

Technical Clarification on Flood Risk

Dear The Highland Council,

Electricity Act 1989

Town and Country Planning (Scotland) Act 1997

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

Glen Earrach Energy Pumped Storage Hydro (PSH) Project

Technical Clarification THC Flood Risk Management Team – October 2025

ECU Ref: ECU00005121

The Highland Council (THC) Planning Case Officer received internal consultation responses from the THC Flood Risk Management Team on 3 June 2025 and 19 August 2025. The initial response noted no objection to the application subject to conditions. The latter response included a holding objection pending submission of additional information relating to flood risk and the proposed upgrade to Dochfour Weir.

This document provides technical clarification responses to each comment raised.

Response 1: 3 June 2025 (no objection)**THC Comment 1 - Flood Risk:**

The EIAR's flood risk assessment (Chapters 10 and 11) is satisfactory, with mitigation to manage flood risk. The scheme will operate within set Loch Ness water levels, ceasing generation during high levels to avoid downstream flooding.

A condition is requested to consult THC on the final "stop generating" level under SEPA's Controlled Activities Regulations (CAR) to ensure no increased flood risk.

Applicant Clarification:

The Applicant is committed to ongoing consultation with THC on this matter and confirms the submission of a CAR licence application to SEPA, which will include compliance with required stop generating limits.

THC Comment 2 – Dochfour Weir Upgrade:

Upgrades to Dochfour Weir (separate application) require a site-specific Flood Risk Assessment (FRA) to confirm no impact on flood risk, including operating and maintenance details.

Applicant Clarification:

The Applicant can confirm that the Dochfour Weir works are subject to a separate planning application. The Applicant has proposed that this be brought forward by Scottish Canals and is working with Scottish Canals as owners of the Dochfour Weir to deliver a separate planning application on this basis. The Applicant agrees that this will therefore require a separate flood risk assessment, including the referenced operating and maintenance details, to support that application.

THC Comment 3 – Watercourse Crossings:

New/upgraded watercourse crossings must convey a 1-in-200-year plus climate change flood event without impeding flows. A condition is requested for THC to review final crossing designs.

Applicant Clarification:

The Applicant is aware of this requirement, with detailed design of crossings to be undertaken prior to commencement of construction and submitted to THC for review and approval. It is anticipated that this will be secured by a planning condition. It is noted that a separate CAR licence application will be required to SEPA for new/upgraded watercourse crossings, unless they fall within the General Binding Rules for CAR.

THC Comment 4 – Drainage:

Sustainable Urban Drainage Systems (SUDS) are required for new hardstanding areas. A condition is requested to review final drainage designs as per THC's Supplementary Guidance.

Applicant Clarification:

The Applicant is aware of this requirement, with detailed design of final SUDS to be undertaken prior to commencement of construction and submitted to THC for review and approval. It is anticipated that this will be secured by a planning condition of consent.

Response 2: 19 August 2025 (Objection)

The Flood Risk Management Team has reviewed the information provided by the Applicant and have raised an objection to the application due to the lack of information on flood risk as follows:

THC Comment 1:

We commented on the application previously (response dated 03/06/2025) and stated that: *It is noted that the EIA includes details of proposals to upgrade the Dochfour Weir. This is to provide additional mitigation to manage water levels in Loch Ness during the operation of proposed Pumped Storage Hydro Schemes around the Loch. These works are not part of this application. For avoidance of doubt, at this stage we do not accept these proposals. Any future application for changes to the weir will need to be supported by a site-specific Flood Risk Assessment that demonstrates that the proposals will have no impact on flood risk to others. This will need to include details of the proposed operating procedures along with details of the party responsible for maintenance and operation of the structure.*

Applicant Clarification:

The Applicant provided technical clarification regarding the above point in an email of 27 August 2025 to the Planning Case Officer. The clarification is repeated here for clarity and completeness.

Following on from the workshop held by THC on 28 July 2025, it is important to note that the concept of a variable weir at Dochfour is proposed as mitigation within the Glen Earrach PSH application. However, it is important to draw a distinction here: the merits of the weir and how it would be designed to function during flood events (including a full flood risk assessment), together with forms of redundancy, would be for consideration once that separate application is made by Scottish Canals and is being assessed.

The Applicant considers that THC's August response addresses matters that are properly within the scope of the separate weir application, rather than the concept of a variable weir being in place as mitigation, which is what is being proposed as part of the current Glen Earrach PSH application.

At this stage, therefore, the mitigation provided by a variable Dochfour Weir is included within the current application, whilst the Weir itself (including its detailed design, operation, and flood risk assessment) will have its own separate application and assessment process.

Proposed Planning Conditions:

Following the workshop held on 28 July 2025, the matter of securing the commitment to construct the variable weir prior to operation of the Glen Earrach PSH scheme was discussed. THC suggested the use of either a Section 75 agreement or a Planning Condition to achieve this. Following review and legal advice, the Applicant considers a Planning Condition is the most appropriate route to securing this requirement and proposes wording in the following form:

- There shall be no commencement of the Development unless and until planning permission for works to upgrade the Dochfour Weir (based on Appendix 2.1 Dochfour Weir Upgrade Description of the EIA Report) shall have been granted.
- Prior to first commercial operation of the Development, the works to upgrade the Dochfour Weir shall have been constructed in accordance with the planning permission granted in respect of the works to upgrade the Dochfour Weir.

THC Comment 2:

The Energy Consents Unit has requested that comments include the proposed works on the Weir as this is considered an integral part of the design. The following comments relate to the Dochfour Weir proposal and should be read in conjunction with our previous comments (response dated 03/06/2025) which relate to the other aspects of the application.

Applicant Clarification:

The ECU has requested that the mitigation proposals related to works at the Dochfour Weir be included in the assessment, i.e. the hydrological modelling of the scheme should be based on the inclusion of the variable weir. The request from the ECU is not to include the works at the Dochfour Weir as part of the Proposed Development itself; there will be a separate application for this. The Applicant has proposed that this be brought forward by Scottish Canals and is working with Scottish Canals as owners of the Dochfour Weir to deliver a separate planning application on this basis.

In addition, for clarity, while the detailed design and construction of the Dochfour Weir upgrade will form part of a separate planning application, the operational behaviour of the proposed variable weir has been fully represented within the hydrological and water balance modelling submitted with the Glen Earrach PSH application.

This modelling enables assessment of the scheme's mitigation performance and its interaction with Loch Ness water levels and River Ness flows, ensuring that the effects of the weir, insofar as they influence the PSH operation, have been properly considered within the present application.

THC Comment 3:

The EIA (Appendix 11.1: Water Resource Assessment) considers the impact of the proposed Weir on water levels in Loch Ness and on pass forwards flows to the River Ness. The design objective is to ensure that the fluctuating levels in Loch Ness do not impact adversely on flows in the River Ness. The impact was assessed by running a simulation of 10 years of gauge data that includes relatively high level/flows in 2014. Data in the report shows that this results in a decrease in the maximum water level of Loch Ness (for all scenarios). It is assumed that the peak is the event of 2014. The reason for the decrease is not clear and we seek comment on this. The impact on peak flow in the River Ness has not been presented. The modelling should be updated to include a range of flood events to help better understand the impact of the structure on loch levels and River Ness flows during such events. This should include a range of return periods up to and including a 1 in 200 year plus climate change event.

Applicant Clarification:

1. Reason for the decrease in simulated Loch Ness peak level

- The apparent reduction in the modelled maximum Loch Ness level results from the operational rule that halts generation once the "hands-off" threshold is reached. Generation

ceases at a River Ness flow of 600 m³/s, corresponding to 17.44 mAOD on Loch Ness, ensuring that no additional water is added to the loch at high flows.

- Pumping to the headpond can continue during these periods when storage and market conditions permit, thereby removing water from Loch Ness. This produces a small, temporary reduction in loch level during flood events.
- This effect occurred naturally within the 10-year simulation, as several flooding events coincided with active pumping cycles, explaining why the model outputs show a minor decrease in maximum water level.

2. Impact on River Ness peak flows

- The operational rules for the scheme include a hands-off threshold as mentioned above. At, or before, this level, generation stops, so no additional water is released to the River Ness.
- This threshold corresponds to the maximum flow that the River Ness can safely convey without overtopping its defended banks, as established through the River Ness Flood Protection Scheme.
- By curtailing generation before this limit is reached, the scheme ensures no increase in the peak flows or frequency of flood events affecting receptors, thereby maintaining the existing standard of flood protection.

3. Flood-event scope and control approach

- The operational control is defined by this hands-off flow limit, which is the relevant determinant of flood safety even for events beyond the statistical 1 in 200 year range.
- Curtailment of generation prior to the threshold automatically prevents any contribution to extreme flood peaks, ensuring that operation of the scheme does not increase flood risk to receptors on Loch Ness or the River Ness.

THC Comment 4:

It is stated that the weir will operate seasonally and not be in use during the winter months. The proposed operating rules for the weir (EIA Appendix 2.1: Dochfour Weir Upgrade Description) are such that: 'The variable weir operation would be restricted in winter months, recognising the need to maintain flood resilience, with the maximum operating point being set such that it is possible to lower the weir to the current Ness Weir sill level with notice of possible flood without causing excessive flow in River Ness while doing so'. This implies that the weir will have to be operated in the winter months based on weather warnings/flood forecasts. The modelling should include winter scenarios and consider worst case scenarios where warnings are not issued/received in time to draw down the loch.

Applicant Clarification:

1. Seasonal operation and winter position

The proposed variable-crest weir will operate only during the summer months. During winter, when larger flood events are most likely, the crest remains fully lowered and aligned with the existing Dochfour Weir level. The stop-generating threshold of 17.44 mAOD on Loch Ness (equivalent to 600 m³/s in the River Ness) applies year-round, ensuring the scheme does not elevate flood levels.

Winter flood risk therefore remains unchanged from the current baseline condition.

2. Summer operation and flood compatibility

In summer, the variable weir operates dynamically to maintain near-natural downstream flows: raising slightly during generation (when water is released) and lowering during pumping (when water is abstracted).

Telemetry linked to all participating PSH schemes ensures that River Ness flows remain stable, with summer flow ranges well within channel capacity. The operational logic prevents any increase in flood risk even under short-term high-flow conditions.

3. Fail-safe and operational resilience

The detailed design of the variable weir will be developed and submitted under a separate planning application, which will include full engineering drawings, specifications, and operational protocols for review by the relevant authorities.

The weir will be designed to follow an intrinsically safe approach, ensuring that the structure remains in a safe configuration under all foreseeable conditions, including loss of power or control.

However, for information, the Applicant can advise the following at this stage:

- The concept design envisages multiple independently controlled panels, each with its own actuation and control system to avoid any single point of failure.
- A hydraulic (water-based) control system is proposed, which does not depend on continuous external power to hold the gates in a safe position.
- In the event of a power loss, control would be maintained through DC or battery-backed systems, and the gates could be lowered using their own hydraulic force. A local manual override would also be provided for on-site operation.
- The existing fixed weir and SSE sluices would be retained within the integrated arrangement, ensuring continuity of the established flood management regime and operational resilience.

4. Future potential

It is, however, recognised that, subject to further technical work and agreement with THC, SEPA, and other stakeholders, there may in future be opportunities to use the Dochfour Weir upgrade for a limited level of active winter flow management, potentially providing wider system benefits. This would require separate assessment and consent. The current application does not include any such operation as the environmental impact assessment carried out did not identify this as a required mitigation. The present design and proposals ensure that the works will not increase flood risk on Loch Ness or downstream on the River Ness.

THC Comment 5:

It is stated that a 'water management board would be established involving key stakeholders of Loch Ness, with the responsibility to oversee the control approach adopted, taking account of the flow data received from each of the PSH schemes on Loch Ness'. It is assumed that the board will have input into the operating rules for the weir, but it is not clear which body/organisation will be responsible for the day to operation and have ownership and inspection and maintenance responsibilities. This will need to be clarified.

Applicant Clarification:

The proposed water management board referenced in the EIA would act as a coordination and oversight mechanism among the various pumped storage operators on Loch Ness, SEPA, and The Highland Council. Its purpose would be to facilitate consistent and transparent data sharing and operational alignment across schemes, ensuring that cumulative activities maintain agreed flow thresholds and environmental safeguards.

However, the Applicant would anticipate that this body would not be a statutory operator and would not assume direct responsibility for the day-to-day operation, inspection, or maintenance of the Dochfour Weir upgrade.

GEE has proposed an approach whereby ownership, inspection, and maintenance responsibilities for the variable weir structure would rest with Scottish Canals as an appropriate public body, in accordance with the Reservoirs (Scotland) Act 2011 and standard engineering governance requirements.

The detailed design, including operational protocols, inspection arrangements, and maintenance procedures, will be developed and submitted under a separate planning application for the weir works. At that stage, the roles of the statutory undertaker, inspecting engineers, and coordination arrangements with other Loch Ness operators will be set out in full and agreed with SEPA and THC.