. Therefore, new watercourse crossings are unlikely to significantly impact sediment transport processes. Therefore, the magnitude of impact is assessed to be minor adverse, which given the low importance of the receptors for hydromorphology, results in a negligible adverse effect (not significant).

12.7.29 There is a proposed temporary bridge at NO 31063 44097 which crosses AT16. 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. 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 therefore, given the medium importance of the watercourse, results in a negligible adverse effect (not significant).

Table 12-24. Culverts and Affected Watercourses ID

Culvert NGR	Affected Watercourse ID	Sensitivity	Existing/New	Impact	Effect
NO 38005 38848	AT2	Low	Existing, upgrades to culvert	Negligible adverse	Negligible adverse effect (not significant)
NO 38185 38845	AT2	Low	Existing, upgrades to culvert	Negligible adverse	Negligible adverse effect (not significant)
NO 38694 38892	AT2	Low	Potential new culvert	Minor adverse	Negligible adverse effect (not significant)
NO 34881 38946	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 35257 39153	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 35250 39090	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 35231 39033	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 35104 39464	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 34981 39508	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 34946 39572	AT6	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 33623 40265	AT11	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 33549 40317	AT11	Low	Existing ford, potential new culvert	Minor adverse	Negligible adverse effect (not significant)
NO 33043 40871	AT13	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 32921 40975	AT13	Low	Upgrade to culvert	Negligible adverse	Negligible adverse effect (not significant)

Culvert NGR	Affected Watercourse ID	Sensitivity	Existing/New	Impact	Effect
NO 32927 40993	AT13	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 32907 40849	AT13	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 32909 40816	AT13	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 33013 41300	AT14	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 32572 41947	AT15	Low	New culvert	Minor adverse	Negligible adverse effect (not significant)
NO 31064 44095	AT16	Medium	Upgrades to culvert	Negligible adverse	Negligible adverse effect (not significant)
NO 30790 44307	AT17	Medium	Upgrades to culvert	Negligible adverse	Negligible adverse effect (not significant)
NO 29598 45767	AT20	High	Upgrades to culvert	Negligible adverse	Minor adverse effect (minor significance)

Foundation Improvements

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

12.7.31 There is only one tower (Tower 644) which lies over a water feature (a tributary of Dean Water (AT20)). Any foundation improvement works that take place at this location could have a medium impact to the high sensitivity AT20, resulting in a **moderate adverse effect (significant)**.

Effects on Soils

12.7.32 Considering the Class 1 and Class 5 Carbon and Peatland habitats that are outwith the Proposed Development and limit of deviation (at approximately 500 m and 300 m north, respectively), and, given the likely works associated with the Proposed Development (upgrading of existing towers, temporary access tracks, temporary compounds, etc), it is not expected that the construction will impact on these receptors. Furthermore, as both these areas are located within a SSSI (Auchterhouse Hill), it is not expected any access tracks, storage areas or compounds will be located within Carbon and Peatland habitat, further justifying that the construction works are not expected to impact on the receptors present. For extra vigilance (despite the distance of these receptors from the Proposed Development), control of working areas and the marking out of the Carbon and Peatland habitats

would be employed to avoid disturbance to these areas from construction plant and activities. Due to the distance of receptors from the Proposed Development, the likely works associated with the Proposed Development, control of working areas and the marking out of the Carbon and Peatland habitats, and undertaking works in accordance with best practice, the potential magnitude of impact on the Class 1 and Class 5 Carbon and Peatland habitats ('**very high**' and '**moderate**' sensitivity respectively) is '**negligible**'. Therefore, the significance of effect is **'minor' (not significant)** for the Class 1 Peatland Habitat and **'negligible' (not significant)** for the Class 5 Carbon and Peatland Habitat.

12.7.33 The Class 5 Carbon and Peatland habitat within the Proposed Development between existing Towers 670 and 671 ('medium' sensitivity) may be affected by the works. The extract from the OS map highlights the area anticipated to be referred to in the Carbon and Peatland map where peat may have accumulated. The topography indicates steep slopes above a flatter area along the line of the present OHL with the slope then falling through wooded area to the south. Rock outcrops on the steeper slopes above and the borehole taken at Tower 671 indicates rockhead at a depth of 2.9m with glacial deposits overlying. There is no record of peat and the glacial deposits correspond with the information indicated on the BGS soils maps. Small streams issue from the hillside locally and the existing tracks bypass the area which may suggest a softer boggy area and if any peat is present it is likely to have accumulated within this area.

12.7.34 Based on the available information it is not anticipated deep peat deposits will be encountered locally between Towers 670 and 671. As there are also no signs of peat landslide activity, no raised bog and the topography locally where peat would have accumulated is not greater than 2 degrees, it is not considered that a Peat Landslide Hazard and Risk Assessment (PLHRA) is required.

12.7.35 During construction, the placing of temporary compounds within the area where Class 5 peatland has been indicated should be avoided to minimise disturbance or damage from repeated trafficking or during installation. At present the presence, extent and depth of peat within this area is not proven. As works will be undertaken in this area, investigation should be undertaken local to works areas, prior to construction, to positively identify the peat. The new temporary stone road proposed within the Class 5 area should take into consideration damage/disturbance of the soil environment and as such the use of stone on a geo-textile fabric base to minimise excavation of the peat should be considered. The new temporary stone road will be returned to its previous condition following construction of the Proposed Development and as such the handling and temporary storage of any peat excavated should be undertaken in accordance with best practice. Taking into consideration the above considered measures as well as following best practice would ensure the magnitude of impact on the Class 5 habitat is 'minor' and thus the significance of effect is **'minor**' (**not significant**).

12.7.36 The potential peat deposits towards the northern extent of the Proposed Development within the alluvial soils ('**low**' sensitivity) are also likely to be affected by the works, if present. As such, as with the Class 5 habitats within the Proposed Development, no placing of temporary compounds should be undertaken within these areas unless it can be proven that peat or carbon rich soils are not present, as this may result in a significant impact. Any access track used in the area should take into consideration damage/disturbance of the soil environment and as such temporary trackway, specialised low ground bearing pressure vehicles or stone roads on a geo-textile fabric base should be considered, unless it can be proven that peat or carbon rich soils are not present. Taking the above into consideration as well as following best practice would ensure the magnitude of impact on the potential peat deposits is '**minor**' and thus the significance of the effect is **'negligible' (not significant)**.

Assessment of Operational Effects

12.7.37 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.

12.7.38 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.

Assessment of Decommissioning Effects

12.7.39 The Proposed Development will not have a fixed operational life; however, it is assumed that the Proposed Development would be operational for 50 years or more. Once the design life of the OHL has been reached, a decision would be taken on whether to decommission and remove the transmission infrastructure or potentially to replace or upgrade it. The effects associated with the construction phase are considered to be representative of worst-case decommissioning effects, and therefore no separate environmental assessment is necessary for the decommissioning phase.

Cumulative Effects

12.7.40 Cumulative effects have been considered as part of this water environment impact assessment, and the results presented below.

Intra Cumulative Effects

12.7.41 The intra cumulative effects assesses other developments within 3 km of the OHL. The intra cumulative effects assesses where a single receptor is affected by multiple aspects of a project, which can lead to potential worsening of effects on the receptor. This includes where sources different components of the project are combined to be of greater significance than when considered individually.

12.7.42 Table 12-25 Interactive (intra) cumulative assessment for Associated SSEN Developmentslists the intra cumulative effects associated with developments related to the construction of the Proposed Development, shown, indicatively, on Figure 5.1 (Volume 3).

Inter Cumulative Effects

12.7.43 The assessment of likely cumulative effects is based on proposed developments identified in the surrounding area. The cumulative developments identified are those that are reasonably foreseeable - i.e. in the public domain at scoping stage or consented but not yet under construction/constructed at the point of writing the assessment/at submission.

12.7.44 Inter-relationship cumulative effects have assessed qualitatively where committed development is proposed that could have cumulative effects with water features that may be affected by the Proposed Development, either during construction or operation phases.

12.7.45 Table 12-26 In-combination (inter) cumulative assessment for Other SSEN and 3rd Party Developments lists all the committed developments in the wider area around the Proposed Development site that have been considered by this EIA Report, shown, indicatively, on Figure 5.1 (Volume 3).

12.7.46 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 12-25 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
Tealing- Westfield 275 kV OHL upgrade	A	Tealing-Westfield/ Glenrothes	Upgrade of approximately 38 km of an existing 275 kV OHL between Tower 182 (west of Tealing Substation) and the licence boundary with Scottish Power Energy Networks (SPEN) (Westfield/Glenrothes) (midspan between Towers 66 and 65) to enable operation at 400 kV.	EIAR in preparation (alongside the EIAR for the Proposed Development	No significant impacts predicted.	Construction of the Tealing-Westfield 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 Scoping Report submitted 2nd July 2024 Angus Council Planning Portal Link: 24/00431/EIASCO	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.	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
						Therefore, no likely significant cumulative effects.	
Kintore- Tealing 400 K Connection	C	Kintore-Tealing	Construction of a new 400 kV OHL between Kintore and Tealing. T	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.
Alyth-Tealing and Tealing to 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 between Tower 680 and Tower 682, connecting to the new Tealing (Emmock) substation. This will enable the removal of approximately 1.5 km of redundant OHL between Tower 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 12-26 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 12th July 2023 and EIA Screening Request submitted and determined EIA Not Required 11th 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 submitted 3rd 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

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 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 17th November 2023. EIA not required.	No EIA completed, however from assessment completed, significant effects are considered unlikely.	No likely significant cumulative effects.	None.
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	Status: Application Consented 13th December 2023 EIA not required.	No EIA completed, however from assessment completed, significant effects are considered unlikely.	No likely significant cumulative effects.	None.
Fithie Energy Park BESS	I	Land to the north-west of Tealing Substation	Construction and Operation of up to 1400 MW battery energy storage system (BESS) and associated infrastructure	Screening Report submitted 23rd February 2024	Not available.	No likely significant cumulative effects predicted due to relative distance.	None.
Ark Hill Wind Farm Extension	J	Approximately 2.5 km north-east of Alyth-Tealing	Extension of Ark Hill Wind Farm consisting of the erection of four wind turbines measuring a maximum height of 89.5 m (to blade tip) with a rotor diameter of 71 m, the formation of access tracks and associated	Application validated 21st October 2021, awaiting decision. EIA Required	No significant residual effects identified.	No likely significant cumulative effects predicted due to relative distance,	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
			hardstanding areas, set down areas, construction compound, electrical substation and borrow pit				
Balnuith Farm BESS (Tealing)	K	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 6th September 2022	Not available.	No likely significant cumulative effects predicted due to relative distance.	None.
Myreton BESS	L	Land to the south of Tealing Substation	A proposed BESS with an installed capacity of around 750 MW.	Screening Report submitted 22nd February 2024	Not Available.	No likely significant cumulative effects predicted due to relative distance.	None.

12.8 Mitigation

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

12.8.2 There are a number of potential soils, 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 soils and water environment. A more detailed description of the embedded mitigation relevant to a particular effect / receptor is provided in this section.

Access Requirements

12.8.3 There is no information of the design or any associated mitigation of the culvert upgrades.

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

12.8.5 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

12.8.6 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 12-23 above, waterbodies within 50 m of potential Tower foundation upgrades have been identified.

12.8.7 The Construction Methodology Statement[69] 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.

12.8.8 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.

12.8.9 Foundation improvements will have the potential to impact the hydromorphology of water courses. In particular, AT20 could be impacted by any foundation improvement works at Tower 644. As outlined in the Construction

[69] Balfour Beatty (2023) Construction Methodology – ASTI Framework

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.

Watercourse Crossings

12.8.10 Table 12-24 lists all of the proposed watercourse crossings proposed. At the time of writing, detailed design of each of the new culverts proposed is not available. In drawing LT384-BB-ROAD-ZZ-D-H-0002[70] it is shown a pipe culvert is to be used. It is also assumed that water crossings will be designed to accommodate the 1 in 200-year event plus climate change and other infrastructure as recommended by SEPA (see Table 12-4).

12.8.11 SEPA have also created guidance on good practice for river crossings[71] which describes the impact on rivers from different types, replicated in Plate 12-1 below. When selecting a water course crossing design, this guidance will be taken into consideration but may not be able to adhere to absolutely.

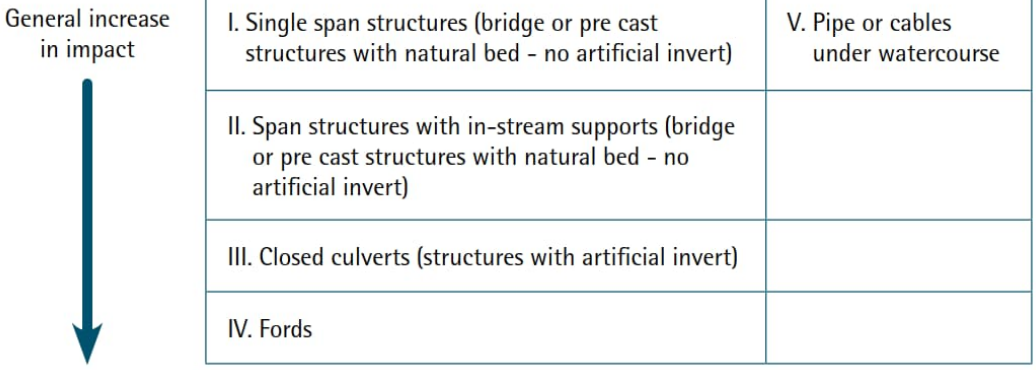

Plate 12-1 River crossing types extracted from SEPA document wat-sg-25

Soils Environment

12.8.12 Areas have been identified within the Proposed Development area where peat or carbon rich soils are likely to be present. The impact of the foundation upgrades potentially required in these areas can be managed and mitigated through use of the CEMP and best practice. For the access tracks within these areas, these shall be installed using temporary stone roads on a geo-textile fabric base, temporary trackway or specialised low ground bearing pressure vehicles should be used based on ground conditions present. Temporary compounds shall also not be constructed unless the absence of peat or carbon rich soils are proven.

12.8.13 It is recommended survey and/or intrusive works are carried out within the areas identified as containing peat or carbon rich soils to determine if these are present, their extent and their quality.

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.

[70] SSEN. YT Route ASTI Reconductoring Projects. LT383. Generic Culvert Design for 12T Axly Access General Arrangement. LT384-BB-ROAD-ZZ-D-H-0002

[71] SEPA (2010) Engineering in the Water Environment: Good Practice Guide (River Crossings) (online) Available at: https://www.sepa.org.uk/media/151036/wat-sg-25.pdf. [Accessed: July 2024]

Control of Construction Water Environment Risks

12.8.14 A CEMD referring to a range of standard mitigation measures and will draw on mitigation measures set out as part of this EIA Report will be prepared and implemented by the Principal Contractor as necessary to protect the water environment from pollution and physical impacts during construction works.

12.8.15 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 run-off 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

12.8.16 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 2011[72], 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

12.8.17 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 in for the consented project in advance of and during construction. Central to this will be a programme of water quality monitoring (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.

12.8.18 The design is to follow best practice outlined by a CEMD. The Guidance of Pollution Prevention (GPP) on the NetRegs website[73] 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

[72] SEPA (2024) Controlled Water Activities (CAR) Consents (Scotland) (online) Available at: 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]

[73] 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]

- GPP 20: dewatering underground ducts and chambers.

12.8.19 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.

12.8.20 Although no significant effects are predicted for the soils environment and so no specific mitigation is required, other than no temporary compounds being permitted within areas identified as having potential for peat or carbon rich soils (unless proven to be absent), it should be highlighted that damage to / disturbance of soils, soils compaction and soils erosion should be mitigated through the design process, best practice, a CEMP and by having a geotechnical specialist present onsite to monitor the construction works relating to the ground and provide specialist advise, where required. Note that given the volumes of peat or carbon rich soils anticipated within the Proposed Development, it is not anticipated a stand-alone Peat Management Plan (PMP) will be required. It is considered that the principles and guidance required through the preparation of a PMP can be incorporated into the CEMP.

Management of Construction Site Run-off

12.8.21 Mitigation measures to manage construction site run-off will be detailed in the WMP.. Below is a summary of measures to be included as a minimum:

- 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 (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 run-off to existing ponds); and
- 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.

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

12.8.23 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 and inert barrier.

Management of Spillage Risk

12.8.24 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 on the control of spillages and leaks.In summary 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 site 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 similarly 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 Site and regularly topped up;
- all construction workers would receive spill response training;
- the Proposed Development site will be secure 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.

12.8.25 Any site welfare facilities would be appropriately managed, and all foul waste disposed of by an appropriate contractor to a suitably licensed facility. The main compound 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 contractor so that the water could be disposed of at a suitably licensed waste facility.

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

12.8.27 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 final 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

12.8.28 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 future CEMD; and
- managing 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.

Additional Mitigation

Water Quality and Flow Monitoring

12.8.29 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 12.1 (Volume 4) should monitored before, during and after construction.

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

12.8.31 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.

12.8.32 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.

Table 12-27 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
WE2	Throughout Proposed Development	Prior to and during construction	A CEMD and WMP should be prepared and include, but may not be limited to: • 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);	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
			• 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.			
WE3	Throughout Proposed Development	Prior to and during construction	A CEMD and WMP should be prepared and include, but may not be limited to: • 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	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	To minimise the impact of any groundwater control activities during	Relevant Authority	

Mitigation Item	Location	Timing of Measure	Mitigation Measure	Mitigation Purpose / Objective	Specific Consultation or Approval Required	Potential Monitoring Requirements
			relevant statutory regulator and will need to comply with the pollution prevention requirements set out in the future CEMD. 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 final CEMD.	construction on the water receptors.		
WE5	Affected works	Prior to and during construction	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 samples on a regular or ad hoc basis for analysis at an accredited laboratory.	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.
WE6	New culvert locations	Detailed Design and During Construction	Watercrossings should be designed to accommodate the 1 in 200-year event plus climate change and other infrastructure.	Reduce flood risk	No	No

12.9 Residual Effects

12.9.1 All identified impacts are described after standard and embedded mitigation as **negligible adverse** or **minor adverse (not significant).**

12.9.2 It is expected that there will be minimal impacts from the operation of the OHL. This is because due to the nature of the Proposed Development, 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.

12.9.3 Table 12-28 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.

12.9.4 No significant environmental effects on the soils or water environment have been predicted with the application of the mitigation measures described in this chapter of the EIA Report.

Table 12-28 Summary of Effects

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Sidlaw Hills WFD Groundwater Body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD and WMP	Minor	Not Significant
	Foundation Improvements – groundwater change in flow	Minor	Implementation of CEMD and WMP	Minor	Not Significant
Strathmore WFD Groundwater Body	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD and WMP	Minor	Not Significant
	Foundation Improvements – groundwater change in flow	Minor	Implementation of CEMD and WMP	Minor	Not Significant
The Isla and Lower Tay Sand and Gravel WFD Groundwater Body	Foundation Improvements – groundwater change in flow	Minor	Implementation of CEMD and WMP	Minor	Not Significant
	Foundation Improvements – groundwater change in flow	Minor	Implementation of CEMD and WMP	Minor	Not Significant
Private Water Supplies	Foundation Improvements – groundwater contamination	Minor	Implementation of CEMD and WMP Monitoring before, during and after construction	Minor	Not Significant
	Foundation Improvements – groundwater change in flow	Minor	Implementation of CEMD and WMP Monitoring before, during and after construction	Minor	Not Significant
	Access Tracks and other works	Minor	Implementation of CEMD and WMP Monitoring before, during and after construction	Minor	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
AT2	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Negligible/Minor	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT3	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT6	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Minor	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT7	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT8	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT9	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT10	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
AT11	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Minor	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT12	Water Quality - Sediment Laden Run-off	Minor	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Spillage Risk	Minor	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT13	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Negligible/Minor	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT14	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Minor	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT15	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	Hydromorphology - culverts	Minor	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT16 (Kirkinch Burn)	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT17 (Camno Burn)	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology - culverts	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT19 (Dean Water)	Water Quality - Sediment Laden Run-off	Moderate	Implementation of CEMP, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Spillage Risk	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
AT20	Water Quality - Sediment Laden Run-off	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Spillage Risk	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Foundation Improvements	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Hydromorphology - culverts	Minor	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Hydromorphology – foundation Improvements	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
AT21 (River Isla)	Water Quality - Sediment Laden Run-off	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Spillage Risk	Moderate	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
AT22 (Commerton Burn)	Water Quality - Sediment Laden Run-off	Minor	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
	Water Quality - Spillage Risk	Minor	Implementation of CEMD, WMP and embedded mitigation	Minor	Not Significant
AT26	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT27 (Den Burn)	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
AT28	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT29 (Denend Burn)	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT31 (Auchterhouse Burn)	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT32	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Hydromorphology – Foundation Improvements	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
AT33	Water Quality - Sediment Laden Run-off	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant
	Water Quality - Spillage Risk	Negligible	Implementation of CEMD, WMP and embedded mitigation	Negligible	Not Significant