Balliemeanoch Pumped Storage Hydro

Environmental Impact Assessment Report

Volume 2: Main Report
Chapter 12: Water Resources and Flood Risk

ILI (Borders PSH) Ltd

July 2024

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Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	July 2024	Submission	DL	David Lee	Technical Director

Distribution List

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12.1 Introduction

This chapter of the EIA Report provides an assessment of the potential effects of flood risk and water resources from the Development. This chapter is informed by the following appendices contained within *Volume 5: Appendices* of the EIAR:

- Appendix 12.1: Water Resources Assessment
- Appendix 12.2: Flood Risk Assessment

Chapter 2: Project and Site Description (Volume 2: Main Report) details the project and site description of the required works to implement the Development.

Detail on relevant water environment sections including water quality, hydro morphology and hydrogeology please see *Chapter 10: Water Environment (Volume 2: Main Report).*

Consultation has been undertaken with SEPA, this is further explained within *Section 12.3 Consultation*.

12.2 Legislation and Policy

This section outlines the relevant legislation, planning policy and guidance relevant to this assessment and admissible to the Development (please note that regulations transferring powers from the European Union the United Kingdom have not been included within this section).

12.2.1 Legislation

A number of specific regulations have been enacted to implement the statutory European and national legislation into UK law – these regulations include:

- EU Directive 2000/60/EC (Water Framework Directive (WFD)), transposed into the (Ref 1)
- Water Environment and Water Services Act (Scotland) 2003 ('the WEWS Act') (Ref 2).
- Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) in respect of discharges to surface or groundwater ('the CAR Regulations') (Ref 3);
- Flood Risk Management (Scotland) Act 2009 and the Flood Risk Management (Flood Protection Schemes (Ref 4), Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010 ('the Flood Risk Management Act') (Ref 5); and
- Reservoirs (Scotland) Act 2011 (Ref 6).

This legislation aims to protect and enhance the status of aquatic ecosystems, prevent further deterioration of such ecosystems, promote sustainable use of available water resources, and contribute to the mitigation of floods and droughts.

12.2.2 National Planning Policy

Planning Advice Notes (PAN) provide national guidance and SEPA (statutory consultee) have produced a range of guidance documents covering a range of environmental issues. These documents relevant to the water environment are listed below:

- National Planning Framework 4 (NPF4) (2023) (Ref 7)
- PAN 51 – Planning, Environmental Protection and Regulation (Revised 2006) (Ref 8)
- PAN 61 – Planning and Sustainable Urban Drainage Systems (2001) (Ref 9)
- PAN 79 – Water and Drainage (2006) (Ref 10)
- PAN 1/2013 – Environmental Impact Assessment (Ref 11)

- SEPA Interim Position Statement on Planning and Flooding; (2006) (Ref 12)
- SEPA Engineering activities in the water environment: Good practice guide – River Crossings (Ref 13); and
- SEPA Technical Flood Risk Guidance for Stakeholders (Version 12, 2022) (Ref 14).

12.2.3 Local Planning Policy

The Argyll and Bute Local Development Plan 2 (Ref 15) was adopted in February 2024. The plan sets out the policies preferences on two conditions: the type of development, and the area within which it should take place. Site specific proposals are included with the purpose of the plan to encourage development and possible changes in land use in areas of lower flood risk that will serve the public interest.

Policy 55 – Flooding

Development proposals should avoid areas that are susceptible to flooding and promote sustainable flood risk management.

Potential development areas are broken down into three types to examine the most appropriate for development types, to minimise risk to the council residents. These are as follows:

a) All types of development within areas with a probability of flooding of less than 1:1000 annual probability of flooding are acceptable in terms of this policy unless local circumstances and/or the nature of the development dictate otherwise;
b) All types of development, excluding essential infrastructure, within area with a probability of flooding between 1:1000 and less than 1:200 annual probability of flooding are acceptable in terms of this policy unless local circumstances dictate otherwise.
c) Within flood areas (1:200 or greater annual probability of flooding) only those categories of development indicated in criteria i), ii) or ii) of this policy may be acceptable.

The indicated criteria, see above, that described the acceptable developments within flood areas (1:200 or greater Annual Exceedance Probability) are as follows:

i) Redevelopment of residential, commercial, and industrial development and which are of an equally or less vulnerable use within built-up areas providing flood prevention measures to a 1:200 year plus climate change standard already exist or are under construction. Water resistant materials/ construction together with a suitable freeboard allowance as appropriate;

ii) Development on undeveloped and sparsely developed areas within the functional flood plain and compromising:

- Essential development such as navigation and water-based recreation use and essential transport and some utilities infrastructure; and an alternative lower risk location is not achievable;
- Essential infrastructure which should be designed and constructed to remain operational during floods;
- Certain water compatible recreational, sport, amenity and nature conservation uses providing adequate evacuation procedures are in place.

iii) Development, which is in accord with flood prevention or management measures as specified in association with a Local Development Plan 2 Allocation or development brief.

The requirements of Argyll and Bute Council state that all development proposals at risk of flooding or in a flood risk area, under section d), shall demonstrate that:

d) All development proposals at risk of flooding or in a flood risk area shall demonstrate that:
i) All risks of flooding are understood and addressed;
ii) There is no reduction in floodplain capacity, increased risk for others, or a need for future flood protection schemes;
iii) The development would remain safe and operational during floods;
iv) Flood resistant and resilient materials and construction methods are used, and
v) Future adaptations can be made to accommodate the effects of climate change.

If proposals are subject to potential flooding and do not comply with parts a),b),c) or d) of this policy, see above, or to advice of the Environment Protection Agency (SEPA). The planning authority (Argyll and Bute) must exercise the 'precautionary principle' and refuse development proposals.

In all cases development proposals will be subject to assessment using Flood Risk Management Plan: Highland and Argyll Local Plan District; Flood Risk Management Plan: Clyde and Loch Lomond Local Plan District; and The River Basin Management Plan for Scotland 2021-2017 (see LDP2 T16 Technical Working Note: Flood Risk Framework).

Policy 61 – Sustainable Drainage Systems

All proposed developments should incorporate Sustainable urban Drainage Systems (SuDS) where appropriate including existing ponds, watercourse, or wetlands as positive features in development schemes, these should be designed in accordance with the CIRCIA SuDS Manual (C753).

Policy 62 – Drainage Impact Assessment

The Council will require developers to demonstrate that all development proposals incorporate proposals for SUDS measures in accordance with technical guidance. Developers will be required to submit a Drainage Impact Assessment (DIA) with the following categories of development:

- *Development of six or more new dwelling houses;*
- *Non-householder extensions measuring 100 square metres or more; AND,*
- *Other non-householder developments involving new buildings, significant hard standing areas or alterations to landform.*

Developments excluded from the above three categories might also require a DIA when affecting sensitive areas such as areas affected by flooding, contamination, or wildlife interest.

In all cases the Council will encourage the use of sustainable options for waste and surface water drainage.

12.3 Consultation

This section outlines the consultation that has been conducted previous to the draft of this EIA chapter. Consultation with the statutory consultee, SEPA, was conducted via Teams on the 19th of March 2024. Further details regarding consultation on water resources can be found within *Table 12-1 Summary of Consultation*, please see below.

Table 12.1 Summary of Consultation

Consultee	Key Issue	Summary of Response	Action Taken
Scottish Environmental Protection Agency (SEPA)	Rate of change of Loch Awe level	The rate of change in Loch Awe level will be 20cm to 1m levels for drawdown/ increase depending on period (season) of operation, please refer to *Table 1* within *Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*.	Operation parameters of a minimum level of 35.95 mAOD and 37.00-37.65 mAOD are proposed for Loch Awe. SEPA will need to review this once submitted, contextualising the parameters with the Loch levels.
	Cumulative impacts	Ratings of cumulative effects of downstream of the barrage of Loch Awe have been developed. SSE operate the barrage downstream, however, they have provided no information.	Assumptions of the barrage have been adopted and inputted into the flood model, please see *Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*. Estimated dimensions and levels for the radial gates that control the outflow to River Awe were derived from the Flood Risk Assessment (FRA) report for the Cruachan expansion.
	Consideration to the existing run-of-river hydro scheme	The 'Hands-off' operating regime is to be included within	Please see *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)* where

Consultee	Key Issue	Summary of Response	Action Taken
		the proposed headwater design.	the tailpond structure will adopt the 'hands-off' operating regime when Loch Awe is at 37.67 mAOD (50% AEP event). This will be reduced with a 10% AEP rainfall event to 37mAOD to reduce flood risk downstream of the headwater pond.
MOWI	Assessment of water level changes on the mooring systems and containment measures for stock at the Tervine and Braevallich fish farms	Water levels will be kept within normal fluctuations of Loch Awe through the operational regime. The water levels will be controlled through a CAR license from SEPA.	The operation regime with 'hands-off' minimal level 35.95 mAOD and maximum level of 37.65 mAOD.
	Assessment of water level changes to shoreside from infrastructure such as spillways and vessel pontoons.	Operation regime is proposed to limit the water levels during periods of high and low water levels. Based on a no discharge/ abstraction from Loch Awe. An assessment of variation of change has been conducted based on the proposed generation and abstraction rate. The rate of change has been found to be in line with the current changes in Loch Awe based on the review of Historic Levels. The rate of change (fluctuation) of water levels has been found to be higher as a result of the scheme operation.	The operational regime ' hand-off' water levels, with a minimal level of 35.95 mAOD and maximum level of 37.65 mAOD.
Argyll and Bute Council	In the event of flooding or low loch levels what potential cumulative impacts this would generate if the consented Cruachan Expansion scheme is also operating and extracting water at its maximum operational capacity. Please expand on the point " Impacts on the marine environment in cumulation with Cruachan and its proposed expansion in terms of water extraction and discharge should be carefully detailed.	The potential cumulative impacts have been identified within this Chapter, 12. These however are deemed low or negligible for flooding and low flow through the introduction of the operational regime. The Cruachan Expansion regime was included within the baseline environment for the loch levels; therefore, the operational regime is built upon Loch Awe existing hydropower usage.	The operational regime ' hand-off' water levels, with a minimal level of 35.95 mAOD and maximum level of 37.65 mAOD. This is based on historical water levels and therefore the scheme should not pose a risk to marine/aquatic life.

12.4 Study Area

Balliemeanoch, the Development Site, is a pumped storage hydro proposed within the council boundaries of Argyll and Bute, western Scotland. The study area expands from the southern border of Loch Awe along the A85, south of Portsonachan to Inveraray on the northwestern side of Loch Fyne.

Loch Awe is a freshwater lake with an expansive catchment area, please see *Table 12-2* for more detail. Loch Awe is dammed by the Awe Barrage which is located on the River Awe northeast of the Loch (NGR: NN04520 286890), operated by Scottish and Southern Electric (SSE). The Barrage contains a Borland fish pass and two hydro intake arrangements. These include a turbine on the compensation flow and a penstock that diverts water downstream to the Inverawe Power Station (25MW).

The Development is a 1.5GW pumped storage hydro that utilises Loch Awe as its Tailpond, generating a Headpond located in the proximity of Lichan Airigh, as it above reservoir. The water will be transported through below-ground tunnels and a generation station. An above-ground Tailpond inlet / outlet structure will allow for the

abstraction/generation of water between the two reservoirs. Please see *Chapter 2: Project and Site Description* for further details.

For the purpose of the Water Resource Assessment- *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)*, the Loch Awe catchment was assessed to calculate the inflows to Loch Awe (gauged and ungauged), to determine the baseline levels of Loch Awe and the regulation of the Awe barrage (water level vs discharge). From the assessment the Loch Awe catchment has total catchment area of 815 km^2, this is tabulated into gauged and ungauged areas, as follows:

Table 12-2 Gauged & Ungauged catchments within the Loch Awe catchment

Gauged/ ungauged catchment	Name	Area (km^2)	Gauged Years
Gauged	Orchy @ Glan Orchy	251.2	47
Gauged	Strae @ Glen Strae	36.2	47
Gauged	Lochy @ Inverlochy	47.7	46
Gauged	Avich @ Barnaline Lodge	32.1	44
Gauged	Abhain a Bhealaich @ Braevallich	24.1	43
Ungauged	Headpond catchment	5.37	N/A
Ungauged	Loch Awe area	38.5	N/A
Ungauged	Remainder catchment modelled	380.73	N/A

A second report was generated, the Flood Risk Assessment (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*) additionally considers the flood risk that this development poses to the site itself and downstream of the Awe barrage. Downstream of the Awe barrage has various sensitive receptors, the three analysed within the FRA are the road and infrastructure around Loch Awe A85 and the Taynuilt Potentially Vulnerable Area (PVA) that sits at the mouth of the River Awe, west of the Awe Barrage.

The study area is regulated by the location of the new development, including the construction works (above & below ground infrastructure) and the planned access routes. A brief summary of the infrastructure proposed is:

- The Tailpond inlet / outlet structure to Loch Awe,
- The Headpond located in the proximity of Lochan Airigh,
- New Access Tracks extending from the Tailpond inlet / outlet to the of the Headpond,
- Tunnels will be constructed below ground;
- Temporary Construction Compounds.

Please see *Chapter 2: Project and Site Description (Volume 2: Main Report)* for further details.

Loch Awe has an existing hydropower scheme Cruachan PSH scheme, 440W, with an expansion of Cruachan 2 delivering 600MW additional output within generation mode. This scheme uses Loch Awe as their Tailpond; therefore, this has been included within the baseline loch water levels, please see *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices).* An additional three smaller hydro schemes also operate using water from Loch Awe; Allt Beochlich, River Avich and Loch Nant.

12.5 Assessment Scope

The assessment considers the effects during the three phases of the Development lifespan as identified in *Section 12.16 – 12.19* of *Chapter 2: Project and Site Description*. The phases include: pre-construction, construction, operation and decommissioning.

The assessment considers; the proposed run-of-river hydro scheme, at the four stages mentioned above in relation to Flood risk and Water Resource.

Flood Risk Assessment

The Flood Risk Assessment (FRA) (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices))* was undertaken to assess the impact of flooding on the proposed site during construction and operation. *Section 12.6*

summarises the work undertaken to assess the flood risk to the site and downstream of the Awe Barrage. The FRA considers the peak level in the Loch Awe and peak flow at the Loch Awe Barrage within the fluvial model to assess the risk of the Development during construction and operation.

Water Resources Assessment

The Water Resource Assessment (*Appendix 12.1 Water Resources Assessment (Volume 5: Appendices))* reviews the current water resource usage within Loch Awe and the working parameters or key receptors. It develops the potential impact on water resources as a result of the development and addresses appropriate mitigation measures to reduce the impact of the Development including outlining the operational rules.

12.5.1 Baseline Data Collection

The following sources have been utilised to assess the baseline environment in which effects of the Development may impact. Data has been obtained from the following sources, to inform Flood Risk Assessment study:

- Site information and development proposals
- Scottish Environmental Protection Agency (SEPA) flood risk mapping (Ref 16)
- Ordnance Survey (OS) mapping; and
- Loch Awe Water Levels – Drax Ltd. (Ref 17)
- The proposed expansion of Cruachan PSH scheme Flood Risk Assessment (Ref 18)

Sources of data in regard to the water resource assessment (*Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)*), are as follows:

- SEPA Gauge data, for five rivers in the Loch Awe catchment, covering 48% of the catchment area,
- HadUK-Grid rainfall dataset, for rainfall estimates over Loch Awe,
- Hydro-PE HadUK-Grid dataset, for evapotranspiration, converted to evaporation values over Loch Awe using Environmental Agency advice,
- Loch Awe level data provided by Drax,
- Loch Awe Barrage operating range targets, from the Cruachan expansion application.

12.6 Assessment method

Water resource assessment

- To assess the current water resource usage within Loch Awe an understanding of the water levels (inflow and outflow), dependent on the Awe Barrage (NN04520 28689) was assessed to determine the impact of the Development. A water balance model was used to understand the statistical relationship between the level and the outflow dependent on the seasonality, please see *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices).,* for further details.
- Secondly, a Loch Awe reservoir model was built within Flood Modeller version 5.1. This was set up to estimate the generation and abstraction potential of Loch Awe in reference to the seasonality, as discussed in section 3 within *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices).*
- To assess the impact of the Development to the water levels and activity of the Awe Barrage, an assumed operation was added, either abstraction or generation. These results were compared to the baseline with operation input.
- These results were re-run with a cyclical operation of the Development including abstraction and generation for 5 hours and 4.06 hours, respectively, for each day. These were either modelled beginning with abstraction or generation, to compare effects on Loch Awe. The results were crossed referenced to the distribution of level changes from the hourly record of loch levels from 2019-2021 provided by Drax.

Flood Risk Assessment

- A HEC-RAS model was built to assess the fluvial flood risk to the Development itself and downstream of the Development, by calculating the peak water level in Loch Awe and peak flow at the Loch Awe Barrage.

- The model was built along a 4km arm between the Loch Awe and River Awe. Upstream of the model was represented as a reservoir unit based on the water resource analysis and the downstream extent of the model was defined by the Awe Barrage. The inflow from the upstream component was estimated by FEH catchment characteristics run in a ReFh2 model. The barrage gates were modelled with 4 sluice gates to open at 37.0 mAOD. The model was run for 3 to 4 days to simulate a 72-hour rainfall event. This gave results of the peak water level for the design storm event of 0.5% AEP+59%CC, giving an indication of the potential receptors of flood risk at this design event.
- A sensitivity analysis was conducted on the model by running two additional scenarios of:
    - Increasing the inflow by 20%,
    - Reduction of the outfall capacity of the Awe Barrage, by reducing the gates by 20%.
- Other sources of flood risk were assessed by SEPA flood risk maps and site observations/reports, see *Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)* for additional information.

12.6.1 Limitations And Assumptions

The Water Resources Assessment (*Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)*), sets up a water balance model to understand the statistical relationship between the level of Loch Awe and outflow from the Awe Barrage. One inflow element inputted within this model, ungauged inflows, was estimated by scaling the flow at the Orchy gauge based on the catchment area. This data was interpolated due to the limited gauged data within the catchment. This estimate did not include inflows, north and south of catchment, generating an inaccurate result of inflows to Loch Awe. Please refer to *Volume 5: Appendices*, *Appendix 12.1 Water Resources Assessment*, *Figure 3* where the inaccuracies of inflows are recorded.

The water balance model results show the generalised assumed relationship between loch level and outflow from the Barrage. The model showed inaccuracies of outflow (Awe Barrage operation) with many points out with the trend line, showing higher outflow during periods of lower loch levels, please see *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices).*

The second model set up within the Water Resource Assessment was the ‘behavioural analysis’ model. The model included Loch Awe as a reservoir unit and the scheme as an abstraction unit. The water balance model results, described above, determined the loch level to outflow relationship within the model.

Calibration of the ‘behavioural analysis’ model included within the water resource analysis deemed the model to overestimate outflows from the flow-level boundary during prolonged periods of low levels, most notably within winter operation with data obtained from the water balance model. Therefore, the model was adapted to assume that there was zero outflow when the loch Awe level was below 35.5 mAOD in winter and 36.0 mAOD in summer. For further details please see *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices).*

To assume the potential impact of the Development operation on Loch Awe levels the ‘reservoir’ model was run with either, an assumed generation of abstraction to Loch Awe. The first round of model scenarios was run with either 10%, 20%, 50% or 100% generation/abstraction, with the model split between summer and winter.

The second scenario was run with a cyclical operation of the Development. This runs a model with either a 5-hour generation or 4.06 hour abstraction per day to return the Loch Awe level to its original state. This equates to the same amount of water ~ 7 million m^3. This model assumed that the operation of the barrage gates is not adjusted during cyclical operation.

The Flood Risk Assessment set up a HEC-RAS model to determine the peak water level of Loch Awe along River Awe and at Awe Barrage, please see *section 12.6* and *Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)* for further details.

Two components of the Flood Risk Assessment fluvial model’s geometry are assumed due to limitations to acquire data. The depth of the channel from Loch Awe to the Loch Awe Barrage is assumed from a previous Bathymetry survey conducted in 1904.

Secondly, the geometry of the barrage & sluice gates was assumed due to SSE declining to provide data. The geometry from the previous Flood Risk Assessment Report for the Cruachan expansion was used as an input into the model.

The FRA fluvial model build includes an estimation of the upstream inflow, based on previous assumptions from the reservoir model, including a new parameter of FEH catchment characteristics inputted within an RefH2 model inputted upstream within the model setup.

The FRA (*Appendix 12.2 Flood Rish Assessment (Volume 5: Appendices))* and Water Resources Assessment (*Appendix 12.1 Water Resources Assessment (Volume 5: Appendices))* have been based on available information. With regard to the modelling within the FRA and water resource review, multiple assumptions were inputted within the model due to lack of information.

12.6.2 Baseline Environment

The baseline flood risk and water resource conditions relevant to this assessment are outlined in the following sections.

The Development Site is situated between Loch Awe and Loch Shira water environment areas. The Development Site sits at Balliemeanoch on the border of Loch Awe. The Site is bordered by the B840 along the edge of Loch Awe to the west and Loch Shira to the east. Further details of the general hydrological setting are explained within *Chapter 11: Water Environment (Volume 2: Main Report).*

Water Resource – Loch Awe and River Awe

Loch Awe and River Awe are water resources for the existing Cruachan Power station, located roughly 66km away from the Development, in Dalmally. Details of the operational arrangements of the Cruachan scheme were provided by Drax, see *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)* for further details.

Loch Awe spans from Ford to Stronmilchan. The Loch discharges through the existing barrage constructed for the Loch Awe power station spilling west into the River Awe at the upstream end of the Loch. The barrage effectively controls the Loch Awe and subsequently Loch Etive. River Awe flows west through Balure into Loch Etive discharging to Ardmuckingnish Bay a small coastal embayment, southwest of the Development.

During drought conditions, SSE is required to release water from upstream catchments and reservoirs to provide minimum ‘compensation’. A minimum pass forward flow must be maintained to the River Awe over the Awe Barrage with a minimum water level maintained.

Minimum environmental flows must be maintained in the River Awe at all times. This is achieved through the opening of radial gates on the Awe Barrage. This is undertaken by SSE based on water levels in the loch.

The Cruachan Hydro Power Scheme, 440 MW scheme, extracts water from Loch Awe, generally operating on a daily cycle. A daily water level dataset measured at the Cruachan intake was acquired from Drax from 2013 till 2021. The daily water level data is shown within Figure 2 of the *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices),* shows that the target water level range is from 35.95 mAOD to 37.15 mAOD. From further assessment of these water levels, the winter operating range is exceeded 25% of the time and during summer operation water levels drop below the range approximately 30% of the time.

Direct Flood Risk to the Development

SEPA flood maps were accessed from the SEPA website, for the following sources of flooding: fluvial, pluvial, coastal, groundwater. The SEPA flood risk maps indicated that fluvial, pluvial, and coastal flooding were potential sources of flooding to the site. These maps are strategic level maps and are used to give an indication of the flood risk to a development, however, do not contain adequate detail to correctly map flood risk to planned sites or induvial properties.

As the Development Site is to be protected to a 0.5%AEP+ 59%CC event, in line with SEPA Vulnerability Land Use guidance; SEPA flood maps were analysed for the potential fluvial flood risk. The maps showed the largest fluvial flood risk follow the Allt Beaochlich, tributary to Loch Awe. However, the maps do not give an indication of flood risk from smaller watercourses in close proximity to the Development Site. The locations of the fluvial risk would pose a risk to the following development components: Tailpond inlet / outlet structure and the access route to the Headpond. There are existing structures along the access route including the B840, a gate house with associated building and infrastructure. During a flooding event that directly effects the Development, the above-mentioned receptors would have a moderate risk of flooding.

Direct Pluvial Flooding to the development

The potential pluvial flooding was assessed by SEPA flood maps, the maps showed a large high likelihood area around the Allt Beochlich along the A815, with further ponded areas of high likelihood of flooding along the A815 to Loch Awe. During construction, emphasis should be made to the potential of surface water flooding in these areas with appropriate mitigation measures to eliminate the risk of contaminated surface water released into the natural environment.

The nature of the Development will see an increase in steeply graded and semi-impermeable surfaces within the area, therefore it should be expected that an increase in run-off will be experienced. Leaving multiple receptors at risk of infrastructure flooding.

Direct Coastal/Tidal Flooding to the development

The SEPA flood maps show the level of coastal flooding is kept within the surrounding water environment and Loch Awe. An elevation assessment of the surrounding area and the Development Site showed the minimum elevation to be 35.5 mAOD. The surrounding water bodies and watercourses are additionally not tidally influenced.

Direct Groundwater flood risk to the development

There are no known records of groundwater flooding, and it is unlikely in this location due to the steep slope and freedom of drainage to Loch Awe. Additionally, the SEPA flood maps showed that there was no risk of groundwater flooding within the site.

The below ground infrastructure may be potentially affected by local groundwater flows to infrastructure within the Power Cavern and Tunnels. It is proposed that the pumped system will serve the below ground infrastructure to mitigate against groundwater flooding. However, during a failure event these pumping systems may be at risk to groundwater flooding. Suitable mitigation including regular monitoring must be put in place to minimise this source of flooding to the Development.

Sensitivity of Receptors

To enable a meaningful assessment of environmental impact to be made in accordance with the guidance in DMRB HD45/09 (Ref 19), the importance of flood risk receptors must be defined.

Offsite properties, residential and non-residential infrastructure would be vulnerable to any adverse change in flood risk and could be caused by the Development. This could result in financial loss and emotional distress to residents, and disruption to transport and services. SEPA guidance suggests that residential properties are classified as Category 2 – Highly Vulnerable Uses with regard to flood risk. The sensitivity of these receptors, including all property types, in reference to the criteria in this assessment, is therefore categorised as **High**.

Site workers, construction and permanent site workers may be sensitive to flood risk at the Development. During periods of severe weather, the usage of the site may be restricted, reducing the risk to workers. SEPA guidance indicated that the Development site is classified under Category 6 – Water Compatible Uses with regard to flood risk. Due to the balance of vulnerable users and the water compatible land use, the sensitivity of these receptors, in reference to the criteria in this assessment, is assessed to be **Low.**

The location of the construction equipment on-site and the use of the Development Site during operation may be necessary but changes to flood risk could cause damage to equipment and pollution incidents. However, equipment located in flood prone areas would be replaceable and is likely to be able to withstand some flooding. The sensitivity of these receptors is therefore assessed to be **Low**.

Loch Awe and the downstream of River Awe are sensitive to changes in water levels during prolonged periods of dry spells which could be altered by the Development. Loch Awe and the existing pumped hydro scheme, Cruachan, are of national importance and therefore its supply of water is essential for its operation. For operation to continue, provisions must be put in place for an environmental minimum flow down the River Awe and sustained Loch Awe water levels. Both waterbodies form part of the operational parameters of the wider catchment. The ability to work within and not compromise the ability of others to work within those operational parameters is therefore essential. The sensitivity of these receptors is therefore accessed to be **High**.

Table 12.3: Sensitivity of Flood Risk and Water Resource

Receptor	Features	Overall Safety
Offsite properties and infrastructure	Health and wellbeing implications of flooding, disruption, and financial cost.	High
Proposed site users	Health and safety	Low
Development infrastructure	Financial cost	Low
Loch Awe, River Awe, and operation of Loch Awe Barrage	Operation of Barrage and Loch Awe water level for the wider water environment	High

Climate Change

According to SEPA guidance Table 2 (Ref 20), rainfall intensity is projected to increase by up to 46% until 2080 due to climate change. The minimum lifetime of the Development is believed to be 100 years; the drainage infrastructure provisions but in place therefore must have an applied rainfall intensity of 46% to reduce the risk of surface water flooding over the developments lifetime. The mitigation measures within the Mitigation and Monitoring section are based on the levels within Loch Awe, with accurate modelling climate change parameters included. These estimates are based on UKCIP2018 which produces rainfall intensity data through a collaboration between DEFRA, the MET Office, and the Environment Agency.

SEPA guidance Table 1 (Ref 20) splits Scotland within twelve river basins to determine the peak river flow allowances for each river basin. As the site sits within Argyll and Bute, the Argyll River basin climate change uplift to the year 2100 was utilised within the fluvial modelling (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices))* with a value of 59%. This information is additionally based on the UKCIP2018 data to guarantee accuracy of the estimate.

12.7 Assessment of Effects

The following section will consider the impact of the construction, operation and decommissioning of the Development on the flood risk and water resource receptors as identified in *Table 12.3*, as appropriate.

Construction Effects

During construction these is potential increase in flooding due to:

- An increase in site runoff due to the increase of hardstanding area and compacted ground from site clearance, Access Tracks and Compounds;
- Interim water storage (in attenuation ponds and drainage systems); and
- Increased flows due to dewatering activities.

Temporary impermeable or compacted surfaces, such as those in the compounds, Access Tracks and as a result of pre-construction site clearance, could result in rapid surface water run-off to local watercourse via the surface water drainage system or increased overland flow. In line with the receptors identified within *Table 12.3*, the following effects are assessed below, in the absence of mitigation:

This is considered to of Low magnitude and considering the High sensitivity of offsite receptors; this results in a **Moderate adverse** effect.

The Low magnitude effect considered with the low sensitivity of proposed on-site users and Low sensitivity of the Development, result in a significance of effect of **Minor** and **Negligible** respectively.

It is anticipated that there will be no adverse effects on Water Resources during construction to any receptors identified in *Table 2.3*.

Operation Effects

The operational flood risks associated with the Development are discussed in detail in Flood Risk Assessment (FRA) (*Appendix 12.2-Flood Risk Assessment (Volume 5: Appendices))*. The following is a summary of the risk identified therein which are:

- Risk of flooding from the Headpond including risk of wave action and risk of overtopping;
- Risk of embankment breach;
- Risk of groundwater flooding to above & below ground infrastructure;
- Reduction in water levels in Loch Awe during normal and low water level conditions;
- Increased fluctuation of water level in Loch Awe;
- Increased flood risk downstream of Awe Barrage; and,
- Increased flood risk to the Development.

Discharge under Normal Operating Conditions

The Development will include a discharge to Loch Awe under normal operation, suitable operating parameters must be put in place to ensure the Development does not increase fluvial flood risk downstream from Loch Awe itself or River Awe.

Without appropriate mitigation the effect could be of a medium magnitude on a medium importance receptor, leading to a potential minor adverse effect. The magnitude would however result in an increase in fluvial flood risk, which would be contrary to the guidance set out by Argyll and Bute council in their supplementary guidance of the Flood Risk Management Policy and therefore have been considered further in mitigation and monitoring section.

Risk of Flooding from Headpond

The Development will include the creation of a Headpond, this will impound a substantial amount of water during operation of the Development. Therefore, there is a risk of flooding associated with this component of the Development. However, due to the high standard of design, management and maintenance required under the Reservoir (Scotland) Act 2011 and provided by any responsible operator, this is deemed as a very low risk. This will be in addition to the requirements set out within *Chapter 2: Project and Site Description* to guarantee the safety of the Development.

The headwater pond sitting at an elevation of 360 mAOD is out-with existing flood zone. The Headpond will be designed to accommodate extreme flood events beyond the 1 in 200-year event with climate change in line with the Reservoir (Scotland) Act 2011. This will include the influence of significant wave action due to high winds can damage and erode the Embankment, with potential overtopping of the Headpond.

Breach Analysis

An Embankment breach was considered as a potential operating effect, however as the Headpond will be regulated by the Reservoir Act, as mentioned above (*Risk of Flooding from Headpond*) an assessment of this within the Flood Risk Assessment (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices))* was deemed unnecessary.

Groundwater Flooding

The analysis within the FRA (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices))* demonstrates that there is no risk of groundwater flooding to the above ground infrastructure, from analysis of the SEPA flood risk maps and reporting from previous site visits. It additionally demonstrates that the design of below ground infrastructure will have to consider local groundwater flows on-site and elsewhere; consider groundwater flows into the Headpond; and ensure that groundwater inflow does not pose a risk to users of below ground areas. Details of the groundwater assessment can be found within *Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*.

Reduction in water levels in Loch Awe during normal and low water level conditions

Water will be extracted from Loch Awe to recharge the Headpond. A maximum operating volume of 53,400,000 m^3 of water will be pumped from Loch Awe through cyclical operations. This equates to a generation rate of 480 m^3/s over 30 hours and abstraction rate of 390 m^3/s over 38 hours, please see the Water Resource Assessment *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)*, for further details.

Analysis was undertaken corresponding to the normal and low water level in Loch Awe. The analysis of the worst-case scenario showed that the water levels would take up to 14.8 days to return to normal water levels following an isolated generation cycle. Water levels would take 18.8 days to return to normal water levels following a full isolated abstraction cycle from Loch Awe to the Headpond. The impacts are however likely to be shorter based on subsequent abstraction or generation cycle respectively.

For cyclical operation the results show that the Development alters the Loch Awe level by approximately 15 cm at its maximum. The level for the period outside of the Developments operation fluctuates by 5 cm from baseline, which is a minor effect.

Increased Fluctuation in Loch Awe water levels

The variability in Loch Awe was accessed over longer periods of time using daily level data within *Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)*. The variation of the loch levels was seen over several intervals (days) these were 2, 4, 7, 14 and 30. Fluctuations in levels of 20 cm are seen with approximately five hours of operation, this compares to a median fluctuation between two days in the recorded data of 6 cm. The daily variation of Loch Awe with 10 hours of operation is 40 cm, which is at the 98th percentile of 2-day variation. This assessment shows that Loch Awe water levels are sensitive to the operation of the Development.

As mentioned above, Loch Awe is sensitive to water levels. This is a cumulative impact as the environment of the Loch, specifically the aquatic ecology, is dependent on the level of the loch to migrate through the fish pass (lift) at the Awe Barrage, please refer to the *Chapter 7: Aquatic Ecology (Volume 2: Main Report)*.

Flood Risk to the Development

The HEC-RAS fluvial flood risk model built within the Flood Risk Assessment (FRA) assesses the flood risk to the Development to a higher refinement than the SEPA flood maps, described in *Section 12.6*. The model was based on the design event of 0.5%AEP+59%CC. This concluded the flood level at the main area within Loch Awe is 39.8 mAOD.

The potential receptors, annotated within *section 12.6.2 – Direct Flood Risk to the Development* were:

- The Tailpond inlet / outlet structure;
- Access route to the Headpond;
- B840 road; and,
- Gate house and associated building.

The top of the Tailpond inlet / outlet structure sits at an elevation of 38.6 mAOD, therefore this would be completely submerged during the design event. However, this is deemed as flooding compatible, so is not deemed as a flood risk. The B840 that runs on the perimeter of Loch Awe, has an elevation of 40.8 mAOD, with the associated gate houses and storage areas sitting at the same level. These are out with the flood plain within the model's first scenario.

As explained within *Section 12.6*, a sensitivity analysis was applied on the fluvial flood model within A*ppendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*. This increased the fluvial flood level, when increasing inflows by 20%, resulted in a peak level of 40.8 mAOD; decreasing the outflow capacity by reducing the gate dimensions resulted in a peak flooded water level of 40.2 mAOD. Therefore, there is an adequate freeboard for these receptors to the fluvial flood risk and this operational effect is deemed as low.

Increased Flood Risk Downstream

The fluvial flood risk downstream of the development at the Awe Barrage was assessed by the HEC-RAS fluvial model, developed for the Flood Risk Assessment (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*). The possible flooded areas downstream of the site are the road and rail infrastructure around Loch Awe, especially the A85 which runs through the Pass of Brander and the Taynuilt Potentially Vulnerable Area (PVA) downstream of River Awe. Increased flood levels in Loch Awe could also lead to increased flood flows in the River Awe. The operating regime of the barrage is not known below the gate opening level of 37.0 mAOD

The results of the flood risk model showed that if generation through the Development caused Loch Awe to rise to a level of 37.67 mAOD which corresponds to a 50% AEP rainfall event (1 in 2-year return period), which is the Developments proposed 'hands-off' limit to stop generation. If this level precedes a flood event, the resultant peak flood level downstream would be 40.0 mAOD.

To ensure that the Development does not create additional flood risk downstream an additional operating restriction is proposed. Where forecasted rainfall amounts for the next three days exceed 150mm (approximately equivalent to a 10% AEP event), the hands-off level will be reduced to 37.0 mAOD. The residual impact of additional flood risk is therefore negligible.

Decomissioning effects

Decommissioning of the Development is assumed to have similar activities to construction, potentially with additional crushing of some construction component materials and removal of drainage pipe networks containing residual water and sediment from the previous operating scheme. The attenuated water from the Headpond will be re-released back to Loch Awe in line with normal operation parameters. Decommission of the Headpond, including the design and completion of works, must be to the satisfaction of a suitable qualified reservoir engineer with certification of being discontinued under the Reservoir (Scotland) Act 2011. This will give confidence to the consideration that the Headpond has the ability to safely attenuate and convey flood flows is considered during the decision process.

The Headpond is impounding, regulating a river, however the scheme will pass flood flows and the Headpond catchment is not a significant area of the total Loch Awe catchment. Therefore the loss of storage will not have a flood risk downstream of the River Awe. Compliance to the Reservoir (Scotland) Act 2011 regulations will ensure that the short and temporary term impacts due to the decommissioning of the Development will be **Negligible**.

12.8 Cumulative Effects

Intra-relationship and inter-relationships cumulative effects have been considered as part of the Flood Risk Assessment (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*). and Water Resource Impact Assessment (*Appendix 12.1 Water Resources Assessment (Volume 5: Appendices)*); the results are described below.

12.8.1 Inter-Cumulative Effects

The inter-relationship cumulative effects have been assessed above that could have cumulative effects from the water bodies that will be affected by the Development, either during the periods of construction or operation. However, it is expected that if supplying the similar robust and rigorous approach to mitigating and monitoring as other developed schemes as this proposal, the potential for these significant adverse cumulative effects will be low.

The above assessment has considered the current operational arrangements for Loch Awe ensuring the need for minimum water levels and hence the pass forward environmental flows to the River Awe and operation of the Awe Barrage. It is assumed that all other developments must operate within these levels.

There is a historic existing dam that feeds into the Inverawe hydropower station, located roughly 5 km from the barrage. The Cruachan PSH scheme additionally utilises Loch Awe as its Tailpond, with its own abstraction/generating cycle.

There are another operational hydro power schemes utilising Loch Awe and River Awe. These are historic uses of River Awe and therefore form part of the baseline scenario.

12.8.2 Intra-Cumulative Effects

Intra-project cumulative effects due to components of the Development being undertaken synergistically have been analysed as part of the assessment above.

There is a potential for intra-relationship effects between the assessment of water levels through the flood risk, water resource and the water environment assessments.

Protected species and important and sensitive ecological receptors are expected to be within the watercourses across the site and surrounding areas, to pass through the fish lift (fish pass) at the Loch Awe Barrage, please refer to *Chapter 7: Aquatic Ecology (Volume 2: Main Report).* The chapter concludes that it is unknown at this stage at which levels the fish lift (fish pass) of the Loch Awe Barrage is no longer able to operate. Therefore, careful consideration must be made alongside monitoring to agree upon an operating regime water level to ensure the vitality of the aquatic ecology and water environment around Loch Awe.

12.9 Mitigation and Monitoring

During the construction phase of the project, a Construction Environmental Management Plan (CEMP) will be implemented. The CEMP includes the contents of an Environmental Response and Flood Risk Management Plan. These measures outlined within this document will be implemented to prevent any adverse effects to the previously identified receptors, for all three stages of the Development.

Any Sustainable urban Drainage Systems (SuDS) for surface water storage will be designed appropriately with the correct locations, type, size in line with the CIRCIA SuDS Manual C753 (Ref 21) to be concluded within the detailed design phase (as described within *Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*). As stated, these will be positioned correctly to store overland flow but additionally will consider the effect they may have on the downstream flood risk receptors or connectivity with other water resources to avoid impacts to shared receptors, reducing inter-cumulative effects. A Surface Water Management Strategy (SWMP) will be prepared providing these details, building on the requirements set out in the FRA (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*) and submitted to Argyll and Bute council for approval prior to construction.

An effect of operation is the potential of increased flood risk as a result of increased Loch Awe levels and downstream flows in the River Awe. This would be contrary to the guidance outlined within the Argyll and Bute Flood Risk Management Policy supplementary guidance. The comprehensive Flood Risk Assessment (*Appendix 12.2 Flood Risk Assessment (Volume 5: Appendices)*) undertaken assess the areas at risk from the Development, with a design event of 0.5%AEP+59%CC resulting in a flooded water level of 39. 8 mAOD. To mitigate flooding to the Development itself and downstream receptors, the proposed hands-off level for generation is 37.67 mAOD, which corresponds to a 50% AEP flood event. An additional operating regime will be applied to the Development with a hands-off level of 37.0 mAOD when forecasted rainfall amounts for 3 days subsequent exceed 150 mm (which is roughly equivalent to a 10% AEP event).

Abstraction of large quantities of water from Loch Awe during periods of low water levels can have a negative effect on the ability to maintain flow within the River Awe. The significant effect of abstraction, as mentioned above, needs to be mitigated against, therefore it is proposed that abstraction is limited based on a minimum water level in Loch Awe.

To ensure this mitigation procedure is in place, a monitoring arrangement and control procedures will be installed at the Tailpond inlet / outlet structure on Loch Awe to measure the water level, and if necessary, stop the abstraction of water if below the level limit, set out by the operation rules. The operation loch limit based on a set hands off level is to be set at a water level of 35.97 mAOD. This equates to the 95th percentile water level (a level which is exceeded 95% of the time).

The mitigating effect, the operation regime, additionally mitigates against the impact on fish passage at the Awe Barrage, the operating regime is based on the historical variation of Loch Awe, to allow for viability of fish passage. The fluctuation of Loch Awe, posed by the Development is within the existing operating parameters therefore, there should be a negligible effect of fish passage at the Awe Barrage.

Any operational discharges or abstractions required by the Development will be regulated by the CAR license, as supervised by SEPA. Therefore, the appropriate operational levels for either activity will be agreed and secured by this regulatory regime.

The implementation of the above-mentioned operation regime will ensure that the abstraction of water from Loch Awe will have a negligible impact on available water resource.

12.10 Residual Effects

The implementation of the mitigation measures is outlined within *section 12.90 Mitigation and Monitoring.*

Table 12.4: Summary of Effects: Construction

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Off-site properties – High	Flooding due to temporary increase in impermeable area and compacted ground. Temporary water storage and increased flow due to dewatering activities.	Low	Implementation of CEMP. Suitable design of Sustainable urban Drainage Systems.	Negligible	Not Significant
On-site users – Medium	Flooding due to temporary increase in impermeable area and compacted ground. Temporary water storage and increased flow due to dewatering activities.	Medium	Implementation of CEMP. Suitable design of Sustainable urban Drainage Systems. Diverting	Negligible	Not Significant
Development - Low	Flooding due to temporary increase in impermeable	Low	Implementation of CEMP.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	area and compacted ground. Temporary water storage and increased flow due to dewatering activities.		Suitable design of Sustainable urban Drainage Systems. Diverting		
Loch Awe, River Awe and operation of the Loch Awe Barrage	Flooding due to temporary increase in impermeable area and compacted ground. Temporary water storage and increased flow due to dewatering activities.	Negligible	Implementation of CEMP. Suitable design of Sustainable urban Drainage Systems. Diverting	Negligible	Not Significant

Table 12.5: Summary of Effects: Operation

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Loch Awe, River Awe, and operation of Awe Barrage- High	Increase flood levels in Loch Awe during flood conditions.	High	Implementation of operational parameters based on maximum level in Loch Awe for generation to reduce flood risk downstream.	Negligible	Not Significant
Offsite properties- High	Increase flood levels in Loch Awe during flood conditions.	High	Implementation of operational parameters based on maximum level in Loch Awe for generation to reduce flood risk downstream.	Negligible	Not Significant
Onsite Users- Low	Increase flood levels in Loch Awe during flood conditions.	Low	Implementation of operational parameters based on maximum level in Loch Awe for generation to reduce flood risk downstream.	Negligible	Not Significant
Development – Low	Increase flood levels in Loch Awe during flood conditions.	Medium	Implementation of operational parameters based on maximum level in Loch Awe for generation to reduce flood risk downstream.	Negligible	Not Significant
Loch Awe, River Awe and Awe Barrage operation- High	Fluctuation of water level within Loch Awe.	High	Implementation of operational parameters of hands-off high and low water levels resembling the existing range in loch levels.	Low	Not Significant
Offsite properties – High	Fluctuation of water level within Loch Awe	High	Implementation of operation parameters with a hand-off value of 37.65mAOD or 37.00mAOD if a flood event proceeds the generation to Loch Awe.	Low	Not Significant
Onsite Users- Low	Fluctuation of water level within Loch Awe	Low	Implementation of operation parameters with a hand-off value of 37.65mAOD or 37.00mAOD if a flood event proceeds the generation to Loch Awe.	Negligible	Not Significant
Development- Low	Fluctuation of water level within Loch Awe	Low	Implementation of operation parameters with a hand-off value of 37.65mAOD or 37.00mAOD if a flood event proceeds the generation to Loch Awe.	Low	Not Significant
Offsite properties – High	Risk of flooding from Headpond	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant
Onsite Users – Low	Risk of flooding from the Headpond	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant
Development- Low	Risk of flooding from the Headpond	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant
Loch Awe, River Awe and Awe Barrage – High	Risk of flooding from Headpond	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant
Offsite properties – High	Embankment Breach	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Onsite Users – Low	Embankment Breach	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant
Development – Low	Embankment Breach	Negligible	Headpond regulated by the reservoir Act	Negligible	Not Significant
Loch Awe and River Awe water level – High	Reduction in water levels in Loch Awe during low flows	High	Implementation of operational parameters based on minimum level in Loch Awe for abstraction	Low	Not Significant
Offsite properties- High	Reduction in water levels in Loch Awe during low flows	Negligible	Implementation of operational parameters based on minimum level in Loch Awe for abstraction	Negligible	Not significant
Onsite Users- Low	Reduction in water levels in Loch Awe during low flows	Negligible	Implementation of operational parameters based on minimum level in Loch Awe for abstraction	Negligible	Not significant
Development - Low	Reduction in water levels in Loch Awe during low flows	Low	Implementation of operational parameters based on minimum level in Loch Awe for abstraction	Low	Not significant

Table 12-6: Summary of Effects: Decommission

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Loch Awe and River Awe water levels – High	Crushing of development materials and components that may hold residual water (i.e. drainage pipes etc.)	Negligible	These will be designed to be deconstructed by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Offsite properties – High	Crushing of development materials and components that may hold residual water (i.e. drainage pipes etc.)	Negligible	These will be designed to be deconstructed by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Onsite Users – Low	Crushing of development materials and components that may hold residual water (i.e. drainage pipes etc.)	Low	These will be designed to be deconstructed by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Development – Low	Crushing of development materials and components that may hold residual water (i.e. drainage pipes etc.)	Negligible	These will be designed to be deconstructed by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Loch Awe and River Awe water levels – High	Transporting of attenuated water within Headpond to Loch Awe	Low	This will be designed with the completed works supervised by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Offsite properties – High	Transporting of attenuated water within Headpond to Loch Awe	Negligible	This will be designed with the completed works supervised by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Onsite Users – Low	Transporting of attenuated water within Headpond to Loch Awe	Negligible	This will be designed with the completed works supervised by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant
Development – Low	Transporting of attenuated water within Headpond to Loch Awe	Negligible	This will be designed with the completed works supervised by a qualified professional reservoir engineer under the Reservoir Act.	Negligible	Not Significant

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